

# Chinese Alchemy

*Preliminary Studies*

**Nathan Sivin**

**HARVARD MONOGRAPHS IN THE HISTORY OF SCIENCE**



Harvard University Press

# Chinese Alchemy: Preliminary Studies

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IN THE HISTORY OF SCIENCE



Chinese Alchemy:  
Preliminary Studies

NATHAN SIVIN

HARVARD UNIVERSITY PRESS

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1968

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席文文之著  
伏煉試探

洪業著  


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*To*  
*Ho Ping-Yü*

何丙郁先生

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千里馬常有而伯樂不常有

**It's not that fast horses are rare,  
but men who know enough to spot them  
are few and far between.**

— Han Yü



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## FOREWORD

THE DECADES since World War II have witnessed the rise of the history of science as an academic subject, taking its place in the curricula of our colleges, institutes of technology, and universities. At the same time there has been an enormous enlargement of that company of scholars who write on one or another aspect of the history of science but whose primary professional allegiance does not have its locus in the history of science—among them scientists, philosophers, historians, sociologists, and science teachers. As a consequence, the responsibilities for publication in this field have become so much greater that new ways of disseminating the results of research must be envisioned. Soon after the formal creation of a regular Department of the History of Science at Harvard University in the spring of 1966,\* therefore, the group of faculty members who had major or full-time commitments to the history of science decided to constitute themselves a committee † to edit and publish (through Harvard University Press) a series of book-length publications to be known as the Harvard Monographs in the History of Science.

It is the hope of the editors that the Harvard Monographs in the History of Science may embrace the many varieties of scholarly work now being pursued in this field. Thus, one result of our activities should be to disclose the essential unity of common aims in such apparently dissimilar topics as: the ancient exact sciences or alchemy in China and the growth of

\* A program leading to the degrees of M.A. and Ph.D. had been in active existence for some thirty years under a Committee on Higher Degrees in the History of Science and Learning.

† Consisting of I. Bernard Cohen (chairman), Donald H. Fleming, Gerald Holton, Ernst Mayr, Everett Mendelsohn, John E. Murdoch.



## Foreword

concepts in modern physiology; the Chemical Revolution of the eighteenth century and the history of the concept of force; the changing role of science as a social institution and the development of the main ideas of genetics; or the philosophic background of scientific concepts and the design, manufacture, and use of antique or modern scientific instruments. The defining quality of all such works derives from a commonality of method: the applications of historical inquiry to the hard subject matter of science or its social and intellectual environment. If the history of science is in fact a discipline, and not merely a collection of unrelated specialties, it stands apart from other types of intellectual or social history in the control that comes from the very scientific concepts, methods, theories, techniques, observations, and experiments on which valid history of science must always be founded.

The historian of science must ask questions about truth or falsity that other kinds of historians need not concern themselves with. Not only must he be familiar with simple matters of scientific information, such as how heavy bodies actually do fall in resisting mediums, or whether certain animals do or do not exhibit particular traits, or whether a given equation can or cannot be solved in a finite number of terms. Eventually he must be able to know the solutions to more difficult problems: such as whether a given scientific theory is or is not adequate to deal with a given set of phenomena or data, perhaps being able to make precise just where the limits of such adequacy may lie. While, of course, the historical role of a set of scientific concepts, scientific methods, or scientific theories is independent of their present use, the historian of science knows well that to understand fully the science of the past he must command much of the science of the present. How different this is from the arts! It has not been demonstrated that Joyce's *Ulysses* helps us to have a better sense of Homer; but no one doubts that an ignorance of Newtonian dynamics gravely restricts the degree of critical understanding of the science of

## Foreword

Nicole Oresme and his contemporaries, or of Galileo and Huygens.

The editors hope that this new series of monographs will be of use to all scholars who are concerned with historical problems, and also to practicing scientists. Many of the current controversies in almost any branch of science cannot be understood fully without a knowledge of the antecedent concepts and theories. Even the actual phrases used in presenting arguments may prove, in historical analysis, to have been interpreted incorrectly, or in a misleading fashion. Hence it can be of practical importance to trace back the main concepts of our present science to the original sources. Additionally, the maximum depth of understanding of any aspect of the interrelations of science requires a historical perspective.

The first book in this series shows many of the features that define the history of science as a discipline. For Dr. Nathan Sivin has called upon a knowledge of chemistry (even to the point of making special experiments) to reinforce his background in history, in Sinology, in alchemy, and in the history of science in general. Only thus has he been able to master the subject matter of alchemy in seventh-century China and to relate it to the main problems of the comparative study of the forms the study of matter has taken in different cultures. While the importance of understanding Chinese culture in all its manifestations surely needs no underlining at the present time, the major contribution of Dr. Sivin's book may very well be to show other historians of science—and also scientists, Sinologists, and general historians—how a combination of library and laboratory methods of research gives new depth and perspective to a little-known subject. The unique character of Dr. Sivin's book comes from the fact that he is neither a Sinologist nor a chemist, but rather a historian of science who is trained both in Sinology and in chemistry—first and foremost he is a historian of science.

Some particularly significant features of Dr. Sivin's book

## Foreword

have been admirably summarized by Professor Willy Hartner of the University of Frankfurt (in a letter to me) as follows:

The extraordinary importance of alchemical and astrological literature for the understanding of that strange mixture of empiricism, rationalism, and magic belief which, two millennia ago, simultaneously conquered human thought from the Far East to the extreme West of the inhabited world, is beyond doubt. It might seem astonishing, therefore, that only few Sinologists have so far made serious efforts to get acquainted with the available texts and substitute factual knowledge for unfounded theories and creeds. However, the reasons for this omission are obvious. It is much easier to force a phenomenon, of which only a few traits have become recognizable, into a strait jacket of some preconceived theory of history than to take the trouble of untwisting the tangle it presents. Also, penetrating into the secrets of a Chinese alchemical text requires, apart from a thorough linguistic and historical training and a more than superficial familiarity with the philosophical and religious currents, a considerable experience in modern chemistry combined with a certain intuition to hit upon that one out of several possible interpretations which agrees best with the process described. Few are qualified for such a task.

In the early 1930's, owing to the keen interest which a distinguished scientist, the late Professor Tenney L. Davis of MIT, was taking in the subject, Cambridge, Massachusetts, had become a center of Chinese alchemical studies. A number of important investigations were carried out by Professor Davis and by his Chinese collaborators, and some interesting papers (above all Lu-Ch'iang Wu's translation of two chapters of Pao-P'u-tzu, ably prefaced by Davis) marked a really promising start. Alas, this fruitful period did not last long.

Now, after an interruption of more than twenty years, it may be stated with the greatest satisfaction that the Cambridge tradition has been revived by a young scholar, whose first publication in the field bears witness to a perfect mastery of his subject and marks a milestone in the history of Chinese alchemy. Professor Nathan Sivin, whose educational roots lie in Harvard as well as in MIT, is a chemist by training and a historian of science by profession, who has at the same time a deep insight into the intricate ways of Far Eastern thought. Because of his unusual facility in reading classical Chinese (he speaks and writes modern Chinese as well), he seems predestined to approach and to solve problems the difficulties of which would deter most of his contemporaries.

## Foreword

Sun Ssu-mo's *Tan Ching Yao Chüeh* is, to the best of my knowledge, one of the few treatises fit for serving as a starting point for further investigations. Though the text—especially those passages which seem perfectly clear at first sight—offers great difficulties, it proves not so esoteric that any attempt to unravel its meaning might appear vain.

The edition of the Chinese text is done with great care and testifies to Sivin's excellent philological erudition. The same impression is gained from reading the translation with its rich and extremely valuable annotations. Here I insist in particular on the skill with which the author chooses between the various possibilities of rendering translatable technical terms in English or of leaving them untranslated whenever a simple English equivalent seems susceptible of causing misunderstanding. The notes offer a wealth of important information, as he displays perfect familiarity with the Chinese traditional literature, the philosophical currents, and the intricacies of Chinese grammar.

No other work on Chinese alchemy lays as firm a foundation for further studies as this book. I am happy that its publication by Harvard University Press inaugurates the new series of Harvard Monographs in the History of Science. I have no doubt that new and no less important publications will follow, attesting the fact that Cambridge again has become a center of alchemical studies.

It is not planned to limit this series to any one kind of monograph. Studies will be welcomed which may deal with the achievements of particular individuals, the growth of one or more specific concepts, or aspects of the development of science in general, the study of science in a particular period or region, and even annotated critical editions of texts. While it is hoped that Harvard authors will provide the series with many outstanding books, the editors have designed the series to include publications from scholars both in America and in foreign lands.\*

I. Bernard Cohen

Trastevere, Rome  
November 1967

\* The editors would be happy to consider not only completed original manuscripts, but also proposals of works in progress (or even works being contemplated) for inclusion in the series.



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## PREFACE

THIS book is not history; it consists merely of examples of three of the preliminary stages of historical investigation. The conduct of these three stages seldom has had to be delineated in such detail. My motive in doing so is to demonstrate that an insistence upon craft, and upon what rigor the historian commands, is as indispensable to comprehension of alchemy and the other arcane sciences of China as it is to reconstruction of the established classical disciplines. Such pioneers as Obed Simon Johnson, Tenney Davis, Ts'ao Yuan-yü 曹元宇, and Ch'en Kuo-fu 陳國符 have staked out the land; if we are to render it fruitful our standards must be high.

My fundamental concern is with the history of ideas. This study is not devoted to ideas because when it was written I did not yet understand alchemical theory well enough, and did not feel free to assault the reader with speculations which ultimately may well have to be disavowed. I do not, in any case, contemplate writing about matters of method in such detail again. I feel impelled to do so once in the hope that such a study, however imperfect itself, will contribute to the establishment of high standards of investigation in the field of Chinese scientific thought by furnishing examples of how the critical tools of the classical sinologist can be gainfully applied in a systematic way.

This monograph is the first of a series of studies which will elucidate the nature and history of "external" (that is, operative) alchemy 外丹, its chemical aspects, its relation to "internal" (that is, physiological) alchemy 內丹 and other Taoist disciplines, and its connections with medicine. The general strategy is to begin with groups of cognate, datable texts in order to develop criteria for the historical treatment of

## Preface

anonymous and pseudonymous books which cannot be dated by internal evidence; and to proceed from texts which deal with clearly defined laboratory operations to theoretical works which were meant to be understood only by advanced adepts. *Tan ching yao chueh* 丹經要訣 (Essential formulas for oral transmission from the alchemical classics), attributed to Sun Ssu-mo (alive 673), is a collection of formulas for the preparation of elixirs of immortality and a few miscellaneous substances. It is exceptional in that its period can be determined; in that it deals with substances and operations which, with very few exceptions, can be conclusively identified; in that it is provably cognate with other equally accessible texts – and, most important, because it offers a glimpse into the mind and psyche of one of the world's great alchemists.

Even as a first step, this investigation of *Tan ching yao chueh* and its putative author is necessarily incomplete.

My original plan contemplated an elucidation of the chemistry reflected in the work, and a chapter of general conclusions. Pressure of time made necessary a postponement of the chemical portion, for most of the formulas are so complex that usually one can confidently discuss the reactions involved only after repeating the preparations. I am most grateful to the Department of Chemistry, University of Singapore, for their generosity in making laboratory facilities available for exploratory experiments. These first results are reported in Chapter IV. There is no prospect, however, of continuing this fascinating but time-consuming work in the immediate future, for I am convinced, for reasons outlined in Chapter I, that the chemical identities of the alchemist's products are only marginally relevant to the reconstruction of the theoretical bases of alchemy, to which I have chosen to give priority. I hope, of course, that those whose main interests lie in other directions will find it worth while to study the processes described in *Tan ching yao chueh*, and to carry them out in the controlled conditions of the modern laboratory. I have done everything I

## Preface

could to make the formulas accessible to the experimenter.

Until the practical chemistry of *Tan ching yao chueh* is fully reconstructed, and until our almost complete ignorance of its theoretical background has been somewhat relieved by a critical study and imaginative synthesis of the whole extant literature of alchemy, I consider it premature to essay an overall assessment of the book. While I feel somewhat reluctant to publish this translation without such an assessment, there is a great and constantly growing need for trustworthy renderings of classical Chinese scientific documents. Wishing to help relieve that need, I must ask the reader's pardon for indulging my conviction that Sun Ssu-mo is capable of speaking for himself far better, in the long run, than I could speak for him.

I have attempted in Chapter II to sketch lightly the place of *Tan ching yao chueh* in the alchemical tradition. The concerns we find reflected in that tradition form a continuum, with a highly theoretical attempt to build a chemical model of cosmic process at one end, and a predominantly pragmatic search for elixirs of immortality at the other. It is to this latter technological trend rather than to the scientific tendency that *Tan ching yao chueh* belongs. In the same chapter I have also considered seriously the possibility of false ascription, a practice common in traditional Chinese literature and particularly prevalent in Taoist writings. The issue remains in doubt, but I have shown where the real difficulties lie. In Chapter III, I have taken Sun's "official" biographies, typical of the accounts of important Taoists and other unconventional figures in the two Standard Histories of his period, and subjected their every assertion to close scrutiny. The Histories, compiled shortly after the end of the T'ang period under the imperial sponsorship of its successors, are fundamental sources for the lives and careers of more orthodox individuals. Although in the past they have been treated as reliable sources for the biographies of alchemists, I have demonstrated for a representative case that they



## Preface

are completely without value (except, of course, to ethnographers, hagiographers, and students of early fiction) unless the most stringent precautions are taken. This is the point of Chapter III, for it is in the nature of the materials that an exhaustive conventional biography of Sun Ssu-mo would be of small relevance to the history of alchemy. I have, however, gathered a few of the most interesting documents, those which have to do with his health, in Appendix A, and have provided a chronological table in Appendix E. The other appendixes, including a list of published translations of alchemical treatises and a bibliographic essay on the identification of chemical substances and medical disorders in ancient literature, are intended to facilitate further research. Much of the material of Appendix A appeared as "A Seventh-Century Chinese Medical Case History," *Bulletin of the History of Medicine*, 1967, 41:267-273, and is used by permission of the editors.

I am constantly aware of the immeasurable debt I owe my many teachers, colleagues, and friends, whose commitments to the guiding power of curiosity and the will to understand have taught me to indulge my own. I will not pretend that this debt can be discharged by listing their names.

I must, however, record the series of events which led up to my choice of *Tan ching yao chueh* as a first object of investigation. In 1961, through the great kindness of J. R. Ware, I was able to add to my library a collection of the papers of Tenney Davis, late Professor of Chemistry at Massachusetts Institute of Technology, patron of and participant in many of the first serious investigations of Chinese alchemy. Among these papers were a number of unpublished manuscripts by Davis and his Chinese collaborators. One was a translation of *Tan ching yao chueh* and of part of one of Sun Ssu-mo's biographies. It had been prepared by Ch'en Kuo-fu and submitted to the *Harvard Journal of Asiatic Studies* on his behalf by Davis in 1942, but was never published. It was clear from Ch'en's rendering that the treatise was fundamental, and that

## Preface

its chemical content was phrased in language clear enough that, with application, almost all the substances involved could be identified. I also learned from Ho Peng-yoke (Ping-yü), who shortly was to become my master and initiator in early Chinese chemistry, that *Tan ching yao chueh* was related to a compilation which he had just translated himself, and would thus be ideal as a focus for my work under his guidance in Singapore. Although I found it advisable to lay the Ch'en manuscripts aside and translate the treatise and biographies afresh, my version has benefited greatly from the opportunity to compare it with the work of another mind. Ch'en has since become a great authority on the transmission of Taoist literature. It is very satisfying to be instrumental in realizing his wish to make the *Tan ching yao chueh* accessible to readers the world over.

I must particularly note the generous guidance of Willy Hartner and Yang Lien-sheng concerning the portion of the book which, in an earlier recension, was my doctoral dissertation at Harvard. I also wish to acknowledge the great benefit I have derived from the unfailing sagacity and benevolence of I. Bernard Cohen, Chairman of the Editorial Board of this series, over our years of association. Finally, for whatever relevance my book may prove to have to the deepest and most authentic questions of the history of science, the credit is due to my earliest and most constant teacher, Giorgio de Santilana. I only wish that I could offer him, for his sixty-fifth birthday, a book less burdened with trivialities.

I am grateful to the Inter-University Fellowship Program, to the National Institutes of Health, to Harvard University, and to the Department of Humanities, Massachusetts Institute of Technology, for financial support, to Mme. Hélène Kane for her indefatigable labors during the preparation of the final manuscript, and to Mrs. Ruth Dubois for countless patient feats of administration. I acknowledge with pleasure the Chinese title in the hand of William Hung, and the calligraphy of Mrs. Daisy H. Tao throughout the book. Margaretta Fulton,

## Preface

Ann Louise McLaughlin, and David Ford, of Harvard University Press, deserve great credit for their patience and skill in transmuting my manuscript into a book.

N. Sivin

Kyoto, Japan  
March 1968

### NOTES ON CONVENTIONS

1. This book uses the standard Wade-Giles system of romanization. I omit, as do most contemporary writers, certain useless diacritics.

2. Since in ancient sources many events are dated only by the reign period in which they fell, they can be located only within a period of several years. Dates of this kind are indicated by a slant line. For example, "712/724" means "at some time in the period 712–724."

3. There are certain words in Chinese natural philosophy whose functions are so basic, and whose meanings have been so enriched by two or more millennia of use in an unbroken tradition, that it would take many English equivalents to render accurately the technical senses of each in various contexts. The most important of these words, "*ch'i* 氣," occurs often in the sources of this study. It stands for a conception similar in breadth to the Stoic *pneuma*. On one level it names the air we breathe, the subtle material breath of life. In cosmology it is used for a terrestrial effluence through which the planets move. In chemistry it can refer to an aroma, to fumes, to smoke, or to the activity of a reagent. In medicine the homeostatic force within the body is a *ch'i*; so is any pathological agent which disturbs the balance; so, for that matter, is abdominal gas. That all of these are to us fundamentally different meanings is a statement not simply about the Chinese language, but about the mapping of Chinese upon English. In translating, therefore, one must choose between carrying over the larger concept or the particular sense. For instance, the mechanical rendering of

## Preface

"*ch'i*" as "energy" by some European writers on acupuncture, far from making the traditional theory more intelligible to contemporary readers, reduces it to nonsense. I prefer in almost every case merely to transliterate the word—to signal its presence, so to speak—and then to provide in parentheses an English equivalent which brings out the sense of the statement. The total conception, nonetheless, is always there. When an author specifies that the alchemical reaction vessel be tightly luted so that the *ch'i* of the volatile ingredients may not escape, one naturally chooses "vapors" as the equivalent which makes his intention clearest; but one loses the implication unless it is kept in mind that "*ch'i*" means "activity" too. I have been less hesitant about translating "*tao* 道" as "Way" or "principles," but I have romanized it instead in places where any English equivalent would be deceiving in its concreteness.

4. The translation problem is particularly bothersome in the case of ancient book titles. A literal translation often gives little or no information about the subject. It is often impossible even to *understand* the title without both studying the book and mastering the jargon of its tradition. When book and tradition are lost, the rendering of titles becomes not scholarship but poetry. I have translated names of books only when I saw point in doing so. Otherwise I have simply romanized the title and added a few words to indicate what the book is about.

5. Rather than inflict upon the reader a common system, equally inconvenient to all, for citing Chinese and Western books, I have used the various forms which are prevalent, so that sinologists as well as historians of science will be able to consult the works cited with a minimum of trouble. I translate "*ts'e* 冊" as "volume." "*Chüan* 卷," a structural division which depends sometimes upon subject and sometimes upon length, is untranslatable. In footnotes it is generally abbreviated "*ch.*" or indicated by page and *chüan* number. Thus, "47B:24a" means "the recto of page 24 in the second subdivision of *chüan* 47."



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## CONTENTS

|                                                               |     |
|---------------------------------------------------------------|-----|
| Foreword by I. Bernard Cohen                                  | vii |
| I ON THE RECONSTRUCTION OF ANCIENT<br>CHINESE ALCHEMY         | 1   |
| Priorities in the Study of Chinese Science                    | 5   |
| Priorities in the Study of Chinese Alchemy                    | 11  |
| II <i>TAN CHING YAO CHUEH</i> : THE TRADITION<br>AND THE BOOK | 35  |
| The Tradition of the <i>Tan Ching Yao Chueh</i>               | 36  |
| The Text of the <i>Tan Ching Yao Chueh</i>                    | 52  |
| The Authenticity of the <i>Tan Ching Yao Chueh</i>            | 59  |
| III THE BIOGRAPHY OF SUN SSU-MO:<br>A HISTORIOGRAPHIC INQUIRY | 81  |
| The Official Biographies of Sun Ssu-mo                        | 87  |
| Autobiographical Documents                                    | 136 |
| IV <i>TAN CHING YAO CHUEH</i> : AN ANNOTATED<br>TRANSLATION   | 145 |
| Preface                                                       | 147 |
| A Catalogue of Elixirs, Arranged in Three Grades              | 151 |
| Method of Making Six-One Lute                                 | 160 |
| Formula for Grand Unity Jade Powder Elixir                    | 169 |
| Formula for Grand Unity Three Envoys Elixir                   | 171 |
| Formula for Making Empyrean-Roaming Elixir                    | 171 |
| Formula for Making Minor Cyclically Transformed<br>Elixir     | 174 |
| Another Method                                                | 175 |

## Contents

|                                                                                   |     |
|-----------------------------------------------------------------------------------|-----|
| Formula for Making Calomel Elixir                                                 | 176 |
| Formula for Making Scarlet Snow and Flowing Pearl<br>Elixir                       | 180 |
| Method of Preparing Greater Yang Powder                                           | 183 |
| Formula for Making Gold Elixir                                                    | 185 |
| Formula for Making Lead Elixir                                                    | 187 |
| Formula for Preparing Purple Essence Elixir                                       | 188 |
| Formula for Making Flowing Pearl Elixir                                           | 189 |
| Formula for Seven-Cycle Cinnabar                                                  | 191 |
| Formula for Making Jade Fountain Eye Medicine                                     | 192 |
| The Stone-Cooking Method of Chang Ho of T'ai Shan                                 | 192 |
| Formulas for Augmenting <i>Li</i> by the Use of <i>Tui</i>                        | 194 |
| Essential Method for Fixing Mercury                                               | 198 |
| Primeval Realization Method for Using Tin to Get<br>Rid of Halo                   | 200 |
| Primeval Realization Method for Augmenting Pak-<br>tong with <i>Tui</i>           | 201 |
| Formula for Removing Halo from Copper                                             | 202 |
| The Persian Method for Using Persian Lilac Fruit<br>to Augment Brass              | 203 |
| The Primeval Realization Essential Formula for<br>Using Brass                     | 204 |
| The Primeval Realization Formula for Using Realgar                                | 205 |
| The Primeval Realization Formula for Using Iron                                   | 205 |
| Formula for Using Tin to Fix Realgar [or] Orpiment                                | 207 |
| Formula for Making Sal Ammoniac Bath Reservoir                                    | 207 |
| Formula for Making Plum Bath                                                      | 208 |
| Formula for Making Demon-Killing Pellets for Use<br>in the Preparation of Elixirs | 208 |
| Formula for Refining Kalinite to Fix Mercury                                      | 210 |
| Formula for Making White Jade                                                     | 211 |
| Formula for Making Pearls                                                         | 212 |
| Another Formula                                                                   | 212 |
| Formula for Making Granular Malachite                                             | 213 |
| Formula for Making Indigo                                                         | 213 |

## Contents

|   |                                                             |     |
|---|-------------------------------------------------------------|-----|
| V | <i>TAN CHING YAO CHUEH:</i><br>CRITICAL EDITION OF THE TEXT | 215 |
|---|-------------------------------------------------------------|-----|

### APPENDIXES

|   |                                                                                                 |     |
|---|-------------------------------------------------------------------------------------------------|-----|
| A | Medical Case History of Sun Ssu-mo                                                              | 249 |
| B | "Apothecaries' Measure" in the T'ang Period                                                     | 252 |
| C | Comparison of Elixir Names in Sun Ssu-mo's Lists with Those in Other Sources                    | 257 |
| D | Directions for Preparing the Reaction Vessel and Lute as Given in <i>Ch'ien chin fang</i>       | 262 |
| E | Table of Dates Concerned with the Life of Sun Ssu-mo                                            | 265 |
| F | Sources for the Life and Legend of Sun Ssu-mo                                                   | 268 |
| G | Notes on the Identification of Substances Mentioned in <i>Tan ching yao chueh</i>               | 272 |
| H | Notes on the Identification of Medical Disorders Mentioned in <i>Tan ching yao chueh</i>        | 295 |
| I | On Understanding the Language of Early Chinese Chemistry and Pathology: A Bibliographical Essay | 306 |
| J | Published Translations of Chinese Alchemical Treatises                                          | 322 |
|   | Index                                                                                           | 325 |



## Contents

### ILLUSTRATIONS

Symbols of the Four Elixirs, decorating chapter headings, represent four of the Five Elements: the Dark Battle (Water), page 1; the Virid Dragon (Wood), page 35; the Vermilion Bird (Fire), page 81; the White Tiger (Metal), page 145. (From an early treatise on physiological alchemy, *Yun chi ch'i ch'ien chüan* 72.)

A contribution to the legend of Sun the Immortal. (Courtesy of the Harvard-Yenching Institute.) 85

Sun Ssu-mo as cultural heritage. (Postage stamp courtesy of Professor Yabuuchi Kiyoshi, University of Kyoto.) 135

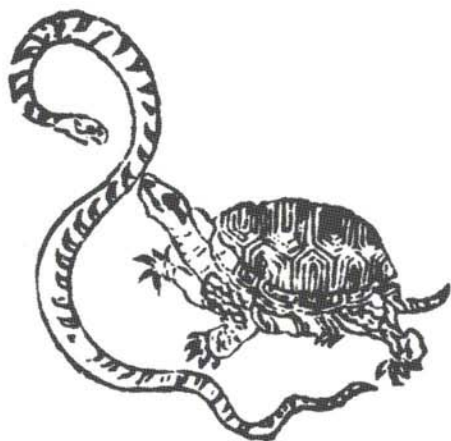
Dreaming of immortality in a thatched hut. (Courtesy of the Freer Gallery of Art, Washington, D.C.) 146

Conjectural reconstruction of Sun Ssu-mo's two-part reaction vessel. 167

Sealed two-part reaction vessels used for preparation of Scarlet Snow and Flowing Pearl Elixir. 182

**Chinese Alchemy:  
Preliminary Studies**





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I

## On the Reconstruction of Ancient Chinese Alchemy

There are no Caesarean operations in the history of thought. — Magdalen Goffin

WE HAVE gradually come to realize that questions like “What did Paracelsus contribute to the growth of modern science?” are fruitfully asked, not at the first stages of investigation, but at the last, after the whole picture of a man and his time has fallen into place. It is odd that, almost without exception, the first question that people interested in history ask about the Chinese scientific tradition, of which our comprehension is best described as nascent, is “Why did it not spontaneously evolve into modern science?”<sup>1</sup>

<sup>1</sup> Joseph Needham’s emphasis on the question of relevance to modern science as an organizing issue of his great scholarly survey will not, for anyone who reads him attentively, obscure the great care taken throughout to comprehend ideas in their matrix, to the extent that this can be done without bogging down an exploration of such scope in technical problems. His use of that issue as a focus makes possible the integration of the hundreds of amateur researches which have previously told us practically all we in the

## Chinese Alchemy: Preliminary Studies

This question, to be sure, is crucially important, for much of China's convulsive experience of the past century or so, and indeed much of her predictably convulsive experience of the decades to come, are part of a world upheaval in which the intellectual, social, and economic consequences of the Scientific Revolution are gradually asserting themselves. Poignance is no guarantee of relevance, however; my point is that sound understanding of the Chinese scientific tradition must begin inside the subject and work outward. The demand for instant answers to large comparative questions (which presupposes an adequate characterization of what is being compared) is likely to prove a major distraction.

The most difficult (in point of taste, skill, and rigor) and very commonly the most decisive stage in historical studies is the phrasing of questions which point to the foci of strength or weakness, which establish the regularities and isolate the anomalies, in a given area. Questions in this sense are conservative mechanisms; they tend to circumscribe the means of solution and the language of the answer, to the very extent that answer and question are conformable. To the extent that both reflect the material, this limiting tendency is to be expected. It becomes a liability only when the historian of ideas is diverted by certain preconceived canons of relevance, so that he is unable to consider integrally the structure of ideas which it is his intention to understand. Ordinarily he must begin by applying to a new area the questions naturally suggested by its similarity (in form *or* content) to an area already more or less under control. If he is content to rest in the security of these questions, he may never discover that the problems his sources

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West know about Chinese science. Needham's appeal to the natural curiosity of the student of history is leading to widespread awareness of the tradition's very existence for the first time, and will ultimately be responsible for attracting most of the next generation of specialists. See his *Science and Civilisation in China* (7 vols. projected, Cambridge: At the University Press, 1954-).

## On the Reconstruction of Ancient Chinese Alchemy

aimed to solve lay in quite another direction. These remarks may not apply to political history, but their cogency for the historical study of human thought is obvious enough.

The historiography of science began in Aristotle's time, and his basic procedure—to construct a genealogy of the contemporary state of scientific understanding by finding precursors, men who anticipated important conceptions in one way or another, and then to account for their failure to come up with the complete modern formulation—is still characteristic of the bulk of publication, although this is no longer widely considered a happy state of affairs.<sup>2</sup> Positivism was, in fact, by no means obviously unsatisfactory so long as only isolated segments of the tradition were under control, for it was easy to assume that classical Greek natural philosophy sprang full-blown from the brow of Zeus, and that a black morass of ignorance lay between the Greeks and the Renaissance. As the lacunae began yielding to combined linguistic, historical, and scientific competence, it became apparent that Greek science represented a particular growth of a tradition which began not too long after the Urban Revolution, and that just as the groundwork for the scientific advances conventionally associated with the Renaissance was laid in the late Middle Ages, the groundwork for the late Middle Ages was laid in Islam (no longer a mere conservator) and, even more remotely, in the Dark Ages. But what seemed at first to be a desirable enlargement of the universe of discourse soon became a profound embarrassment. As one sedulous investigation after another lengthened the genealogies of key conceptions, there arose apprehension that the most universal ideas of science might eventually be traced back to the primeval ooze. If the procedure is endless it is necessarily trivial. The general historian, perfectly willing to consider science as a historic force, is left holding the bag.

Considerations of this kind have in recent years deeply af-

<sup>2</sup> *Metaphysics*, 983a–993a.

## Chinese Alchemy: Preliminary Studies

fects the study of the Western scientific tradition, moving many of its historians to reassess radically their fundamental approach to natural philosophy as a historical process, substituting (in the words of Thomas Kuhn) “evolution-from-what-we-do-know for evolution-toward-what-we-wish-to-know.”<sup>3</sup>

Indeed there is much to be learned about modern science, which its best navigators seldom forget is a leaky ship, from close study of the state of affairs at any point in our tradition. At the same time, the role of scientific thought as a primary shaping force in intellectual history and thence in general history, eventuating in our various present predicaments, is being adequately delineated as never before. But the point of the most enlightened historiography of science is that the questions suggested by the claims of the present upon the past must be last in the order of understanding if not at all necessarily in the order of interest. Valid and fruitful comparison of the past with the present has to begin with an integral understanding of the concrete past situation, a reconstruction of the entire crisis of understanding that a thinker faced, and his whole answer, with its articulations intact. To look only at his answer—or worse, only at the superficially forward-looking part—is to flirt with circularity in the final comparison. The picture of Paracelsus as the deliverer of medicine out of scholastic verbalism into experimental pharmacology is now wheezing its superannuated last in a few encyclopedias and history textbooks. A less selective acquaintance with his writings revealed that not only was the value of his laboratory work negligible, but his thought looked back at least as often as forward; many of his fundamental frames of reference were precisely those that, to the positivist, made the early Middle Ages hopelessly unscientific. This opened the way to another equally partial

<sup>3</sup> *The Structure of Scientific Revolutions (International Encyclopedia of Unified Science, vol. II, no. 2; Chicago: Phoenix Books, 1964), p. 170.* The historiographical imperative is integral to Kuhn's forceful argument but, as the title of his book indicates, is not the main issue.

## On the Reconstruction of Ancient Chinese Alchemy

reading, Paracelsus the model of atavism, which was even sponsored as heroic by chroniclers of Aryan medicine in the Nazi period. It has since become possible to appreciate the “dark” Stoic-Gnostic-Hermetic complex as a serious and estimable competitor of the dominant but crisis-ridden classical heritage well into the Renaissance, a vehicle for ideas of resonance on one hand, and of specificity on the other, with which its rival was poorly fitted to deal. We are beginning to realize that the influence of this tradition upon much more mannerly natural philosophers was both widespread and continuous. Paracelsus need no longer be taken as a man either ahead of his time or behind it, and begins to be intelligible as a man thinking his own thoughts.<sup>4</sup>

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### PRIORITIES IN THE STUDY OF CHINESE SCIENCE

Even at this early stage it is possible to predict that if we structure Chinese philosophy of nature by its own concerns and content rather than according to our habits and expectations, the result will not be convenient for the making of summary judgments. The Chinese tradition is certainly science, by any definition not utterly parochial, but except on the level that makes it science, its goals so consistently diverge from ours that most similes become gratuitous. Chinese physics is a universal science, no more mathematical or free of values, to be sure, than any contemporary system in the pre-Renaissance West. Unlike the irreconcilably distinct sublunary and celestial physics of Aristotelian philosophy and its pre-Galilean descendants, Chinese physics is perfectly unitary. It is built upon none of our classical conceptions of causality,

<sup>4</sup> The remarkable work of Walter Pagel on Paracelsus and of Frances Yates on Hermeticism in the Renaissance are models of scholarly respect for the integrity of one's subject.



## Chinese Alchemy: Preliminary Studies

but rather on the idea of simultaneous resonance between categorically related physical entities. The causality of Newtonian mechanics occurs only as an insignificant degenerate case, and action at a distance is in no way anomalistic. These resonance theories are not, to be sure, altogether unlike anything in European experience; there are at least crude similarities of basic approach in the pneumatic physics of the Stoics.<sup>5</sup>

As branches of Chinese science, in which the general principles are applied to derive laws and theories of particular classes of phenomena, we can provisionally point to cosmology, harmonics (which includes metrology), alchemy, geomancy, medicine, and *I ching* permutation studies.<sup>6</sup> Whether this is a satisfying array of departments of natural knowledge when compared with that of, say, Aristotle, is at least partly a matter of aesthetics. The Chinese schema lacks the coordination of one man's curriculum, but its breadth is commensurate, and anyone operating inside the system would be able to place a new datum in the proper pigeonhole with equal ease.

Many of the familiar departments of modern science are not to be found in the Chinese schema. We find it convenient and useful to think in terms of "Chinese biology" and "Chi-

<sup>5</sup> The most serious analysis to date is in S. Sambursky, *The Physics of the Stoics* (London: Routledge and Kegan Paul, 1959), an exceptionally stimulating example of the historiography of hindsight.

<sup>6</sup> The sixty-four binary symbols under which the divination judgments in the *I Ching*, the Book of Changes (the canonical form of which incorporates the oldest extant Chinese book), are arranged, early became what Needham calls a "universal concept-repository," a symbolic vocabulary for speculation about the structural aspects of nature, society, and personality. The study of their permutations, about two millennia old, is only one of the many distinct kinds of speculation which have grown up about the Changes, and is perhaps the least adequately described in Western writing. It is best glimpsed in the diverting attempt of Z. D. Sung (Shen Chung-t'ao) to apply it to modern science, *The Symbols of Yi King or the Symbols of the Chinese Logic of Changes* (Shanghai: The China Modern Education Co., 1934). See also *Science and Civilisation in China*, II, 304–345; Hellmut Wilhelm, *Change. Eight Lectures on the I Ching* (London: Routledge and Kegan Paul, 1960), pp. 79–86; and my remarks in *Harvard Journal of Asiatic Studies*, 26 (1965–1966): 290–294.

## On the Reconstruction of Ancient Chinese Alchemy

nese astronomy,” and are often tempted while doing so to forget that no such discipline as the former ever existed, and that the structure of the latter and its role in intellectual history had little in common with corresponding factors in the West.

Where do we go for the data from which to create a “Chinese biology”? To begin with, there is in Chinese natural philosophy on the most abstract level a concern (seldom sharply marked off from others in discourse) with the organization and intelligible features of the world of living creatures, and even a conception of evolution as a succession of developments in a universe “which had the property of bringing to birth moral values and ethical behavior when that level of organization had been reached at which it was possible that they should manifest themselves.”<sup>7</sup> As for the particulars of flora and fauna, one goes first to the voluminous literature of pharmacognosy, then to that of agriculture and gardening, to the commentaries on lexicons and other classics, to monographs on the connoisseurship of domestic plants and animals, to treatises on commodities, to works on the laws of resonance (which often include examples that concern living creatures), to the literature of regional geography, and by no means last to the miscellaneous jottings so often published by intellectually curious gentlemen. Of the two books most often represented as “pure” botany, Chi Han’s 嵇含 *Nan-fang ts’ao mu chuang* 南方草木狀 (Records of the plants and trees of the southern regions; A.D. 305?) and Wu Ch’i-chün’s 吳其濬 (1789–1847) *Chih wu ming shih t’u k’ao* 植物名實圖考 (An illustrated study of the names and identities of plants; published 1848), the first is allied to the tradition of regional ge-

<sup>7</sup> Needham, *Time and Eastern Man. The Henry Myers Lecture, 1964* (London: Royal Anthropological Institute of Great Britain and Ireland, 1965), p. 21, also printed as “Time and Knowledge in China and the West,” in *The Voices of Time. A Cooperative Survey of Man’s Views of Time as Expressed by the Sciences and the Humanities* (J. T. Fraser, ed.; New York: George Braziller, 1966), p. 110.

## Chinese Alchemy: Preliminary Studies

ography and the intent of the second is philological.<sup>8</sup> One must con the materia medica for detailed taxonomic schemes. On the Western side the biological core in Aristotle is very much better defined, and on the whole much more closely tied to observation, but still one does not ignore early pharmacological, agricultural, and economic sources.

Mathematical astronomy was at the very least an ancillary in any classical Western scheme of natural science, in the sense that astronomical postulates weré to be deduced from, and working models based upon, cosmological first principles. It was one of those theoretically based sciences of antiquity that, like rational medicine, at the same time had appreciable practical utility; its application was in astrology, which (from the Hellenistic period on) played an even larger part in the rational planning of human endeavor than the Dow-Jones Aver-

<sup>8</sup> The "philology 小學" of late Imperial China included lexicography and phonology. While this is Wu's end, his means—descriptions culled from all the best compilations, with his own observations and hearsay added—make the book a botanical trove. His classification is trite, taken with insignificant modification from Li Shih-chen's 李時珍 (1518–1593) *Great Pharmacopoeia* (*Pen-ts'ao kang-mu* 本草綱目). For a modern description of his work, see E-tu Zen Sun, "Wu Ch'i-chün: Profile of a Chinese Scholar-Technologist," *Technology and Culture*, 6 (1965):394–406; on Chi's book, see Wu Te-lin 吳德林, "Ch'üan-shih wo-kuo tsui tsao ti chih-wu chih (*Nan-fang ts'ao mu chuang*) 詮釋我國最早的植物誌(南方草木狀)" (Exegesis of our country's earliest botanicon, *Records of the Plants and Trees of the Southern Regions*), *Chih-wu hsueh-pao* 植物學報 (*Acta botanica sinica*), 7 (1958):27–37.

Wu places the completion of the book in A.D. 304 on the basis of the date "day 12 of the sexagesimal cycle, eleventh month of the first year of the Yung-hsing reign period 永興元年十一月丙子," which appears in a Sung edition, but the "first year" of that reign actually lasted only one month, namely the *twelfth* lunar month, which corresponds to January 12–February 10, 305. If "eleventh month" is taken as a copyist's error for "twelfth month," the date of the book's completion would be January 24, 305. The inscription is, however, also suspect on other grounds, for which see Hu Yü-chin 胡玉經, *Ssu-k'u ch'üan shu tsung mu t'i yao pu cheng* 四庫全書總目提要補正 (Additions and corrections to the Summary catalogue of the Complete Library in Four Branches of Literature; Wang Hsin-fu 王欣夫, ed.; 2 vols., Peking: Chung Hwa Book Co., 1964), p. 617.

## On the Reconstruction of Ancient Chinese Alchemy

age does today. Chronology and calendar reform were of comparatively minor importance.

In China cosmological speculation and celestial kinematics parted company in, very roughly, the second century after Christ. Their initial accommodation was based on too crude an understanding of the celestial motions, and as astronomy advanced the necessarily considerable revision of cosmology was not carried out. Astronomers were bureaucrats, but that need not have stopped them; all one can say is that efforts were made, but not until the tradition was dying. The famous “empirical, practical bent” of mature Chinese mathematical astronomy (which disqualifies it as a branch of natural philosophy) seems, on a closer look, to be the result of a conscious choice rather than an aspect of national character.<sup>9</sup> At the same time, in general the Chinese took the very reasonable view that predictable phenomena are not ominous, and therefore astrologically trivial. Judicial astrology, which exploited the resonance between the natural and political spheres to read the fortunes of the Empire in the sky, thus was directly concerned only with observational astronomy, which by itself is not a science but a technology. Horoscopic astrology, in which an individual’s prospects are *calculated* from the configuration of the heavens at one instant, the moment of his conception or birth, was imported too late, and never became popular enough, to change the picture in any way that modern research has been able to detect.<sup>10</sup> That is why practically everything we know about Chinese computational astronomy (and, for that matter, most of what we know about advanced mathematics) comes from, and maintains structural unity only in, writings on the calendrical art—which is concerned with construction of an ephemerides by which all predictable celestial phenomena

<sup>9</sup> This position is documented in my “Cosmos and Computation in Early Chinese Astronomy,” forthcoming in *T’oung Pao* (Leiden).

<sup>10</sup> For one of the very few discussions which reflect more than a nodding acquaintance with the literature, see Shigeru Nakayama, “Characteristics of Chinese Astrology,” *Isis*, 57 (1966):442–454.

## Chinese Alchemy: Preliminary Studies

may be forecast, and a chronology by which all history may be equitably paced.

Both “Chinese biology” and “Chinese astronomy” are abstractions which make no sense except in the categories of modern science. The varieties of knowledge which they include were never combined to form these distinct single entities in traditional Chinese minds. One can, of course, disregard fundamental differences of structure, and by adroit picking and choosing find reassurance in the truism that the Chinese found many of the same old solutions to many of the same old problems, and the corollary that they were finally barred from the Promised Land merely by some quirk of fate, national character, language, economics, scientific method, or social structure. There is no better basis for this exercise than the question “How closely did the ancient Chinese approximate what we now know?”

My plea for the open-minded reconstruction of Chinese science does not imply that comparisons between East and West are not of the first importance. They are pointless only so long as we do not know what we are comparing, just as conclusions about the social relations of Chinese science may well be fruitless until we know what we are relating. Nothing is more urgently needed than a responsible comparative history of science, for it can free us from culture-bound assumptions about the conditions of discovery. Needham has already saved philosophers countless ergs of cerebration on the necessary character of causality and (proto-judicial) natural law by demonstrating that the Chinese went quite a distance in science without depending significantly upon either. The Chinese tradition offers a natural beginning for comparative studies because of its considerable sophistication, because of its massive documentation, and because of the Chinese meticulousness about chronology which enables us to see science as a historical phenomenon. We can hope for no more than a beginning until all the great independent and partly in-

## On the Reconstruction of Ancient Chinese Alchemy

dependent traditions have been investigated without the benefit of foregone conclusions.<sup>11</sup> Only then will we be ready to appreciate fully the potentialities of the human intellect in its confrontation with nature.

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### PRIORITIES IN THE STUDY OF CHINESE ALCHEMY

Now what is needed in order to make sense of Chinese alchemy? First of all, there are certain requirements so basic as to be independent of what particular questions we nominate for priority.

#### *Initial Conditions*

The first of these is that the basic documents be available; the second is that they be readable; the third is that they be read. The field of Chinese alchemy is remarkable in that the first is trivial, for the approximately one hundred alchemical books which still exist are almost all found in a widely distributed collection of Taoist canonical writings.<sup>12</sup> The second

<sup>11</sup> Until recently it has been fashionable for nonspecialists to consider Islamic science as a complex of attempts to discharge more or less creatively the burdens of trusteeship of the classical tradition. It is clear, however, that (for instance) some Islamic astronomers demanded a level of rigor not approached in Europe until Copernicus' time. Mathias Schram, among others, has been applying his formidable erudition and analytical capacities to the elucidation of Islamic physics on its own terms, and Seyyed Hossein Nasr has even suggested in his various books that from the standpoint of developed Mohammedan natural philosophy, the influence of the West was more transitory than European historians like to suppose. Shigeru Nakayama's forthcoming *Outline History of Japanese Astronomy: Western Impact vs. Chinese Background* (Cambridge: Harvard University Press) shows for the first time in a Western language how early Japanese scientists viewed the transition from one set of problems and approaches to another.

<sup>12</sup> See Chapter II. There are a great many late works of definite alchemical interest, although few unambiguously describe laboratory operations, and the majority—like Li Wen-chu's 李文燭 famous *Huang pai ching* 黄白镜 (Mirror of [the art of] yellow and white, preface dated 1598)—make sufficiently little chemical sense that one looks for their significance almost

## Chinese Alchemy: Preliminary Studies

is not to be taken so lightly, for we are dealing with a lost esoteric tradition, whose classics were not meant to be intelligible even to the average Taoist without a period of initiation in the course of which one or more books was expounded orally. We do, however, have the great advantage of seeing all the texts together and, by colligating them with their historical connections in mind and applying modern chemical reasoning where required, of making sense of alchemy's arcane terminology without being held back by the limitations or biases of any one master.

The problem does not differ in kind from that of deciphering the dead terminology of ancient technology, for instance, or semantics (*ming hsueh* 名學); one begins from a basic familiarity with classical Chinese and reads the sources of one period or school together closely and repeatedly, each time beginning from a new level of understanding, until their content has fallen into place. All in all, the medical tradition is much more difficult to master than the alchemical, largely just because Chinese medicine is not quite obviously dead, and offers hindsight as an all too convenient key to understanding.<sup>13</sup> One can enroll in an academy of traditional medi-

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entirely on the physiological level. Perhaps the most interesting widely accessible document of late operative alchemy is *chüan* 11 of a little potpourri of familiar arts (writer's slang, cookery, home remedies, prognostication, cosmetics, even *ars amatoria*) called *Mo o hsiao lu* 墨娥小錄, possibly of the fourteenth century (reprint of 1571 edition; 4 vols., Peking: Chung-kuo shu-tien, 1959).

The necessary ancillary studies in *nei tan* 內丹 (the physiological analogue of alchemy), philosophy, medicine, chemical industry, and so on require access to a major collection. The most important facilities outside of China for the study of Chinese science are the collection of Joseph Needham at Gonville and Caius College, Cambridge, England; the library of the Research Institute of Humanistic Studies (Zimbun kagaku kenkyūsyō), University of Kyoto; and (especially, but not only, for Chinese medicine) the Gest Oriental Library, Princeton University.

<sup>13</sup> See my "On the Demise of Chinese Acupuncture," forthcoming in *Journal of the American Oriental Society* (1968).

## On the Reconstruction of Ancient Chinese Alchemy

cine, interview scholarly practitioners, and have at one's side dictionaries, encyclopedias, and handbooks prepared for their use.<sup>14</sup> Modern reference books and native informants enormously simplify the investigation of Chinese medicine as it is practiced in the middle of the twentieth century, but the information they furnish cannot be applied directly to earlier periods unless medicine was not a historical entity, and unless its theory and terminology did not change significantly with time. Comparison of the entry for almost any disease in the Unabridged Dictionary of Chinese Medicine (*Chung-kuo i-hsueh ta tz'u-tien* 中國醫學大辭典, 1921)—or in any book, for that matter, which gives familiar Western equivalents for each Chinese disorder—with the corresponding description in Ch'ao Yuan-fang's 巢元方 still authoritative landmark of pathology, *Chu ping yuan hou lun* 諸病源候論 (On the origins and symptoms of diseases, 610), should be sufficient to prove that even simple problems of denotation cannot be settled without reference to the whole system of medicine at a given moment. Neglect of this principle is an especially prominent component of the squalid state of research in Chinese medical history, whose amateurs have been more than content to exhibit as the fruit of their considerable labors an omnium-gatherum of empirical discoveries, striking deductions, irrationalities, irrelevancies, and specious scientific breakthroughs. So long as one is satisfied with the impression that the eminent physicians of ancient times were excellent clinicians but otherwise either primitives, madmen, or fools, it is not difficult to confuse volume of publication with depth of understanding. The reader who is curious about alchemy,

<sup>14</sup> At the same time, no alchemical reference book of any kind exists, and even the sinological equivalent of the *OED*—*Dai Kan-Wa jiten* 大漢和辭典—defines only a handful of alchemical terms, many of them incorrectly or imprecisely. There is a very short but useful glossary of alchemical operations in Yuan Han-ch'ing 袁翰青, *Chung-kuo hua-hsueh shih lun-wen chi* 中國化學史論文集 (Collected papers on the history of Chinese chemistry; Peking: San Lien Bookstores, 1956), pp. 207–209.



## Chinese Alchemy: Preliminary Studies

on the other hand, is much better served; he is not at all likely to be deceived into thinking that we understand anything important.

That the alchemical classics are readable does not mean that they have been read, despite the fact that they have been very widely available outside China since 1926. The only book-length study of Chinese alchemy in a Western language, which was completed in 1925, showed no awareness that such a body of documents existed.<sup>15</sup>

Several publications on alchemy in Chinese and Japanese have reflected familiarity with the entire literature,<sup>16</sup> but this can be said of no monograph which has appeared in Europe or the United States until very recently. Western writings have in general been based exclusively on the *Chou i ts'an t'ung ch'i* 周易參同契 (The concordance of the Three; an apocryphal tradition of interpretation of the Book of Changes, A.D. 142?) or the *Pao p'u tzu nei p'ien* 抱朴子內篇 (The inner chapters

<sup>15</sup> It is odd that the author listed in his bibliography Fr. Leon Wieger's itemized descriptive catalogue, *Taoisme*, vol. I ([Ho-chien-fu: Mission Press], 1911), fourteen years old at the time.

<sup>16</sup> Particularly valuable are Ts'ao Yuan-yü 曹元宇, "Chung-kuo ku-tai chin-tan-chia ti she-pei chi fang-fa 中國古代金丹家的設備及方法" (Equipment and methods of ancient Chinese alchemists), in Wang Chin 王璉 *et al.*, *Chung-kuo ku-tai chin-shu hua-hsueh chi chin-tan-shu* 中國古代金屬化學及金丹術 (Metallurgical chemistry and alchemy in ancient China; Shanghai: Chinese Scientific Book and Instrument Company, 1955), pp. 67-87, and his "Ko Hung i-ch'ien chih chin tan shih lueh 葛洪以前之金丹史略" (A historical survey of alchemy before Ko Hung), *Hsueh i 學藝* ("Wissen und Wissenschaft"), 14 (1935):145-156 and 283-293; the book of Yuan Han-ch'ing's cited in note 14; Chang Tzu-ka'o's 張子高 rather doctrinaire *Chung-kuo hua-hsueh shih kao. Ku-tai chih pu* 中國化學史稿:古代之部 (Draft history of Chinese chemistry: The ancient period; Peking: Science Press, 1964); Yoshida Mitsukuni 吉田光邦, "Chūsei no kagaku (rentan jitsu) to senjitsu 中世の化學 (煉丹術) と仙術" (Medieval chemistry [alchemy] and the arts of immortality), in Yabuuchi Kiyoshi 藪内清 (ed.), *Chūgoku chūsei kagaku gijitsushi no kenkyū* 中國中世科學技術史の研究 (Studies in the history of medieval Chinese science and technology; Tokyo: Kadokawa shoten, 1963); and Yoshida's popular introduction to world alchemy, *Renkin jitsu 鍊金術* (Alchemy; Tokyo: Chūō kōronsha, 1963).

## On the Reconstruction of Ancient Chinese Alchemy

of the philosopher Pao p'u tzu, ca. 320), two very early tracts which have circulated independently, or on less famous individual books chosen from the Patrology by processes which are not always comprehensible.<sup>17</sup> Of the ten nominally alchemical works translated integrally into Western languages before 1959 (see Appendix J), only two can be described as important sources for the study of alchemy itself (seven have to do with "internal alchemy," *nei tan*, its physiological analogue),<sup>18</sup> and only one was rendered with sufficient fidelity to avoid bemusing the reader. The situation has changed drastically for the better with a series of collaborative publications of Ho Ping-yü, Ts'ao T'ien-ch'in, and Joseph Needham; they have set a standard of responsible scholarship which makes further dabbling superfluous.<sup>19</sup>

<sup>17</sup> Since most of the literature in Western languages can be used without serious confusion only by those who control the primary sources, I see no point in duplicating the work of its bibliographers here. For lists of publications, see Obed Simon Johnson, *A Study of Chinese Alchemy* (Shanghai: The Commercial Press, Limited, 1928), pp. 136-141; William Jerome Wilson, "Alchemy in China," *Ciba Symposia*, 2 (1940):623-624; Henry M. Leicester and Herbert S. Klickstein, "Tenney Lombard Davis and the History of Chemistry," *Chymia*, 3 (1950):6-16; and for current work, my annotated entries in the approximately annual *Critical Bibliographies of Isis* from 1960 (51.3:419-423) on.

<sup>18</sup> "External alchemy" (*wai 外 tan*) is the complementary term used to distinguish the laboratory art. Some historians have rendered the dichotomy as "esoteric/exoteric." While this accurately reflects the point of view of certain late Chinese writers who were unable to appreciate that operative alchemy had ever been anything but a confidence game, we know from early documents that *wai tan* was fully as esoteric as its yogic counterpart.

<sup>19</sup> Ho and Needham, "Elixir Poisoning in Mediaeval China," *Janus*, 48 (1959):221-251; "Theories of Categories in Early Mediaeval Chinese Alchemy," *Journal of the Warburg and Courtauld Institutes*, 22 (1959):173-210; "The Laboratory Equipment of the Early Mediaeval Chinese Alchemists," *Ambix*, 7 (1959):57-112; Ts'ao, Ho, and Needham, "An Early Mediaeval Chinese Alchemical Text on Aqueous Solutions," *ibid.*, pp. 122-155. The last article has been published in abridged translation by Wang K'uei-k'o 王奎克 as "'San-shih-liu shui fa'-Chung-kuo ku-tai kuan-yü shui jung-yeh ti i chung tsao-ch'i lien-tan wen hsien '三十六水法'-中國古代關於水溶液的一種早期煉丹文獻," *K'o-hsueh shih chi-k'an*, 5 (1963):67-81.

## Chinese Alchemy: Preliminary Studies

### *Preliminary Operations*

Attempts to determine the date, condition, and provenance of a document, and the search for clues about the life and concerns of the author and his motives in writing what he wrote, are preliminary operations in the sense that they are usually carried out regardless of which historical questions the investigator has in mind or is trying to formulate. That they are preliminaries does not imply that they are optional, for their purpose is to make evidence useful by removing it from the abstract isolation of a book and locating it within a historical process. Some historians never get beyond dating and editing and constructing chronological biographies—I do not deny the magnitude of their contribution, but merely suggest that philology is far less moribund than its critics claim. Other historians are content to treat matters of period, authorship, and so on perfunctorily, much as a child washes his hands before he sits down to lunch. The soundness of these scholars' conclusions often turns out to be directly related to the number of philologists who have covered the ground first.

A happy medium has been struck in little work on Chinese science in the past. To a degree this reflects the common (but far from universal) old Chinese prejudice against treating heterodox writers and writings seriously. To a degree it is due to taking for granted that the high standard of textual transmission and the chronological accuracy usual in conventional literature hold equally for Chinese arcana. To an extent that varies from one historian to another, it can also be traced back to a suspicion that if doubt were invoked systematically, precious few factual data would survive.

That last point of view is, if jaundiced, not wholly inaccurate. The biography of any alchemist in the Standard Histories (so generally reliable for orthodox figures) is so full of wonders and improbabilities that one has reason to despair of finding the man behind the figure of the magus. If when attempting to trace the development of alchemy we were to re-

## On the Reconstruction of Ancient Chinese Alchemy

ject every source which does not carry a date, the literature would be reduced to between a half and a third its present size; if we were to accept only those dates which seem likely, rejecting all to which doubt attaches, the remainder would be diminished by half again; if we were to demand positive substantiation according to the sorts of rules found in charming old manuals of historical method, we would be lucky indeed to be left with five of our original hundred books. Further, whereas the meticulousness of those who recopied the Confucian classics through the centuries before printing often accomplished prodigies of accurate transmission,<sup>20</sup> the alchemical corpus clearly was not considered worthy of much care. There is so seldom any possibility of confronting independent textual traditions that the danger of basing an interpretation on what is actually a scribal error can never be quite ignored.

But is there a middle ground between the unattainable luxury of methodological purism and the patent folly of taking the sources at face value? The object of this book is to demonstrate by detailed example that there is, that in fact as clear as possible a consciousness of what we do *not* know is indispensable to the reconstruction of Chinese alchemy.

In practice, conclusions about the circumstances of a document or events in the life of its author are neither absolutely true nor absolutely false, but imply judgments of probability which are practically never stated. Take the case of two documents, one not only dated but attested in the writings of several contemporaries, and the other datable only by a passing mention in a compilation of no great merit. In the first case, it is most unlikely that the author and all of his witnesses were lying, mad, or independently mistaken. It is less inconceivable that the author got his dates mixed up, and that the testimonies were based on the author's slip or referred to a different docu-

<sup>20</sup> See, for instance, Bernhard Karlgren, *Philology and Ancient China* (Cambridge: Harvard University Press, 1926), pp. 103–108.

## Chinese Alchemy: Preliminary Studies

ment. In the second case, even the most notorious source is not automatically wrong in every instance (as one is sometimes tempted to suppose in the cases of such donkeys of antiquity as Diogenes Laertius or that great acupuncturist Huang-fu Mi 皇甫謐). It is not merely paradoxical to assert that we tend to favor the first case with fewest misgivings when we know least about the people involved. Tracing the bases of statements as far as they can be followed, examining the motives and customary methods of those who made them, worrying every testimony for internal discrepancies or inconsistencies with other testimonies, distinguishing genuine information from what is merely conventional in a given culture: these make possible that unquantifiable but realistic estimate of likelihood which can be detected in the background of any sound historical inference.

The problem of editing (which underlies that of translation) is analogous. In the absence of truly independent texts one must depend largely upon a highly developed ability to pick out corruptions, which are especially difficult to detect with confidence in classical Chinese. This sensibility becomes sharp only when honed by continuous practice in comparing analogous passages from other books and in following conjecturally the mental processes of a careless editor, scribe, or even forger.<sup>21</sup> It is by no means difficult to estimate the reliability of emendations if one begins by practicing upon works for which affiliated variorum texts (otherwise seldom highly useful) are available. As more and more of the sources are studied with uncompromising care, balancing prudence with a willingness to stick one's neck out in the short run, we shall have developed a considerable body of highly probable knowledge against which new criteria can be tested.

<sup>21</sup> I do not mean to imply that forgery—as distinguished from conventional false attribution—is a serious problem in Taoist literature. I have not yet detected in any alchemical work an unmistakable forgery or interpolation, and find it difficult to imagine why anyone would want to bother.

## On the Reconstruction of Ancient Chinese Alchemy

### *Internal Problems*

Once the tools of which I have just spoken have been shaped to fit the hand, the historian is ready to do history. It will be convenient, in order to discuss what is likely to be involved in investigating the various questions which suggest themselves, to separate those internal to the subject from those meant to throw light on its connections with other sorts of endeavor. This distinction has no absolute validity. In China as in the West science was not done in a vacuum. Man's conception of nature reflected his relations with it and thus how he saw himself. This was a feedback process in that science was a determinant of political and moral thought and, no less, action. Chinese alchemy might be defined after the fact as a discrete entity having to do with the construction of a chemical model of natural process and with the production by chemical means of substances capable of certain unique functions which involve time—making individuals immortal, maturing gold and silver from a base matrix at a greatly accelerated rate, and so on. But it would be a mistake to let such a definition obscure alchemy's continuity with medicine and chemical technology, and indirectly with moral philosophy and social thought.

*Origins.* The problem of when and under what circumstances Chinese alchemy originated has a special fascination, not only inherently but because chronology is a vital issue in the question of priority between East and West. It is impossible to believe that two traditions which apparently shared so many materials, methods, and goals could have remained mutually exclusive over two millennia of unceasing cultural contact. But did they at least begin independently, or can we expect to find some sort of transmission or diffusion of ideas at the inception of one of them? This question cannot be answered until the documents on both sides have been understood to a much greater depth than in the past. Even so, the nomination of *Chou i ts'an t'ung ch'i* as the earliest extant Chinese alchemical treatise rests on nothing but tradition, and many of its com-

## Chinese Alchemy: Preliminary Studies

mentaries show signs of false attribution.<sup>22</sup> Nor is there general agreement on the dates of the earliest Western documents, and the need for a definitive edition and translation of the Alexandrian corpus is generally acknowledged. Its study has been sadly neglected in the past two generations.<sup>23</sup>

In his early attempts to trace the enigmas of Chinese alchemy, heavily relied upon by writers of surveys,<sup>24</sup> Homer H. Dubs chose to define alchemy as "the actual turning of base metals into precious ones," which is to say any imitation which could not be detected at a given time in a given culture.<sup>25</sup> He concludes that alchemy could not have originated in the West, for "ancient Babylonia . . . possessed an unambiguous test for gold, now called cupellation," and thus "could not have tolerated the 'discovery' of alchemy." The so-called Egyptian (that is, Hellenistic Alexandrian) alchemists "assert they were taught by the 'Mede, Ostances'," and "nowhere . . . assert that they actually 'make' gold . . . Egypt must then be excluded as a possible motherland for alchemy. Only when the Babylonian culture had been destroyed as a result of barbarian invasions,

<sup>22</sup> Yuan Han-ch'ing, *Chung-kuo hua-hsueh shih lun-wen chi*, p. 171, tabulates eleven commentaries and describes three more. He doubts that any is earlier than the tenth century.

<sup>23</sup> For the documents, see Marcellin Berthelot, *Collection des anciens alchimistes grecs* (4 vols., Paris: G. Steinheil, 1887-1888). The best general discussion of chemical content to date is Frank Sherwood Taylor, "A Survey of Greek Alchemy," *Journal of Hellenic Studies*, 50 (1930):109-139. An up-to-date bibliographic survey of alchemy and chemistry to about 1750 is Allen G. Debus, "The Significance of the History of Early Chemistry," *Journal of World History*, 9 (1965): 39-58.

<sup>24</sup> For instance, F. Sherwood Taylor, *The Alchemists. Founders of Modern Chemistry* (London: William Heinemann Ltd., 1951), pp. 68-75; Eric John Holmyard, *Alchemy* (Harmondsworth, England: Penguin Books Ltd., 1957), pp. 31-40; and Henry M. Leicester, *The Historical Background of Chemistry* (New York: John Wiley and Sons, Inc., 1956), pp. 53-61.

<sup>25</sup> "The Beginnings of Alchemy," *Isis*, 38 (1947):62-86; "The Origin of Alchemy," *Ambix*, 9 (1961):23-36. See also Arthur Waley's pioneering "Notes on Chinese Alchemy," *Bulletin of the School of Oriental and African Studies*, University of London, 6 (1930):1-24. Neither author was prepared to cope with alchemical terminology; it would be impossible to correct their details here.

## On the Reconstruction of Ancient Chinese Alchemy

could alchemy have raised its head in Europe or in the Near East.”

In China, on the other hand, “down to about the 5th century B.C., the Chinese language did not even have a word for gold. Confucius knew nothing about gold.” Because of this late start “chemical knowledge developed quite slowly”; lack of ability to detect false gold made China “a place that could serve well as a virgin soil for alchemy.” Dubs nominates as the first document of alchemy an edict of 144 B.C. against “coining cash or making counterfeit gold,” and traces the pre-documentary tradition to the cosmologist Tsou Yen 騶衍, who “seems to have been the ‘discoverer’ of alchemy,” for he is said to have written some alchemical books, and a palace was built for him “at a retired and rocky place near the coast . . . Such a location was considered ideal for alchemical experiments.” Dubs also translates an interesting passage which occurs in both of China’s two earliest Standard Histories, to the effect that several famous immortals “practised the method of [becoming] immortals [by the use of magical] recipes” before the second century B.C. and that the *yin-yang* arts of Tsou himself were transmitted by “the gentlemen who [possessed magical] recipes (*fang-shzh*) along the seashore of Yen and Tsi.” He suggests an ultimate source for alchemy in an Aryan tradition going back to the second millennium B.C.

It must be remarked immediately that Dubs’s argument, to which I have necessarily done violence in condensing it, is quite irrelevant to the history of *Chinese* alchemy. His definition, which includes all successful counterfeiting or falsification of gold regardless of motive, and excludes both concern with the chemical principles of change and with the arts of immortality except when accompanied by goldmaking, would have been inconceivable to any alchemist, and rules out all but a small fraction of the alchemical corpus. Examined point by point, his discussion also appears to have little relevance to the problem of origins:



## Chinese Alchemy: Preliminary Studies

1. It is a commonplace of the historical record that the falsification of gold flourished in the West regardless of assayers' ability to detect imitations.<sup>26</sup> The selling of gold bricks even in our day has proved to be more a matter of entrepreneurial skill than of the ability to make sophisticated forgeries. This is not merely because people who have bought gold objects hesitate to have them melted down; the touchstone has been available at least since Plato's time, and the hydrostatic test for specific gravity since Archimedes'.

2. The Hellenistic alchemists of Alexandria are ruled out only by Dubs's special definition, which necessitates rejection of both their chemical manipulations and theoretical speculations.

3. In view of the fact that there had been a gold industry in China for a thousand years before Confucius' time, his silence cannot be taken for ignorance.<sup>27</sup> He does not mention copper or its alloys either.

4. The anti-coining edict of 144 was apparently nothing more than that. Its language does not imply that anything but "coining cash or making counterfeit gold" was involved, nor do its early commentaries (about 350 years after the fact) prove either that the purpose of the edict was to suppress alchemy or that alchemy needed to be suppressed.<sup>28</sup>

5. Tsou Yen is supposed, according to a legend set down about two hundred years after his time, to have written on the

<sup>26</sup> See, for example, John Read, *Prelude to Chemistry. An Outline of Alchemy, Its Literature and Relationships* (reprint of second ed., 1939, Cambridge: The M.I.T. Press, 1966), esp. pp. 22 and 177.

<sup>27</sup> Cheng Te-k'un, *Archaeology in China* (Cambridge, England: W. Heffer and Sons Ltd., 1959-), II, 161, 198, and 245.

<sup>28</sup> It is ironic that because of a mistranslation Dubs was unable even to establish positively that either commentator *believed* this passage had alchemical import ("The Beginnings of Alchemy," pp. 63-64). Actually Meng K'ang 孟康 (ca. A.D. 180-260) quotes a proverb of his own time, "If gold could be made, the world could be transcended" (that is, immortality could be attained). Dubs, unfamiliar with the common Taoist term "tu shih 度世," rendered the last part word-for-word as "the world could be measured," which is meaningless.

## On the Reconstruction of Ancient Chinese Alchemy

attainment of immortality (and practically everything else), but I have not been able to find in any early source a statement that he wrote a book on “the actual turning of base metals into precious ones.”

6. “[Magical] recipes” is Dubs’s translation of “*fang* 方,” a word which does not necessarily imply the use of drugs or chemical processes at all; its meaning in early texts is wide enough to include spells and every sort of magic, and it is thus generally best translated “[magical] methods.”<sup>29</sup> For that matter, the passage makes no reference whatever to alchemy in Dubs’s original sense.

Dubs’s point of view, while based on much better data on the Chinese side, must be considered a regression from the level of understanding attained much earlier by Tenney L. Davis, distinguished both as chemist and historian of chemistry. Davis believed that “alchemy came to Europe from China, probably through the agency of the Arabs in the eighth or ninth century, and that it there mingled with the purely chemical tradition of Alexandria to make up the body of information and practice, knowledge and speculation, which was the alchemy and chemistry of mediaeval Europe.”<sup>30</sup> His characterization of the Alexandrian tradition as “purely chemical” depends again upon a definition of alchemy as “the search or the effort, whether successful or not, by chemical means to

<sup>29</sup> Bernhard Karlgren, in his “Grammata serica recensa,” *Bulletin of the Museum of Far Eastern Antiquities*, Stockholm, 29 (1957):196, does not find “*fang*” used to mean “recipe” in any of the pre-Han classics. Yü Ying-shih, who has given special attention to this problem, shows that “*fang-shih* 方士” (Dubs’s “*fang-shzh*”) was used in Han times to refer to practitioners of astrology, divination, medicine, sexual yogas, and so on. “Life and Immortality in the Mind of Han China,” *Harvard Journal of Asiatic Studies*, 25 (1964–1965):104–105. Note particularly that in the translation on p. 69 of Dubs’s first article, “many gentlemen [possessors of] marvellous and strange recipes” should be “many devious and eccentric magi.”

<sup>30</sup> “The Dualistic Cosmogony of Huai-nan-tzū and Its Relations to the Background of Chinese and of European Alchemy,” *Isis*, 25 (1936):327–340, esp. p. 340. The argument was restated in “The Chinese Beginnings of Alchemy,” *Endeavour*, 2 (1943):159.

## Chinese Alchemy: Preliminary Studies

prepare a medicine of longevity or immortality, or by chemical means to prepare authentic noble metal from base metal or both," which is perfectly adequate if, like Davis, one thinks of alchemy as an art to be distinguished from the science of chemistry. The distinction made possible Davis' clear recognition that "alchemy arose at a time when much chemistry was already known. It was not pre-chemistry. It arose in consequence of a pre-existing knowledge of chemistry."<sup>31</sup> This needed to be said, for technologists had been accumulating knowledge of chemical processes since before the Urban Revolution, and philosophers had been attempting theoretical explanations of substantial change long before any trace of alchemy can be documented. What distinguishes alchemy is the systematic attempts of its practitioners to apply a philosophical framework to chemical operations. Any definition of alchemy that is not an obstacle to understanding must take into account the fact that Bolos Mendes and his Hellenistic successors, like the author of *Chou i ts'an t'ung ch'i*, had theoretical aims. If these aims have usually been described in terms of spiritual rather than natural process, we must keep in mind that in both Stoicism and Gnosticism the two are parallel and inseparable.<sup>32</sup>

<sup>31</sup> "The Problem of the Origins of Alchemy," *The Scientific Monthly*, 43 (1936):551-552.

Ho and Needham ("Theories of Categories," p. 191) reflect a basic agreement with Davis when they call the earliest Egyptian devotees "alchemists" only with misgivings because "they were not concerned with preparing drugs of longevity or immortality, or with the later 'philosopher's stone.' They were interested in the techniques which had grown up in Hellenistic Egypt for imitating gold, silver, purple and precious stones, whether by the making of alloys or by methods of dyeing, 'tingeing,' veneering with superficial metal or oxide layers, etc., etc. These techniques they interpreted by means of semi-mystical philosophies of the nature of matter, but 'spiritual' or psychological allegories based on alchemical procedures were undeveloped among them." Such allegories are characteristic of the later writings of Zosimus of Panopolis (ca. 300), however, and it is precisely the interpretations of the early alchemists which make them proto-scientists rather than technological dilettantes.

<sup>32</sup> See the exemplary survey of H. J. Sheppard, "Gnosticism and Alchemy," *Ambix*, 6 (1957):86-101, esp. p. 90.

## On the Reconstruction of Ancient Chinese Alchemy

When Davis' definition of alchemy is extended to include the attempt to construct a dynamic chemical model of cosmic process, his hypothesis becomes congruent with the view, to which vastly expanded evidence and cumulatively finer understanding seem to be pointing, that the Western tradition began in Alexandria and was influenced by Chinese ideas and methods through the agency of Islamic culture before alchemy traveled to Europe in the Middle Ages.

The question of priority, on this reading, remains open. If we discard a number of particularly ill-founded speculations, the Chinese side (which is but a moiety) of the priority problem looks like this: Belief in the possibility of physical immortality begins by, roughly, the eighth century B.C., and by the fourth century immortality was widely thought to be attainable by the taking of drugs as well as through other techniques.<sup>33</sup> The idea that these drugs were to be made rather than found in nature or procured from immortals began somewhat later; when and how remain unknown until certain problems of interpretation are settled. The transformation of cinnabar into gold is not spoken of as possible, according to extant sources, before 133 B.C. On its first appearance (as part of the sales pitch of a magus in Emperor Wu's court) gold-making was clearly associated with the immortality cult, but only indirectly; eating off utensils made from the gold was supposed to lengthen life to the point that the thaumaturgic and ritual prerequisites to actual immortality could all be satisfied.<sup>34</sup> The conviction that some potable form of natural or artificial gold, like other drugs, could bring about transcendence when ingested is a later development still. Huan K'uan 桓寬, in his Discourses on Salt and Iron (*Yen t'ieh lun* 鹽鐵論, 73/49 B.C.), based on a series of economic debates which began in 81 B.C., is the first to speak of this belief, in a highly polemical discussion of the Ch'in First Emperor's

<sup>33</sup> Yü Ying-shih, "Life and Immortality," pp. 87-94.

<sup>34</sup> Waley, "Notes on Chinese Alchemy," pp. 2-4.

## Chinese Alchemy: Preliminary Studies

(r. 255–210) disastrous patronage of anyone who offered to procure him immortality: “At this time gentlemen of Yen and Ch’i set aside their hoes and digging sticks and competed to make themselves heard on the subject of immortals and magicians. Consequently those who headed for Hsien-yang [the capital] numbered in the thousands. They asserted that the immortals had eaten of gold and drunk of pearl; after this had been done their lives would last as long as sky and earth.”<sup>35</sup> Though no one would seriously maintain that this embellishment of a twice-told tale yields sound information about the First Emperor’s time, the idea of immortality drugs prepared by chemical means clearly existed early in the first century. Only in the *Chou i ts’an t’ung ch’i*, probably of the mid-second century after Christ, does the theoretical element appear, but at a level of sophistication which seems to indicate lost antecedents.

Even if it were possible in the future to confirm that chemical operations played any part in the Chinese cult of immortality before the second half of the second century B.C., we would not yet be ready to do more than romance about the likelihood of influence upon Western developments. The Chinese penchant for ritual does not affect the fundamentally physiological character of their early concept of immortality, to which the Stoic, and, later, Gnostic ideals of spiritual and intellectual perfection which inform Alexandrian alchemy may be likened only at the price of considerable distortion.<sup>36</sup>

*Aims.* Most of the discussion thus far has had to do with the relations between transmutation and immortality. If alchemy were never more than a set of empirical techniques, however, it would be difficult to account for frequent refer-

<sup>35</sup> Wang Li-ch’i 王利器 (ed.), *Yen t’ieh lun chiao chu* 校注 (Shanghai: Ku-tien wen-hsueh ch’u-pan-she, 1958), p. 208 (sec. 29). I am indebted to Yü Ying-shih for correspondence upon this point.

<sup>36</sup> Compare Henri Maspero, “Les Procédés de ‘nourrir le principe vital’ dans la religion taoïste ancienne,” *Journal Asiatique*, 229 (1937):178–182, with the article of Sheppard cited in note 32.

## On the Reconstruction of Ancient Chinese Alchemy

ences to such theoretical entities as *yin* and *yang*, and for the many treatises which give no directions for making anything. But often enough the alchemists state their questions clearly—that is the point of the rhapsody on the mysteries of cosmic process which begins so many alchemical books—and when they are not expressed, they may be deduced from the theories worked out to answer them. In sum, this group of problems is unsolved but ripe.

*Theories.* Our ability to grasp the import of its theories is the key to understanding both the aims and results of Chinese alchemy. The empirical content of alchemy has little significance unless we know what it meant to the alchemist, within what framework he understood it. If one of the elixirs of immortality, for instance, turns out to be more or less pure metallic arsenic, it is tempting to chalk this up as another accomplishment of Chinese science. But are we justified in doing so if we find out that the elixir was not considered different in kind from, say, calomel or vermilion? This is simply a matter of distinguishing the Chinese alchemist's understanding from our own, and thus an elementary courtesy.

The first pertinent scholarly study was published thirty years ago by Tenney L. Davis. From his examination of two early sources he concluded that “while we do not find in the [*Chou i ts'an t'ung ch'i*] any clear-cut dualistic doctrine of chemistry, we do find an account of the alchemical process based directly upon *Yin-Yang* . . . it seems to have furnished a general scientific background upon which alchemy sprang up, an alchemy identical in theory and practice with the later alchemy of mediaeval Europe.”<sup>37</sup> To put it another way, dualism plays an essential part, but on the level of concept rather than that of theory.

Ho Ping-yü and Joseph Needham have taken a great leap

<sup>37</sup> “The Dualistic Cosmogony of Huai-nan-tzū,” p. 340. Research of the past decades indicates that Chinese and Western alchemy were far from identical in theory or practice.

## Chinese Alchemy: Preliminary Studies

forward in their "Theories of Categories in Early Mediaeval Chinese Alchemy," which demonstrates that in one genre which borders upon and to some degree overlaps with alchemical literature, "besides something like the marriage of contraries there was the firm conviction that *simila cum similibus agunt*. These two principles were combined in the thought that substances of opposite sign will react only if they belong to the same category (*lei*)." <sup>38</sup> No claim is made that this is the whole story, for it cannot be applied to every treatise to explain the composition of elixirs, but Ho and Needham have demonstrated for the first time that the theoretical formulations of the Chinese alchemists are not impenetrable.

*Operations and equipment.* Since the various sorts of manipulation and apparatus in the alchemist's repertory are described in language more or less continuous with that of modern chemistry, it is not surprising that this aspect of alchemy is the first to be treated fully and adequately by modern historians. In 1933 Ts'ao Yuan-yü adduced evidence from about twenty alchemical treatises to describe both equipment and methods.<sup>39</sup> Ho and Needham have recently used an even wider selection of sources to provide a more detailed inventory of equipment and, with extraordinary critical acumen, to work out the first reconstruction of the historical development of the still which takes the contributions of all the great civilizations into account. While it would not be difficult for the authors to expand their monograph into a substantial book, it stands as a definitive survey.<sup>40</sup>

<sup>38</sup> Pages 198-199.

<sup>39</sup> The article cited earlier was originally published in *K'o-hsueh* 科學 (Science), 17 (1933):31-54.

<sup>40</sup> It would be particularly interesting to compare the equipment of the alchemist with that of the pharmacologist-physician, as an approach to the historical development of equipment other than the still. The extent of coincidence is immediately apparent from the list of essential types of drugs and apparatus for the doctor's laboratory given in Sun Ssu-mo's *Ch'ien chin*

## On the Reconstruction of Ancient Chinese Alchemy

One aspect of alchemical method, most relevant to the history of scientific thought, remains unexplored. Nowhere except in the original texts can one find any indication of how customarily quantitative relations were used, what factors conditioned their use, and what – if anything – the alchemists thought of them. These questions are not only central, but data is extremely abundant. While answers which command confidence must await painstaking study, the barest familiarity with the literature is enough to reveal that weight relations are far from uncommon, and that their significance is not merely pragmatic; more than one writer explicitly considers relative combining weights of reagents to be a comparative measure of activity.<sup>41</sup>

*Products and their evaluation.* The study of alchemy as a science is concerned above all with what the practitioner *thinks* he has made. From the standpoint of alchemy as a technology – and thus of its practical contributions to materia medica and to chemical industry – the objective identity of his preparations is completely pertinent. It is, for that matter, also pertinent to the comprehension of the psychological and religious aspects of alchemy. In a passage such as “When the medicine is done it will have a brilliant radiance. It will be of the shape of a pendant string of pearls or of colored silken threads. Again, its configuration will be that of stretched knotted netting. Its fresh brilliance dazzles the eye. Those who see it will, unawares, feel a shock,” the operator is evidently expected to be in a state of heightened awareness.<sup>42</sup> But awareness of what; what was he looking at? Many questions of this kind must be answered if Carl Jung’s brilliant but reductive application of psychology to alchemy is to be extended to

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*fang*, written in the 650’s – *Pei chi ch’ien chin yao fang* 備急千金要方 (Prescriptions worth a thousand; Edo igaku 江戸醫學 ed. of 1849), 1:36b.

<sup>41</sup> These matters will be discussed in a paper entitled “Quality and Quantity in Chinese Alchemy,” now in preliminary draft.

<sup>42</sup> See below, p. 181.



## Chinese Alchemy: Preliminary Studies

make sense of what went on in the laboratory.<sup>43</sup> What happened when actual alchemists took their elixirs, and how did their physiological reactions affect their successors' conceptions of immortality? Is the entire transcendental basis of the cult of immortality a classic manifestation of the "perennial philosophy," or can some of the alchemists' convictions be traced back to the hallucinations of mercury, lead, and arsenic poisoning? <sup>44</sup> This question and many like it, however uncongenial to most conventional historians of religion, are keys to the mature Taoist complex of physiological, mental, and spiritual approaches to individual salvation.

### *External Problems*

To talk about alchemy's connections with other departments of knowledge tends to obscure the fact that only an act of abstraction has separated it out in the first place. The point is rather to understand alchemy's role within the complex of Chinese thought. To make a statement which necessarily—because we know so little—is merely structural and ignores historical change, it appears that alchemy in its empirical aspect blends into medicine and alchemy, and in its deductive aspect is one of the several sciences which derive from what may be called loosely a common metaphysic. There remains in the complex another ingredient whose bonds to alchemy are particularly direct, and historically of overwhelming importance.

"Internal alchemy" is parallel in many ways to the "spiritual alchemy" of the West, which used the preparation of the

<sup>43</sup> C. G. Jung, *Psychology and Alchemy* (R. F. C. Hull, tr.; New York: Pantheon Books, 1953), and many of his other writings; see also the contribution of I. Bernard Cohen, "Metallurgical and Nonmetallurgical Alchemy," forthcoming in the *Proceedings of the Second Buhl International Conference on Materials* (held at Carnegie Institute of Technology, March 16, 1966).

<sup>44</sup> Ho and Needham, "Elixir Poisoning in Mediaeval China," p. 233, discuss Chinese knowledge of the symptoms of poisoning by these common elixir constituents.

## On the Reconstruction of Ancient Chinese Alchemy

Philosopher's Stone to stand for the process by which an individual passes through the "death of the soul" to rebirth and spiritual perfection. In China the language of alchemy was applied to various techniques of breath control whose aim was physical immortality—material resurrection of the integral personality in a new and imperishable body which is nurtured like an embryo by yogic disciplines within the old physique, just as the alchemist brings an elixir to maturity in a matrix of lead. The breathing techniques themselves are very ancient in China, certainly older than alchemy itself. The coincidence of aim and many formal similarities made it possible, once the language of alchemy was fully developed, to use it as an extended metaphor.<sup>45</sup> Finally the metaphor replaced the reality, and the old alchemical writings were either reinterpreted in terms of physiologic procedures (and even religious meditation once Buddhist influence made itself felt) or else dismissed as aberrations.<sup>46</sup> But was the success of the metaphor

<sup>45</sup> There is still no better description of early internal alchemy than in Waley, "Notes on Chinese Alchemy," pp. 15–16. The classic explication of immortality as the goal of breath control is to be found in Maspero, "Les Procédés de 'nourrir le principe vital,'" pp. 178–181; see also his "Essai sur le Taoïsme aux premiers siècles de l'ère Chrétienne," in *Le Taoïsme (Mélanges posthumes sur les religions et l'histoire de la Chine, II)*; Paris: Civilisations du Sud, 1950), pp. 96–97.

The alchemical metaphor was also applied to the Taoist sexual techniques which have been described most recently by R. H. van Gulik in *Sexual Life in Ancient China. A Preliminary Survey of Chinese Sex and Society from ca. 1500 B.C. till 1644 A.D.* (Leiden: E. J. Brill, 1961), esp. pp. 80–84. As the author of *Wang-wu chen-jen k'ou shou yin tan pi chueh ling p'ien* 王屋真人口授陰丹秘訣靈篇 (Marvelous secret method of feminine alchemy orally transmitted by the Realised Immortal of Mount Wang-wu—supposed to be set down by Liu Shou 劉守 in 763/779, but in no case later than the tenth century; *Yun chi ch'i ch'ien* 雲笈七籤, 64:14a) puts it, "The 'masculine alchemy' [*yang tan* 陽丹] leads to transcendence, and the 'feminine alchemy' [*yin tan* 陰丹] leads to longevity. Masculine alchemy is the cycling of elixirs; feminine alchemy, the art of cycling the semen."

<sup>46</sup> A late "alchemical" tract, much influenced by Buddhist spiritual disciplines, has been translated by Richard Wilhelm as *The Secret of the Golden Flower. A Chinese Book of Life* (London: Kegan Paul, 1931). The great indologist Jean Filliozat has recently addressed himself to the question

## Chinese Alchemy: Preliminary Studies

a major cause of the demise of the operative art, or did internal alchemy merely fill the gap as external alchemy lost its intrinsic vitality? Before this question can be answered we must know how successful alchemy was—that is, what was expected of it and how it was evaluated in terms of its ends.

There are, of course, many other central problems of alchemy's relation to its intellectual background. Alchemy was, like the other traditional Chinese sciences, moral; it was expected to generate human values as well as understanding of Being in its natural aspect. But to what degree did its theories ever break away in the direction of that objectivity which C. C. Gillispie, in an analysis of fundamental importance, has found to mark the watershed between ancient and modern in the development of each branch of science in the West? <sup>47</sup> The price of objectivity was a science completely indifferent to the dilemmas of moral choice. Was this price ever comprehended, and did anyone ever imply a willingness to pay it? Something which, glimpsed through the Procrustean framework of dialectical materialism, looks very much like the problem of objectivity turns out to be vital to the "scientific" Marxist comprehension of the scientific tradition. The subtlety with which the "idealist/materialist" dichotomy has been applied by some contemporary Chinese historians amounts, however, to using a blackjack where a lullaby would do:

the principles upon which alchemy based its explications of material transformation were founded upon the *yin-yang* and five-elements theories widespread at the time. This produced in the intellectual realm a complicated struggle between idealism and materialism. On

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of whether Taoist breath control antedates the corresponding Indian yogas. He suggests that while each system is peculiar to its culture, there are too many similarities to argue entirely independent development. At the same time, he is convinced that such common elements as the concern with retention of the pneuma and the use of certain positions go back too far in India to be imported from China. See his "Taoisme et Yoga," *Dân Việt Nam*, 3 (1949):113-120.

<sup>47</sup> *The Edge of Objectivity* (Princeton: Princeton University Press, 1960).

## On the Reconstruction of Ancient Chinese Alchemy

the whole, the use of *yin-yang* theory to explain the nature of material transformations is materialistic, while to use five-elements theory in constructing explanations is to have taken the road toward idealism. The reasons are these. The *yin-yang* theory is spontaneously dialectical, reflecting a universal law which unites the contradictions of the objective world. Particular concrete material transformations are necessarily subsumed by this universal law. The five-elements theory is pure materialism, although it has both a progressive and a retarded aspect. By its progressive aspect is meant the fact that it was generalized from the experience of production; this is true whether we consider the theory of the "mutual production" order or that of the "mutual overcoming" order [according to which the dominant elements succeed each other]. By the retarded aspect of the five-elements theory is meant the fact that it was unable to develop as production developed, becoming, on the contrary, gradually petrified, vainly incorporating farfetched material.<sup>48</sup>

In the course of being rendered conformable to the thought of Mao Tse-tung the concept of objectivity has lost both its vagueness and its pathos, and become a tool for marking off sides in the dialectical struggle toward the Millennium. The teleological view of the growth of science is not only perpetuated but made integral with the teleology of History; the external relations of alchemy reduce finally to its connections with the forces of production.

For those intellectually disqualified from taking advantage of this convenient simplification, there is no short cut to understanding the functions of alchemy in Chinese thought as a whole, the roles of the alchemist in Chinese society, and the significance of transmission from and to other cultures. There is nothing to be gained from essaying an inventory of concrete issues into which the large questions can be resolved, until we have begun surveying them more critically and in greater depth. Inventories of the sort I have provided earlier for internal problems, for that matter, have very little inherent value. They are too arbitrary, and few historians acute enough to be capable of substantial contributions will be satis-

<sup>48</sup> Chang Tzu-kao, *Chung-kuo hua-hsueh shih kao*, p. 77.

## Chinese Alchemy: Preliminary Studies

fied with someone else's schema. What matters is not so much which questions are plotted out as what suggestions can be made toward solving them. It is always true that the best possible questions for the next stage of investigation depend upon having formulated the best possible answers at the last stage.



## II

# *Tan Ching Yao Chueh:* The Tradition and the Book

When you know something, to know you know it; when you don't know something, to know you don't know it: that is knowledge.— Analects

STUDYING the alchemical treatises preserved in the Taoist Patrology is like strolling through the newly excavated site of a lost civilization. The monuments are there, once more open to the light of day. If their significance is to be made plain, however, we must find at least one document which can be deciphered, and use it as a point of departure from which to proceed through the rest in order of intelligibility.

The *Tan ching yao chueh* 丹經要訣 (Essential formulas from the alchemical classics), ascribed to the great seventh-century physician Sun Ssu-mo 孫思邈, is such a key.<sup>1</sup> A compendium of detailed and exceptionally lucid formulas for

<sup>1</sup> His name may also be transliterated somewhat more colloquially as "Sun Ssu-miao." I choose the more old-fashioned reading since it has been used in the past by a majority of the best scholars writing in Western languages, and thus is most useful for purposes of reference.

## Chinese Alchemy: Preliminary Studies

preparing elixirs of immortality (some of which are also recommended for treatment of specific diseases), augmenting certain scarce mineral substances, and “making” pearls, jade, and malachite, it also provides substantial specifications for, and instructions in the use of, alchemical laboratory equipment. That this treatise can be dated, even roughly and tentatively, means more than satisfaction of one’s desire for order. The identities of minerals and other drugs named in classical Chinese technical literature have shifted again and again. It is too much to expect that a substance named in an early work can be conclusively identified by so convenient a process as qualitative analysis of a sample appropriately labeled in a modern Chinese apothecary’s shop. To know the period of an alchemical treatise makes it possible to establish these identifications as completely as possible on the basis of contemporary texts—and, in this particular case, on the basis of nearly contemporary samples.

This is a necessary preliminary to the reconstruction of the chemical processes which were being exploited for alchemical ends. Once this content is understood, the lack of literary evidence will no longer be an insuperable bar to reconstituting the original relationships of the treatises which make up the alchemical tradition, and going on from there to write its history.

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### THE TRADITION OF THE *TAN CHING YAO CHUEH*

Despite the high rate of attrition inherent in an occult tradition, there remain over a hundred of these treatises, from half a millennium to two millenia old. Of the origins of Chinese alchemy we know nothing.<sup>2</sup> It is clear, at the same time, that

<sup>2</sup> See above, pp. 19–26.

## *Tan Ching Yao Chueh: The Tradition and the Book*

the earliest extant treatise, the *Chou i ts'an t'ung ch'i* 周易參同契 (The concordance of the Three; an apocryphal tradition of interpretation of the Book of Changes, A.D. 142?), is the fruit of long growth.<sup>3</sup> A blend of prose with doggerel in various meters, it is in effect a monograph devoted to the technical problem of phasing the alchemic process in a sequence of stages derived from the sixty-four hexagrams of the Book of Changes.<sup>4</sup> "The Three" are, as the *Ts'an t'ung ch'i* explains, the alchemical operations 爐火之事, the Taoist 黃老 (originally Cosmologist) theories which give them significance, and the system of the Changes which governs their dynamics.<sup>5</sup> The process involves two ingredients, which are sealed in a reaction vessel and subjected to the cyclically regu-

<sup>3</sup> The content of the treatise has been surveyed with great competence in an unpublished article by Ho Ping-yü. There is no translation sufficiently accurate that it can be recommended to one who does not control the original—nor, for that matter, has the preliminary task of producing an adequate critical edition of the patently battered text been done.

<sup>4</sup> This interpretation, which I doubt more critical study will affect, pervades the commentary most widely accepted as authoritative, that attributed to the Neo-Confucian master Chu Hsi 朱熹 (1130–1200) and printed in the *Ts'an t'ung ch'i k'ao i* 參同契考異. For a sample of text and commentary correctly paraphrased and clearly explained, see Joseph Needham, *Science and Civilisation in China* (Cambridge, England: At the University Press, 1954–), II, 330–331.

Chu Hsi, like many commentators of his time and practically all who came later, believed that at a deeper level the text was referring to breathing disciplines which had taken over the language of alchemy by his time. One of the greatest treatises purposely written to expound this "internal alchemy 內丹," Chang Po-tuan's 張伯端 *Wu chen p'ien* 悟真篇 (On the awakening to Realization, preface dated 1075), has been translated into English; see Tenney L. Davis and Chao Yun-ts'ung, "Chang Po-tuan of T'ien-t'ai, his Wu Chen P'ien, Essay on the Understanding of the Truth, a Contribution to the Study of Chinese Alchemy," *Proceedings of the American Academy of Arts and Sciences*, 73 (1939):97–117. The classic study of Chinese breathing yogas is Henri Maspero, "Les Procédés de 'nourrir le principe vital' dans la religion taoïste ancienne," *Journal Asiatique*, 229 (1937):117–252.

<sup>5</sup> *K'ao i* (*Ssu pu pei yao* 四部備要 ed., p. 24b). The concordance affirmed in this work is parallel to that of the Three Realms—heaven, earth, and man—in the Changes itself (p. 8a).

R. H. van Gulik, who hoped to publish what would have been a definitive



## Chinese Alchemy: Preliminary Studies

lated influence of heat, passing through a succession of coitions and alternating exaltations which culminate in the par-turition of a Cyclically Transformed Elixir of Immortality 還丹. One sees clearly throughout that the alchemist is constructing a microcosm and that, through the power of analogy, he is controlling the cosmic motion of *yin* and *yang*, the great feminine and masculine principles whose complementarity governs the rhythms of nature.

It is profoundly typical of Taoism that the alchemist did not seek control of process in order to change it, but merely to bring about material mutation at a rate so accelerated that he could observe it from start to finish.<sup>6</sup> This is the point of an extraordinary passage in an early medieval work: "Natural cyclically transformed elixir is formed when mercury 流汞, embracing lead, becomes gravid. Wherever there is cinnabar

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translation of the *Ts'an t'ung ch'i*, has recently thrown fresh light on its meaning in his *Sexual Life in Ancient China. A Preliminary Survey of Chinese Sex and Society from ca. 1500 B.C. till 1644 A.D.* (Leiden: E. J. Brill, 1961), pp. 80–84. He notes that "Since in the *Ts'an-t'ung-ch'i* the descriptions of the alchemistic *opus* and of sexual congress constantly merge and overlap, most passages can be rendered adequately only by a double translation, namely one version that interprets the text in its alchemistic sense, and a second that gives the sexual meaning. To many passages even a third translation should be added, in order to render the implied philosophical significance regarding the cosmic order and one of its aspects, viz. good government."

This understanding is the fruit of great erudition, and is unarguable. I would merely prefer to shift the emphasis, for it seems to me that the ultimate significance of the book is cosmological. The model presented may be, and indeed has been, read indifferently as alchemic, sexual, or concerned with conventional breath yogas. Which of these possibilities the author intended—or whether ambiguity was his purpose—is a question which remains to be studied historically. One must distinguish, as van Gulik does, the abstractly sexual origin of the *yin-yang* concept from the very specific content of the Taoist sexual disciplines.

<sup>6</sup> The view of alchemy as the acceleration of natural process in the material sphere has been brilliantly applied to the various traditions of the world and derived from a pre-philosophical matrix in Mircea Eliade, *Forgerons et alchimistes* (Paris: Flammarion, 1956), an English version of which has appeared under the title *The Forge and the Crucible* (Stephen Corrin, tr.; New York: Harper, 1962).

## *Tan Ching Yao Chueh: The Tradition and the Book*

there also are lead and silver. In four thousand three hundred and twenty years the elixir is formed.”<sup>7</sup>

The process done, of course there remained a product, which could be used for public or private ends just as human society had an unquestioned right to the things that Nature made in her own good time. But the *Ts'an t'ung ch'i* is not a handbook of elixir manufacture; it is, like many works in the Alexandrian corpus, a philosophical study and an exploration of mysteries. The theoretical strain which it represents may be traced through more than a thousand years of Chinese alchemy, developed in commentaries on the *Ts'an t'ung ch'i*,<sup>8</sup> in new studies of *yin-yang* and five elements correspondences as the basis of material interaction,<sup>9</sup> and in ever more complex chemical

<sup>7</sup> *Tan lun chueh chih hsin chao* 丹論訣旨心照, a work of the tenth century or earlier, preserved in *ch.* 66 of the Sung Taoist encyclopedia *Yun chi ch'i ch'ien* 雲笈七籤 (ca. 1023; *Tao tsang* 道藏, vols. 677-702), p. 12b. The same treatise also occurs independently in *Tao tsang*, vol. 598, where the character “*chien* 蟻” occurs in the title instead of “*chao*.” Both were without doubt substituted for the synonym “*ching* 鏡” in order to avoid this homophone of the personal name 敬 of the grandfather of Emperor T'ai-tsu (960-976) of the Sung. Unfortunately, the nonobservance of other early Sung taboos disqualifies this as a factor in dating the treatise. See Ch'en Yuan 陳垣, *Shih hui chü li* 史諱舉例 (Examples of avoidance of name taboos in history, 1928; reprint, Peking: Science Press, 1958), p. 154.

<sup>8</sup> Fourteen major commentaries are described in Yuan Han-ch'ing 袁翰青, “*Chou i ts'an t'ung ch'i—shih-chieh lien-tan shih shang tsui ku ti chu-tso* 周易參同契—世界煉丹史上最古的著作” (*Chou i ts'an t'ung ch'i*—the oldest document in the history of world alchemy), in *Chung-kuo hua-hsueh shih lun-wen chi* 中國化學史論文集 (Collected papers on the history of Chinese chemistry; Peking: San Lien Bookstores, 1956), p. 171.

<sup>9</sup> These have been surveyed in the indispensable paper of Ho Ping-yü and Joseph Needham, “Theories of Categories in Early Mediaeval Chinese Alchemy,” *Journal of the Warburg and Courtauld Institutes*, 22 (1959): 173-210. Note that their attribution of *Wu lei hsiang kan chih* 物類相感志 (On the mutual resonance of things according to their categories) to the Sung poet Su Tung-p'o 蘇東坡 (pp. 175, 193) is erroneous. He is confused with the Sung monk Tsan Ning 贊甯 (919-1001), as is demonstrated in Mo Yu-chih's 莫友芝 annotated bibliography *Ch'ih ching chai ts'ang shu chi yao* 持靜齋藏書紀要 (1867-1869; Wen-hsueh shan fang 文學山房 ed.), B:22a-22b.

## Chinese Alchemy: Preliminary Studies

processes involving cyclical treatment of two major ingredients.<sup>10</sup>

There was a parallel tradition, usually but not always distinct, which seems to have been more directly concerned with ends than means. It was well developed by the time of the *Ts'an t'ung ch'i*, whose author castigates "those many scholars among the uninitiated . . . who waste the fire and squander their wealth . . . blindly and arbitrarily carrying out [the Work], their approach not based on knowledge of causation 端緒無因緣, their measurements lacking system."<sup>11</sup> What these luckless puffers had to say for themselves remains beyond our ken, for the earliest eclectic alchemist whose writings have come down to us, the peerless Ko Hung 葛洪 (283–343),<sup>12</sup> repeatedly assures the reader that, while "the uninitiated" pursue the rewards of alchemy as avidly as ever, his credentials (the identities of the masters whose teachings have been transmitted to him as a disciple) are unimpeachable. Ko's reiterated jabs at the low state of contemporary Taoism and his constant assurances of his own unique knowledge, purity, and lack of

<sup>10</sup> The alchemical treatise cited in footnote 7 is particularly accessible and informative, allowing the identification of the two ingredients as mercury refined from cinnabar and silver separated from argentiferous lead. Sulphur takes the place of silver in some traditions. Equally deserving of translation and analysis is Yang Tsai's 楊在 pasticcio *Huan tan chung hsien lun* 還丹衆仙論 (Pronouncements of the immortals on the cyclically transformed elixir, 1052; in *Tao tsang*, vol. 113), which offers such treasures as a statement on how the formation of minerals is influenced by the planets, and an exceptionally graphic description of elixir poisoning.

<sup>11</sup> *K'ao i*, p. 12b. The commentator says (note the mispunctuation in the *Ssu pu pei yao* edition): "This refers to those who make the external elixir [that is, those engaged in operative alchemy rather than in 'nourishing the vital principle']. If the ingredients are not [selected according to the theory of] matching categories, the Treasure will not be formed."

<sup>12</sup> Alfred Forke, "Ko Hung, der Philosoph und Alchemist," *Archiv für Geschichte der Philosophie*, 41 (1932):115–126. Ko's dates have been positively determined for the first time by William Hung 洪業 in his "Tsai shuo *Hsi ching tsa chi* 再說西京雜記" (Further notes on the *Hsi-ching-tsa-chi*), *Li-shih yü-yen yen-chiu-so chi-k'an* 歷史語言研究所集刊 (The Bulletin of the Institute of History and Philology, Academia Sinica), 34.2 (1963):397.

## *Tan Ching Yao Chueh: The Tradition and the Book*

self-interest smack ever so slightly of monomania. What matters is that they set a stylistic fashion adhered to by the better sort of alchemist in subsequent centuries—as the reader will detect in the animadversions of Sun Ssu-mo.

One need not begrudge Ko his modicum of peevishness, for his *Pao p'u tzu nei p'ien* 抱朴子內篇 provides an unequaled picture of the esoteric Taoist arts of his time.<sup>13</sup> Two chapters of its twenty are devoted to alchemy. The fourth, “On liquefied gold and cyclically transformed elixirs 金丹 [= 金液還丹],” provides a great variety of formulas (most so sketchy or evasive as to defy reconstruction) for elixirs of immortality, potable gold among them. The function of these elixirs is the generation of a new physical but immortal self (embodying the old personality) which, leaving the adept’s corpse like a butterfly emerging from its chrysalis, goes off to live among other immortals; death at an advanced age is beside the point. That this “liberation from the corpse 尸解” had taken place was verified when the dead body, light in weight as an empty cocoon, did not decay after death. It is not surprising, therefore, that Ko’s elixirs should be largely based on arsenic and mercury compounds, which have excellent embalming properties.<sup>14</sup> Some preparations, considered less efficacious, provide mere longevity or rejuvenation, cure disease, or allow the adept to raise the dead and perform similarly flamboyant miracles. Ko also provides instructions for the operation known in Western alchemy as “projection”—the casting of a spatula-full of elixir upon a large quantity of quicksilver, which is forthwith transmuted into “red gold” or silver.<sup>15</sup>

<sup>13</sup> The book has been completely translated for the first time by James R. Ware in *Alchemy, Medicine, Religion in the China of A.D. 320: The Nei P'ien of Ko Hung (Pao-p'u tzu)* (Cambridge: The M.I.T. Press, 1966).

<sup>14</sup> In the formulation of this hypothesis, I owe much to conversations with Ho Ping-yü. It is almost developed in Ho Ping-yü and Joseph Needham, “Elixir Poisoning in Medieval China,” *Janus*, 48 (1959):236.

<sup>15</sup> *Pao p'u tzu nei p'ien (P'ing chin kuan ts'ung-shu* 平津館叢書 ed. of 1885), 4:14b and 16:9b. The page numbers of this Chinese text are indicated in the margins of Ware’s translation.

## Chinese Alchemy: Preliminary Studies

The sixteenth chapter, "On the yellow and the white 黃白," reveals the secrets of preparing artificial gold and silver, "made so that, by ingesting them, one becomes an immortal; the object is not to get rich."<sup>16</sup> In other words, this chapter is devoted to a special class of elixir, with a few recipes for attaining various sorts of invulnerability, confounding a hostile army, reversing the course of a stream, and so on. Ko makes it quite clear here, as in the fourth chapter, that he has never had the means to try any of the formulas he transmits, that he has simply compiled a selection out of the voluminous books of secrets passed down to him by his teacher.<sup>17</sup>

In another case such ingenuous disclaimers might be taken as a hint that the book is primarily a work of the imagination — and in the case of a book so influential, as a hint that it begins a tradition instead of continuing one. The *Pao p'u tzu*, nevertheless, is precisely what it has so often been represented as: the most valuable alchemical book remaining from a period of four hundred years. Whether Ko prepared the elixirs or not is immaterial, for someone before him surely did. Insofar as the formulas can be deciphered, they make sense chemically.<sup>18</sup> Most important, they show that by Ko Hung's time both the wet and dry methods of treatment prominent later on had been worked out. Here is a formula for artificial gold from "On the yellow and the white"; the first part prefigures Sun

<sup>16</sup> 16:4b.

<sup>17</sup> 4:2a and 16:1b.

<sup>18</sup> Tenney Davis suggested that the preparation of "gold" from tin, "red salt," and lxivium (16:7b–8a) actually yielded mosaic gold— $\text{SnS}_2$ ; see Lu-ch'iang Wu, "An Ancient Chinese Alchemical Classic, Ko Hung on the Gold Medicine and on the Yellow and the White . . . with an Introduction, etc., by Tenney L. Davis," *Proceedings of the American Academy of Arts and Sciences*, 70 (1935):232 and 264–265. This is reasonable, since only a small yield is specified; *jung yen* 戎鹽, of which "red salt 赤鹽" is a type, generally contains considerable sulphates (see Appendix G for identifications of reagents).

The most interesting publication so far on the chemistry of the *Pao p'u tzu nei p'ien* is Wang K'uei-k'o 王奎克, "Chung-kuo lien-tan-shu chung ti 'chin yeh' ho hua ch'ih 中国炼丹术中的'金液'和华池"

## Tan Ching Yao Chueh: The Tradition and the Book

Ssu-mo's working methods, just as the second part ("Method for making cinnabar solution") is one of the earliest examples of the characteristic Chinese method, studied by Needham and his associates, for bringing minerals into solution by use of a weak inorganic acid.<sup>19</sup>

First take as much as desired, but no less than five *chin* [1.2 kg.],<sup>20</sup> of realgar from Wu-tu, vermilion-colored as a cockscomb, lustrous and without admixed stones. Pulverize it, mix it with oxgall, and

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("Liquefied gold" and "flower trough" in Chinese alchemy), *K'o-hsueh shih chi-k'an* 科學史集刊 (Journal of the history of science, Peking), 7 (1964):53-62. Wang, attempting to identify the ingredients of "liquefied gold" (4:14a), is unable to resolve an ambiguity in the text, but either possibility fits a feasible process – which occurs elsewhere in alchemical sources – for making gold potable. In one case gold would be amalgamated and the mercury dissolved out with nitrate ions in weak acid solution; very little mercury would remain in solution, and little or no gold in suspension, but the golden color of the liquid (due to other ingredients, and attested in a later treatise) would convince the alchemist he had succeeded. The other possibility is that one of the questionable substances is a fruit of the *Rubus* family rather than mercury, so that – if, contrary to specifications, air is present – the high content of cyanogenetic glucosides could conceivably produce an aurocyanide (Au[CN]<sub>2</sub>) solution.

A less successful but still interesting early attempt to deal with several gold recipes may be seen in Masumi Chikashige, *Alchemy and Other Chemical Achievements of the Ancient Orient. The Civilization of Japan and China in Early Times as Seen from the Chemical Point of View* (Tokyo: Rokakuho Uchida, 1936), pp. 47-54. Chikashige explained them by the hypothesis that the red bole which they all used was gold-bearing. The Shōsōin specimen of red bole, which dates from a couple of centuries after Ko's time, and which Chikashige thought might contain "the secret-key of alchemy," has been analyzed since the Second World War, for Imperial Possessions are no longer sacrosanct in Japan. It contains no gold. See Masutomi Junosuke 益富壽之助, *Shōsōin Yakubutsu o chūshin to suru kodai sekiyaku no kenkyū* 正倉院藥物を中心とした古代石薬の研究 (A study of ancient mineral drugs based on the drugs preserved in the Shōsōin; Kyoto: Nihon kōbutsu shumi no kai, 1957), p. 137.

<sup>19</sup> *Pao p'u tzu nei p'ien*, 16:7a-7b. As in all other cases, this is my translation; cf. Wu, p. 264. See Ts'ao T'ien-ch'in, Ho Ping-yü, and Joseph Needham, "An Early Mediaeval Chinese Alchemical Text on Aqueous Solutions," *Ambix*, 7 (1959):122-158.

<sup>20</sup> In Ko's time a *chin* was about 237 grams, a *tou* about two liters, and a *fen* about 1.4 mm. For references see Appendix B.

## Chinese Alchemy: Preliminary Studies

heat to dryness. Take a red-clay pot of one *tou* [2 l.] capacity. First spread Turkestan salt [an impure halite (NaCl)] and powdered chalcantite [native  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ] in the pot to a thickness of three *fen* [4 mm.], then a layer five *fen* [7 mm.] thick of the realgar, then add more of the Turkestan salt [mixture], alternating in this fashion until all [the realgar] has been used. Then add a two-*ts'un* [28 mm.]-thick layer of crushed pieces of charcoal the size of jujube pits. Mix a lute from earthworm excreta and Turkestan salt, spreading it over the outside of the pot. Cover the container [mouth-to-mouth] with another pot and lute the ensemble, forming a layer [of lute] three *ts'un* [4.2 cm.] thick, so that there will be no leakage. Dry in the shade for a month. Then warm over a fire of horse manure for three days and three nights. When the vessel has cooled, open it, take out the contents, and fire them in a forced-air furnace to bring down the copper. The copper will flow like newly smelted copper or iron. Then this copper is to be cast into the form of a tube. When the tube is ready, fill it with cinnabar solution. (Further warm it over a fire of horse manure for thirty days. Open it and heat in a forced-air furnace. When the metal is obtained, make it into a tube, which is further filled with cinnabar solution.)<sup>21</sup> Then warm it over a fire of horse manure for thirty days. Open it, extract [the contents], powder and smelt [them].<sup>22</sup> Take two parts, and add one part of raw cinnabar and mercury. (Mercury 汞 is quicksilver 水銀). It will immediately harden into gold, lustrous and of a beautiful color, suitable for making nails.<sup>23</sup>

*Formula for making cinnabar solution.* Prepare one *chin* [237 gm.]

<sup>21</sup> The two passages which I have enclosed in parentheses are considered by the editor Sun Hsing-yen 孫星衍 (1753–1818) to be early annotations which have been incorporated into the body of the text—the first because it is apparently a mere paraphrase of the four sentences immediately preceding (which is probably true, but repetitious processes do occur and are so described elsewhere, and he assumes the discrepancy between “three” and “thirty” is due to faulty transmission); and the second because it is in the form of a gloss (I agree).

<sup>22</sup> Since it is clear from what follows that the material must be liquefied at this point, I take the liberty of emending “*chih* 治,” which occurs in all texts I have seen, to “*yeh* 冶.” Without this emendation the last clause would simply read “and powder them.”

<sup>23</sup> The odd term “gold nails” occurs twice in Chapter XVI. Chang Tzu-kao, *Chung-kuo hua-hsueh shih kao*, p. 82, makes the sensible suggestion that “nails 釘” is an error for the visually very similar “needles 針.” It is possible that Ko is using *ting* to mean not nails but gold ingots, a rare sense which appears in the etymological dictionary *Shuo wen chieh tzu* 說文解字 (A.D. 121; *Shuo wen chieh tzu ku lin* 詁林, Taipei: Commercial Press, 1959), X (ch. 14A), 6253–6254.

## *Tan Ching Yao Chueh: The Tradition and the Book*

of cinnabar and put it into a tube of green bamboo, adding a mixture of two *liang* [29.6 gm.] each of chalcantite and saltpeter above and below the cinnabar. Close the ends of the tube and seal them with lacquer-impregnated pellets [?漆骨丸], which must be allowed time to dry. Immerse the tube in strong vinegar and bury the ensemble three *ch'ih* [42 cm.] deep in the earth. In thirty days a solution will be formed. It will be scarlet in color and bitter in taste.

This rather involved formula is as interesting in its deployment of techniques as any of the processes which lie at the foundations of Alexandrian alchemy. The product is an alloy, in which copper is lightened with arsenic to resemble gold. One result of the complexity of the procedure is that the amount of arsenic is kept very low; if there were more, the alloy would more closely resemble silver. That other physical characteristics (hardness, specific gravity, and so on) differed could be readily forgiven, for they also varied—within a narrower range—in native gold.<sup>24</sup>

The arsenic and copper salts are evidently reduced with the charcoal and oxgall, the Turkestan salt acting as a flux and contributing very minor metallic constituents to the final alloy. The initial heating in a hermetically sealed vessel is at too low

<sup>24</sup> Even in the West, where the touchstone and Archimedes' principle of displacement were widely known, and the fineness of gold had been tested by assay since Babylonian times (Martin Levey, *Chemistry and Chemical Technology in Ancient Mesopotamia*, Amsterdam: Elsevier Publishing Company, 1959, pp. 190–192), alchemists and their patrons through the ages have accepted inferior alloys as gold. One is reminded of the story in the Old Standard History of the T'ang (*Chiu T'ang shu* 舊唐書, Palace ed., 191:14b–15a) about Meng Shen 孟詵 (ca. 621–ca. 718), a younger acquaintance of Sun Ssu-mo. Liu I-chih 劉禕之, who at the time was Vice-President of the Grand Imperial Secretariat, had been granted some gold by the female despot Wu Tse-t'ien, and was proud enough of it to display it to Meng. Meng "said to I-chih, 'This is alchemical gold 藥金! If a fire is put on it there will be particolored *ch'i* [= smoke or flame?]. The result of a trial was as predicted. Tse-t'ien heard of this and, displeased, had Meng reassigned [away from the capital] on a pretext.'" This anecdote is interesting partly because it seems to be describing a flame test, and partly because it indicates that the disillusionment of credulity was rare enough to be notable.



## Chinese Alchemy: Preliminary Studies

a temperature to effect the reduction. This operation,<sup>25</sup> given in the *Ts'an t'ung ch'i* tradition a philosophical significance close to that of techniques of incubating the cosmogonic egg in Western alchemy, was thus maintained as much for ritual (or thaumaturgical) as for practical reasons, just as in Chinese astronomy the ritual associations of the gnomon perpetuated its use for solstitial measurements for almost two millennia after inherently superior armillary instruments had become available.<sup>26</sup> It is, then, in the forced-air furnace that the actual smelting takes place, yielding a white alloy of copper and arsenic—assuming that there is sufficient access of air to oxidize the speiss and matte. The tube into which this alloy is cast is a forebear of the Chinese chemically reactive container, common in later laboratory practice.<sup>27</sup>

The reactivity of the tube accounts for its utility, since, as is implied but not spelled out in the text, only its contents are used in the last step. These contents are “cinnabar solution” (a mixture of hydrogen, copper, arsenic, mercury, sulphate, nitrate, and acetate ions) which, as it concentrates in the course of the slow heating, attacks the inside of the tube. A very small amount of arsenic and copper are thus brought into solution. The final smelting yields a copper (from the chalcantite and the tube) presumably containing just enough arsenic to lighten it to what would be acceptably—by necessarily lenient standards—the color of gold. The mercury and mercury

<sup>25</sup> Ho Ping-yü and Joseph Needham, “The Laboratory Equipment of the Early Medieval Chinese Alchemists,” *Ambix*, 7 (1959):69–71.

<sup>26</sup> Shigeru Nakayama, “Accuracy of Pre-Modern Determinations of Tropical Year Length,” *Japanese Studies in the History of Science*, 1963, no. 2, pp. 105–106.

<sup>27</sup> Ho and Needham, “Laboratory Equipment,” p. 69.

A container made from (or lined with?) sea salt is mentioned in a recipe ascribed to Ko in Li Shih-chen's 李時珍 Great Pharmacopoeia (*Pen-ts'ao kang mu* 本草綱目, first printed 1596; Basic Sinological Series ed.), 9:61.

## *Tan Ching Yao Chueh: The Tradition and the Book*

salts would be driven off at the melting point of the alloy, and are therefore superfluous.<sup>28</sup>

There is at least heuristic value in the conception of two alchemical traditions, one more concerned with elaborating and applying cosmological theories and the other more intent on increasing the repertory of elixirs and techniques. One finds, of course, certain alchemists whose work cannot be forcibly assigned to either tradition, who demonstrate that even what appears to modern eyes as an eclectic and pragmatic approach was solidly built upon the fundamental concepts of Chinese science. Such a one is Ch'en Shao-wei 陳少微, who probably lived within a century of Sun Ssu-mo.<sup>29</sup> Like the author of the *Ts'an t'ung ch'i*, he was seeking to explain a cinnabar process in dualistic terms. Unlike his predecessor, he no longer restricted the second member of the duality to "philosophical lead 真鉛" or the like; instead, as can be seen from this short excerpt from an extraordinarily interesting book, Ch'en's aim was to work out a theory of categories for a whole class of substances: "The Canon says: 'The essence of *yang* is [the element] Fire; that of *yin* is Water. When

<sup>28</sup> There are ambiguities in the text, which I have resolved by accepting Sun Hsing-yen's emendations (see note 21) and supplying objects for two verbs as noted in brackets. Both of these decisions are defensible but not dictated by purely philological necessity. The final argument for them is that no other reading would give an alloy resembling gold. It would be wise in any case to consider my reconstruction of the process conjectural.

<sup>29</sup> The preface of the work to be quoted below begins, "From the beginning of the T'ien-yuan 天元 period on, I roamed from Mount Heng to Huang-lung 黃龍." There was no T'ien-yuan period in China until after the Yuan, which is too late, for the work is guaranteed a date before the eleventh century by inclusion in *Yun chi ch'i ch'ien*, and is in fact listed in the bibliographical treatise of the New Standard History of the T'ang, *Hsin T'ang shu* 新唐書 (Palace ed.), 59:10a. There are two immediate possibilities:

1. Emperor Hsuan of the Northern Chou, after turning the throne over to his son in 579 (see below, p. 97), took the title "T'ien-yuan Emperor." Although the official reign title was Ta-hsiang 大象, it is conceivable that a writer who remained outside official circles could make such a mistake.

## Chinese Alchemy: Preliminary Studies

*yin* and *yang* control each other, Water and Fire are mutually upholding 持. Thus we know that ice and coals cannot exist together, and that decay and flourishing each has its place. Now cinnabar is the essence of *yang*, and must be controlled by *yin*. That by which *yin* controls is [the element] Water, so it is necessary to use laminar or nodular malachite, rock salt, epsom salts, selenite 玄英, and/or marble [?化石].”<sup>30</sup>

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2. The T'ang Emperor Hsuan-tsung, when he came to the throne in September/October 712, adopted the reign title Hsien-t'ien 先天. In December 713/January 714 it was changed to K'ai-yuan 開元. In 742 the title T'ien-pao 天寶 was adopted. Since the latter two periods are often referred to collectively by their first characters as K'ai-t'ien, this argument goes, it is possible that the first two periods, or more specifically the transition period between them, was referred to by combining their *last* characters.

These two arguments are developed by Chang Tzu-kao (*Chung-kuo hua-hsueh shih kao*, p. 116), who favors ca. 713 as the date meant by Ch'en because the late sixth century “seems too early.” Although on similarly impressionistic grounds I would be inclined to agree with him, neither solution is very compelling, and it is only prudent to consider the puzzle still unsolved.

There is the additional problem that the treatise purports to have been orally transmitted by “Wu the Heavenly Master 吳天師” to one “Ting the Realized Immortal,” who committed it to writing. Finally an unnamed “perfectly Realized man 至真之人” bestowed the treatise upon Ch'en Shao-wei. Now “Celestial Master” is the hereditary title of the “Taoist popes,” all of whom were surnamed Chang, and thus would not be lightly bestowed upon others. The only “Wu the Celestial Master” known to me is Wu Yun 吳筠, a highly connected T'ang Taoist who died in 778 (*Chiu T'ang shu*, 192:13b-14b; *Hsin T'ang shu*, 59:9a and 196:10b-11a). Clearly, if Wu died in 778 and his lifespan was not greatly supernormal, the line of transmission is too long for Ch'en to have encountered his benefactor in the 740's. This throws even greater doubt on the datings proposed, and suggests further investigation of the possibility that “T'ien-yuan” is actually the Japanese reign title Tengen (978-983). Such a hypothesis involves too many difficulties of its own, however, to be adopted without solid proof.

<sup>30</sup> *Ch'i fan ling sha lun* 七返靈砂論 (On the sevenfold-recycled numinous cinnabar; *Yun chi ch'i ch'ien*, ch. 69), p. 8a. This work appears separately in the Cheng-t'ung Patrology (vol. 586) under the title *Ta tung lien chen pao ching hsiu fu ling sha miao chueh* 大洞鍊真寶經修服靈砂妙訣 (Marvelous oral formula for alchemical preparation of numinous cinnabar, from the Great Void Canon on Purification of the Realized Treasure). It is listed under approximately the same title (大洞鍊真寶經修伏丹砂妙訣) in the bibliographical treatise of the New T'ang History (59:10a).

## *Tan Ching Yao Chueh: The Tradition and the Book*

Although it is clear that the distinction between alchemy as a protoscience and alchemy as an art defines two ends of a continuum, not two mutually exclusive poles, Sun Ssu-mo's *Tan ching yao chueh* is an exceptionally pure example of the pragmatic tendency. The emphasis is entirely on the concrete measures required to attain a desired result, without resort to explications in terms of the categories of Chinese natural philosophy. Since it is precisely these categories which we understand least, Sun's is among the most readable of alchemical treatises, and a natural beginning for their exploration. Like most treatises which are collections of formulas, *Tan ching yao chueh* is imbued with its author's medical learning. While the attainment of immortality was Sun's paramount goal, the lengthening of life and the cure of a wide spectrum of diseases were also of great concern. Finally, despite the author's perfectly conventional Taoist disdain for wealth and power for their own sakes, there is an unexplained group of recipes for augmenting brass and making artificial white jade, pearls, and malachite, with no word of explanation as to what noneconomic application these preparations might have. In point of their theoretical irrelevancy they are reminiscent of the "invulnerability" formulas of Ko Hung. There is no reason to impugn Sun's sincerity, for his medical writings express in great depth an entire unconcern with personal advantage. Perhaps it would be fairest to suppose he felt that, so long as such recipes existed, they might potentially be valuable to one of his successors, and that, since his book was meant for personal transmission from teacher to disciple, there was in any case no danger of misuse.

Not only does Sun's treatise afford an entree into the lost—and, even in its prime, recondite—tradition of Chinese alchemy, but it is inherently of exceptional interest to the amateur of ancient chemistry. There is no work in the literature in which the laboratory operations and reagents can be identified with equal confidence, and hence none which can be given

## Chinese Alchemy: Preliminary Studies

quite so trustworthy an English rendition. The only work which rivals it is clearly cognate, and the two are mutually illuminating, as will appear further on.

The *Tan ching yao chueh* is as close to a modern laboratory handbook as anything we are likely to find in ancient literature. Following a preface and a catalogue of elixir names, there is a set of detailed specifications for necessities of the laboratory, including the "six-one" lute which was universally employed in Chinese pharmacology and alchemy for the hermetical sealing of reaction vessels. Finally, there are the recipes themselves: ingredients grouped at the beginning, with weight and advance preparation clearly noted, and perspicacious, concise directions for compounding and using the products. This rational and convenient form of presentation appears also in Sun's medical treatises.

There are still more fundamental indications in the treatise that alchemy was an integral part of medicine. The alchemist derived his means, the range of elixir ingredients as well as the repertory of laboratory techniques, from pharmacology.<sup>31</sup> His processes are in general more complex, and there is more

<sup>31</sup> There is a list of animal, vegetable, and mineral simples in Sun's *Ch'ien chin i fang* 千金翼方 (Revised prescriptions worth a thousand; reprint based on the edition of 1307, Peking: People's Hygiene Press 人民衛生出版社, 1955), pp. 1-5, but how much of it is Sun's and how much the work of his Sung redactors (see below, pp. 137-140) cannot readily be ascertained. An almost equally valuable and somewhat more trustworthy source is Su Ching's 蘇敬 New Pharmacopoeia of 659 (*Hsin hsiu pen-ts'ao* 新修本草). A Japanese MS. dated 731, which includes about half the text, was printed from a copy in 1889 and reprinted in 1957 (Shanghai Hygiene Press). While it is delightful to have a text of such distinguished pedigree at hand, the very copious quotations in *Ch'ung hsiu Cheng-ho ching shih cheng lei pei yung pen-ts'ao* 重修改和經史證類備用本草 (Revised convenient pharmacopoeia, with classifications verified from the classics and histories, printed 1249; photographic reproduction of first printing, 12 vols., Peking: People's Hygiene Press, 1957) are considerably less corrupt and more readable. Note that the edition of the latter work in the series *Ssu pu ts'ung k'an* 四部叢刊, which also purports to be a photographic reproduction of the edition of 1249, is in reality based on a reprint of 1468.

## *Tan Ching Yao Chueh: The Tradition and the Book*

consistent use of mercury, sulphur, and salts of mercury and arsenic, and relatively little employment of herbs. Doses of inorganics are generally higher. On the other hand, there is no chemical manipulation, only an occasional ingredient, and no principle of administration which does not also appear in the medicine of the time. Perhaps the best illustration of this essential congruity is the fact that perfectly typical directions for preparing one of the elixirs named in Sun's elixir catalogue are given in his *Ch'ien chin fang* 千金方 (Prescriptions worth a thousand).<sup>32</sup>

Finally, *Tan ching yao chueh*, which dates from one of China's most cosmopolitan periods, contains much that is relevant to the question of borrowing between cultures. One is often confused in such matters by the difficulty of distinguishing general awareness from individual cases of appropriation. Here as throughout his writing, for instance, Sun uses such Buddhist catchwords as "a treasure of Brahmaloaka 梵天寶," but this is no more than a fashion of the time. No direct influence on his alchemy is discernible. Only because one finds in his medical works considerable incantations in Sanskrit or a similar language (transcribed in Chinese characters, of course) is one justified in suspecting a component from India which was not simply in the air at Ch'ang-an. Sun was also familiar with the products of Sassanian Persia; zingar and Persian brass are prominent among his materials. This does not, however, prove the existence or determine the direction of alchemical transmission. The fact that Sun's selection of

<sup>32</sup> Edo igaku 江戸醫學 ed. of 1849, reproducing a block print of ca. 1147, 12:29a-32a. The title is given as *Pei chi ch'ien chin yao fang* 備急千金要方. See below, p. 68.

It is impossible to do the title full justice with any one rendering. Sun explains it in the Preface to *Ch'ien chin fang*: "Human life is of the very highest value, surpassing that of a thousand units of gold. A prescription which saves it is of greater worth still. That is the reason for the name of this book." A freer translation which makes the implication unmistakable is "Lifesaving prescriptions."

## Chinese Alchemy: Preliminary Studies

minerals was almost identical to that of, say, al-Rāzī is due partly to the fact that so many of them originate in Central Asia, between China and Persia, and partly to the continuous brisk trade between the two civilizations in Sun's time.<sup>33</sup>

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### THE TEXT OF THE *TAN CHING YAO CHUEH*

Incorporation into the complex of Taoist arts has preserved alchemy intact, like a mummy, for the centuries since its vitality expired. As usual in seeking to comprehend the Chinese intellect, one does best to set aside the Western taste for clear-cut doctrinal affiliations. Alchemy is less an offshoot of Taoist philosophy than a graft on the amorphous body of popular Taoism. It does not follow, again, that the conception of nature alchemy reflects is in any important respect irreconcilable with that of the sort of conventional Chinese whom we call a Confucian. His attitude would most often be one of limited interest (since he would likely be too much of a humanist to be deeply concerned with natural philosophy for its own sake) and distaste for the superstitious accretions which became prominent as alchemy's association with Taoism ran its course. Alchemy was welcomed into Taoism in part for the light it threw on natural process—the *Tao*—but rather more, one suspects, because of its promise of immortality. It was, on this account, as central or as peripheral as the various breathing yogas, dietary regimens, and sexual disciplines which offered the same prize. In Taoist hagiography, the dignity of "Immortal" need carry no further specification as to means of attain-

<sup>33</sup> Al-Rāzī's materials have been detailed in J. R. Partington, "The Chemistry of Rāzī," *Ambix*, 1 (1938):192-194. All except sal ammoniac (which is mentioned earliest in China, in the *Chou i ts'an t'ung ch'i*) were known to the Greeks. Al-Rāzī's apparatus has little in common with that of contemporary Chinese alchemists.

An excellent study of Chinese importations in the T'ang is Edward H. Schafer, *The Golden Peaches of Samarkand. A Study of T'ang Exotics* (Berkeley and Los Angeles: University of California Press, 1963).

## *Tan Ching Yao Chueh: The Tradition and the Book*

ment. To what degree the alchemical treatises in the present Taoist Patrology are a representative selection, or—to refine the question—what the basis of their selection was, is a problem for the solution of which we lack adequate evidence. We are unable to examine the rejects. There is so much variety in philosophical depth, chemical interest, magical and fanciful content, and even literary style, that one suspects the editors of the Cheng-t'ung *Tao tsang* 正統道藏, the extant Patrology (printed 1444 or 1447),<sup>34</sup> were altogether indiscriminate, and that every treatise still available to them in the midfifteenth century was included. No considerable new document of early operative alchemy has been found outside the Patrology.

The Patrology of the Cheng-t'ung reign period was by no means the first great attempt to collect and reprint the canonical works of Taoism in a format derived from that of the Buddhist Tripitaka. It was rather the last of a series of major compilation projects spread over seven hundred years. The first printed anthology, the *Wan shou tao tsang* 萬壽道藏 (printed between 1111 and 1117), took as its nucleus 4565 *chüan* (the Cheng-t'ung Patrology comprises 5305 *chüan*) collected and copied a century earlier under the direction of

<sup>34</sup> There remain only two substantially complete copies, one which in 1950 was located in the White Cloud Temple 白雲觀, outside Peking, and one in the Imperial Household Library, Tokyo. A reprint of the Chinese copy, comprising 1421 works in 1057 volumes, was issued by Commercial Press in 1924–26. Before that time the collection was only very rarely open to scholars; that is one reason that the study of Chinese alchemy remains in its infancy. There are two supplements, the Wan-li period Supplementary Patrology (*Hsu tao tsang*, 55 works in 63 volumes) of 1607, reprinted with the Cheng-t'ung Patrology, and the *Tao tsang chi yao* 道藏輯要, which includes 287 rare editions, 114 of them not included in the earlier collections, gleaned from the library of the Erh hsien an 二仙庵, Chengtu, and reprinted there in 1906. By the seventeenth century almost all interest in operative alchemy had been diverted to its physiological analogue; neither supplement contains anything relevant. The contents of the three collections are indexed in Weng Tu-chien's 翁獨健 invaluable *Tao tsang tzu mu yin-te* 道藏子目引得 (Combined indices to the authors and titles of books in two collections of Taoist literature; Harvard-Yenching Institute Sinological Index Series, no. 25, Peiping: Harvard-Yenching Institute, 1935).



## Chinese Alchemy: Preliminary Studies

Chang Chün-fang 張君房 and others.<sup>35</sup> When that work was done, Chang compiled a miniature Patrology, conveying in a choice selection of only 120 *chüan* the essentials of Taoism, and presented it to the throne in 1023 or not long after.<sup>36</sup> Its title, *Yun chi ch'i ch'ien* 雲笈七籤 (Seven tablets in a cloudy satchel), is an allusion to the seven-part division of the Patrology; the three major sections are derived from the Three Baskets (*tripitaka*) of the Buddhist Canon, with four ancillary divisions 輔 representing four Taoist sect traditions. Chang's omnibus, preserved in its entirety in the extant *Tao tsang* and in at least one separate edition, is the only large work of its kind which has come down to us. Most of the Taoist canonical works are anonymous or pseudonymous; of none can the traditional attributions be reaffirmed without probation. There is ample reason to treasure a collection so choice and so ancient, since it guarantees the antiquity and other estimable qualities of its contents.<sup>37</sup>

*Editions of the Yun chi ch'i ch'ien.* Among the ten alchemical works included is the *Tan ching yao chueh*. Since it is found nowhere else, its textual history is closely tied to that of Chang's compendium.

<sup>35</sup> The history of the long line of Taoist patrologies has been capably surveyed by Ch'en Kuo-fu 陳國符 in *Tao tsang yuan-liu k'ao* 道藏源流考 (Researches in the history of the Taoist patrologies, 1949; revised and enlarged ed., 2 vols., Peking: Chung Hwa Book Co., 1963), and some of the most important information summarized in Ho and Needham, "The Laboratory Equipment of the Early Mediaeval Chinese Alchemists," pp. 58-59. Another general view, less detailed than Ch'en's but still worth consulting, is L. Gauchet, "Contribution a l'étude du taoisme," *Bulletin de l'Université l'Aurore*, 1948, ser. 3, vol. 9, pp. 1-38.

<sup>36</sup> See the document of presentation 題 at the head of the book. The order of magnitude is that of ten substantial volumes in English.

<sup>37</sup> For all its exceptional value, *Yun chi ch'i ch'ien* has been paid scant attention. No description has been published. Neither Weng Tu-chien's index nor the inferior index of L. Wieger (*Taoisme*, vol. I [Ho-chien-fu: Mission Press, 1911]) lists its contents, although many are superior texts of works which appear elsewhere in the *Tao tsang*. Ho Ping-yü is, I think, the first scholar to make a point of going to *Yun chi ch'i ch'ien* for documents of high probity.

## *Tan Ching Yao Chueh*: The Tradition and the Book

Before incorporation into *Yun chi ch'i ch'ien*, it seems, as might be expected, that *Tan ching yao chueh* was not widely distributed. Sun's treatise is not listed in early bibliographies nor in the bibliographical treatises—inventories of the Imperial Library—in the Standard Histories from the T'ang on. It is mentioned earliest in a catalogue compiled in the years following 1132 to record the devastation wrought upon the Imperial collection by the catastrophes leading up to the Sung court's retirement to the South. The book is marked "missing 闕," and even the title is given incorrectly.<sup>38</sup> But by this time Chang Chün-fang's compilation had been printed, so that the loss was nominal.

The original printed version of *Yun chi ch'i ch'ien* is also lost; the earliest edition which may be consulted today is that of the Cheng-t'ung *Tao tsang*.<sup>39</sup> There is also a separate edition, the so-called Pure Realization Studio (Ch'ing chen kuan 清真館) edition, prepared and printed early in the seven-

<sup>38</sup> *Pi-shu-sheng hsu pien tao ssu k'u ch'ueh shu mu* 秘書省續編到四庫闕書目 (in *Sung shih i wen chih, pu, fu pien* 宋史藝文志補附編, Shanghai: Commercial Press, 1957), p. 416, followed by Cheng Ch'iao's 鄭樵 *T'ung chih lueh* 通志略 (Treatises from the General history, ca. 1150; Basic Sinological Series 國學基本叢書 ed.), XIX, 136. Both give the short version of the title with the last two characters inverted: "丹經訣要."

<sup>39</sup> Through the good offices of Nakayama Shigeru and the exceptional kindness of H. M. The Emperor of Japan, I have been provided with a microfilm of the relevant portion from the Japanese Imperial Household Library. The text is identical with that of the Commercial Press reprint save for a change in layout, due to which the pagination has been altered. *Tan ching yao chueh* is found in vol. 692, ch. 71, of the *Tao tsang*. It has also been identically reproduced by photography in the same format as that of the Patrology reprint, in Category VI, vol. 45, of *Tao tsang chü yao* 道藏舉要 (Essentials of the Taoist Patrology; Commercial Press ed.) and in the *Ssu pu ts'ung k'an* edition of *Yun chi ch'i ch'ien* (second printing only). It does not appear in the drastically abridged edition in the 1906 Patrology (*Tao tsang chi yao*, vols. 177–189). The expunging of alchemical matter from this latest edition is due not to the inexorable march of rationality, but to the almost exclusive modern preference of Taoists for the breath yogas of "interior alchemy." This change of emphasis is in many ways similar to the triumph of spiritual alchemy in Europe.

## Chinese Alchemy: Preliminary Studies

teenth century by Chang Hsuan 張瑩 (awarded provincial degree 1582), known as one of the principal editors of the Imperial Library Catalogue of 1605,<sup>40</sup> and as a painter and calligrapher.<sup>41</sup> Since his version is shorter—the important preface, the section on apparatus, and three minor recipes are missing—and the title different, doubt is thrown on the integrity of the *Tao tsang* edition. This doubt is simply resolved, however, since at the head of each *chüan* of the Pure Realization Studio edition is printed the serial character from the Thousand Character Classic (*Ch'ien tzu wen* 千字文) which originally served to number ordinally the volumes of the Cheng-t'ung *Tao tsang*. There could be no more final proof that Chang's version is derivative rather than cognate. Significant variant readings (excluding the omissions, and the injection of two short explanatory notes in small type) are so few that neither text is, in the balance, better. One's impression upon comparing them is that Chang corrected a few obvious mistakes in the *Tao tsang* edition, but that he introduced enough new copyist's errors to leave the state of the text about the same. So many obvious corruptions in the earlier edition are ignored that he hardly deserves credit for having performed the labors of an editor. These errors cannot be attributed to a later stage in the history of his recension, for he printed it himself.

*The title of the Tan ching yao chueh.* In the *Tao tsang* the title of the treatise appears as *T'ai ch'ing tan ching yao chueh*

<sup>40</sup> *Nei ko ts'ang shu mu-lu* 內閣藏書目錄 (ordered 1605; in *Shih yuan ts'ung-shu* 適園叢書, vols. 6-9).

<sup>41</sup> I have used a microfilm of this edition, made by Nakayama Shigeru from a copy graciously lent by the Naikaku Bunko, Tokyo. Chang's edition was also copied into the Complete Library in Four Branches of Literature (*Ssu k'u ch'üan shu* 四庫全書); *Tsung mu t'i yao* 總目提要 (original form presented to the throne in 1781; Taipei: Yee Wen Book Co., n.d.), X (ch. 146), 2892. It was also reproduced in the first printing of the *Ssu pu ts'ung k'an*, as J. R. Hightower has kindly verified.

There also exists a collection of miscellaneous reading notes and animadversions by Chang under the title *I yao* 疑耀 (1608; in *Ling-nan i shu* 嶺南遺書, vols. 17-19), but its contents do not add to our knowledge of Chang's alchemical interests.

*Tan Ching Yao Chueh: The Tradition and the Book*

太清丹經要訣. The last four characters, which would have been the original title, are translated exactly, at some cost in concision, as “Essential formulas for oral transmission from the alchemical classics.” The work’s sources have not been identified—and, in view of the Chinese penchant for attributing books to a past in which, it was believed, all the secrets were known, one must reserve judgment upon the author’s implication that he was a transmitter and not a creator.

The practice of writing down formulas designated for oral transmission—in some cases more justly put as “designating written formulas for oral transmission”—is common enough in Chinese alchemy. The point of direct transmission was to ensure that the disciple was not entrusted with powerful secrets before he had attained the philosophical and moral depth required to use them safely, that he received them in context, so to speak, and that his understanding could be tested continuously as he learned. But a master without worthy disciples was seldom content to see a long tradition cut off (or a new tradition aborted); all he could do was to set his secrets down, often attaching dire warnings: “[These treatises] will bring unlimited felicity and longevity to the gentleman of perfect sincerity who obtains and treasures them. He who reveals them lightly to others will bring calamity upon all his relations, close and distant. Nor are they to be spoken of maliciously, obscuring their *tao*. Take care not to copy them to show to the vulgar. Take the measure of a man’s virtue first. Only when you have clear indications of it may you teach these treatises to him.”<sup>42</sup>

The words “*t’ai ch’ing*,” rendered as “Grand Purity” or “Grand Clarity,”<sup>43</sup> are a classificatory prefix of the sort that

<sup>42</sup> *Ch’i fan ling sha lun*, p. 5a; *Ta tung lien chen pao ching*, Preface, pp. 4b–5a.

<sup>43</sup> This is a technical term for the Emyrean. See *Li shih chen hsien t’i tao t’ung chien* 歷世真仙體道通鑑 (Comprehensive history of embodiment of the Tao by successive generations of immortals, early twelfth century; *Tao tsang*, vols. 139–148), 6:2a.

## Chinese Alchemy: Preliminary Studies

indicates that a treatise is supposed to fall within a particular doctrinal tradition, which began with a canon of supernatural origin and gradually incorporated the recorded experience of that canon's devotees. The "Grand Purity" tradition is said in accounts of no historical value to have started with the thoroughly legendary Han immortal Ma Ming-sheng 馬鳴生 (perhaps he is not so shadowy as all that, for the Chinese name of Aśvaghōṣa [end of first century after Christ?], the poet and teacher largely responsible for the philosophical basis of Mahayana Buddhism, was Ma Ming 馬鳴), and to have passed through the hands of that most noble of alchemists Liu An, Prince of Huai-nan 淮南王劉安 (179–122 B.C.), and those of Ko Hung.<sup>44</sup>

Chang Hsuan in his edition of *Yun chi ch'i ch'ien* (or an intermediary, if there was one, in the line of transmission) links Sun even more directly to the T'ai ch'ing tradition by renaming the treatise *T'ai ch'ing chen jen ta tan* 太清真人大丹, or "Great Elixirs of the Grand Purity Realized Immortal."<sup>45</sup> His inspiration was, one suspects, the title of another treatise

<sup>44</sup> Ch'en Kuo-fu, *Tao tsang yuan-liu k'ao*, pp. 89–90. The Pharmacopoeia of 1249 (see note 31), 3:9b, connects the original form of Aśvaghōṣa's name with conventional Chinese alchemy when it quotes "Master Ma Ming's Oral Formulas for Liquefied Gold and Elixirs 馬鳴先生金丹訣."

There is a possibility that the first two characters in *T'ai ch'ing tan ching yao chueh* were a part of the title from the beginning, so that the meaning of the whole is "Essential formulas for oral transmission from the Grand Purity Alchemical Canon." Although there was a book called the Grand Purity Alchemical Canon (see the encyclopedia *T'ai-p'ing yü lan* 太平御覽, 984; Peking: Chung Hwa Book Co., 1960, 669:3a), I consider the omission of the words *t'ai ch'ing* from the two Sung bibliographies (see footnote 38) telling. Addition of such a prefix to a title upon incorporation of a book into the Patrology is very common.

<sup>45</sup> The term "*chen jen*" goes back to the philosophical classic *Chuang-tzu* 莊子, where it occurs often as a general term for immortals. As Taoist hagiography developed, however, the word "*hsien* 僊 (仙)," found first in the slightly later *Lieh-tzu* 列子, came to mean "immortal" in general, and "*chen jen*" came to be reserved for a subgroup of the highest grade. In the present text of the *Chuang-tzu* the word "*hsien*" appears only once, in a passage which is generally considered by commentators to be a late addi-

## *Tan Ching Yao Chueh: The Tradition and the Book*

attributed to Sun in earlier sources, The Grand Purity Realized Immortal's Oral Formula for the Alchemical Preparation of Mica (*T'ai ch'ing chen jen lien yun mu chueh* 太清真人煉雲母訣). How—indeed, whether—Sun came to be called by the lofty but historically rather common title of Grand Purity Realized Immortal is impossible to say, for it is not linked with his name elsewhere.<sup>46</sup>

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### THE AUTHENTICITY OF THE *TAN CHING YAO CHUEH*

Dealing with questions of the authenticity of treatises in the *Tao tsang* entails difficulties and uncertainties which greatly corrode confidence in the outcome. This is true enough of Chinese literature in general, but the widespread tendencies toward pseudonymity and what might loosely be designated pseudepigraphy are especially pronounced in Taoist writing. They are aggravated by the nonchalance with which later compilers and redactors changed titles, omitted names of authors, and even created new works by publishing excerpts from established books under entirely new names. The result is that over the years many an author's output has been distorted and inflated, often beyond restoration. Failure to be mentioned in bibliographies for centuries, in orthodox literature a clear sign of a "soft spot" in the history of a text, may in the case of a

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tion. I translate "*chen jen*" throughout as "Realized Immortal." See Ch'ien Mu's 錢穆 standard annotated edition, *Chuang-tzu tsuan chien* 纂箋 (The *Chuang-tzu*, with critical annotations; third ed., Hong Kong: Tung-nan yin wu ch'u-pan-she, 1957), p. 93 (*ch.* 12), especially the annotations of Lin Yun-ming 林雲銘 (passed metropolitan examination 1658), Yao Nai 姚鼐 (1732-1815), and Wu Ju-lun 吳汝綸 (1840-1903).

<sup>46</sup> The book is one of the Taoist works listed in the bibliographical treatise of the New Standard History of the T'ang (*Hsin T'ang shu* 新唐書, Palace ed., 59:8b), but there the attribution is unclear. It has, I am inclined to think, been inferred by later bibliographers (for example, *T'ung chih lueh*, XIX [*ch.* 19], 143) from Sun's name at the head of the previous listing.

## Chinese Alchemy: Preliminary Studies

Taoist text simply indicate a period of secret transmission.<sup>47</sup> All of these confusions are relevant to the work of Sun Ssu-mo. Giving several problematic attributions the benefit of the doubt for the nonce, twenty-two compositions are ascribed to him in the two Standard Histories of the T'ang, compiled from contemporary archives and other materials. By roughly a millenium after his death, however, the number of titles to which his name was attached had quadrupled.<sup>48</sup>

These factors which make for uncertainty as to authorship often inject a strain of despair into the process of testing attributions. In very few cases can strict canons of verification be applied; loose ends persistently stick out. It often happens, and it is indeed true of the *Tan ching yao chueh*, that one can only conclude the work was written in the general period of the putative author, and is reasonably consonant in style and content with his other work. The question of false ascription by a near contemporary still lurks in the background, but at least the work is shown not to be a late forgery. While one might wish for greater rigor, a source once placed in its time is within the realm of the historian.

In order to exhibit the technical resources available, the utility and limitations of the various criteria of authorship and date are outlined below as they are applied to cast light on the authenticity of the *Tan ching yao chueh*.<sup>49</sup>

<sup>47</sup> It will be seen below (p. 78) that an alchemical bibliography dated 806 includes a "Classic of Sun Ssu-mo," and that internal evidence strongly indicates *Tan ching yao chueh* is referred to.

<sup>48</sup> I have found seventy-nine titles. In many instances two or more titles belong to the same treatise. There is no point in listing the titles until the authenticity of the whole corpus is tested. At present only the major ophthalmological classic *Yin hai ching wei* 銀海精微 is rejected by the consensus of critical scholars.

<sup>49</sup> There are many useful criteria which cannot be applied to the text at hand; my purpose is not to present a catalogue of authentication techniques, but to demonstrate the necessity for critical judgment in their application and in evaluation of results. Ho and Needham ("Theory of Categories," pp. 175-176) have recently furnished an ideal example of using a list of ranks

## *Tan Ching Yao Chueh: The Tradition and the Book*

*Style.* The word "style" is a vague one, and arguments about style in Chinese literature tend to be at least as vague. In general, the most useful judgments have been either general and based on long experience of the various historically prevalent styles of literary Chinese, or quite specific and based on qualitative (or, occasionally, quantitative) analysis of syntax. Even keeping in mind the principle that a superb writer can seldom be imitated successfully except by a superb writer, recognition of a certain style seldom provides much useful information. The effect of styles in Chinese literature has tended to be cumulative rather than successive. That the language of a piece of writing resembles that of a given writer is no guarantee of contemporaneity, much less identity; one expects as a matter of course that later writers imitate a great example, and very few great examples in classical Chinese were entirely unprecedented. At best, a critic with a firm knowledge of the vicissitudes of various styles can reach a probable conclusion: "This is an example of style A, which was common in period M and rare in period N, so the probability that this work comes from M is greater." Exactly what such a statement about the probability of a single occurrence *means* is a question which deserves attention. It may be that what this sort of probability measures is merely the investigator's surprise, which is maxi-

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held by the author to date a treatise. Such lists often appear at the head of a work; official titles changed often, and the changes are detailed chronologically in the "Treatise on Official Posts 職官志" of the Standard Histories. It is necessary, of course, to be aware that this technique assumes the work is correctly ascribed.

Some readers will perhaps be surprised that I do not use earliest occurrence of the name of a medicinal substance in the pharmacological literature as a criterion for testing dates. The assumption that substances were always incorporated in the materia medica before they were used by alchemists is not, however, consistently supported by the documents. This does not in itself prove that alchemy was a major channel by which the resources of pharmacology were extended, of course. It is certain that most ingredients were also in use by medical practitioners in one place or another for long periods before it was clear that they were worth including in a compilation which aimed to become a classic.



## Chinese Alchemy: Preliminary Studies

mal if other criteria prove the work in question to belong to period N, and minimal in the other case. For literature which stylistically is less than unique, the general feel of a style is less reliable for initial identification than for confirmation of conclusions otherwise reached, and in any case can be grossly misleading in the hands of one not thoroughly at home in the ancient language.

The sort of syntactical analysis which has been employed with precision and brilliance in other contexts by such well-known figures as Bernhard Karlgren is useful in medieval literature primarily for establishing individual authorship rather than date. The plethora of models and the predominance of rhetoric make for great latitude in a writer's choice of particles, selection among synonyms to express a given meaning, and use of rare words and idiosyncratic word order. One can obtain unequivocal evidence about authorship by a method which is in essence that of comparing an unknown with a known sample—or, more precisely, of comparing two populations, for the population of a book is words and sentences. It follows that the authenticity of the standard must be positively established if the process is to have any value. It also follows that both the known and the unknown must be of sufficient length for their content to be considered representative in point of syntax and diction, and thus for the conclusions to have some statistical validity.

The most sensible procedure is to define a set of indicators to serve as the basis for comparison. Whether they are chosen from the work in question or from the known work with which it is to be compared does not matter. The indicators are mannerisms of diction and syntax which occur in the sample with sufficient frequency to rule out statistical freaks, but which are individually uncommon in alchemical writing generally. Particles are preferable to substantive words because their occurrence is relatively independent of particular content. Extremely rare words are thus not the best indicators; accord-

## *Tan Ching Yao Chueh: The Tradition and the Book*

ingly, a set of three or four must be chosen so that the probability of their occurring *together* in an independent population is small. If this combination is absent in another work of the same general character (close enough so that these mannerisms could be expected to occur), one must conclude either that the works are by different authors or that they were written by the same author at very different times or under otherwise very different circumstances. One must also keep in mind that if either the known or the unknown is a compilation, the success of the comparison depends largely upon the degree to which the compiler has impressed his own style on his materials. Neither this criterion, nor any of the others applied below, is capable of determining the date or authorship of a mere pastiche, which conveys unobscured the traces of many dates and many authors. That a work is a pastiche is usually betrayed by internal contradictions. Since *Tan ching yao chueh* is free of them, and since it bears prominently the imprint of a strong guiding intelligence, one is not entirely arbitrary in expecting the testing process to be fruitful.

Evaluating the *Tan ching yao chueh* is particularly difficult because it contains two quite different styles. The idiom of the preface, and of the few animadversions which appear elsewhere, is a rather old-fashioned personal essay style. They convey the same attitudes as Sun's masterpieces, *Ch'ien chin fang* and *Ch'ien chin i fang*: high dedication to the ideal of the selfless, scrupulous practitioner who has learned both from books and through oral initiation, and contempt for the ignorant and self-seeking whose follies degrade the Art.<sup>50</sup> These

<sup>50</sup> This contempt is clearly derived from that of Ko Hung, but Sun's remarks, especially those in the medical works, seem to express more professional dedication than pride of initiation. The chapters on "The great physician's practice of his profession 大醫習業" and "The great physician's perfect sincerity 精誠," which begin *Ch'ien chin fang*, are the noblest statement of medical ethics in early Chinese medicine. For an excerpt, see T'ao Lee [Li T'ao], "Medical Ethics in Ancient China," *Bulletin of the History of Medicine*, 13 (1943):268-277.

## Chinese Alchemy: Preliminary Studies

“literary” parts are much too short, however, to be used for more objective comparison. The expository part, on the other hand, is written in extremely condensed and graceless language, which reflects little of the usual Chinese feeling for balance and cadence. It is patently technical writing, devoid of ornament, speaking with little redundancy to one who knows the laboratory. This style is equally characteristic of prescriptions in Sun’s medical works, and harks back to the earliest Chinese compendia of prescriptions and alchemical formulas.

Employment of a set of indicators to compare the instructions for laboratory manipulations—which make up the bulk of the text—in *Tan ching yao chueh* with corresponding portions of the well-authenticated medical writings tends to support the traditional attribution. One such set, individually not common in early medical and alchemical writing but frequent in *Tan ching yao chueh*, includes (1) “右 (the above)” or “右若干味 (the above *n* ingredients)” following a list of ingredients and introducing the instructions for treatment, (2) “訖 (that being accomplished)” as a connective in instructions, and (3) “以” in the sense of “以之 ([do] to it, with it).” Examination of several chapters of *Ch’ien chin fang* and *Ch’ien chin i fang* which describe relatively complex chemical manipulations reveals not only that the three indicators occur, but that their frequency is of the same order of magnitude as in *Tan ching yao chueh*.<sup>51</sup> Since the latter work is explicitly a compilation,<sup>52</sup> nothing is settled; the result merely yields a datum which will be evaluated in conjunction

<sup>51</sup> These remarks are based particularly on *Ch’ien chin fang*, ch. 12 (“The gall” and “Panaceas”), and *Ch’ien chin i fang*, ch. 12 (“Nourishing the vital principle”) and 13 (“Abstention from grains”). In these two knowns as in the unknown, the first indicator occurs in almost every formula, the second is less frequent, and the third occurs only often enough to be recognized as characteristic.

<sup>52</sup> As, of course, are the two medical works. Their heterogeneous nature is underscored by the fact that one even finds copied into *Ch’ien chin fang* a personal letter transmitting a prescription from Hsu Ssu-po 徐嗣伯, a famous physician of the late fifth century, to an unnamed person (14:7b–8a).

## *Tan Ching Yao Chueh: The Tradition and the Book*

with other data. The danger of overestimating the power of this method becomes patent when a compilation closely cognate with *Tan ching yao chueh*, the *T'ai-ch'ing shih pi chi* 太清石壁記 (Records of the rock wall, a Grand Purity canon), is examined. That it also contains the three indicators in roughly the same distribution is, however, exceptional.<sup>53</sup> As a random instance, Ch'en Shao-wei's early *Ch'i fan ling sha lun*, which has been quoted earlier, contains only one occurrence of the second indicator, and none of the first and third.<sup>54</sup>

*Operations and apparatus described.* Comparison of content as an indication of authorship requires, like all other trials by comparison, assumptions about the constancy of the author's opinions which it is difficult to justify *a priori*. If the source in question makes use of processes and equipment markedly different from those employed in a known source for similar purposes, suspicion is justified. Unless, however, both texts can be dated to within the same short period (which seldom happens while the authorship of one remains in question), one is unwise to overlook the possibility that the differences in method are simply due to some years' experience.<sup>55</sup>

Since the range of apparatus and operations exploited in alchemy was largely derived from the resources of the medical laboratory, again *Ch'ien chin fang* and its sequel may gainfully be taken as standards. In general, they reflect roughly an equal level of chemical manipulation; that they specify a few proc-

<sup>53</sup> *Tao tsang*, vols, 582-583. A discussion of the date of this text (also referred to below as *Shih pi chi* for the sake of conciseness) and its close relationship with *Tan ching yao chueh* will be found in the section on "Cognate Treatises" at the end of this chapter. The second indicator appears twelve times and the third twice (B:1b.10 and C:7a.8).

<sup>54</sup> Where *Tan ching yao chueh* would use 右, Ch'en uses 凡 or 共; with but one exception (p. 18b), Ch'en uses 了 instead of 訖.

<sup>55</sup> One notes with interest that Henry E. Stapleton has applied this principle to inconsistencies within the Avicenna corpus. See H. E. Stapleton, R. F. Azo, M. Hidayat Husain, and G. L. Lewis, "Two Alchemical Treatises Attributed to Avicenna," *Ambix*, 10 (1962):43-44.

## Chinese Alchemy: Preliminary Studies

esses (for example, filtration through cloth 漉 is used often) and types of equipment (among others, what seems to be an iron tripod with extensible legs) absent from *Tan ching yao chueh* is probably due merely to their much greater length and concern with a wider range of medicines.<sup>56</sup> Fortunately it is possible to make a more cogent comparison, for there are detailed specifications for a two-part reaction vessel and its lute both in *Ch'ien chin fang* and in *Tan ching yao chueh*.<sup>57</sup> The former recommends a vessel made of two earthenware bowls, or one wrought-iron and one earthenware bowl, placed lip to lip, and explicitly condemns the use of all-iron vessels for the sublimation process. Its recipe for six-one lute (a sealant for which two alchemists seldom used exactly the same formula) is classical in the sense that it uses seven ("six-one") ingredients; this is by no means always the case. The reaction vessel described in *Tan ching yao chueh* is especially made for the application, the two parts being cast (rather than wrought) to precise dimensions and their rims closely fitted. The author states that he has tried many designs but that this is the first to perform successfully. Although he discusses the use of a number of traditional ingredients in six-one lute, he settles iconoclastically on a simple mixture of red bole and kalinite (which is as adequate for hermetically sealing reaction vessels as any of the more complex formulas).

Now what is to be made of these discrepancies? Obviously such incompatible instructions cannot have come from the same man at the same time. The recommendations in *Tan ching yao chueh* are so technically superior, however—the cast-iron vessels would be more durable, and the simpler lute much less expensive—that one hesitates to credit a vague indication in *Tan ching yao chueh* that it is the less mature of the two

<sup>56</sup> *Ch'ien chin fang*, 12:29a. This work (1:36b) also gives a most important list of essential types of drugs and apparatus for the medical laboratory.

<sup>57</sup> For the former see Appendix D, and for the latter Chapter IV, pp. 166–168.

## *Tan Ching Yao Chueh: The Tradition and the Book*

books.<sup>58</sup> Clearly, this comparison alone is incapable of settling the problem of authorship.

*Types of elixirs.* The nomenclature of elixirs of immortality is enormous in size.<sup>59</sup> Because so many of the alchemical treatises are compilations, recipes being copied and recopied from one to another, the names of elixirs often can be used to establish textual or sectarian affinities. It will be seen anon that this method has made possible the recognition of two other alchemical treatises as cognate with the subject of this study, because the coincidence of elixirs named in them is too extensive to be due to chance. Less striking coincidences are more apt to be fortuitous, but any sign of systematic agreement on nomenclature is an important datum.

<sup>58</sup> *Ch'ien chin fang* can be placed with some certitude within the 650's (see Chapter III, note 104). There is only one explicit hint concerning the date of composition of *Tan ching yao chueh*, namely Sun's assertion "For over twenty years I have loved the Taoist arts" (see below, p. 167). Precisely what Sun meant by "the Taoist arts" is difficult to say. If, as the context seems to indicate, he refers to alchemical operations—and assuming, of course, that these words are really his—*Tan ching yao chueh* would long antedate the medical compendium, for we find in *Ch'ien chin fang* an assertion (see below, p. 108) that Sun was preparing elixirs in the period 605/616.

<sup>59</sup> I have found in the alchemical literature roughly a thousand titles of elixirs of immortality (*tan* 丹). It is impossible to specify how many *different* elixirs this represents until these recipes are compared ingredient by ingredient—a task ideally fitted to the capacities of data-processing machinery. Perhaps half the titles, however, occur explicitly as synonyms. The word "*tan*" also occurs in classical medicine in the wider sense of "efficacious prescription (usually prepared from minerals)" and is lately used to refer to artificial inorganic compounds employed as drugs generally, even when uncompounded. Okanishi Tameto 岡西為人, in his "Tan fang yen-chiu 丹方研究 (A study of *tan* prescriptions)," *Huang Han i-hsueh ts'ung-shu*, 皇漢醫學叢書, vol. 11 (1936), indexes 2405 recipes for "elixirs" (defined by occurrence of the word "*tan*" in the title) in 321 medical compilations, but does not use the alchemical literature from which many of these recipes originally derive. The modern conception of "*tan*" is defined in Liu Yu-liang 劉友樑, *K'uang-wu yao yü tan yao* 礦物藥與丹藥 (Mineral and inorganic drugs; Shanghai: Shanghai Science and Technology Press, 1962), p. i.

## Chinese Alchemy: Preliminary Studies

Sun's attested medical works are little concerned with elixirs of immortality as such. While mineral ingredients play a large part in prescriptions, they are usually combined with botanical simples; in very few cases are massive doses of inorganics recommended. In the section of *Ch'ien chin fang* devoted to "Panaceas 萬病丸散," however, there is a recipe for an elixir which is representative of the alchemical tradition in every respect.<sup>60</sup> What matters is that this Grand Unity Wonderful Essence Elixir (*Tai-i shen ching tan* 太一神精丹; interesting also because coal is the fuel used to heat it) is named in a list of "minor elixirs of immortality" in *Tan ching yao chueh*. Although this simple correspondence reveals nothing about authorship as such, it may be considered one more strand connecting the two works.

*Geographical origins of minerals.* In the absence of qualitative analysis based on a sound body of chemical theory, the alchemist's notion of a chemical compound was bound to remain rudimentary. Physical, flame, and reagent tests for identity of important materials were used early, and are systematically recorded in the pharmacopoeias. In many cases varieties of a mineral which differ only in minor impurities were considered separate substances because their colors or other superficial characteristics happened to vary, while compounds which differ appreciably in composition but share some useful property were not distinguished. The point is that, very generally speaking, the alchemist followed the pharmacologist — for both were generally physicians — in defining substances by a combination of chemical and physical properties in such a way as to guarantee the reproducibility of chemical manipulations. But if his processes were to yield the same product time after time, it was essential that he be able to control the purity of chemical sub-

<sup>60</sup> Cited in note 32 above. See also the *Tao tsang* version (entitled *Sun chen-jen pei chi ch'ien chin fang* 孫真人備急千金[要]方, a conflation of the two medical works in 93 *chiian*, vols. 800-820), 39:6b-12a.

## *Tan Ching Yao Chueh: The Tradition and the Book*

stances as he defined them. Since some preparations, although he could not know it, depended more upon impurities than on the basic substance, this control had to be both close and systematic. Whether his ingredients were pure by modern standards did not matter; he needed no more than that the impurities remain constant. Before modern times there was only one way to reach this goal consistently: by specifying geographical origin.<sup>61</sup> At the same time, the discrepant requirements of particular formulas and individual variations in technique are more than sufficient for each author to have had a unique constellation of preferences — provided, of course, that he was not a mere armchair compiler.

Geographical origins of reagents are specified eleven times in *Tan ching yao chueh*. Comparison of these specifications with *Ch'ien chin i fang's* table of drugs produced in the various prefectures of China yields equivocal fruit:

<sup>61</sup> The investigator must further be aware of conservative influences in medical works which were negligible in the alchemical tradition. There is, for example, the dictum of K'ou Tsung-shih 寇宗奭 in his *Pen-ts'ao yen i* 本草衍義 (Dilations upon the pharmacopoeias, printed 1119, quoted in the Pharmacopoeia of 1249, 4:18a): "It is still essential that only varieties of drugs which come from the places specified in the [canonical Shen-nung] Pharmacopoeia be used in medicines; all others represent mere partiality, and are best rejected."

The most important single early source for qualitative tests is Tu-ku T'ao's 獨孤涵 handbook of elixir ingredients, *Tan fang ching yuan* 丹方鏡源 (*Tao tsang*, vol. 596). The system of geographical names which it follows seems to be that of the late T'ang or early Sung, but I do not feel that its date has been satisfactorily established. The first of its three *chüan* has been adequately translated in Fung Chia-loh and H. B. Collier, "A Sung Dynasty Alchemical Treatise: 'Outline of Alchemical Prescriptions' by Tu-ku T'ao," *Journal of the West China Border Research Society*, 9 (1937): 199-209. The form of the title that appears in the *Tao tsang* version, *Tan fang chien* 鑑 yuan, is the result of the earliest editors' avoiding the taboo noted above in note 7. The character occurs correctly in, for instance, the Sung History bibliography and throughout the Pharmacopoeia of 1249. In the latter source and in several other works the second character is not "fang 方" but the homophone "fang 房." Which form is correct still awaits final determination.



## Chinese Alchemy: Preliminary Studies

### LOCUS (MODERN PROVINCE)

| <i>MATERIAL</i> | <i>IN TCYC</i>         | <i>IN CCIF</i> |
|-----------------|------------------------|----------------|
| kalinite        | Hopei-Shansi           | same           |
| alum            | Kansu (Tunhuang)       | none           |
| talc            | Shantung <sup>62</sup> | Kuangsi        |
| Turkestan salt  | Szechuan               | none           |
| lake salt       | Shensi                 | none           |
| salt            | Shansi                 | none           |
| chalcantite     | Shantung               | Shansi, Kansu  |
| white kalinite  | Kiangsu                | none           |
| selenite        | Shansi                 | none           |
| pewter          | Kuangsi                | none           |
| alum            | Kansu (Ansi Co.)       | none.          |

Only three real comparisons are possible. In only one of the three do the sources agree. An essential clue to the proper evaluation of the other two, however, lies in the fact that *Tan ching yao chueh* is internally inconsistent. Alum and its customary ore, kalinite, appear altogether four times, each with a different origin. This clear indication that the author used alum from different places for different applications makes the comparison inconclusive. Since he was apparently able to exploit the impurities in his ingredients with some sophistication, preference for a given origin in a given recipe can be tested rigorously only against another recipe for the same product in another book.

*Place names.* Place names were often officially changed in ancient China, in order to reflect the creation of new (or the

<sup>62</sup> The name "Tung-lai 東萊" was current from the Han until A.D. 621, when it was changed to "Lai prefecture 萊州"; it reverted to the old designation during the period 742-758. The same place is cited in *Ch'ien chin i fang* (p. 5b) as "Lai prefecture." I do not consider this discrepancy significant, since there is no ground for believing that the two books were written at the same time or depended on the same sources.

## *Tan Ching Yao Chueh: The Tradition and the Book*

restoration of old) administrative units, to attract propitious influences, to avoid the infringement of taboos, and occasionally for other reasons. The examination of place names cited in a given work in conjunction with the chronology of relevant administrative decrees in the "Treatise on Geography 地理志" of the Standard Histories can furnish clues to the date of composition.<sup>63</sup> The investigator must exercise considerable caution, for the use of archaic geographical appellations has always been common in China. He cannot proceed on the assumption that officially promulgated changes in place names were promptly and consistently adopted in private writing. In general, the only individual place names which may be taken as positive evidence of date are newly coined ones, which were in any case comparatively rare by the T'ang. The tendency was rather to plumb the past when a change of name was called for. Only when all the geographical designations in a piece of writing are evaluated together has one a basis for conjectures about date. In the case of *Tan ching yao chueh*, place names are consistently given in their T'ang forms.

*Tabooed characters.* It was customary in traditional China that writers consider the personal names (*hui* 諱) of the reigning emperor and his dynastic (and in some cases predynastic) ancestors taboo. From the Chou on a synonym was often substituted for the tabooed character, and sometimes even for its homonyms. By the T'ang the practice was widespread, although the newly invented practice of dropping one stroke from a tabooed character saved many ancient works from distortion when they were reprinted or edited. From the Sung on the avoidance of imperial taboos was rigorously enforced by the government. A knowledge of the history of taboos is per-

<sup>63</sup> *Chiu T'ang shu*, ch. 38-41. Most dates are omitted from the corresponding treatise of the New T'ang History (*Hsin T'ang shu*, ch. 38-43), which is useful to the historian mainly because it lists the customary tribute (that is, the most valuable products) of the various prefectures.

## Chinese Alchemy: Preliminary Studies

haps the sharpest-cutting tool at the investigator's disposal.<sup>64</sup> No criterion of date is proof against a diligent and artful forger, of course, but few forgers indeed were artful enough to master taboos. Forgery in the strict sense, however—as distinguished from false attribution—is hardly a problem in the alchemical corpus, which lacked the prestige required to attract the better sort of counterfeiter.

The avoidance of Sui and T'ang taboos is not difficult to verify, since they include characters of high currency. In *Tan ching yao chueh* forbidden characters of both dynasties, which cover the span of Sun Ssu-mo's adult life, are freely used.<sup>65</sup> Testing for Sung taboos, which is more complex (the characters are less common, but certain homonyms were usually also avoided), would yield no information of value. As Ch'en Kuo-fu has observed, "most of the works collected in the Cheng-t'ung *Tao tsang* avoid name taboos of the Sung. It is apparent that, although the blocks for it were cut in the Ming, it is definitely based on the *Wan shou tao tsang*."<sup>66</sup> If tabooed characters of the Sui or T'ang were altogether missing—and if, as a control, innocuous synonyms did occur—one could assert with some confidence that the work is of one dynasty or the other. As it is, because of the looseness with which the prohibition was observed at the time, no conclusion can be drawn.

*Weights and measures.* Continual alteration of the official system of weights and measures—changes in absolute values and in relations of units—resulted in another series of vicissitudes which the critic is free to exploit, keeping in mind that local variations in value and nomenclature have always been

<sup>64</sup> The subject has been consummately treated in Ch'en Yuan, *Shih hui chü li*. For an example of the utility of this work, see above, note 7.

<sup>65</sup> For instance, “廣,” the personal name of Emperor Yang (605–617) of the Sui, is found on p. 3b; “世,” part of the name of T'ai-tsung (627–649) of the T'ang, occurs on p. 1b; and “洽,” the name of his son and successor Kao-tsung (650–683), is found on p. 13a.

<sup>66</sup> *Tao tsang yuan-liu k'ao*, p. 189.

## *Tan Ching Yao Chueh: The Tradition and the Book*

the rule rather than the exception, and that decrees modifying the official system were often ignored on the popular level.<sup>67</sup> A mensural unit or value whose era was sharply delimited by official decrees must often be allowed in practice a somewhat longer effective life; the resulting uncertainty is best dealt with by using combinations of criteria when the text allows. Minor variations in value can be exploited only when a text happens to speak of them explicitly, but changes in units and their relationships, since they are directly reflected in the language of the text, can be made the basis of systematic tests.

For the T'ang period, one first notes that in the preceding Sui dynasty there was fluctuation between two sets of metrological standards, one of which was a simple multiple of the other. The T'ang retained the two systems, but only the "large system" was official until 721, when the "small system" was given official status for preparing prescriptions, determining the seasons by use of an eight-foot (*ch'ih* 尺) gnomon, tuning ritual instruments, and measuring ceremonial caps, which because of its antiquity were traditional applications. The Sung officially adopted the T'ang's "large system," but both systems remained in popular use for some time. If one finds in an alchemical or medical work such an expression as "large *tou* 大斗," which indicates that the *normal* measures of the work are expressed in the "small system," the implication is that the work is not earlier than the T'ang.<sup>68</sup> On the other hand, as part of an effort to set up a decimal system of small weights,

<sup>67</sup> Bibliographical remarks appear below in Appendix B, "'Apothecaries' Measure' in the T'ang Period." In the present connection the works cited there do not entirely supersede the notes of the great Ch'ing philologist Ku Yen-wu 顧炎武 in his *Jih chih lu* 日知錄 (Notes reflecting "daily cognizance" [see *Analects*, XIX.5], first printed 1670; Basic Sinological Series ed., Taiwan reprint of 1956, 6 vols.), II (*ch.* 11), 65-75.

<sup>68</sup> In the Sui the smaller foot-measure (1.2 of which equaled the *ch'ih* of the old Northern Chou iron rule) was adopted in 589, and a still shorter standard in 607. In 581 weights (*chin* 斤) and volumes (*sheng* 升) were defined as three times what were thought to be the values made standard by the great systematizer Wang Mang 王莽 six hundred years earlier. In

## Chinese Alchemy: Preliminary Studies

in 992 the *fen* 分, theretofore defined as a quarter of a *liang* 兩 (a *liang* was about 37.3 grams in the Sung), was redefined as 0.01 *liang*, or 0.1 *ch'ien* 錢.<sup>69</sup> Accordingly, a text which uses the *fen* as a unit of weight only one order of magnitude lower than the *liang* is probably no later than the early decades of the Sung. Since *Tan ching yao chueh* exhibits both of these conventions,<sup>70</sup> one may infer, assuming that the text is homogeneous, that it was written between the seventh and tenth centuries.

*Quotation from earlier and in later sources.* Conclusions about the period of a work can be drawn from parallel passages in other works only when they can be dated and when the direction of quotation can be clearly established. Parallel passages can often be located, because copying and quoting play an important part in a tradition based on the conviction

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603, however, Emperor Yang adopted the "Wang Mang" values (that is, one-third the prevalent values) for ritual use because of their antique basis. The "large system" of weights and volumes remained in popular use. Although physicians' and alchemists' use of the "small system" as distinguished from a "large system" employed in the world at large most likely began at this time, only from 618 (the inception of the T'ang) on was the large measure of length also current. Wu Ch'eng-lo, *Chung-kuo tu liang heng shih* (see Appendix B), pp. 160-167.

<sup>69</sup> Wu, pp. 128, 170-171, 254. The old *fen*, while still used by some writers, was generally written in the form "份."

Widespread pharmacological use of the *ch'ien* as a unit of weight dates from the great compendium of therapeutics *T'ai-p'ing sheng hui fang* 太平聖惠方 (992), but Wu and many other historians of metrology have found reason to believe that the unit had been used unofficially by medical men since the early T'ang. This position has recently been challenged by Miyasita Saburō, who points out (private communication) the weakness of the evidence upon which Wu's view is based. The question remains to be settled; if the conventional opinion does not hold up, the indications which argue that *Tan ching yao chueh* was compiled before 992 (occurrence of the *fen* as 1/4 *liang*) and after 992 (occurrence of the *ch'ien*) would tend to cancel out.

<sup>70</sup> The term "large *ts'un*" occurs on p. 18a (see below, p. 188), and *fen* as a unit of weight on pp. 20b, 27a, and 29a (see below, pp. 194, 209, and 213).

## *Tan Ching Yao Chueh*: The Tradition and the Book

that the ancients knew all the secrets. Few compilations can be assigned a meaningful date, however, and in the absence of explicit attribution one can rarely be sure that both versions of a passage are not copied from yet a third: for these reasons quotation criteria seldom yield unequivocal results when applied to alchemical literature.

In the case of *Tan ching yao chueh* it is possible at the present stage of research to identify within the text only one quotation from a datable work, and to detect what are definitely quotations from the text in only two later compilations. The earlier work quoted is the Shen-nung Pharmacopoeia (*Shen-nung pen-ts'ao* 神農本草), which T'ang physicians used in the authoritative recension of T'ao Hung-ching 陶弘景 (451–536).<sup>71</sup> One of the two later compendia is *Yun chi chi'ien* (ca. 1023), which provides the whole text translated below. The other, Wonderful Elixir Formulas of the Masters (*Chu chia shen p'in tan fa* 諸家神品丹法), a hodge-podge of elixir recipes, some attributed to particular alchemists and some not, requires more extended consideration. Those sections which have extant originals are seen to be unsystematically condensed and generally in poor repair. Since this altogether rather questionable book consists entirely of excerpts and lacks preface and colophon, there is no immediate prospect of determining when it was compiled, or by whom. Particular recipes can be dated as far back as the fourth century; a few claim to come from Liu An, at the very beginning of the alchemical tradition. The latest about which any statement can be made are no earlier than the Sung.<sup>72</sup>

<sup>71</sup> Page 16a, translated on pp. 183–184 below. See also Chapter IV, note 1.

<sup>72</sup> *Tao tsang*, vol. 594. The collection begins with *ch.* 16 of Ko Hung's (born 283) *Pao p'u tzu nei p'ien*; comparison with the original text fails to disclose the presence of substitutes used by the editor in place of tabooed characters.

In other portions one finds references to Ting 定 porcelain (4:6b, 7a; 5:18a), one of the famous wares of the Sung, and to the *ch'eng* 秤, a unit of weight which was used from the Sung through the Ming (4:15a; 5:14b; 6:3a).

## Chinese Alchemy: Preliminary Studies

Because of the uncertainty as to age, *Chu chia shen p'in tan fa* throws no light on the dating of *Tan ching yao chueh*, but it does raise questions about the integrity of the extant version of Sun's book. On the one hand, it reproduces six recipes from an "alchemical classic of Sun the Realized Immortal (*Sun chen-jen tan ching* 孫真人丹經)"; none of the six appears in *Tan ching yao chueh*.<sup>73</sup> On the other hand, one recipe (called "Method for Scarlet Snow and Flowing Pearl Elixir 赤雪流珠丹法") is quoted from *Tan ching yao chueh*, but anonymously, without mention of book or author.<sup>74</sup> The incongruity is striking enough to drown in doubt the supposition that *Chu chia shen p'in tan fa* preserves otherwise lost portions of *Tan ching yao chueh*. Without playing the dangerous game of second-guessing the thought processes of an altogether unknown late medieval compiler, it is not feasible to say more than that the seven recipes were almost certainly copied from two different sources.<sup>75</sup>

*Cognate treatises.* There are two other alchemical treatises which are so closely related to *Tan ching yao chueh* that they may be considered cognate, although the pattern of filiation

<sup>73</sup> 3:14a; 4:10a; 5:4a, 10b, and 12a; and 5:13a. Comparing such titles as those on 5:1a, 10a, and 11b gives support to the hypothesis that "alchemical classic of Sun the Realized Immortal" is not the title of a book.

<sup>74</sup> 3:9b-10a. See below, pp. 180-181.

<sup>75</sup> Whether there might have been another "Sun the Realized Immortal" (see footnote 46 above) I do not venture to say, but the "lost" recipes are by no means redolent of the brush of Sun Ssu-mo. They use "坏" for "to melt," while in *Tan ching yao chueh* the term is "熔" or "烱." They also employ the *ch'eng* as a unit of weight, highly suspicious in a work that purports to be pre-Sung (see note 72).

Contemporary Chinese historians of science apparently do not share my hesitation, however. Sun Ssu-mo has recently been given credit for the earliest known detailed formula for proto-gunpowder on the basis of a formula entitled "Method for fixing sulphur 伏火硫黃法" (5:11a-11b); see Feng Chia-sheng 馮家昇, *Huo-yao ti fa-ming ho hsi ch'uan* 火藥的發明和西傳 (The invention and westward transmission of gunpowder; Shanghai: Shanghai People's Press, 1962), p. 9, and Chang Tzu-kao, *Chung-kuo hua-shueh shih kao*, p. 125. The problems raised above turn out to be superflu-

## *Tan Ching Yao Chueh: The Tradition and the Book*

eludes reconstruction. The style of one, *T'ai-ch'ing shih pi chi*, which reached final form in the middle of the eighth century,<sup>76</sup> has been compared earlier with that of *Tan ching yao chueh* and shown to be extremely close. The degree to which the large repertory of elixirs in the two books coincides is also striking.<sup>77</sup> *Shih pi chi* contains a short parallel passage which serves as final proof of close linkage.<sup>78</sup> Finally, the general character of the book is extremely similar. The clear formulas, the lack of explicit philosophical context, the attention paid to medical applications of elixirs, and even the pains taken that the reader not be confounded by the multiplicity of names of each elixir, make it as good an example of what I have loosely called the pragmatic tradition in alchemy as *Tan ching yao chueh*. The latter work is more interesting primarily be-

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ous, however, for the formula Feng cites is not attributed to Sun in the original! It is anonymous, and the preceding recipe carries not Sun's name but that of "His Excellency Huang Tertius 黃三官人." The one before that is assigned to Sun, but has nothing to do with proto-gunpowder.

Lack of direct quotations from *Tan ching yao chueh* in extant medical books does not prove that its formulas were not widely used by doctors. Dr. Miyasita has kindly pointed out, for instance, that three formulas appear in somewhat altered forms under different titles in early Sung pharmacopoeias. In *T'ai-p'ing sheng hui fang* (Peking: People's Hygiene Press, 1958), 95:3053-3054, 3059, and 3064, Purple Powder Numinous Treasure Elixir and Spirit Tally Jade Powder Elixir are similar to *Tan ching yao chueh's* Lead Elixir, and Feminine-Subdued Purple Numinous Elixir closely resembles Flowing Pearl Elixir. In *Sheng chi tsung lu* 聖濟總錄 (ca. 1118; Idem., 1962), 200:3274, Immortals' Numinous Cinnabar Elixir is substantially the same as Purple Essence Elixir. Proportions of ingredients, technical terms, and wording in general differ too greatly to support any suggestion of a direct link.

<sup>76</sup> I do not know when this work was originally written or compiled, and there is no point in sifting through all the complex, inconclusive evidence here. The dates given in Ho and Needham, "Laboratory Equipment," p. 60, depend on incomplete information and doubtful readings. The bibliographical treatise in the New Standard History of the T'ang (*Hsin T'ang shu*, 59:8a) notes under the entry for this title that it was "edited by someone who was Assistant Prefect 司馬 of Chien-chou 劍州 [Szechuan] during the Ch'ien-yuan period [758/759]; his name is lost."

<sup>77</sup> For examples, see the tables in Appendix C.

<sup>78</sup> See below, p. 180.



## Chinese Alchemy: Preliminary Studies

cause the passions of the author can be glimpsed from time to time.

Mei Piao's 梅彪 *Shih yao erh ya* 石藥爾雅 (Synonymy of mineral preparations; 806) is only a few pages long, and contains not a single recipe, but it is an essential tool for the reconstruction of early Chinese alchemy. It is not a formulary, but a reference handbook which records secrets of the pragmatic tradition. Mei's lists of elixirs, of their variant names and those of their ingredients, and his bibliographies of key treatises are together more comprehensive than those provided by any other early author. The enumeration of elixirs is so closely parallel to that of *Tan ching yao chueh* that recourse to *Shih yao erh ya* has permitted the breaking of otherwise intractable textual enigmas.<sup>79</sup> The section entitled "Bibliography of [alchemical] classics, interpretative works, and mnemonic formulas in verse 敎諸經傳歌訣書目" includes both a Records of the Rock Wall (*Shih pi chi*) and a Classic of Sun Ssu-mo (*Sun Ssu-mo ching*). From every point of view the Synonymy of Mineral Preparations appears to be the latest member of a trio which are the survivors of a remarkably close-knit tradition.

In the absence of explicit attribution, nonetheless, the precise character of the links which connect this trio resists speculation. While it is easy enough to postulate that *Tan ching yao chueh*, as the earliest, was one of the principal sources of the other two books, every coincidence can equally be accounted for by positing a lost common source for all three. Only one clue points more definitely (but only barely so) in that direction: The list of "Grand elixirs of immortality, of which the names but not the formulas are known 大仙丹有名無法者" in *Shih yao erh ya* is said to be taken from a "Classic of Master Ch'u-tse" (*Ch'u-tse ching* 楚澤經). *Shih yao erh ya* mentions the *Shih pi chi* elsewhere by name, as has

<sup>79</sup> *Tao tsang*, vol. 588; the *Pieh hsia chai ts'ung-shu* 別下齋叢書 ed. (1925) includes useful variants. See Chapter IV, note 9, below.

## *Tan Ching Yao Chueh: The Tradition and the Book*

been noted, as though it were a completely different book. The extant edition of *Shih pi chi* carries the name of Master Ch'u-tse (a sobriquet) on its title page, although the treatise is attributed in the New Standard History of the T'ang to one Su Yuan-ming 蘇元明.<sup>80</sup> The corresponding list of elixirs is not found in the text of *Shih pi chi*, however, but in *Tan ching yao chueh!* At the moment only guesses are possible; one more or less reasonable conjecture is that Ch'u-tse's Classic is the lost common font, that Mei Piao copied from it rather than from the two later works (which he also knew and presumably consulted), and that the name "Ch'u-tse" is not that of the compiler of *Shih pi chi* but of the author of his chief source. In no case can conclusions be drawn from the relationship of these cognate works about the date or authorship of the present text of *Tan ching yao chueh*.

*Summary and Conclusion.* This essay at an exhaustive examination of the *Tan ching yao chueh* has failed both to positively uphold and to demolish Sun Ssu-mo's claim to authorship. Certain features of syntax and diction are also characteristic of medical works known to be Sun's. Since these features appear as well in a cognate work by another author, it is necessary to emphasize the need for caution when applying criteria of style to compilations. Specifications of the geographic origins of minerals do not tally perfectly with those in a known work, but since there are inconsistencies within *Tan ching yao chueh* itself one cannot expect correspondences except when comparing constituents of the same formula. The most serious

<sup>80</sup> The only Su Yuan-ming I have been able to identify passed the metropolitan examinations in 742/755; his biography (*Hsin T'ang shu*, 202:23b-25b) portrays him as a conventional litterateur, but his authorship of *I yuan pao chuan* 易元包傳, a speculative treatise on the Book of Changes, suggests the possibility of wide interests. The second character in his name is 源, not 元. I have been unable to determine whether the difference is scribal or substantive. One wonders if he would not be too late, in any case, to have written a book which received final editing by a man who held a post at the prefectural level in 758/759 (see note 76 above).

## Chinese Alchemy: Preliminary Studies

question arises when descriptions of apparatus and operations are compared with those in Sun's *Ch'ien chin fang*, for they are contradictory. The significance of the contradiction is by no means clear, however, since it may be accounted for by positing a change of preference based on experience in the period between the writing of the two books.

Other criteria—place names, weights and measures, quotation in later works—strongly support a date within Sun's lifetime, or at worst no more than three hundred years later. Because they are no more sharp-cutting than that, they do not rule out the possibility that the attribution is false but early.

The point, then, is where the burden of proof lies. If an attribution is to be accepted unless successfully challenged, as would ordinarily be the case for "orthodox" books, the work is genuine. But if, as Confucius recommended, we are concerned to know what we do not know, such an insouciant approach does not befit the arcane and tangled literature of Chinese alchemy. The answer to the conundrum of authorship must remain for the time being in suspense. It is only realistic, at the same time, to consider the work as approximately of Sun's time, and to own that the attribution is at least sufficiently likely that a critical inquiry into the biography of Sun Ssu-mo is not only heuristically justified but also relevant.<sup>81</sup>

<sup>81</sup> In order to avoid awkwardness, I refer subsequently to the author of *Tan ching yao chueh* simply as "Sun Ssu-mo."



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### III

## The Biography of Sun Ssu-mo: A Historiographic Inquiry

The men of whom you speak, Sir, have long since returned to dust, bones and all; only their words remain. — *Shih chi*

INASMUCH as a major aspect of Sun Ssu-mo's historical identity is that of the Taoist, the recluse, the magus, interpretation of the historical record requires a particular wariness of the obvious; for the obvious often turns out to have little or nothing to do with the individual.

Plainly visible in accounts of Sun's career are the background and attainments of a conventional figure; not the Confucian bureaucrat, to be sure, but the Taoist recluse,<sup>1</sup> a paradigm no less

<sup>1</sup> Not all recluses were Taoists. The special characteristics of the type, determined in the main by rejection of the prevalent ideal of civil service, have been aptly defined by F. W. Mote: "To bar one's gates and earn one's living without reliance on the emolument of office, to display a lack of regard for the social status which could be attained only by entering official-

## Chinese Alchemy: Preliminary Studies

firmly entrenched in that gallery of characters for emulation or detestation, the biographical section of the Standard Histories.<sup>2</sup> On the face of it, Sun appears from his "official" biographies, compiled a few centuries after his death by imperial commissions, to have been an eccentric and unfathomable wise man, deeply familiar with various arcana, albeit preserved from the taint of outright heterodoxy by the possession of attributes and sentiments which guarantee intellectual and moral respectability. The catholicity of his youthful interests, his refusal to accept honors and offices tendered him by three emperors (in a land where civil service was considered the highest goal of the educated man), his uncanny ability to predict the future, his great age, and his final apotheosis—these elements mark a life which would seem to have little in common with that of a plodder through the bureaucratic hierarchy. At the same time they fall into place only when they are recognized as by no means unique to Sun; they occur in varying combinations and embedded in varying concrete circumstances in the official biographies of

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dom, and to devote one's life to self-cultivation, scholarship or artistic pursuits made one a recluse." "Confucian Eremitism in the Yuan Period," in *The Confucian Persuasion* (Arthur F. Wright, ed.; Stanford University Press, 1960), p. 203.

The place of the recluse in Chinese society has been studied at length in Nemoto Makoto 根本誠, *Sensei shakai ni okeru teikō seishin* 專制社會における抵抗精神 (The spirit of resistance in authoritarian society; Tokyo: Sōgensha 創元社, 1952), which I have not been able to consult. A recent study, which seems to be based on a restricted range of sources, is Li Ch'i, "The Changing Concept of the Recluse in Chinese Literature," *Harvard Journal of Asiatic Studies*, 24 (1962-1963):234-247.

<sup>2</sup> This paradigmatic function of the official biographies has been the subject of considerable study in recent years. A number of articles which develop the general thesis and analyze specific cases of identification are to be found in Arthur F. Wright and Denis Twitchett, eds., *Confucian Personalities* (Stanford: Stanford University Press, 1962), especially pp. 10-15, 31-32, 154, and 264. That didactic value was a primary criterion for inclusion of biographies in the Histories is demonstrated in Denis Twitchett, "Chinese Biographical Writing," in W. G. Beasley and E. G. Pulleyblank, eds., *Historians of China and Japan* (London: Oxford University Press, 1961), pp. 101-103.

## The Biography of Sun Ssu-mo

many ancient recluses.<sup>3</sup> Here, then, is the first trap: how is true testimony to be distinguished from devices of characterization?<sup>4</sup>

<sup>3</sup> They correspond to the *topoi* which Herbert Franke has detected in biographies of "model servant[s] of the State"—"Some Remarks on the Interpretation of Chinese Dynastic Histories," *Oriens*, 3 (1950):120–121. A few *topoi* which mark the man of letters have also been noted by Hans H. Frankel in "T'ang Literati: A Composite Biography," in *Confucian Personalities*, pp. 73–74.

The biographies of recluses in the Old (*ch.* 192) and New (*ch.* 196) T'ang histories include 29 persons, one of whom (K'ung Min-hsing 孔敏行) is included only as an adjunct to his father's biography. Three are said to have been interested in "heterodox" classics in their younger days; thirteen refused honors or high office, and two more refused to go to the capital when summoned; thirteen (including five in the previous category) were dismissed or gave up civil office; three made striking predictions (one of these, it must be said in fairness, was of short range); thirteen lived to great age (that is, seventy or over); and four or five attained immortality. It would be possible to construct a much more extensive list of *topoi* peculiar to recluses, by no means all of whom were Taoists. Imperial indulgence toward serious breaches of court etiquette (ironic considering the heavy penalties Confucian officials sometimes paid for trifling infractions), and an unwillingness of the scholar living in retirement to countenance the vulgar ways of the people about him, are additional examples.

There is, one notes, considerable overlap of *topoi* from one category to another. It will be seen that Sun's biography (not to mention those of other recluses) includes three elements noted by Franke in accounts of Confucian activists:

"1. The person is a very clever child . . .

"2. Friends or relatives say that he will have a brilliant career . . . [The prediction in Sun's case is that it will not be conventional].

"3. When he is introduced to the emperor, the latter is deeply impressed by his new servant."

On the other hand, isolated recluse *topoi* do not invariably mark a recluse or a Taoist; Lu Ch'i-ch'ing 盧齊卿, who led a conventional career in official posts, was famous for his prognostications (see the references given in note 86 below).

<sup>4</sup> *Topoi* are by no means the only problem. In a brilliant study of the Standard History of the Later Han (*Hou Han shu* 後漢書), Hans Bielenstein established the criterion, to a large extent also true of the later Histories, that speeches not made in the presence of the Emperor, anecdotes, and "vivid and dramatic accounts, except those concerning the Emperor," are of little historical value unless substantiated. "The Restoration of the Han Dynasty," *Bulletin of the Museum of Far Eastern Antiquities*, Stockholm, 26 (1954):81.

## Chinese Alchemy: Preliminary Studies

Nor is that distinction sufficient, since exclusive concern with a question of function can throw little or no light on serious problems of content. Certain events in Sun's biographies — his prognostications and his transfiguration — are so far divorced from what the historian is entitled to consider the natural order of things that the question of their function loses much of its urgency, if not its interest. And once the relative sanctuary of the Standard Histories is left behind for other, less thoroughly rationalized early sources, what by all rights should be accumulating historical evidence is instead all too obviously the stuff of legend and myth. So long as the historian remains without a clear and specific understanding of how a legend, which is a general sort of thing, attaches itself to a particular person — and it would not be too much to say that our understanding in this area is practically nil — euhemerism can only be a matter of charity at best and of sentiment at worst. In other words, we simply do not know what to do with the many marvels which add color to Sun's life. Their value, once we have recognized them, lies primarily in the light they cast on the growth of what may be called the cult of Sun the Immortal.

Again, however, they are typical of the genre. Rare indeed is the Taoist who does not appear invested with thaumaturgic — or, if the reader prefer, archetypal — trappings in at least one of the Taoist or even the Buddhist hagiographies, or in those early miscellanies of supernatural anecdotes which are now considered among the finest flower of T'ang and pre-T'ang fiction.

The point is that, because of Sun's associations and concerns, while there is a great deal of early writing about him, very little can be expected in the way of reliable historical fact. What fact there is can be established only by judicious colligation and

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There is an interesting characterization of "evocativeness" as a paramount goal in Chinese biographical writing in Jaroslav Prusek, "History and Epics in China and the West: A Study of Differences in Conception of the Human Story," *Diogenes*, no. 42 (1963), p. 37.



*A Contribution to the Legend of Sun the Immortal.* A woodcut of 1602 which purports to show Sun as a Taoist hermit-doctor out gathering herbs. From the hagiographical collection *Hsien Fo ch'i tsung* 僊佛奇踪. Courtesy of the Chinese-Japanese Library of the Harvard-Yenching Institute, Harvard University.



## Chinese Alchemy: Preliminary Studies

weighing of all the evidence.<sup>5</sup> Although in any event the yield must be small, there are extrinsic benefits which should in the long run be even more valuable. One, of course, is that a rigorous inquisition can serve to some extent as a guide to approaches and sources useful in the study of other men of Sun's type, for many must be closely investigated before our understanding of these figures who played such an important part in the sciences and proto-sciences can be better than peripheral.

There are corresponding discoveries ultimately to be made in the realm of historiography. While our comprehension of the processes of historical compilation has made steady strides forward,<sup>6</sup> what we know makes much better sense for scholar-officials than for those who would have no dossier in the Board of Civil Office and for whom the compilation of an Account of Conduct would be a matter of little or no concern to the Department of Merit Assessments. There is much to learn in this respect from tracing, insofar as possible, the sources of the biographies of unconventional men. Certainly no single study can make more than a small contribution, but every serious investigation provides clues for an eventual synthesis.

<sup>5</sup> If stressing this point seems to be a mere rehearsal of the obvious, it is well to recall that the published accounts of Chinese alchemists in English are based *exclusively* on legendary materials. The only exception of which I am aware is William H. Barnes and H. B. Yuen, "T'ao the Recluse (A.D. 452-536), Chinese Alchemist," *Ambix*, 2 (1946):138-147, but it is an unscholarly translation of a rather offhand article published in a "local students' periodical"—actually *I-hsueh hsueh-sheng* 醫學學生 (Medical student)—by Ts'ao Yuan-yü 曹元宇 in 1935.

There are, to my knowledge, no extended biographical studies in other Western European languages based on research in Chinese sources. Alfred Forke's "Ko Hung, der Philosoph und Alchemist," *Archiv für Geschichte der Philosophie*, 41 (1932):115-126, while not primarily biographical, is a useful discussion of high quality.

<sup>6</sup> See particularly Yang Lien-sheng, "The Organization of Chinese Official Historiography: Principles and Methods of the Standard Histories from the T'ang through the Ming Dynasty," in *Historians of China and Japan*, pp. 44-59; for biographical writing, in addition to Denis Twitchett, "Chinese Biographical Writing," pp. 95-114, see his "Problems of Chinese Biography," in *Confucian Personalities*, pp. 24-39.

## The Biography of Sun Ssu-mo

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### THE OFFICIAL BIOGRAPHIES OF SUN SSU-MO

The most productive course, then, will be to examine closely the biographies of Sun Ssu-mo in the two Standard Histories of the T'ang dynasty,<sup>7</sup> comparing them with cognate accounts and supplementing them with what evidence can be gleaned from other early sources.

The Old Standard History of the T'ang dynasty was completed in 945 by a board which had been appointed by Emperor Kao-tsu of the Posterior Chin dynasty 晉高祖 in 941. Much of the book was transcribed verbatim from those portions of the Veritable Records 實錄 and National History 國史 — themselves T'ang compilations close to the archives — which had not been lost during the rebellion of An Lu-shan and his successors (756–762) or in the chaos at the end of the T'ang.<sup>8</sup>

By the middle of the eleventh century the *ku-wen* (“ancient style”) movement, which aimed at widespread reforms to be achieved by the universal adoption of a simple, flexible literary style based on classical models, was in the ascendant. Its leader, Ou-yang Hsiu 歐陽修 (1007–1072), persuaded his pliable Emperor that the Old History was “shallow and vulgar” in style (since it was on the whole written in a reasonably utilitarian narrative style, this criticism, voiced by the Emperor himself, apparently referred mainly to the diction and

<sup>7</sup> *Chiu T'ang shu* 舊唐書 (hereafter abbreviated *CTS*), 191:8a–10a, and *Hsin T'ang shu* 新唐書 (cited as *HTS*), 196:4a–5b. For all citations from the post-Han Standard Histories I have used the Ch'ien-lung palace edition of 1739. The text of the *HTS* biography in the *Po-na* edition of the Histories is identical.

<sup>8</sup> Lü Ssu-mien 呂思勉, *Sui T'ang Wu-tai shih* 隋唐五代史 (History of the Sui, T'ang, and Five Dynasties periods; 2 vols., Peking: Chung Hwa Book Co., 1959), II, 1323–1325, and E. G. Pulleyblank, “The *Tz'yjyh Tongjiann Kaoyih* and the Sources for the History of the Period 730–763,” *Bulletin of the School of Oriental and African Studies*, University of London, 13 (1950):448–473.

## Chinese Alchemy: Preliminary Studies

rhetoric of the speeches, poems, and essays which were often copied into the biographies and other sections), and in 1045 Ou-yang was appointed to a board of revision. Because documents were used which had not been available a century earlier, and a number of valuable historical works had been written in the meantime, in many ways the New History (completed 1060) is a more reliable work.<sup>9</sup> As a comparison of the two biographies of Sun will illustrate, however, condensation was occasionally carried beyond the limits of limpidity, and stylistic criteria sometimes overruled historical value in determining passages to be inserted or excised.

It is customary in the Standard Histories to group biographies of (politically) minor figures in categories. In the Old History the account of Sun is included in a chapter called "Biographies of wonder-workers," a general repository of diviners, astronomer-astrologers, physicians, and sundry eminent Buddhists and Taoists. When the New History was prepared, Sun and Meng Shen 孟詵, an eminent physician and alchemist of the next generation, were shifted to the "Biographies of recluses" for reasons which an examination of the chapters as a whole fails to disclose.<sup>10</sup> These rubrics are, in the nature of things, almost interchangeable; most wonder-

<sup>9</sup> Chao I 趙翼, *Nien-erh-shih cha-chi* 廿二史札記 (Reading notes on the Twenty-two Histories, 1796; Kuang-ya shu-chü 廣雅書局 ed.), 16:2b-6b. Revision of the biographies was the responsibility of Sung Ch'i 宋祁, and was essentially independent of Ou-yang Hsiu's work on the remainder of the History; see Wang Ming-sheng 王鳴盛, *Shih-ch'i-shih shang-ch'ueh* 十七史商榷 (A critical study of the Seventeen Histories, printed 1787; Kuang-ya shu-chü ed.), 69:2b-4b. Sung's work began about 1030 and was completed between 1041 and 1048. Wang believes it was edited, at least slightly, by Ou-yang, before the completed New History was presented to the Emperor.

<sup>10</sup> Neither the prefaces nor the choice of subjects in the "Biographies of wonder-workers" in the Old and New Histories (*ch.* 191 and 204 respectively) reveal any significant difference in approach, with the single exception that Buddhist monks are excluded from the later version. Other famous physicians, such as Chang Wen-chung 張文仲 (Physician of the Imperial Service ca. 690 則天初), remain under the old rubric.

## The Biography of Sun Ssu-mo

workers were recluses at one time or another, and most recluses were skilled in one or more of the occult arts—and medicine, particularly prognosis, was occult enough. We shall see that in Sun's case the changes in content which accompanied the shift do not seriously affect his characterization.

The two biographies, translated below, have been divided arbitrarily into short sections, which have been juxtaposed to facilitate comparison of parallel texts. Each section has been provided with an explicatory and exegetical commentary, in order to take the reader behind the formal superstructure of the biographies and to evaluate their content.<sup>11</sup>

### I

#### *Old History*, 191:8a 方技傳

Sun Ssu-mo was a native of Hua-yuan 華原, in Ching-chao [prefecture] 京兆.<sup>12</sup> He began his formal studies at the age of seven [*sui*: six years or a little less]; he learned more than a thousand words every day. At the age of about twenty 弱冠 he discoursed with skill of Lao-tzu and Chuang-tzu, and of the theories of all the various schools of philosophy. He

<sup>11</sup> In order to allow the reader to gauge the extent of condensation in the New History version, the translations are quite literal—although I adhere to the axiom that a translation which comes out gibberish, regardless of its word-by-word correspondence to the original text, is no translation at all. Because the subject or object of a verb is often omitted in one text or both, brackets have been used somewhat more freely than would ordinarily be necessary simply to convey the sense. Only textual variants that significantly affect the meaning have been noted. Punctuation is, of course, determined by sense, but the placement of full stops is to some degree arbitrary.

<sup>12</sup> This was the region of the Western Capital, Ch'ang-an, in present Shensi province. For a short history of Hua-yuan subprefecture, see Sung Min-ch'iu 宋敏求, *Ch'ang-an chih* 長安志 (Gazeteer of Ch'ang-an, contemporary preface by Chao Yen-jo 趙彥若 dated 1074; *Ching hsun i'ang ts'ung-shu* 經訓堂叢書 ed.), 19:5a-6b. I have not been able to consult the special study by Ma K'an-wen 馬堪溫, "T'ang-tai ming i Sun Ssu-mo ku li tiao-ch'a chi 唐代名醫孫思邈故里調查記" (Record of an investigation of the ancestral home of the famous T'ang physician Sun Ssu-mo), *Chung-hua i shih tsa-chih* 中華醫史雜誌 (Journal of history of Chinese medicine), 6.4(1954).

## Chinese Alchemy: Preliminary Studies

was equally fond of the Buddhist scriptures. When Tu-ku Hsin 獨孤信, Governor-general 總管 of Lo-chou<sup>13</sup> 洛州, saw him, he sighed and said: "This is a prodigy! Too bad his capacity is so great that it will be hard to make use of it."

*New History*, 196:4a 隱逸傳

Sun Ssu-mo was a native of Hua-yuan in Ching-chao [prefecture]. He mastered the theories of all the various schools of philosophy, and skillfully discoursed of Lao-tzu and Chuang Chou [that is, Chuang-tzu]. Tu-ku Hsin of the [Northern] Chou dynasty, when Governor-general of Lo-chou, noticed his youth and marveled at it. He said: "He is a prodigy, but it will be hard to make use of such great capacity."

### Commentary

This section is wholly conventional. The first sentence, the usual formal beginning of a biography, states the ancestral place of registration (which need not be the place of birth or residence at all) and thus provides an indication of the subject's clan affiliations. The remainder is meant to establish the justice of Sun's classification as a wonder-worker/recluse. His precocity and his interest in "heterodox" literature are noted in terms so bromidic that it would be foolish, despite their likelihood, to consider them anything more than a later estimate of what Sun's youth *should have been* like. This is all the plainer in the anecdote of Tu-ku Hsin.

Tu-ku Hsin,<sup>14</sup> of noble Hunnish descent, was one of the

<sup>13</sup> Centered on modern Yung-nien 永年 county, Hopei. In the T'ang a *tsung-kuan* was a commander of an expeditionary army, but in the Northern Chou this term was applied to the office which both before and after was called *tu-tu* 都督. See *T'ung-chih lueh* 通志略 (Treatises from the General history; ca. 1150, Basic Sinological Series ed.), XIV ("Chih-kuan lueh 職官略," Outline of official ranks, part 6), 41.

<sup>14</sup> Biographies in *Chou shu* 周書 (Standard History of the Northern Chou, 636), 16:3a-8b, and *Pei shih* 北史 (Standard History of the Northern Dynasties, 659), 61:5a-8b.

## The Biography of Sun Ssu-mo

greatest military men of the period before the Sui reunification of China. He came to fame shortly after 520, and was forced to commit suicide at the beginning of 557, when his part in an assassination plot was discovered. The mention of his rank would place the episode in the period 537–540,<sup>15</sup> almost a century and a half before the putative date of Sun's demise (682).

In Chinese history there are many anecdotes in which a wise or charismatic character is struck by the appearance (perhaps more properly the *mana*) of a youth who is destined for eminence. His words are generally a prophecy, often obscurely couched. This case would seem to be no exception, for Tu-ku's words are not in the least to be taken as disparagement. Their implication is simply "He is too talented for a conventional career—but another sort of success is his for the seeking," and their language is that of philosophical Taoism. While it would be too much to call them an allusion, they are clearly reminiscent of the Taoist parable in which Hui Shih complained to Chuang-tzu that he had been saddled with an enormous gourd, the capacity of which was so great that, with all his common sense, he could find no use for it. Chuang-tzu's reply was an exhortation to the kind of life which the conformist could never know: "As for you and your large gourd, why did you not tie it as a buoy at your waist, and, borne up by it on the waters, float to your heart's content amid the streams and inland seas? Instead, you grumble about its gigantic dimensions and say that ladles made from it would hold nothing; the rea-

<sup>15</sup> His biographies (see also the "Annals of Emperor Wen" in *Chou shu*, 2:4a–5b) have him appointed Grand Governor-General 大都督 in 537. He occupied Loyang in late November or early December 537 大統三年十月, and abandoned it about ten months later. In 540 he was made Grand Governor-General of Northwest China from Kansu Westward 隴右十一州大都督, and, shortly afterward, Grand Marshal 大司馬.

For the reader's convenience, concise chronological tables of events and sources connected with both the historical and the legendary Sun Ssu-mo are provided in Appendixes E and F.

## Chinese Alchemy: Preliminary Studies

son being, I fear, that your own thoughts have not learnt to run beyond the commonplace.”<sup>16</sup>

A large part of the Old History biography (the beginning of section I, most or all of sections II, III, V, VI, and XII, and a variant version of section XI) was already assembled in a slightly earlier work of no serious historical pretensions, the *Hsu hsien chuan* 續仙傳 (Continuation of the Biographies of immortals).<sup>17</sup> Since the *Hsu hsien chuan* was not, so far as

<sup>16</sup> Ch'ien Mu 錢穆, *Chuang-tzu tsuan chien* 莊子纂箋 (The *Chuang-tzu*, with critical annotations; 3rd ed., Hong Kong: Tung-nan yin wu ch'u-pan-she 東南印務出版社, 1957), p. 6. Trans. Arthur Waley, *Three Ways of Thought in Ancient China* (1939; Garden City, N. Y.: Doubleday and Company, Inc., n. d.), pp. 4-5.

My interpretation rejects the early version of the Tu-ku Hsin anecdote found in the great story collection *T'ai-p'ing kuang chi* 太平廣記 ("Amplified records" of the T'ai-p'ing-hsing-kuo reign period, 977, hereafter *TPKC*; 5 vols., Peking: Peoples' Literature Press, 1959), I (ch. 21), 140. There Tu-ku's words are "Too bad that although his capacity is large his discrimination is small 識小, so that it will be hard to make use of him." I will show below, however, that the part of the *TPKC* version which parallels the *CTS* biography is almost certainly copied from it, with purely *ad lib* modifications. This is one of only two substantive additions, and ironically it destroys the point of the story. It is in turn misquoted by a Yuan dynasty hagiographical compendium, the Taoist Chang T'ien-yü's 張天雨 *Hsuan p'in lu* 玄品錄 (*Tao tsang* 道藏, vol. 558), 4:11a, in a conflation of the *TPKC* account with the two official biographies. There we find the homophone "適" for "識." This variant does not read as well, since the antithesis is destroyed, but at least it restores to the anecdote a remotely feasible point: "Too bad that although his capacity is large he is only a child; it would be hard to make use of him," that is, he was too young to become Tu-ku's protégé.

<sup>17</sup> Preserved in the Sung Taoist encyclopedia *Yun chi ch'i ch'ien* 雲笈七籤 (*Tao tsang*, vols. 677-702), 113B:17b-20b. The order is the same as that of *CTS*, except that a version of the "dragons of K'un-ming pool" legend is inserted before the account of Yang Chien's summons in sec. II.

The date of this work is not known with precision, but its author, Shen Fen 沈汾, was an official of the Posterior T'ang dynasty (April 923-November 936), as is shown by the editors of the *Ssu-k'u ch'üan shu* (*Ssu-k'u ch'üan shu tsung mu t'i yao* 四庫全書總目提要, Summary catalogue of the Complete Library in Four Branches of Literature, original form presented to the throne in 1781, cited hereafter as "Ssu-k'u Catalogue"; Taipei: Yee Wen Book Co., n. d., X [ch. 146], 2891), and he signs the preface as "presently Censor of Provincial Courts of Inquiry."

## The Biography of Sun Ssu-mo

can be ascertained at this remove, available to the editors of the Old History, and since, as will be seen below, the text of the Old History diverges from it in favor of readings which can be located in earlier texts, it is evidently not the proximate source.<sup>18</sup> In view of the short interval between the two works, the most likely hypothesis is that they both derive from one or more books no longer extant.<sup>19</sup> Consequently, although large parts of the two sources correspond practically word for word, for purposes of *Quellenforschung* a comparison of minor textual variants is beside the point. The anecdote of Tu-ku Hsin does not appear in *Hsu hsien chuan*.<sup>20</sup>

There is also a parallel text—practically verbatim except that sections IV and VIII (both of which come from the same primary source) are amalgamated, and that three additional legends are included—in the section on “Immortals” of *T'ai-p'ing kuang chi*.<sup>21</sup> Although this compilation was undertaken several decades later (977) than the Old History, the biography of Sun is credited to two considerably earlier works, the *Hsien chuan shih i* 仙傳拾逸 (Gleanings from the biographies of immortals) of the influential Taoist Tu Kuang-t'ing 杜光庭 (850–933) and the collection of supernatural anecdotes *Hsuan shih chih* 宣室志 of Chang Tu 張讀 (flourished in the

<sup>18</sup> *Hsu hsien chuan* is listed as *Hsu shen hsien chuan* 續神仙傳 in the Bibliographical Treatise of the New History (59:9a), but is not listed in that of the Old History.

<sup>19</sup> I do not, however, entirely rule out the possibility that the parallel portion of the biography of Sun in *Hsu hsien chuan* as we have it is derived from that in the Old History. The question cannot be finally settled without an exhaustive investigation of the date, provenance, and present condition of *Hsu hsien chuan*. It is relevant that the text was stabilized within a century of its putative date, since it is found in the Sung Taoist encyclopedia *Yun chi ch'i ch'ien* (ca. 1023).

Henri Maspero, in his classic “Les Procédés de ‘nourrir le principe vital’ dans la religion Taoïste ancienne,” *Journal Asiatique*, 229 (1937):232, n. 3, allows as one possibility that *Hsu hsien chuan* is the proximate source, but this is only a passing judgment.

<sup>20</sup> Nor elsewhere, so far as I have been able to ascertain, in extant works prior to the Old History.

<sup>21</sup> I (*ch.* 21), 140–143.



## Chinese Alchemy: Preliminary Studies

period 881–884 中和). The ascription is indubitably acceptable, but no part of the *TPKC* biography can be found in the extant incomplete texts of these works.<sup>22</sup>

Since both sources are clearly earlier than the Old History, it is a simple matter to suppose that one of them is the source of the Old History's biography, and that the other provided the three legends. This view is, however, hardly tenable, for three reasons. First, it is clear from what remains of the two sources that they consist of short, discrete anecdotes, in which little or no biographical background is provided. Second, the first two legends occur paired in a similar work of the same period, Tuan Ch'eng-shih's 段成式 famous *Yu-yang tsa tsu* 酉陽雜俎 (ca. 860).<sup>23</sup> Third, the third legend ("the transfig-

<sup>22</sup> A few of the anecdotes from *Hsien chuan shih i* are collected in the great Ming treasury of fragments *Shuo fu* 說郛 (Commercial Press ed., vol. 4), 7:1b–2a. There are about fifty scattered through *TPKC*; they are easily located by using Teng Ssu-yü 鄧嗣禹, ed., *T'ai-p'ing kuang chi p'ien mu chi yin shu yin-te* 太平廣記篇目及引書引得 (Index to titles of items and to books quoted in *TPKC*; Sinological Index Series, no. 15, Peiping: Harvard-Yenching Institute, 1934). I have also examined the five other extant works of Tu Kuang-t'ing without success.

The present text of *Hsuan shih chih* in ten *chüan* with a supplement in one *chüan*, preserved in the collection *Pei hai* 裨海 (Chen lu t'ang 振鷺堂 ed., vols. 37–38), is generally considered complete, but it is not. As Ch'ang Pi-teh 昌彼得 has recently demonstrated, in fact, the *Pei hai* recension, from which all other "complete" versions descend, was copied out of *T'ai-p'ing kuang chi*, in which the same anecdotes—and ten more—credited to *Hsuan shih chih* appear in precisely the same order. There are a number of odd fragments which do not appear in the "complete" versions; for instance, of the twenty-nine fragments in the compendium *Lei shuo* 類說 (Reproduction of woodblock ed. of 1626; Peking: Wen-hsueh ku chi k'an-hsing shē, 1955), II, 1583–1602, twelve are independent. See *Shuo fu k'ao* 說郛考 (Researches on the *Shuo fu*; offprint from the *Nien-pao* 年報 [Annual report], Chinese Planning Committee for Asian Studies 中國東亞學術研究計劃委員會, 1962, no. 1), p. 179. There is a work by Wang Jen-chün 王仁俊 entitled "Hsuan shih chih i wen 佚文" (Lost fragments of the *Hsuan shih chih*) in his collection "Ching-chi 經籍 i wen," but it exists only as a manuscript in the Shanghai Library.

<sup>23</sup> *Ssu-pu ts'ung k'an* ed., 2:10a–11a. For the date of this work, see Paul Pelliot, "Autour d'une traduction sanscrite du *Tao tö king*," *T'oung Pao*, 13 (1912):373–375.

The relation of this version to that of *TPKC* will be discussed below.

## The Biography of Sun Ssu-mo

ured child") is explicitly dated toward the end of the period 860–874 咸通末, which—barring a considerable anomaly—puts it about two and a half decades too late for *Hsuan shih chih*.<sup>24</sup> These data support the hypothesis that the three legends are to be divided between the two sources, and that the biography is a conflation of those in the Old History and *Hsu hsien chuan*, made without acknowledgment.<sup>25</sup> Both works were available to the editors of *T'ai-p'ing kuang chi*, who were working under imperial auspices. In the absence of ancillary sources which are decisive on this point, however, a residue of uncertainty must remain, for, as R. H. van Gulik has demonstrated in a classic case study on the growth of Taoist legend, T'an K'ai's 談愷 Ming edition (1566) of *T'ai-p'ing kuang chi*, from which all extant versions descend, is far from faithful to the original Sung print.<sup>26</sup>

In this section, as in most of the remainder, one apprehends that the New History's revision was mainly a matter of condensation which affects the sense only slightly, and that quotations were condensed as freely as narration. The degree of modification of the Chinese text is somewhat less than the translation can indicate, since the change of a single character can affect the general import of a sentence considerably. Rhetorical particles, on the other hand, have been freely altered,

<sup>24</sup> The events in the majority of the anecdotes in *Hsuan shih chih* are dated; the latest date is 842 會昌二年 (*Pei hai* ed., 3:11a), and most are considerably earlier. I would assign this work to the latter half of the ninth century, and *Hsien chuan shih i*, on the basis of the author's *floruit*, to the year 900 plus or minus about twenty-five years.

<sup>25</sup> *TPKC* does not consistently name its sources. See Teng Ssu-yü and Knight Biggerstaff, *An Annotated Bibliography of Selected Chinese Reference Works* (rev. ed., Cambridge: Harvard University Press, 1950), p. 170.

That *Hsu hsien chuan* or another work in the same textual tradition was employed is demonstrated in notes 45 and 48 below.

<sup>26</sup> "The Mango 'Trick' in China. An Essay in Taoist Magic," *The Transactions of the Asiatic Society of Japan*, ser. 3, 3 (1954):117–175, esp. pp. 140–141.

## Chinese Alchemy: Preliminary Studies

purely in the name of style (for this was a major motive in the revision), in ways too semantically insignificant to be reflected in (a readable) English rendering.

### II

#### *Old History*, 191:8a

In the time of Emperor Hsuan [578–579] of the [Northern] Chou dynasty, because of the many intrigues of the princely houses, Ssu-mo went to live in retirement on Mount T'ai-po 太白山. When [Yang Chien 楊堅, who later became] Emperor of the Sui dynasty, was Regent 輔政, he summoned [Ssu-mo] to be a Master of Wide Learning in the University of the Sons of the State,<sup>27</sup> but Ssu-mo declined on the pretext of illness. He said to someone close to him: "Fifty years from now a sage is bound to emerge; only him will I assist, in order to succor humanity."

#### *New History*, 196:4a

When he grew up he lived on Mount T'ai-po. When [Yang Chien, who later became] Emperor Wen of the Sui dynasty, was Regent, he summoned [Ssu-mo] to be a Master of Wide Learning in the University of the Sons of the State, but he did not accept. He confided in someone: "Fifty years from now a sage will emerge. Then I will assist him."

#### *Commentary*

Here we learn that civil unrest prompted Sun to undertake the serious commitment to esoteric Taoism which traditionally comes to fruition in a mountain retreat.<sup>28</sup> Before the be-

<sup>27</sup> For translations of T'ang official titles, see Robert des Rotours, *Traité des Fonctionnaires et Traité de l'Armée traduits de la Nouvelle histoire des T'ang (Chap. XLVI-L)* (Bibliothèque de l'Institut des Hautes Etudes Chinoises, vol. VI; 2 vols., Leiden: E. J. Brill, 1947–1948).

<sup>28</sup> Mount T'ai-po (modern Mei 郿 County, Shensi), in the Chung-nan range, was about a hundred miles from his ancestral home. It is interesting that by the eleventh century his old retreat was believed to be next to Hua-

## The Biography of Sun Ssu-mo

ginning of the Sui, says his biography, he was a sufficiently accomplished sage that his services were desired by a ruler — one who was about to attain the highest power in name as well as in fact, and whose legitimacy would be bolstered a quantum every time he patronized a man of great virtue (in the archaic sense of the term). But just as an Emperor's literally cosmic responsibilities can be discharged only if he is surrounded by sages, so the sage's virtue can be fully manifested only if the monarch he serves is also a sage. Here we verge on the Confucian metaphysics of statecraft, which by the T'ang had bred so commonplace a set of assumptions that the word I translate "sage" was often used as a conventional term equivalent to "His Majesty."<sup>29</sup>

The intrigues were those which culminated in the blood-bath from which the Sui emerged. Emperor Hsuan was an inexperienced and unbalanced young man who abandoned the throne to his six-year-old son early in 579 in order to devote himself more entirely to the pleasures of the palace. When Hsuan died in 580, an edict was fabricated appointing Yang Regent. In the bitter power struggle which resulted, the child Emperor and many princes were slaughtered. The putative date of Sun's refusal to take office would therefore fall between 580

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yuan at Mount Feng-k'ung 風孔 (also called Wu-t'ai 五臺), and in 1059 a temple to him was built there. See "Sun chen-jen tz'u chi 孫真人祠記" (An account of the shrine of Sun the Realized Immortal [1081], in Wang Ch'ang's 王昶 *Chin-shih ts'ui pien* 金石萃編 (Collected inscriptions, preface dated 1805), 138:13b-14a; and *Ch'ang-an chih*, 19:9b-10a.

The Mount Wu-t'ai associated with Sun (which should not be confused with the great Buddhist center of the same name in northeastern Shansi) has lately been renamed Medicine King Mountain (that is, Mount Yao-wang 藥王) in his honor. For a description of Sun's shrine as it appears today, see Li Ching-wei 李經緯, "Sun Ssu-mo," in *Chung-kuo ku-tai k'o-hsueh-chia* 中國古代科學家 (Ancient Chinese scientists; Institute of the History of the Natural Sciences in China, Chinese Academy of Sciences, ed.; Peking: Science Press, 1959), p. 100.

<sup>29</sup> This point is made in a review by Yang Lien-sheng in *Harvard Journal of Asiatic Studies*, 15 (1952):263-264.

## Chinese Alchemy: Preliminary Studies

and 604, when Yang became Emperor of a reunified China.<sup>30</sup> Since, as will be clear in the next section, Sun's prophecy probably applies to the T'ang Emperor Kao-tsung (650–684), the date of its utterance can be specified more exactly as circa 600, toward the end of Yang's regency. T'ai-tsung appeared in 627, which would be slightly too early even if the specification of fifty years is not precise.

### III

*Old History*, 191:8a–8b

When T'ai-tsung [of the T'ang, reigned 627–649] came to the throne, he summoned [Ssu-mo] to audience at the capital. Struck by the extreme youthfulness of his countenance, [T'ai-tsung] said to him, "Because [of you] I see that those who possess the Tao are truly to be respected. Surely [the stories of] Hsien-men-tzu and Kuang-ch'eng-tzu are not mere prattle." He wished to bestow noble rank [upon Ssu-mo], but [Ssu-mo] firmly excused himself from accepting it. In the fourth year of the Hsien-ch'ing 顯慶 period [659] Kao-tsung had an audience with him and appointed him Imperial Censor-Counselor, but again he firmly excused himself from accepting [the honor]. In the first year of the Shang-yuan 上元 period [674] he requested permission to retire from the court on account of illness. [The Emperor] especially bestowed upon him a fine horse, and the administrative palace for the domain of the Princess of Po-yang 鄱陽公主 as his residence. Such eminent gentlemen of the time as Sung Ling-wen 宋令文, Meng Shen, and Lu Chao-lin 盧照鄰 served him according to the forms appropriate to a teacher.

<sup>30</sup> As soon as Yang had consolidated his position he took the title of Emperor retroactive to the second month (February 19–March 20) of 581, but his "legitimate mandate" is reckoned from his taking the throne of all China in 604. For an excellent narrative of these complex events, see Lü Ssu-mien, *Liang Chin Nan-pei-ch'ao shih* 兩晉南北朝史 (History of the Western and Eastern Chin and of the Period of Division, 1948; reprint, 2 vols., Hong Kong: Peace Book Co., 1962), II, 763–775.

## The Biography of Sun Ssu-mo

*New History*, 196:4a

Early in his reign, T'ai-tsung [of the T'ang] summoned [Ssu-mo] to audience at the capital. He was already an old man, but his hearing and sight were excellent. The Emperor sighed and said: "He is a possessor of the Tao." [The Emperor] wished to make [Ssu-mo] an official, but he did not accept. In the Hsien-ch'ing period [656–660] he was summoned to audience again, and appointed Imperial Censor-Counselor, but he firmly excused himself. In the first year of the Shang-yuan period [674], pleading illness, he returned to the mountains. Kao-tsung bestowed upon him a fine horse, and assigned him the administrative palace for the domain of the Princess of Po-yang as his residence. Ssu-mo was a perfect master of the *yin-yang* arts [numerology, prognostication, alchemy, and so forth], astronomy, and medicine. Meng Shen, Lu Chao-lin, and others served him as their teacher.

### *Commentary*

We have now entered the period in which, given a normal human lifespan, Sun's age would not be wildly inconsistent with the events described. If we provisionally accept his own statement, transmitted by a witness, that he was born in 581 (see below, section VIII), we can understand the reason for his appearance of youth and vigor in 627 or so, and even perhaps interpret T'ai-tsung's admiration as prompted by Sun's accomplishment at so young an age rather than by his geriatric durability.<sup>31</sup> T'ai-tsung's remark, which compares Sun with two legendary immortals known to every educated

<sup>31</sup> There is no *a priori* basis for concluding that the incidents, either legendary or else grossly misdated, of sections I and II were even known in T'ai-tsung's time. The statement about Sun's advanced age in the *HTS* version is obviously a stylistic "improvement," like the assertion in section XI that he was over a hundred years old at his death. There is not a single discrepancy in the two biographies of such a nature as to suggest that the *HTS* editors had access to new archival material; their only substantial addition comes from a current literary work (section VII).

## Chinese Alchemy: Preliminary Studies

Chinese,<sup>32</sup> need not be taken as more than an affirmation that Sun must be a master of the secrets of transfiguration; in esoteric Taoism immortality does not strictly imply great age.

We are further told somewhat indirectly that, at what would in the same view be the age of 78, Sun entered court life, not compromising himself by accepting official responsibilities but rather remaining in the Emperor's retinue for fifteen years in some informal capacity.

Now how dependable is this account? While in general the Standard Histories tend to be most reliable on matters directly related to the court and thus verifiable from the imperial archives, there is evidence that in the T'ang this verification did not always take place,<sup>33</sup> and we have no ancillary evidence. If the *Hsu hsien chuan* version were precisely parallel we would be forced to assign a very low reliability, for *Hsu hsien chuan* is a highly imaginative work by an author who there is no reason to believe had access to official records. We are fortunate that the last part of this section (beginning "In the first year of the Shang-yuan period") and the date of Kao-tsung's summons

<sup>32</sup> *Hsu Hsien chuan*, p. 19a, differs by two characters ("羨門之徒" for "羨門廣成"), changing the overall meaning considerably: "Surely [the story that he is] a successor [lit., "disciple"] of Kuang-ch'eng-tzu is not mere prattle."

These two semidivinities are connected with emperors who wished to learn the secrets of immortality from them. Hsien-men Tzu-kao 羨門子高 was one of those Ch'in Shih-huang (221-209 B.C.) sent an expedition to seek out; a satirical interview between Kuang-ch'eng-tzu and the Yellow Emperor appears in one of the "suspect" chapters of *Chuang-tzu*. See Takikawa Kametarō 瀧川 龜太郎, *Shih chi hui chu k'ao-cheng* 史記會注考證 (Records of the Historian, with collected commentaries and philological annotations; reprint, 10 vols., Taipei: Yee Wen Book Co., n.d.), 6:45; cf. 28:21, 23; and Ch'ien Mu, *Chuang-tzu tsuan chien*, pp. 82-84, trans. James R. Ware, *The Sayings of Chuang Chou* (New York: Mentor Classics, 1963), pp. 71-73.

<sup>33</sup> The Accounts of Conduct 行狀, on which historians from the T'ang on so greatly depended, were often compiled privately—almost always in the case of a subject who had not held high office—and the bureaucratic arrangements were not such as to facilitate systematic checking by the compilers of the Histories. See D. C. Twitchett, "Chinese Biographical Writing," pp. 103-107.

## The Biography of Sun Ssu-mo

(659) are not to be found in any earlier published source. While it is impossible to prove that they come from the archives, they lend a beguiling note of concreteness, and allow a verdict of “unproved but not unthinkable” at this point.

Nothing can be deduced from the contents of this section as to Sun’s whereabouts after 674. The statement in the Old History that he requested permission to retire from the court (lit., “requested to return 請歸”) is given a slightly more elegant formulation in the New History, but “to return to the mountains 歸山” is simply a euphemism, applied to Taoists, for “to retire.”<sup>34</sup>

The last sentence in section III was evidently inserted as a bridge to the next section, and merely implies that Sung Ling-wen (fl. third quarter of seventh century), Meng Shen (ca. 621–ca. 713), and Lu Chao-lin (ca. 641–ca. 680) knew Sun when they were young men.<sup>35</sup> The phrase “served him according to

<sup>34</sup> In late times “retirement to the mountains” might involve nothing more than a comfortable, moderately gregarious life on a city estate after a few years in minor posts. See the amusing case of Yuan Mei 袁枚 (1716–1797) in Li Ch’i, “The Changing Concept of the Recluse in Chinese Literature,” pp. 245–246.

<sup>35</sup> Sung, according to the official biographies of his son Chih-wen 之問, was a Literatus Reviser and Corrector in the Imperial Chancellery during the reign of Kao-tsung (650–683) (*CTS*, 190B:16a–17b; *HTS*, 202:3b–5a). That his son was similarly connected with the Taoist recluse T’ien Yu-yen 田遊巖 (*HTS*, 196:6a) is substantiated by poems in Chih-wen’s collected works.

Meng was another of the great physicians of the early T’ang as well as a political figure (*CTS*, 191:14b–15a; *HTS*, 196:6b–7a; *Hsuan p’in lu* [in *Tao tsang*, vol. 559], 5:2a–2b). His chemical prowess is reflected in the anecdote that he proved some gold which the infamous Empress (or, to be more rigorous, female Emperor) Wu Tse-t’ien (ninth month of 684–first month of 705) had given a fellow official was “alchemical gold” 鈔金; he was consequently transferred away from the capital. See above, Chapter II, note 24.

Lu Chao-lin, whose collected works is the only extant primary source for Sun’s life (below, section IV), is considered one of the four great prose writers of the early T’ang 初唐四傑 (*CTS*, 190A:18a–18b; *HTS*, 201:15b–16a). He was driven to the occult arts by what appears to have been progressive rheumatoid arthritis of the extremities. In the early stages of the disease he was forced to give up his official career, going to Mount T’ai-po



## Chinese Alchemy: Preliminary Studies

the forms appropriate to a teacher以師資之禮事之” is conventional for a polite relationship between young and old men; the more definite formulation in the New History, “師事之,” was substituted purely to save four characters. The omission of Sung’s name in the New History is perhaps due to the editors’ desire to restore consistency to the characterization of a man otherwise known as a conventional litterateur and calligrapher; conversely, his inclusion in the Old History version adds verisimilitude, since he is not an obvious choice. Both Meng and Lu are otherwise known to have been involved in the Taoist occult arts. Neither Sung nor Meng are connected with Sun Ssu-mo in any other source.

Finally, Kao-tsung’s grant is not of the sort which would be independently verifiable. Despite the fact that, thanks to the assiduity of Chinese and Japanese scholars, we know more about the topography of Ch’ang-an in the T’ang dynasty than about that of any other city in the world—when Ch’ang-an was the world’s most populous city—there is no independent evidence for the existence of this building,<sup>36</sup> nor indeed for the

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to seek an alchemical remedy. As the crippling of his hands and feet became increasingly severe, he moved to Mount Chü-tz’u 具茨山 (modern Yü 禹 county, Honan), where he eventually drowned himself.

<sup>36</sup> It is not mentioned in the extant portion of Wei Shu 韋述, *Liang ching hsin chi* 兩京新記 (New records of the two capitals, 713/741, reconstituted by Ts’ao Yuan-chung 曹元忠, preface dated 1895; in *Nan-ching cha-chi* 南菁札記, vol. 6). The descriptions in the two most exhaustive sources, Hsu Sung’s 徐松 *T’ang liang ching ch’eng fang k’ao* 唐兩京城坊考 (Studies on the wards of the two T’ang capitals, 1810; *Lien yun i* 連筠篸 *ts’ung shu* ed.), 4:12b, and its sequel, Ch’eng Hung-chao’s 程鴻詒 *Liang ching ch’eng-fang k’ao chiao-pu chi* 校補記 (printed 1897; *Ou hsiang ling shih* 藕香零拾 ed.), p. 14a, are based entirely on the source to be discussed in section IV. Excellent maps of Ch’ang-an are provided in Hiraoka Takeo 平岡武夫, *Tōdai no Chōan to Rakuyō* 唐代の長安と洛陽 (Ch’ang-an and Loyang in the T’ang period, 2 vols.; Kyoto: Research Institute of Humanistic Studies, Kyoto University, 1956). The maps have been reprinted with a Chinese translation of the explanatory fascicule (*Ch’ang-an yü Lo-yang*; Hsian: Shensi Peoples’ Press, 1957).

## The Biography of Sun Ssu-mo

existence in Chinese history of a Princess of Po-yang who, as we learn in the next section, died a spinster.<sup>37</sup>

### IV

*Old History*, 191:8b

Once when Ssu-mo went to the Summer Palace in the retinue of the Emperor, Chao-lin stayed behind at his residence. At the time there was a diseased pear tree in front of the main hall. Chao-lin made it the subject of a rhymeprose (*fu* 賦), the preface of which says:

In the year *kuei-yu* [that is, the tenth year in a sexagesimal year cycle] I was abed with illness in an official building in the Kuang-te ward of Ch'ang-an. The elders [of the place] told me that this was the administrative palace for the domain of the Princess of Po-yang, and that, long ago, the princess having died a spinster, her domain was abolished. At this time the recluse scholar Sun Ssu-mo was residing there. [Ssu-mo]'s [approach to] the Tao is a blend of ancient and new, and he is learned in the divinatory arts. His lofty discourse of true oneness<sup>38</sup> is that of an old-time Chuang-tzu 蒙莊子, while his penetration of nonduality is that of a modern Vimalakīrti 維摩詰.<sup>39</sup>

<sup>37</sup> Comprehensive lists of T'ang princesses are given in *HTS*, ch. 93 ("Biographical memoir of princesses 諸帝公主列傳") and *T'ang hui yao* 唐會要 (Collected statutes of the T'ang, 961; Basic Sinological Series ed.), I (ch. 6), 63f. The Standard Histories for the dynasties immediately preceding the T'ang do not include chapters on princesses, but extensive lists are found in the encyclopedia *Wen hsien t'ung-k'ao* 文獻通考 (compiled ca. 1254–ca. 1280, published 1319; *Wan yu wen k'u* ed.), 258:2041–2049, and in Liu Yü-i 劉於義, *Shan-hsi t'ung-chih* 陝西通志 (General gazeteer of Shensi, printed 1723/1735, 100 vols.), 49:1a–21b. The former source mentions (p. 2042) a Princess of Po-yang, second daughter of Emperor Hsiao-wu (373–376) of the Chin, but states that she was married. Further, since no dynasty is mentioned in section III, the implication there is that the lady in question was of the T'ang.

Yang Lien-sheng has suggested (private communication) that it is quite possible her existence was not recorded at the Standard History level because she died in infancy or early childhood.

<sup>38</sup> In the T'ang, 正一 was also the name of an esoteric technique said to have been passed down from the great alchemist T'ao Hung-ching 陶弘景. See *CTS*, 192:12a.

<sup>39</sup> Vimalakīrti (a supposed contemporary of Śākyamuni) was extremely popular in China as a model for the urbane Buddhist layman who could lead

## Chinese Alchemy: Preliminary Studies

In calculating the positions of the heavenly bodies 推步甲乙 [for astrology and calendrical astronomy] and in measuring [the alternation of] Masculine and Feminine [for alchemy and divination] he is the peer of Lo-hsia Hung 洛下閔 and Master An-ch'i 安期先生.

### Commentary

While the major function of this section, which was discarded in revision, is to introduce the conversations between Sun and Lu in sections V and VI, it is of far greater value than they, because it presents the actual words of a man who knew Sun. The quoted passage is taken from the preface to a "Rhyme-prose on a Diseased Pear Tree 病梨樹賦," still found in Lu's collected works.<sup>40</sup> There is only one significant textual discrepancy in the two versions, but its nature reveals the Old History editors' concern for concision even at the price of characterization. Lu's original preface reads: "In his calculating the motions of the heavenly bodies 推步甲子, in his measuring [the alternation of] Masculine and Feminine, in the cleverness with which he [prepares elixirs by] subliming minerals, in the skill with which he cleanses intestines [that is, performs sur-

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a saintly life while eschewing asceticism. The Taishō Tripitaka contains six translations of the *Vimalakīrti-nirdeśa sutra* 維摩詰 [所說] 經 — Takukusu Junjirō 高楠順次郎 and Watanabe Kaigyoku 渡邊海旭, eds., *Taishō shinshū daizōkyō* 大正新修大藏經 ("The Tripitaka in Chinese"; 100 vols., Tokyo: Taishō issaikyō kankōkai 大正一切經刊行會, 1922-1932), nos. 474-479—made between the early third century (by Chih-ch'ien 支謙) and Sun's time (by Hsuan-tsang 玄奘, ?602-664). For a definitive French version, see Etienne Lamotte, *L'Enseignement de Vimalakīrti (Vimalakīrti-nirdeśa)*, traduit et annoté (Louvain: Publications universitaires, Institut orientaliste, 1962).

The mention of Meng, Chuang-tzu's native place, is purely for purposes of apposition; in the interest of apposition in English, I do not translate it.

<sup>40</sup> There are several editions, none clearly superior to the others. I have collated the text of the preface in *Lu Sheng-chih chi* 盧昇之集 (in *Chi-fu ts'ung-shu* 畿輔叢書, vol. 55), 1:4b-6a, with those in *Yu-yu-tzu chi* 幽夏子集 (*Ssu-pu ts'ung k'an* 四部叢刊 ed.) and *Ch'u T'ang ssu chieh wen chi* 初唐四傑文集 (*Ssu-pu pei yao* 四部備要 ed.).

## The Biography of Sun Ssu-mo

gery),<sup>41</sup> he is the peer of Kan Te 甘公 [=德], Lo-hsia Hung, Master An-ch'i, and Pien Ch'ueh 扁鵲." Since these four gentlemen were, respectively, a late Chou astrologer, a Former Han calendrical astronomer and magus, a legendary alchemist, and a Later Han medical practitioner,<sup>42</sup> the structure of the sentence is quite clear. Although the first part of the sentence is merely abridged in the Old History, the shifting about of persons in the second part so that they exemplify different skills cannot be justified or explained. That this shifting does no violence to the sense of the assertion is a tribute to the versatility of Lo-hsia and An-ch'i (or at least to the looseness of their limning in classical sources).

Although the editors of the Ssu-k'u Catalogue believe that Lu's works have been tampered with to some degree, they find

<sup>41</sup> This is an allusion to the legendary prowess of the great Later Han physician Hua T'o 華佗, as described in one of his biographies—*San kuo chih* 三國志 (Standard History of the Three Kingdoms period), "Wei chih 魏志" (History of the Wei), 29:1b: "For illnesses which would not respond to the needle or to drugs, he would give an anesthetic powder 麻沸散 which rendered the patient unconscious, and cut out the diseased portion. If it was in the intestines, he would cut them out and wash them, [replace them,] sew up the stomach, and rub on an ointment. The illness would remit 差 in four or five days . . . and the patient would be back to normal within a month."

Ch'en Yin-k'o 陳寅恪 suspects that this story is of Indian origin; see his "*San kuo chih* Ts'ao Ch'ung Hua T'o yü Fo-chiao ku-shih 三國志曹冲華佗與佛教故事" (The biographies of Ts'ao Ch'ung and Hua T'o in the Standard History of the Three Kingdoms Period, and Buddhist legends), *Ch'ing-hua hsueh-pao* 清華學報, 6.1 (1930):18–20.

<sup>42</sup> The star charts of Kan Te (second half of the third century B.C.) are discussed with authority in Henri Maspero, "L'Astronomie chinoise avant les Han," *T'oung Pao*, 26 (1929):267–284. The involvement of Lo-hsia Hung in the *T'ai-ch'u* 太初 calendar reform of 104 B.C. is remarked in the Standard History of the Former Han (*Han shu pu chu* 漢書補註, Basic Sinological Series ed., 8 vols.), III (ch. 21A), 1671. The name of An-ch'i was used to bilk Emperor Wu (140–187) of the Han as Shih-huang of the Ch'in had been bilked in the name of Hsien-men Tzu-kao (*Shih chi hui chu k'ao-cheng*, 12:7–8, 17). An important recent study by R. F. Bridgman, "La Médecine dans la Chine antique," *Mélanges chinois et bouddhiques*, 10 (1955):1–213, is based in part on the biography of Pien in the *Shih chi* (*Shih chi hui chu k'ao-cheng*, 105:1–19).

## Chinese Alchemy: Preliminary Studies

no reason to question the authenticity of this preface,<sup>43</sup> and indeed it is beyond doubt. The natural possibility that the preface as found in Lu's collection was "reconstituted" from this biography is almost completely ruled out by the fact that the preface also contains the matter of section VIII, but not that of the intervening sections. While it seems odd that, according to Lu, Sun was living in the Princess of Po-yang's yamen by 673, that is to say *before* his retirement and the formal grant by Kao-tsung, we know from a reliable source that 673 was one of the years in which Kao-tsung did go to the Summer Palace.<sup>44</sup> The rhythm and supple organization of this preface are in every way worthy of Lu Chao-lin. The words quoted in the first sentence of section VIII below indicate that it was written at the same time as the rhymeprose it introduces.

We are justified in concluding with virtual certainty that Sun was in Kao-tsung's retinue in 673.

### V

*Old History*, 191:8b-9b

Chao-lin had a chronic disease which the doctors had not been able to cure, so he asked Ssu-mo about the *tao* [= principles] according to which the illustrious physicians treated illness. Ssu-mo said:

"I have heard that those who discourse well on nature 天 take their analogies from man, while those who discourse well on man base [their conceptions] on nature. In nature there are the four seasons and the five elements. Winter cold and summer heat follow each other in turn. In this cyclical movement harmony gives rise to rain, anger [that is, discord] to winds,

<sup>43</sup> They argue that the modern version is in seven *chüan*, while the original was in ten; there is also some difference in the order of the compositions included. They accept the rhymeprose as a production of the year 673. X (*ch.* 149), 2947-2948.

<sup>44</sup> Other removals in the same period took place in 670, 676, and 678, according to his "Basic Annals." A new Summer Palace 紫桂宮 was built in 679 and used from the next year on. (*HTS*, 3:13a-17b).

## The Biography of Sun Ssu-mo

condensation to snow, expansion to the rainbow; these are the unvarying measures in heaven and earth. In man there are the four limbs and the five viscera. For each period of consciousness there is a period of sleep. With expiration and inspiration, *ch'i* [= pneuma] and seminal essence pass back and forth.<sup>45</sup> Their flow gives rise to circulation, their manifestation to outward expression, and their issuing forth to sound; these are the unvarying measures in man. The function of the Masculine is shape, and that of the Feminine is essence; in this respect nature and man are identical.

“When it happens that there is a disorder [in the alternating motion of *ch'i* and essence within the body], if it is a steaming 蒸, the result is a fever; if a stoppage 否, the result is chills.<sup>46</sup> The knotting up [of *ch'i*] forms tumorous swellings; its sinking in forms abscesses.<sup>47</sup> Its unrestrained motion causes

<sup>45</sup> Of the three extant purportedly earlier versions of this section, only that of the story collection *T'an pin lu* 譚賓錄—in *TPKC*, III, (ch. 218), 1669; see below, p. 113—agrees with the reading “精氣往來.” *TPKC*, I (ch. 21), 141, reads “循而為往來”; *Hsu hsien chuan*, 113B:19b, has “動,” which is better, for “循.” Both of these readings leave the series of verbs in the next sentence without a subject. While this is by no means unthinkable, one notes that the subject they demand is clearly “*ch'i* and seminal essence.”

<sup>46</sup> The tentative translation of “蒸” and “否” (=痞) above conveys their usual sense in Chinese medical texts. Because the two terms are used here in apposition, which is not the case elsewhere, I suspect that this translation is not altogether appropriate, and may be entirely incorrect.

It was held in Sun's time that fevers and chills were due to a lack of free interchange of *yin* and *yang* (that is, a stoppage) in the body, due to a failure of the *ch'i* circulation. An excess of the *yang* pneuma and a deficiency of the *yin* pneuma gave rise to fever, and the converse situation to chills. Unseasonable weather was a primary agent of *ch'i* unbalance. “Steaming” (lit., “ascension [of *ch'i*]”) plays no part in this rationale. See *Chu ping yuan hou lun* 諸病源候論 (On the origins and symptoms of diseases, 610; Peking: Peoples' Hygiene Press, 1955), p. 116 (ch. 21). This treatise of the Sui physician Ch'ao Yuan-fang 巢元方 was one of the main sources for the remarks on pathology in Sun's *Ch'ien chin fang* 千金方 (Prescriptions worth a thousand).

<sup>47</sup> The verbs may be taken to be transitive, changing the sense in the direction of comprehensibility if not fidelity: “[The *ch'i*] knots up [the flesh] to form tumorous swellings, or causes it to sink in to form abscesses.”

## Chinese Alchemy: Preliminary Studies

panting; its exhaustion causes desiccation. Disease becomes manifest on the countenance; its progress [can be traced by symptoms which] move across [the surface of] the body.

“If [this argument] is extended to heaven and earth it remains true. The inequalities of the planetary motions, the irregular movements of the stars,<sup>48</sup> eclipses of the sun and moon, the sweeping over of comets: these are the symptoms of disorders in nature. The coming of cold and of heat out of their seasons are nature’s steamings and stoppages. The extrusion of boulders and the upthrust of land are nature’s tumors. The collapse of hills and the sinking of land are nature’s abscesses. Raging storms are the panting of nature;<sup>49</sup> the drying up of streams is its desiccation. The skillful physician directs [the curative forces (*ch’i*)] with his medicinal substances, and relieves [the symptoms] with his needles and his prescriptions.

<sup>48</sup> While the *T’an pin lu* version agrees with the *CTS* reading of the beginning of this sentence, both *Hsu hsien chuan* and *T’ai-p’ing kuang chi* (ch. 21) have instead 星辰失度日月錯行 (The planets’ violation of their measures, the irregular motions of the sun and moon . . .). This is the same alignment of texts as that remarked in note 45.

The Old History’s reading is without doubt an emendation made by someone with scant understanding of astronomy. The result is an expression which occurs frequently in classical literature. See, for instance, the History of the Later Han (*Hou Han shu chi chieh* 後漢書集解 [Basic Sinological Series ed.]), VI (ch. 20B), 2120.4, annotation; XI (ch. 49), 2070.7; XII (ch. 59), 2459.9; and, in particular, X (ch. 47), 1996.1, annotation. Although 星辰 carries the same ambiguity as French *astre*, in all these cases it is certainly the planetary anomalies which are referred to. In *CTS*, however, the phrase in question is the second of four phrases deployed in apposition, where the first refers unambiguously to the planets. The reader is, therefore, forced to resolve the ambiguity of “星辰” in favor of the sense “fixed stars,” which does not make astronomical sense. I consider this shared misunderstanding a very strong argument for the affiliation of the *T’an pin lu* and *CTS* versions.

<sup>49</sup> The earlier versions begin the next clause with four additional characters, the last of which varies: “The failure of rain to fall 雨澤不降” (*T’an pin lu*) or “The unseasonable falling of rain 雨澤不時” (*T’ai-p’ing kuang chi*, I, 141, and *Hsu hsien chuan*, 113B:20a). Only the first variant fits the context. The phrase was excised by the Old History editors apparently in order to maintain a metrical balance between what corresponds to the two parts of this sentence.

## The Biography of Sun Ssu-mo

The sage harmonizes [the cosmic forces] with his perfect virtue, and supports [the work of government] with [his knowledge of] human affairs. Thus the ills of the body are curable, and natural calamities can be averted.”<sup>50</sup>

*New History*, 196:4a–4b

Chao-lin had a chronic disease which would not respond to treatment, so he asked [Ssu-mo]: “How did the great physicians go about curing illnesses?” He answered:

“In nature there are the four seasons and the five elements. Winter cold and summer heat subsist in turn. Harmony gives rise to rain, anger to winds, condensation to snow, expansion to the rainbow; [these are] the unvarying measures in nature. In man there are<sup>51</sup> the four limbs and the five viscera. For each period of consciousness there is a period of sleep. Expiration and inspiration alternate. Flowing gives rise to circulation, manifestation to outward appearance, issuing forth to sound; [these are] the unvarying measures in man. The function of the Masculine is shape, and that of the Feminine is seminal essence; in this respect nature and man are identical.

“When there is a disorder, if it is a steaming the result is fever; if a stoppage, the result is chills; if a knotting, the result is tumorous swellings; if a sinking in, the result is abscesses. Unrestrained motion causes panting, exhaustion causes desiccation. [Disease] becomes manifest on the countenance, and moves across [the surface of] the body.

“This is also true of heaven and earth. The inequalities of the planetary motions and the sweeping over of comets are

<sup>50</sup> The construction of this sentence is somewhat oblique, and is best accounted for if we accept the four additional characters “通乎數也” which occur at the end of the *T’an pin lu* version. The translation would accordingly be amended to read “Therefore, that the body’s ailments are curable, and that nature’s calamities can be averted, is because they depend upon the same invariant principles.”

<sup>51</sup> Following the *CTS* version, I emend “之” to “有” to provide the requisite verb.



## Chinese Alchemy: Preliminary Studies

[nature's] symptoms of disorders. The coming of cold and heat out of their seasons are its steamings and stoppages. The extrusion of boulders and the upthrust of land: these are its tumors. The collapse of hills and the sinking of land: these are its abscesses. Raging storms are its panting; the drying up of streams is its desiccation. The great physician directs [the curative forces] with his medicinal substances, and relieves [the symptoms] with his needles<sup>52</sup> and his prescriptions. The sage harmonizes [the cosmic forces] with his perfect virtue, and supports [the work of government] with [his knowledge of] human affairs. Thus the ills of the body are curable, and natural calamities can be averted."

### *Commentary*

This section, included largely for its literary merit, presents a uniquely Chinese theory of the correspondence of the natural world as macrocosm with the human body as microcosm. It differs from similar theories in the West in that there is no causation implied, nor even any influence suggested. The point is an analogy between the work of a physician, who restores homeostasis to the afflicted body, and that of the paradigmatic Confucian sage—ruler or minister—who, since he operates at the synapse of the natural and political worlds, restores cosmic harmony by establishing just rule of the Universal State (*t'ien hsia* 天下). While the details of the correspondence are occasionally crude (the equation of the four seasons with man's four limbs is sheer number magic, for instance) the argument is novel and ingenious and is tied together at several levels.<sup>53</sup>

<sup>52</sup> I follow the Sung scholar Wu Chen 吳縝 in reading “砭” for “針” (“針” in the Po-na ed.). See his *Hsin T'ang shu chiu miu* 新唐書糾謬 (Corrections of errors in the New T'ang History; *T'ang Sung ts'ung-shu* 唐宋叢書 ed., vol. 16), p. 23a.

<sup>53</sup> Hung Mai 洪邁 (1123–1202) has called attention to the similarities between Sun's analogy and one enunciated in 711 by Ssu-ma Ch'eng-chen 司馬承禎, an important figure in the development of religious Taoism—*Jung-chai sui pi, wu pi* 容齋隨筆, 五筆 (Jottings from the Jung Studio,

## The Biography of Sun Ssu-mo

The minor premises, so to speak, are that in right functioning the cyclical alternation of the seasons corresponds to the alternating movement of *ch'i* and essence throughout the human body, and that natural disorders, as omens of disease in the body politic, correspond to physical symptoms.

The basis of the first of these premises is found in a chapter on "Resonance based on embodiment of the *yin* and *yang* 陰陽應象大論第五" in the major classical source of medical theory, the *Huang ti nei ching* 黃帝內經 (The inner classic of the Yellow Emperor).<sup>54</sup> There we find the statement: "In na-

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5th collection; *Ssu-pu ts'ung k'an* ed.), 2:5b-6a. The two arguments have practically nothing in common, however; Ssu-ma's message, redolent of the *Lao-tzu*, is that the Taoist approaches to self-cultivation and statecraft are identical (CTS, 192:12b; HTS, 196:12a).

<sup>54</sup> *Ssu-pu pei yao* ed., 2:3a, 4a-6b, quoted in Sun's *Ch'ien chin fang* (Edo igaku 江戸醫學 ed. of 1849), 27:3b. There is an altogether useless translation in Ilza Veith (tr.), *Huang Ti Nei Ching Su Wên: The Yellow Emperor's Classic of Internal Medicine* (1949; second edition, Los Angeles: University of California Press, 1966), pp. 117-120, and a somewhat more reliable free paraphrase in A. Chamfrault and Ung Kang Sam, *Traité de médecine chinoise* (5 vols., Angoulême: Editions Coquemard, 1954-1963), II (*Les Livres sacrés de médecine chinoise*), 32-35.

Mrs. Veith was misled in her translation of the title because she did not know that in the Han dynasty there also existed an "outer classic" (*Huang ti wai ching* 黃帝外經). It is impossible to determine the basis of the "inner/outer" distinction from the present text, which was almost certainly reconstituted in the Six Dynasties period (third to sixth centuries). To suppose that "inner/outer" corresponds to a dichotomy of internal and external medicine implies that the "inner classic" is predominantly or exclusively concerned with the former. To the contrary, the "inner classic" treats disorders both of the interior and exterior of the body impartially in terms of a unitary medical theory. Generally in early book titles the "inner/outer" division demarks the oldest part of a text from accretions, an esoteric part from an exoteric part, or a theoretical part from a practical part. Since the *Nei ching* is so exclusively theoretical, the last possibility is perhaps most likely, but one can do no more than guess. See the critical comments of James R. Ware in his review of the first edition of Mrs. Veith's book in *Bulletin of the History of Medicine*, 24 (1950):487-496, and the animadversions collected in Chang Hsin-hui 張心澂, *Wei shu t'ung k'ao* 偽書通考 (Comprehensive researches on pseudepigraphical and forged books, 1939; third ed., 2 vols., Shanghai: Commercial Press, 1957), II, 969-978.

See also the important discussion of the nature-man correspondence in

## Chinese Alchemy: Preliminary Studies

ture there are the four seasons and the five elements. According to [the seasons of] birth, maturing, reaping, and storing, there arise cold, heat, dryness, wetness, and wind [, which correspond to the elements]. In man there are the five viscera, which transform the five *ch'i*<sup>55</sup> to give rise to joy, anger, grief, melancholy, and fear." There follows a very elaborate system of five-element correspondences, including those in the realm of nature, in the human body, in the emotions, notes of the scale, tastes, and so on. The second premise,<sup>56</sup> while drawing an original analogy, refers to familiar aspects of the Chinese "metaphysical" theory of monarchy.<sup>57</sup>

Literary and philosophical quality are not, unfortunately, very relevant to the question of whether this statement on the doctor's position in the cosmic scheme comes ultimately from Sun Ssu-mo. In view of the great currency in Chinese historical literature of wholly imaginary monologues and dialogues,

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what is almost certainly an earlier work, Tung Chung-shu's 董仲舒 (?179–104? B.C.) *Ch'un ch'iu fan lu* 春秋繁露 (*i cheng* 義證 ed. of Su Yü 蘇輿 [d. 1914], preface by Wang Hsien-ch'ien 王先謙 dated 1914), ch. 17, *pien* 56, translated in Fung Yu-lan, *A History of Chinese Philosophy* (Derk Bodde, tr.; 2 vols., Princeton: Princeton University Press, 1952–1953), II, 30–31. The conception of disease as a resonance phenomenon first appears explicitly in *Tso chuan*, first year of Duke Chao, translated in James Legge, *The Chinese Classics* (reprint, second ed., Taipei: The Book World Co., 1966), V, 580–581. There is another closely parallel passage cited with attribution to the Han ritual classic *Chou li* 周禮 in Ch'en Pang-hsien 陳邦賢, *Chung-kuo i-hsueh shih* 中國醫學史 (A history of Chinese medicine, 1937; reprint, Taipei: Commercial Press, 1958), pp. 21–22. I have been unable to locate it, however, in the text of the *Chou li* or, for that matter, in any of the early Confucian, cosmological, or medical classics, or in any of the major ancient encyclopedias.

<sup>55</sup> The pneumas which correspond to the four cardinal points and the center, which in turn are ruled by the five elements.

<sup>56</sup> It is also drawn in a diverting but inferior passage from "Father Huang of Chiu-chiang on the Prognosis [?] of Carbuncles (Chiu-chiang Huang fu hsiang yung-chü lun 九江黃父相癰疽論)" quoted by Sun in his medical masterpiece *Ch'ien chin i fang* (Peking: Peoples' Hygiene Press, 1955), p. 273a (ch. 23).

<sup>57</sup> For a full explication of this theory and its cosmological basis, see Fung, *A History of Chinese Philosophy*, II, 7–58, esp. pp. 55–58.

## The Biography of Sun Ssu-mo

the question of source is far more critical even than that of inherent probability.

Besides the version in *Hsu hsien chuan*, which antedates the compilation of the Old History's biographies by only a decade or two, there exists a much earlier parallel text, on which this section and the next two may well be based. It is found in the section on "Physicians" in *T'ai-p'ing kuang chi*, and is ascribed to the *T'an pin lu* 譚賓錄 of Hu Ch'ü 胡瑛 (flourished 827/846).<sup>58</sup> The text is in every case as full as or fuller than that in the two Histories; the additional material makes such good sense in context that one is led to suspect it belonged there, and was excised by the editors of the Histories for rhetorical reasons.<sup>59</sup> Furthermore, the text is identical with the Old History text at points where the *Hsu hsien chuan* (and the later version elsewhere in *T'ai-p'ing kuang chi*) diverges.<sup>60</sup> *T'an pin lu*, if not the proximate source of the "three conversations" in Sun's official biographies, is not far removed from it.

In view of the long interval between the period of Lu's association with Sun (673) and the *floruit* of Hu Ch'ü, and the fact that none of the "three conversations" is to be found in the extant genuine writings of Sun or Lu, confidence in the value of *T'an pin lu* as a historical source hinges entirely on its general

<sup>58</sup> III (ch. 218), 1669-1670.

According to the "Treatise on Bibliography 藝文志" of the New History (59:20a), Hu flourished in the reigns of Wen-tsung (827-840) and Wu-tsung (841-846) 文武時人. Eleven fragments of his work are preserved in Wu Tseng-ch'i 吳曾祺, *Chiu hsiao-shuo* 舊小說 (Old works of fiction; 6th ed., 20 vols., Shanghai: Commercial Press, 1924), Ser. B, V, 643-648, but they appear to have been chosen from about 125 included in *TPKC*.

Note that the immediately preceding anecdote in *TPKC* (p. 1668), also credited to *T'an pin lu*, is similarly parallel to part of the biography of the acupuncturist Chen Ch'üan 甄權 in the T'ang histories (Old History, 191:3b; New History, 204:2a-2b).

<sup>59</sup> See notes 49 and 50 above. Section VII appears only in the New History biography, where, in comparison with the *T'an pin lu* version, its brevity makes it lifeless and uninteresting as literature.

<sup>60</sup> See notes 45 and 48 above.

## Chinese Alchemy: Preliminary Studies

character and its antecedents. Since the extant fragments are in the main gossip, varying greatly in credibility, about the T'ang court and people associated with it, one is not greatly tempted to give Hu's book the benefit of the doubt.

### VI

*Old History*, 191:9b

He also said:

"Let your gall be large and your heart small; let your discernment be round and your actions square. When the Odes says 'as if approaching a deep abyss, as if treading on thin ice,' it is speaking of the small heart. [When it says] 'the elegant warrior, he is a protection and wall to the prince,' it is speaking of the large gall. 'He does not take a crooked course for gain, nor does he think the doing of righteousness a distress' refers to squareness of action. 'He perceives the first signs and immediately takes action; he does not wait even a whole day' refers to roundness of discernment."<sup>61</sup>

*New History*, 196:5a

Chao-lin said: "And how about human affairs?"

He said:

<sup>61</sup> The loci of the four classical allusions in this paragraph are:

1. *Shih ching*, no. 195, often quoted in the Confucian classics. Trans. Bernhard Karlgren, *The Book of Odes* (Stockholm: The Museum of Far Eastern Antiquities, 1950), p. 143.

2. *Shih ching*, no. 7, also quoted in *Tso chuan*, 12th year of Duke Ch'eng. Trans. in *ibid.*, p. 5.

3. *Tso chuan*, 31st year of Duke Chao. Trans. in James Legge, *The Chinese Classics*, V, 737-738.

4. *I ching*, "Hsi tz'u," B.5. Trans. in Richard Wilhelm, *The I Ching or Book of Changes* (2 vols., New York: Pantheon Books, Inc., 1950), I, 367, modified to follow the definition of "幾" given in Bernhard Karlgren, "Grammata Serica Recensa," *Bulletin of the Museum of Far Eastern Antiquities*, Stockholm, 29 (1957):146 (graph 547a). In both Histories, as well as in *Hsu hsien chuan*, 113B:20b, and *TPKC*, I, 141, "幾" has been corrupted to the homophone "幾." *T'an pin lu* (*TPKC*, III, 1670) reads correctly, but this does not rule out its being a source for the Histories; they could have used a variant text.

## The Biography of Sun Ssu-mo

“The heart acts as monarch of [the body]. In a monarch humility is esteemed; therefore let [your heart] be small. When the Odes says ‘as if approaching a deep abyss, as if treading on thin ice,’ it is speaking of [this] smallness. The gall acts as general of [the body]. The indispensable attribute 務 of a general is determination; therefore let [your gall] be large. When the Odes says ‘The elegant warrior, he is a protection and wall to the prince,’ it is speaking of [this] largeness. Human-heartedness is quiescent and typifies earth, and therefore should be square. When the [Tso] Tradition says ‘He does not take a crooked course for gain, nor does he think the doing of righteousness a distress,’ it is speaking of [this] squareness. Discernment is dynamic, and typifies heaven, and therefore should be round.<sup>62</sup> When the Changes says ‘He perceives the first signs and immediately takes action; he does not wait even a whole day,’ it is speaking of [this] roundness.”

### *Commentary*

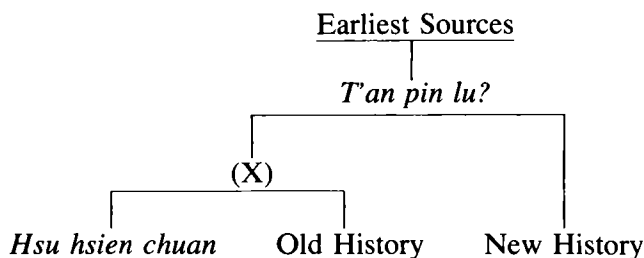
This speech is an elaborate conceit based partly upon a play on words. In Chinese “large of gall” is a very common way of saying “brave,” and “small of heart” means no more (and no worse) than “cautious.” Since it is certain that this section was not included merely to make use of material which happened to be in the archives, one is naturally prompted to wonder whether the editors’ intention was to characterize Sun as what we might call an indigenous Polonius. While this cannot entirely be gainsaid—the Poloniuses of whatever nation tend to fare rather well in official biographies—an additional sentence at the end of the parallel text in *Hsu hsien chuan* makes the real point in most explicit fashion: “His erudition was as out-

<sup>62</sup> The earth:heaven::square:round conception is that reflected in the *kai-t'ien* 蓋天 (lit., “heaven as a [hemispherical] cover”) cosmology, which took definite shape in the first century B.C. and was generally accepted by men of letters until modern times. See Joseph Needham, *Science and Civilisation in China* (7 vols. projected; Cambridge, Eng.: At the University Press, 1954–), III, 210–216.

## Chinese Alchemy: Preliminary Studies

standing as his mastery of the Taoist arts was beyond description.”<sup>63</sup>

It would appear from the preceding sections that the editors of the New History were faithful, by the standards of the time, to the work they were revising. They felt free to condense documents regardless of their probity, but this was a common practice, and many precedents in the Old History have already been noted. This section presents a new problem, in that the New History version is substantially fuller. Once again, however, the character of the editors as conscientious compilers is vindicated, for the seeming interpolations can be traced back to an early source — to the very source, in fact, which lies furthest back of the Old History version, namely the *T'an pin lu* or whatever earlier lost work it represents. The New History editors were merely restoring material which previously had been excised, and excising material made redundant by the restoration. Every sentence in either source, that is, is also found in *T'an pin lu*. The only discrepancy, the reading “actions 行” in the Old History in place of “human-heartedness 仁” in *T'an pin lu*, indicates that the *proximate* source of the Old History version was the lost work affiliated with *Hsu hsien chuan*. The New History, however, introduces material found only in *T'an pin lu*. The provenance of sections V and VI (and also, as will appear in the sequel, of sections VII, XI, and XII) can be depicted thus, keeping in mind that *T'an pin lu* may merely represent another source actually employed but no longer identifiable:



<sup>63</sup> 113B: 20b, repeated with minor variation in *TPKC*, I, 141.

## The Biography of Sun Ssu-mo

A corollary of this schema is that the *T'an pin lu*, if used at all, was available to the editors of the New History but not to the editors of the Old History (who had to use "X" instead). Since we have recourse to the Treatises on Bibliography of both Histories, this corollary is easily verified.<sup>64</sup>

### VII

*New History*, 196:5a-5b

[Chao-lin] further inquired about the essentials of nourishing the vital principle. [Ssu-mo] answered:

"Just as in nature there are surfeits and deficiencies, so there are difficulties and dangers in the course of human life; without prudence there is no help for them. Therefore, in order to nourish the vital principle, it is necessary to understand prudence.

"The basis of prudence is awe. Thus if the gentleman is without awe he will be careless as to humanity and justice; if the farmer is without awe he will be slothful as to his crops; if the artisan is without awe he will be slipshod as to his proportions; if the merchant is without awe he will not make a profitable return on his goods. If the son is without awe he will be forgetful of filial devotion; if the father is without awe he will be remiss in parental kindness. If the minister is without awe, he will have no merit to reward; if the monarch is without awe, disorders cannot be controlled. This being so, the greatest awe is that of the *tao*; next is awe of heaven; next is awe of all earthly things 物; next is awe of men; next is awe of self. He who is anxious about himself will not be cramped by others; he who feels awe of himself will not be controlled by others. He who is prudent concerning small things will have no reason to fear the large; he who is on guard in matters close to him will not be disgraced in those more distant. One who realizes these things has a complete command of human affairs."

<sup>64</sup> See note 58 above. This cannot, of course, be taken as proof that *T'an pin lu* was used.



## Chinese Alchemy: Preliminary Studies

### *Commentary*

This dreary exercise, typical of classical rhetoric at its least absorbing, is reminiscent of many second-rate late Confucian preachments in the overdevelopment of a single idea by ringing changes on the four orders of society (gentry, peasants, artisans, and merchants), the cardinal relationships (father-son, emperor-minister), the gradation of being from the *tao* to the self, and so on. If “sincerity” or “loyalty” were substituted for “awe” throughout, the essay would partake equally of eternal but platitudinous truth. As this speech stands, there is nothing specifically Taoist about it, and one is tempted to translate “*yang hsing* 養性” in the Mencian sense, “to nourish the inborn moral nature,”<sup>65</sup> rather than as “to nourish the vital principle.” Why, then, should Sun be the speaker?

The sole appeal of the speech lies in its style, which is just the sort which the editors of the New History were trying to revive and encourage. This is one reason section VII appears in the New History but not the Old; the other, evidently, is that *T'an pin lu* was not available to the previous compilers. This speech is clearly abridged from a version in that source. Most of the excisions are the very things which give the speech its Taoist flavor, and consequently must have appeared too frivolous to Sung Ch'i and his collaborators. For all the tenuousness of the connection between prudence and awe on the one hand and the vital principle on the other, what this speech promised was considerably more than a better moral and ethical climate. Here is an excised portion which, in *T'an pin lu*, precedes the last sentence of section VII: “One who is able to understand these things is safe from harm by dragons when traveling on water, and cannot be hurt by tigers or rhinoceroses when traveling on land. Weapons cannot wound him, nor can contagious diseases infect him. Slanderers cannot destroy his good name, nor the poisonous stings of insects do him harm.”<sup>66</sup>

<sup>65</sup> Mencius, VII. 1.2; cf. Legge, *The Chinese Classics*, II, 449.

<sup>66</sup> *TPKC*, III, 1670.

## The Biography of Sun Ssu-mo

There is no doubt that “*yang hsing*” was meant in the esoteric sense, and that the prudence and awe so earnestly recommended carry metaphysical connotations, as is spelled out clearly enough in the *Chuang-tzu*: “He who understands the Way is certain to have command of basic principles. He who has command of basic principles is certain to know how to deal with circumstances. And he who knows how to deal with circumstances will not allow things to do him harm. When a man has perfect virtue, fire cannot burn him, water cannot drown him, cold and heat cannot afflict him, birds and beasts cannot injure him. I do not say that he makes light of these things. I mean that he distinguishes between safety and danger, contents himself with fortune or misfortune, and is cautious in his comings and goings. Therefore nothing can harm him.”<sup>67</sup>

Sun’s third conversation is quite possibly genuine, although, in the condensed form which appears in the New History, it seems least germane of the three to the concerns of the Taoist, and although one cannot infer from the version in *T’an pin lu* how or concretely why one is supposed to go about being prudent. The content of Sun’s speech appears in narrative form in a small treatise on physiological disciplines (dietary proscriptions, breath control, gymnastics, and so on) attributed to Sun and preserved in the early Taoist encyclopedia *Yun chi ch’i ch’ien*.<sup>68</sup> Though one scarcely expects that the correctness of the attribution can be positively demonstrated, if this tractate

<sup>67</sup> *Chuang-tzu tsuan chien*, p. 133 (ch. 17), translated by Burton Watson in *Chuang Tzu* (New York: Columbia University Press, 1964), pp. 103–104.

<sup>68</sup> (*Tao tsang*, vols. 677–702), 33:2a–5a. The title is given as *She-yang chen chung fang* 攝養枕中方 (Pillowbook of methods for nourishing [the vital principle]), but no such title is independently recorded. Since in *Yun chi ch’i ch’ien* classificatory modifiers are sometimes added at the beginnings of titles, I tentatively identify this work with Sun’s *Chen chung su shu* 枕中素書 (Pillowbook written on silk; see section XII), not otherwise extant, in line with a suggestion which appears in a Sung bibliography, *Pi shu sheng hsu pien tao ssu-k’u ch’ueh shu mu* 秘書省續編到四庫闕書目, compiled beginning 1132, in *Sung shih i wen chih, pu, fu pien* 宋史藝文志補附編 (Shanghai: Commercial Press, 1957), p. 393.

## Chinese Alchemy: Preliminary Studies

is a forgery it must be an early one.<sup>69</sup> There is no question that *T'an pin lu* is an intermediary in the line of transmission we are considering, for in that miscellaneous collection the matter of section VII first appears in dialogue form with Lu Chao-lin as interlocutor. There is no sign that the editors of the New History used *She-yang chen chung fang*, or were even aware that what they were condensing was only an excerpt. Only when we return to this presumably ultimate source do we confront the final anticlimax: this lofty if flaccid plea for prudence, in context, merely introduces an argument against overindulgence of any sort, and pushes a very conventional set of taboos ("From the summer solstice to the autumnal equinox, do not eat greasy cakes, broths, and other things of the kind.").

### VIII

*Old History*, 191:9b

Ssu-mo himself said that he was born in the year *hsin-yu* 辛酉 [that is, the fifty-eighth year in a sexagesimal year cycle] of the K'ai-huang period [581–600], and that at present

<sup>69</sup> I am persuaded by the following considerations that the treatise is early and that it is the source used by Hu Ch'ü rather than being partly derived from his work.

1. Since it occurs in *Yun chi ch'i ch'ien*, in no case can it be later than the early eleventh century.

2. It quotes the elusive Hsiang-erh 想爾, a Taoist cult figure whose annotations to the *Lao-tzu* were no longer well known even in the early T'ang. See Ch'en Shih-hsiang 陳世驥, "Hsiang-erh' Lao-tzu Tao ching Tun-huang ts'an chüan lun cheng '想爾'老子道經燉煌殘卷論證" (On the historical and religious significance of the Tun-huang MS. of *Lao-tzu*, Book I, with commentaries by "Hsiang erh"), *Tsing Hua Journal of Chinese Studies*, N.S., 1 (1957):41–62, and Jao Tsung-i 饒宗頤, *Lao-tzu Hsiang-erh chu chiao chien* 老子想爾注校殘 (A study on Chang Tao-ling's Hsiang-er commentary of Tao Tê Ching; Hong Kong: The Author, 1956).

3. The passage under discussion occurs in context, and is considerably fuller. This is therefore the only version in which its function is fully discernible. While in a couple of places the *T'an pin lu* version contains matter not found in *She-yang chen chung fang* (notably part of the passage quoted just above), that matter is sufficiently relevant and Taoist in character that one does not easily picture a forger rejecting it.

## The Biography of Sun Ssu-mo

he is ninety-three *sui* old. When inquiries were made in his native village, everyone agreed that he is several hundred *sui* old. When he spoke of events in the [Northern] Chou [557–581] and Ch'i [550–577] dynasties, it was done so graphically that [his auditors] seemed to see before their eyes [the events he was describing].<sup>70</sup> These facts considered together, he must be a centenarian at least. Nonetheless, his sight and hearing are unimpaired, and he is flourishing in spirit and body.<sup>71</sup> He might fittingly be called a wise and learned immortal [like those] of ancient times.

### *Commentary*

This section was taken from Lu Chao-lin's collected works, where it directly follows the matter quoted in section IV. The "three conversations," that is, have been tucked into a passage of authentic testimony. There is no point in looking for anything nefarious in the motives of the Old History's editors; Lu's works were highly regarded by their time, and must have been reasonably familiar to their readers. It is no more than fair to postulate that the "three conversations" were interpolated because the editors believed them to be genuine, and because, for reasons of continuity, where they were put was the best place to put them. That the editors of the New History discarded this section proves nothing except that their criteria for the weighing of evidence differ appreciably from those applied by modern historians — and that is scarcely a surprise, nor is it grounds for disparagement.

This section provides statements of very high probity concerning the date of Sun's birth. The opinion of the village elders is hearsay, and may be discarded immediately. They say nothing of his actual birth or youth; since there was undoubtedly

<sup>70</sup> Since, as usual in classical Chinese, no tense is indicated, it is equally possible to read all the verbs in this sentence in the present tense. I quite arbitrarily take this sentence to be explaining the previous one rather than contributing an additional item of proof.

<sup>71</sup> *Lu Sheng-chih chi*, 1:5a, reads "神形" for "神彩."

## Chinese Alchemy: Preliminary Studies

a high turnover of population and a low life expectancy in the Ch'ang-an region in the early seventh century, conceivably no one interviewed was in a position to do so.

There remains a statement from Sun himself which, despite several problems, must be considered a most precious datum. Two discrepancies must be dealt with, and indeed have been closely examined by authorities in the past. The first problem is that the K'ai-huang reign period embraced only the thirty-eighth through the fifty-seventh years of the current sexagesimal cycle; the fifty-eighth began the Jen-shou 仁壽 period. The second problem is that, since the meeting with Lu took place in the tenth year of a later cycle, the interval would be of the form  $60n + 12$  (that is, 12, 72, 132 . . . ) years rather than ninety-two years.

Two noteworthy solutions have been proposed, one by the great critical historian Wang Ming-sheng (1722–1798)<sup>72</sup> and one by the editors of the Ssu-k'u Catalogue.<sup>73</sup> Wang suggests, first, that Sun was born in the *hsin-yu* year which followed the last year of the K'ai-huang period (that is, in 601, the first year of the Jen-shou period); the complication of the systems by which years were enumerated guarantees that such minor errors do occur, especially in cases where the two reign periods belonged to the same emperor.<sup>74</sup> He then asserts that Sun's age

<sup>72</sup> *Shih-ch'i-shih shang-ch'ueh*, 92:11b–12b.

<sup>73</sup> VII (ch. 103, s.v. "Ch'ien chin yao fang 千金要方"), 2005.

A third solution, due to Liu Yü-sung 劉毓崧 (1818–1867), is vitiated by excessive respect for the letter of his sources. Liu deduces from the fact that Sun is spoken of (in section I) as having undergone the capping ceremony of manhood 弱冠 (actually this is a simple euphemism for "having reached the age of about twenty," and I have so translated it there) before Tu-ku Hsin calls him a prodigy, "which is to say, not over twenty-one," that he must have been precisely twenty *sui* old at the time of the interview, which Liu sets in 537/538; ergo, Sun was born in 518 or 519. Liu accepts as correct the statement that Sun died in 682, and the necessary inference that he lived to the age of 164 or 165 *sui*. See Liu's collected prose, *T'ung i t'ang wen chi* 通義堂文集 (Ch'iu shu chai 求恕齋 ed., 1920), 11:2b–3a.

<sup>74</sup> See the examples given in Chiang Liang-fu 姜亮夫, *Li-tai jen-wu nien li pei chuan tsung piao* 歷代人物年里碑傳綜表 (General table

## The Biography of Sun Ssu-mo

was seventy-three *sui* (seventy-two years) in 673, and that “ninety-three” is a corrupt reading. His solution thus requires a charitable interpretation for the first problem, and an emendation unsupported by any text of the Old History or of Lu’s collected works for the second.<sup>75</sup>

The editors of the Ssu-k’u Catalogue, on the other hand, accept the reading “ninety-three” for Sun’s age in 673,<sup>76</sup> and restore consistency to the account by emending *hsin-yu* 辛酉 to *hsin-ch’ou* 辛丑 (the thirty-eighth year in the cycle), thus moving the date of Sun’s birth backward to the first year of the K’ai-huang period (February 19, 581–February 8, 582). They dismiss the story of Sun’s residence in the mountains before 580 as “bad judgment on the part of the historians.”

Despite the seemingly lower antecedent probability of the second solution (it requires, as will be seen in section XI, that Sun be 101 *sui* — a hundred years — old at the time of his death), it is by far the better. Although the editors of the Ssu-k’u Catalogue give no sign that they were aware of it, two recensions of Lu’s works (*Lu Sheng-chih chi* and *Lu Chao-lin chi*) actually read *hsin-ch’ou* rather than *hsin-yu*.

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of the dates and places of origin of famous men in successive dynasties, compiled from inscriptions [and other] biographies; rev. ed., Hong Kong: Chung Hwa Book Co., 1961), p. vii.

In his manuscript “Translation of *T’ai Ch’ing Tan Ching Yao Chieh* with preface,” Ch’en Kuo-fu suggests (fol. 42) that the change of reign period may have taken place *during* 601, so that the early part of the year could be designated K’ai-huang 21. We learn from Emperor Wu’s Annals, however, that the change was made on the first day of the year 正月乙酉 (*Sui shu*, 2:15a).

<sup>75</sup> Less prey to disillusion than the modern critic, he continues: “It would seem that Ssu-mo did not want to let the fact that he was an immortal alarm the uninitiated, so he concealed his true age, prevaricating when he said he was born in 601. Therefore there is nothing contradictory about the statement ‘These facts considered together, he must be a centenarian at least.’”

<sup>76</sup> They state that the edition of Lu’s works which they consulted reads “ninety-two,” but they accept the Old History’s reading. Of the three editions I have used (see note 40 above), *Lu Sheng-chih chi* does read “ninety-three”; a note there indicates that one edition reads “ninety-one.”

## Chinese Alchemy: Preliminary Studies

What we have is Sun Ssu-mo's own statement that he was born in 581, and we would be most ungracious not to accept it—that is, to accept the fact that in 673 Sun believed that he was born in 581 and that he was ninety-two years old. Compared with the other data we have examined, his statement is much too moderate to be a lie. Its accuracy may be questioned on the grounds that men so old seldom have reliable memories, but hardly on the grounds that the odds against his living to one hundred were too great. While it is true that not many people live to that age, and that in T'ang China life expectancy was low, every historian is aware that statistics yield no information whatever about an individual case. An insurance company with only one client, however expert its actuaries, would be engaged in gambling, not business. The other counter-argument, if taken too seriously, becomes a *reductio ad absurdum*: Sun was very old, and therefore his memory was unreliable; thus the statement that he was very old—which is based on his recollection of the year of his birth—is probably untrue. Fortunately we have Lu Chao-lin's assurance that Sun still had his wits about him.

The information yielded by this section may be summed up as follows: (b. 581?). Thus Sun's interview with T'ai-tung took place—if at all—when he was about forty-five, and he must have been about seventy-eight when, we are told, he joined Kao-tung's court. He would have retired at the age of ninety-three, the year after Lu's rhymeprose was written.

### IX

*Old History*, 191:9b

Prior to this, Wei Cheng 魏徵 *et al.*, having received the imperial order to compile histories of the [Northern] Ch'i, Liang, Ch'en, Chou, and Sui dynasties, and fearing that there might be omissions, interviewed him several times. As Sun dictated to them, it was as if they were beholding the events with their own eyes.

## The Biography of Sun Ssu-mo

*New History*, 196:5b

Prior to this, Wei Cheng *et al.*, when compiling the histories of the five ruling houses Ch'i, Liang, Chou, Sui, and so forth, consulted him several times about lacunae [in their sources]. His information was extremely detailed.

### *Commentary*

The intended effect of this story is plainly to substantiate the claim that Sun's lifespan extended far beyond the normal limits. There is no a priori reason, in view of what is known about how the Histories were compiled, to deny that such consultations may have taken place. Since there is no parallel in any extant earlier source, section IX may actually be based on the T'ang archives.<sup>77</sup> Substantiation from the five Histories themselves is hardly to be expected.<sup>78</sup>

Two compilation boards, both of which included Wei Cheng, were set up at the beginning of the T'ang; as is well known, sponsoring histories of preceding dynasties was a way of claiming to be legitimate successor to the Mandate of Heaven. The first board, established by Kao-tsu (618–626) in or before 623 to compile Histories of the T'o-pa Wei, Liang, Northern Ch'i, Northern Chou, and Sui, labored for several years without bringing their task to completion. The second board was set up in 629 with the object of compiling the five Histories mentioned in this section. The Wei dynasty project was abandoned, since a perfectly good History already existed. Wei Cheng was in charge of the Sui (581–618) History, and generally supervised those of the Liang (502–556) and Ch'en (557–589) as well. The completed works (excluding the technical Treatises, which

<sup>77</sup> A passage in *TPKC*, I, 141, which for reasons previously given I do not consider earlier, agrees with the Old History version practically word for word.

<sup>78</sup> Nor does Sun's name appear in *Wei Wen-chen ku-shih shih i* 魏文貞故事拾逸 (woodblock edition, colophon dated 1884), an extensive collection of memorabilia concerning, and historical discussions by, Wei Cheng.



## Chinese Alchemy: Preliminary Studies

took twenty years longer) were presented to the throne in 636.<sup>79</sup>

There is no question, therefore, that the story is set in the period 629–636. At this time Sun would have been only about fifty years old (thirty by Wang Ming-sheng's reckoning!). There exist no grounds for establishing the historicity of section IX. The best that can be said is that it is not patently absurd, so long as Wei and his associates *believed* that Sun was, despite his appearance, a very old man, and providing that Sun was a very skilled liar. This last point can be neither affirmed nor denied on the basis of solid evidence. That he seemed to be truthful in 673 (section VIII) proves nothing about his veracity in the neighborhood of 630.

### X

*Old History*, 191:9b–10a

The Vice-President of the Imperial Chancellery, Sun Ch'uyueh 孫處約, took his five sons T'ing 倓, Ching 倓, Chün 俊, Yu 佑, and Ch'üan 全 to visit Ssu-mo. Ssu-mo said: "Chün will be the first to attain honorable position; Yu will succeed late in life. Ch'üan will be the most eminent; calamity will come to him when he goes to war." Afterward everything happened as he said.

When the Intendant-General of the Household of the Heir Apparent, Lu Ch'i-ch'ing 盧齊卿, was a child, [he] asked about his future 人倫之事. Ssu-mo said: "Fifty years from now you will reach the position of Lord of a Quarter [that is, Prefect]. My grandson will be your subordinate.<sup>80</sup> Take care of yourself!" Later, when Ch'i-ch'ing was Prefect of Hsu-chou 徐州, Ssu-mo's grandson P'u 溥 was indeed Assistant Subprefect of Hsiao 蕭 county in Hsu-chou. At the time Ssu-mo spoke to Ch'i-ch'ing, P'u was not yet born, but [Ssu-mo] knew

<sup>79</sup> *CTS*, 73:10b–12a, and Lü Ssu-mien, *Sui T'ang Wu-tai shih*, II, 1321–1322.

<sup>80</sup> The reading “ 束 ” is obviously erroneous; “ 吏 ” is given instead in *HTS*.

## The Biography of Sun Ssu-mo

of this in advance. Of the many odd stories [about Ssu-mo], most are of this sort.

*New History*, 196:5b

Sun Ch'u-yueh once<sup>81</sup> took all his sons to visit Ssu-mo, who said: "Chün will be illustrious earliest; Yu 侑<sup>82</sup> will attain honorable position late in life. As for Ch'üan, calamity will come to him when he goes to war." Afterward everything proved true.

When the Intendant-General of the Household of the Heir Apparent, Lu Ch'i-ch'ing, was a child, Ssu-mo said: "Fifty years from now you will reach the position of Lord of a Quarter. My grandson will be your subordinate. I hope that you will take care of yourself!" At the time, Ssu-mo's grandson P'u was not yet born. When it came to pass that P'u was Assistant Sub-prefect of Hsiao county, Ch'i-ch'ing was Prefect of Hsu-chou.

### *Commentary*

The exact chronology of Sun Ch'u-yueh's career is uncertain, but so far as can be ascertained from other sources he was never Vice-President of the Imperial Chancellery. He was promoted through the Grand Imperial Secretariat to Vice-President in the period 650–656/660, and thereafter made Vice-Rector of the University of the Sons of the State, with the auxiliary dignity of Equal of Functionaries of the Third Degree in the Imperial Chancellery and the Grand Imperial Secretariat. It would seem, then, that his office is given incorrectly in this section, and that the interview is to be placed in the sixth decade

<sup>81</sup> I read "膏" for "常," following the version based on the two T'ang Histories in the early inscription "Sun Chen-jen tz'u chi" (see note 28), p. 16a.

<sup>82</sup> Note that the two Histories give his name differently. Since the two characters are visually similar homophones, this is a case of corruption. The *New History* is apparently correct; cf. *HTS*, 73B:3a.

## Chinese Alchemy: Preliminary Studies

of the seventh century.<sup>83</sup> Much more relevant, of course, are the dates when the predictions about his sons came true, since the uncharitable historian must take it as a rule that prophecies are not generally recorded as successful until they have come to pass. Of the five sons, only Sun Ch'üan makes a splash in history, but his end testifies to Sun's prescience. In the year 712 延和初, as Governor-General of Yu-chou 幽州, he was sent to Manchuria to fight the Hsi 奚 and Khitan Tartars, and, because of bad judgment and bad diplomacy, was captured and killed in the same year.<sup>84</sup> Chün, T'ing, and Ching were all provincial functionaries, the first rising to the post of Chief Administrator and the other two becoming Prefects.<sup>85</sup>

Again there is no record of Lu Ch'i-ch'ing's having held the post of Prefect of Hsu-chou, although he did become a Prefect elsewhere at some time between 713 and about 730 開元初 (his earliest recorded appointment was at the turn of the century 長安初). His encounter with Sun would be placed in the latter's last decades.<sup>86</sup>

The confusion about titles in these anecdotes reveals nothing

<sup>83</sup> *CTS*, 81:11a-11b; *HTS*, 61:9a, 106:17b-18a; and Ssu-ma Kuang's 司馬光 comprehensive history *Tzu chih t'ung chien* 資治通鑑 (1084; 4 vols., Peking: Ku chi ch'u pan she, 1956), III (ch. 201), 6343.12-6344.7. There is some disagreement in these sources as to the dates of his final appointment and retirement, but the best accounts place them in 664. See *Hsu T'ung chih* 續通志 (Continuation of the General history, ordered 1767; *Wan yu wen k'u* ed.), II, 4541c.

<sup>84</sup> *HTS*, *ibid.*, and *Tzu chih t'ung chien*, III (ch. 210), 6672.8-14. The statement in *CTS*, 7:26a that he died in battle was dropped in *HTS*, 5:5a.

<sup>85</sup> Sun Ch'u-yueh (later named Mao-tao 茂道) and his sons, as the most illustrious members of the Honan 汝州 branch of the clan, figure in the "Genealogical Tables of Chief Ministers 宰相世系表" of the New History (73B:3a).

<sup>86</sup> *CTS*, 81:3b; *HTS*, 106:10b. The New History makes what looks to be a gross blunder in giving his name as "Ch'eng-t'ai, style Ch'i-ch'ing 承泰字齊卿," since Lu Ch'eng-t'ai was his father, but "字 (style)" is a misprint for "子 (son)." The prefecture which he administered is named there as Yu-chou 幽州 (in modern Hopei province); in the Old History it is given as Pin-chou 幽州 (in modern Shensi). It is plain from the similarity of the characters that one is corrupt.

## The Biography of Sun Ssu-mo

about their origin except that their author or authors had no access to official records. While they are strongly reminiscent of those T'ang collections of supernatural anecdotes which were so heavily mined by the editors of the Histories, their precise source cannot be ascertained.<sup>87</sup> One's doubts as to their historicity are reinforced to the point of outright skepticism by a variant of the Lu Ch'i-ch'ing story found in Lü Tao-sheng's 呂道生 collection *Ting ming lu* 定命錄 (Records of the working out of destiny, 827/835 太和中):<sup>88</sup> "Sun Ssu-mo lived over a hundred years, and was skilled in medicine. He said to Kao Chung-shu 高仲舒:<sup>89</sup> 'Your physiognomy shows that you are marked for high station.<sup>90</sup> You will hold the

<sup>87</sup> The two stories occur together in the sequel to a T'ang collection, Chung Lu's 鍾輅 *Ch'ien ting lu* 前定錄 (Records of predestination), in *Pai ch'uan hsueh hai* 百川學海 (Po ku chai 博古齋 ed. of 1921, vols. 12-13), p. 6b. The anonymous sequel is generally dated in the Northern Sung. Ch'ang Pi-te, for instance, proposes that it was compiled in the reign of T'ai-tsung (976-997) or Chen-tsung (998-1022); see *Shuo fu k'ao*, p. 275. If this is correct, the Sun stories (like another Ch'ang points out) must have been added at a later date, for they are a verbatim but somewhat corrupt copy of the *Hsin T'ang shu* version, which was not completed until the 1040's.

<sup>88</sup> *TPKC*, III (ch. 222, "Physiognomists 相"), 1703; also see *HTS*, 59:20a. Lü's work, now lost, was a sequel to the *Ting ming lun* 論 of Chao Tzu-ch'in 趙自勤 (fl. 742/755).

That this story actually comes from Chao's work is quite possible. *TPKC* in its list of sources (known to be incomplete) includes only *Ting ming lu*, although it is likely that both works were used (see note 90 below). The "Treatise on Bibliography" in the Standard History of the Sung (*Sung shih*, 206:4b) lists only *Ting ming lu*, in two *chüan*, and names its author as Chao Tzu-ch'in. Since Lü's work was originally in two *chüan*, and Chao's in ten, it appears that there was some confusion of the two works at the time *TPKC* was compiled.

<sup>89</sup> Biographies of this eminent scholiast (fl. early eighth century) are found in *CTS*, 187A:14b-15a, and *HTS*, 191:10a-10b. Neither mentions his having been a prefect, although this is not unlikely. He was a Grand Secretary in the Grand Imperial Secretariat in the first half of the eighth century 開元中

<sup>90</sup> The term "貴相" means more than a literal translation, "noble visage," would indicate. See, for instance, the story immediately preceding in *TPKC*, where Chang Jen-yuan 張仁愿 speaks of the black moles on the soles of his feet as his "貴相." Although this story is also supposed to

## Chinese Alchemy: Preliminary Studies

post of Prefect several times. I [will?] have a son who will be Chief Clerk [of a subprefecture] and will serve you when you become Prefect of Ch'i-chou 齊州 [in modern Shantung]. Although he will incur a beating, I hope that you will remember the words of an old man and let him go.' Afterward it happened as he said. Only after [Kao had had Sun's son] stripped did he suddenly remember and pardon him."

The two versions of this story are so divergent that the identity of their common source, however vague or laconic, is beside the point. There is, finally, no particular significance in the fact that the New History inverts the order of sections X and XI.

### XI

*Old History*, 191:10a

[Ssu-mo] died in the first year [March 15, 682–February 1, 683] of the Yung-ch'un 永淳 period [March 15, 682–December 23, 683]. He left orders that he was to be buried with a minimum of ceremony. No funerary implements were to be interred with him, and no animals were to be sacrificed as spirit offerings.

After more than a month had passed there was no change in his appearance. The corpse, when placed in the coffin, was [light] as empty clothing. At the time this was much wondered at.

*New History*, 196:5b

He died in the beginning of the Yung-ch'un period, more than a hundred years old. He left orders that he was to be buried with a minimum of ceremony. No funerary implements

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come from *Ting ming lu*, I suspect that it is actually from Chao Tzu-ch'in's collection; it is too complimentary to the rebel An Lu-shan 安祿山 to have been written, or even included in a collection, after his name became anathema in 756.

## The Biography of Sun Ssu-mo

were to be interred with him, and in the spirit offerings animal sacrifice was to be omitted.

### Commentary

The date of Sun's death as given here has no claim to credence. This section was copied from *T'an pin lu*, whose veracity we have no assurance the editors of the Old History were at pains to check. There is no indication that the revision in the New History was based on additional sources; it is only prudent to regard the alteration of the first sentence as gratuitous.<sup>91</sup>

There is a considerably more circumstantial version of Sun's death and apotheosis, with more of the classical embellishment of Taoist legend, in *Hsu hsien chuan*.<sup>92</sup> A beguiling example of concrete imagination, it even provides an exact date for Sun's release from worldly bonds—the morning of March 29, 652 永徽三年二月十五日—twenty-one years before his definitely historical journey to the Summer Palace in Kao-tsung's retinue!

The date derived from *T'an pin lu* has at least the merit of being reasonable, and not wildly at variance with other information, but too little is known of its basis to support even the formulation “(?581–682?).”

<sup>91</sup> Wang Ming-sheng (*Shih-ch'i-shih shang ch'ueh*, 92:12b) takes Sung Ch'i severely to task for the meaningless modification of the date (but it is true that the New History agrees with *T'an pin lu*) and the additional phrase, which he considers characteristically motivated by “an imperative desire to bolster the claim to superiority of the New History, although in reality Sung does nothing to improve upon the old version.”

*Hsuan p'in lu* (4:13b), which follows the Old History, erroneously reads “九” for “元.”

<sup>92</sup> 113B:20b, followed in the mammoth hagiographical compendium *Li shih chen hsien t'i tao t'ung chien* 歷世真仙體道通鑑 (Comprehensive history of embodiment of the *Tao* by successive generations of immortals, early twelfth century, Chao Tao-i 趙道一, ed.; *Tao tsang*, vols. 139–148), 29:12a, and condensed in the anonymous collection *Hsiao yao hsu ching* 消搖墟經 (*Tao tsang*, vol. 1081), 2:25a.

## Chinese Alchemy: Preliminary Studies

### XII

*Old History*, 191:10a

He wrote commentaries on the *Lao-tzu* and *Chuang-tzu*,<sup>93</sup> and composed the *Ch'ien chin fang* 千金方 [Prescriptions worth a thousand] in thirty *chüan*; it has remained popular. He also wrote the *Fu lu lun* 福祿論 (On happiness and prosperity) in three *chüan*,<sup>94</sup> and the *She sheng chen lu* 攝生真錄 (Records of the nourishing of vitality for the attainment of Realization), the *Chen chung su shu* 枕中素書 (Pillowbook written on silk), and the *Hui san chiao lun* 會三教論 (On the reconciliation of the Three Teachings [Confucianism, Taoism, and Buddhism]), each in one *chüan*.<sup>95</sup>

In the T'ien-shou 天授 period (October 690–April 692) his son Hsing 行 became Vice-President of the Grand Imperial Secretariat.

#### *Commentary*

This section is devoted to Sun's heritage: his books on philosophical and esoteric Taoism, religious syncretism, and medicine; and his son, whose position in the upper reaches of the civil service brought glory to his ancestral line.

Since the Standard Histories list the holdings of the various imperial libraries during their respective dynasties, it is a sim-

<sup>93</sup> Both titles are recorded in the "Treatise on Bibliography" of the New History (59:5b), but, one notes from the omission of indications of length, the books were lost.

<sup>94</sup> Recorded in the section on divination 五行 in the New History, 59:28b. The rubric implies very little about the character of the book, which is not registered in the Sung and Ming Histories. A work of this title in three *chüan*, with no author indicated, is listed in the bibliographical section of *T'ung chih lueh* (XX, 96).

<sup>95</sup> All three are listed in the section on esoteric Taoism in *HTS*, 59:8b, but drop out of sight afterward. The Taoist Patrology contains two works attributed to him with titles similar to these. One, *She yang chen chung fang* 攝養枕中方, is possibly identical with *Chen chung su shu* (see note 68 above). Of the other, a short calendar of dietary regimen called *She yang lun* 攝養論 (On the nourishing [of the vital principle]; *Tao tsang*, vol. 572), nothing can be said.

## The Biography of Sun Ssu-mo

ple matter to ascertain that the books named here actually existed during the T'ang. More specifically, none of these works is recorded in the Bibliographical Treatise of the Old History, but all—and over a dozen more of Sun's—are recorded in that of the New History.<sup>96</sup> This is not, however, a matter for suspicion. For books prior to the eighth century, both bibliographies depend on the same source, which is simply more drastically abridged in the Old History,<sup>97</sup> and more fully supplemented for later books in the New. The editors of the earlier History made a policy of listing works of prominent T'ang authors in their biographies rather than in the Treatise.<sup>98</sup> Since this policy was not followed later, the first part of section XII could be dropped in the course of revision.

The mandarin Sun Hsing does not pass muster so easily. The existence of a metropolitan official of the third degree of rank is generally reflected in the chronicle of his times, but Sun Hsing's name does not appear either in the "Basic Annals" nor in the "Table of Chief Ministers" for the T'ien-shou period.<sup>99</sup> This is not final proof that he did not hold the post, particularly because in those days of Wu Tse-t'ien's interregnum the replacement rate (as well as the mortality rate) of higher-echelon officials was dizzying; consequently the record of incumbencies cannot be considered complete.

<sup>96</sup> The Old History attributes only one work, a treatise on divining by use of tortoise carapaces (*Kuei ching* 龜經, in one *chüan*; 47:17a), to Sun, but he is given twenty-two in the New History.

<sup>97</sup> So drastically, in fact, that *CTS* does not even list this source, Wu Chiung's 毋獎 *Ku chin shu lu* 古今書錄 (Record of books ancient and modern), itself an abridgment of *Ch'ün shu ssu [pu] lu* 羣書四[部]錄 (Quadripartite bibliography), based on the newly strengthened and ordered imperial holdings and presented to the throne late in 721. The New History's bibliography is about double the size of that of the Old. Neither approaches the scope even of Wu's work, which, for instance, is said to have included over 2500 Taoist and Buddhist works in an appendix. See *CTS*, 46:1a–6b and *HTS*, 57:1a–3a. <sup>98</sup> *CTS*, 46:6a–6b.

<sup>99</sup> Nor, for that matter, in the "Genealogical Tables of Chief Ministers." See *CTS*, 6:6a–7a; *HTS*, 4:7b–10a, 61:13b–15a, and 73B:2a–9a; and *Tzu chih t'ung chien*, 6463.5, 6462.2, 6468.15–16, 6473.19, and 6475.28.



## Chinese Alchemy: Preliminary Studies

The worst of it is that one cannot be sure even of his name. The earliest extant biography of Sun Ssu-mo, in the Buddhist collection *Hua-yen ching chuan chi* 華嚴經傳記 (Biographies of [persons connected with the propagation of] the Avataṃsaka [Garland] Sutra) of the Sogdian monk Fa-tsang 法藏 (643–712), gives the son's name as "Hsing-chen, also called Yuan-i 行真又名元一," and states that like his father he was famed in his time as a devoted Buddhist.<sup>100</sup> Because of its predominantly legendary character, however, this work does not command credence, although the author was a contemporary of Sun's. One has no choice but to consider the account of Sun's son in section XII as doubtful. Whether this was the reason the editors of the New History omitted it we do not know.

This close examination of Sun Ssu-mo's official biographies has demonstrated how much is to be gained—because so much can be discarded—by the application of doubt to every bit of material, even the best material, which concerns Taoists or other figures of the sort who attract legends. Very often such an extended exercise in wariness will leave us only with the realization that we know nothing whatever about the person-age in question, but this is a datum which every historian must accept with good grace.

In the case of Sun, our warrantable knowledge, based on the incontrovertible testimony of a well-placed witness, at least allows us to set him in his time: Sun was in the Emperor's retinue in 673, and stated at the time that he was born in 581; despite the great age which these dates imply, he was in excellent condition, body and mind. Nothing else survives the process of elimination.

This does not mean that the overall probity of the Standard Histories of the T'ang need be reassessed. It is enough to see

<sup>100</sup> In Taishō Tripitaka, no. 2073, 5:171. I do not imply that the authorship of this tractate is indubitable.



*Sun Ssu-Mo as Cultural Heritage.* A modern conception of Sun Ssu-mo issued by the People's Republic of China in 1962 as one of a set of postage stamps depicting ancient Chinese scientists. Courtesy of Professor Yabuuchi Kiyoshi, Director, Research Institute of Humanistic Studies, University of Kyoto.

that their editors located the boundary between the historically feasible and the obviously legendary at a different point than that dictated by our current notions of objectivity. Arcane pre-science or superhuman longevity were assets to the biography of a Taoist, for they were essential touches in the portrayal of his performance *as a Taoist*. His commemoration in history was most definitely conditioned by how well, and with what interesting refinements, he could be shown playing his particular clearly defined role. If a telling anecdote existed, it was welcomed for what it added to the characterization. To accuse the editors of fancy-mongering is to miss the point. Clearly they believed that the stories they incorporated—often precisely dated, usually involving other historical persons—were true. To deny that Sun Ssu-mo predicted the futures of an eminent man's sons, or that the corpse in his coffin was merely an empty shell was, after all, to destroy his qualifications for inclusion in the History, and to begin the destruction of the

## Chinese Alchemy: Preliminary Studies

category "Recluse." Being at Kao-tsung's court in 673 or being an elderly friend of Lu Chao-lin was not enough to earn a man an official biography. In order to impugn the sincerity of the editors it would be necessary to show that at least some of the fantasy was their own creation. This has not been done, and they must rest in our estimation as conscientious compilers. In the great majority of biographies legend had little or nothing of value to contribute, and consequently the yield of warrantable fact is high.

If in the West, as E. H. Carr puts it, the study of history has been the study of causes, we must sooner or later concern ourselves with determining the extent to which Chinese historiography, analogously with Chinese natural philosophy, is the investigation of resonances between categorically related events and people.

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### AUTOBIOGRAPHICAL DOCUMENTS

It is a matter of historical accident that there are so few secondary documents from which to supplement the little in Sun's official biographies which has survived critical scrutiny. In most cases there is much to be gleaned from contemporary writings and inscriptions, but here attrition has been too great. The remaining literary evidence resolves itself into legend; the inscriptions are too late, and therefore thirdhand.<sup>101</sup> We

<sup>101</sup> "Sun Chen-jen tz'u chi," already cited (note 28), is the major biographical inscription. The first part conflates Sun's official biographies, with credit; the last part, although it is said to be based in part on "traditions passed down in detail in his native village" (138:14a), is taken entirely from literary sources reviewed in this chapter. The inscription "T'ai-tsung ssu Sun Chen-jen sung 太宗賜孫真人頌" (Eulogy of Sun Ssu-mo written by Emperor T'ai-tsung [of the T'ang], 1183, recut 1256; *Chin shih ts'ui pien*, 47:22b-24a) has been shown by Wang Ch'ang to be a late fabrication (47:27b-29b).

Part of the mythopoeic impulse was expressed in Sun's veneration as a medical semi-divinity in certain popular cults. See Lee T'ao, "Ten Celebrated Physicians and Their Temple," *Chinese Medical Journal*, 58 (1940): 271-273.

## The Biography of Sun Ssu-mo

can only guess at how much has been lost when we see attested the great breadth of Sun's interests and accomplishments. In addition to his mastery of the diverse Taoist arts, medicine, and philosophy, apparent from the titles of the treatises he wrote, his poetry and prose bespeak a highly cultured man, and his calligraphy was among the finest of the early T'ang.<sup>102</sup> A number of traditions, moreover, portray Sun as an important Buddhist layman.<sup>103</sup>

In view of the shortage of substantive testimony, it is a particularly happy circumstance that our conjectures can be tested against, and supplemented with, the words of Sun himself—words which would have been considered much earlier if the

<sup>102</sup> A poem of his is included in *Ch'üan T'ang shih* 全唐詩 (Complete poetry of the T'ang, preface dated 1707; T'ung-wen shu chü 同文書局 ed. of 1887), 31:66b–67a. Five prefaces and three short compositions attributed to him are printed in *Ch'üan T'ang wen* 全唐文 (Complete essays of the T'ang, 1814; Kuang-ya shu-chü ed.), 158:1a–7b.

In the Ch'un-hsi period (1174–1189), several outstanding pieces of pre-Sung calligraphy which had been added to the imperial collection since the southward migration, a half-century earlier, were inscribed in stone and erected within the palace precincts. The calligraphers whose work was thus perpetuated were mostly of the very first rank, and Sun was one of them. The history and contents of this and related inscriptions are outlined in the Ch'ing author Chou Hsing-jen's 周行仁 *Ch'un-hua Pi-ko fa-t'ieh yuan-liu k'ao* 淳化祕閣法帖源流考 (Researches on the origins and transmission of the Palace Library calligraphy model of the Ch'un-hua period [990–994, and related models]; in *Chao tai ts'ung shu* 昭代叢書, vol. 147), pp. 39a–39b. For an earlier but incomplete account see T'ao Tsung-i 陶宗儀 (fl. ca. 1360), *Shu shih hui yao* 書史會要 (Compendium of the history of calligraphy; T'ao shih i yuan 陶氏逸園 reprint of 1929), 5:24b–25a. A rather extravagant appreciation of Sun's calligraphy by a Ch'ing connoisseur is quoted in a preface (1836) of Chang T'ing-chi 張廷濟 (1768–1848), printed in his collection of epigraphic writings *Ch'ing i ko chin-shih t'i shih* 清儀閣金石題識 (*Kuan tzu te chai ts'ung-shu* 觀自得齋叢書 ed. of 1892), 4:7b.

I am greatly indebted to Ch'iu K'ai-ming for his efforts, not yet successful, to obtain a rubbing of the Ch'un-hsi inscription.

<sup>103</sup> A tradition which goes back to the late seventh century portrays him as an exponent and patron of the Garland Sutra; see note 100 above and the Ch'ing compilation *Hua yen ching ch'ih yen chi* 華嚴經持驗記 (Record of testimonials to the efficacy of the Garland Sutra), *Tai Nihon zoku zōkyō* 大日本續藏經 (Supplement to the Kyoto Tripitaka; 750

## Chinese Alchemy: Preliminary Studies

emphasis of this investigation were not more historiographical than historical. Again, however, we are reminded how completely the historian is at the mercy of his sources, for in the final reckoning the bulk of this autobiographical evidence concerns Sun's health.

Only two of the many writings attributed to Sun are of sufficiently clear provenance that they can be used without the most stringent testing. His two great medical treatises, the *Ch'ien chin fang* 千金方 (Prescriptions worth a thousand) and the *Ch'ien chin i fang* 翼方 (Revised prescriptions worth a thousand), have been in the public eye, so to speak, ever since their completion, the former some time between 650 and 659,<sup>104</sup> and the latter somewhat later.<sup>105</sup> Their current state is by no means pristine; in particular, like most other important early medical treatises, they were extensively modified in the Northern Sung when Lin I 林億 and his associates, under official auspices, edited them to be printed for use as textbooks in the Academy of Medicine.<sup>106</sup>

These modifications, so far as can be ascertained at this remove, chiefly affected details of medical and pharmaceutical practice. With one exception, the case histories and other in-

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vols., Kyoto: Zōkyō Shoin, 1905-1912), vol. 668, p. 305a. The story of Sun's summoning a monk from Chengtu to recite the Lotus Sutra for him was often reprinted. The earliest extant form is in *Hsiang shan yeh lu* 湘山野錄, a collection of reminiscences completed 1068/1077 by the monk Wen-ying 文瑩 (*Tse shih chii ts'ung-shu* 澤是居叢書, vols. 38-39, B:14b-15a); see also *Li shih chen hsien t'i tao t'ung chien*, 29:13a-13b, and *Hsiao yao hsu ching*, 2:25a-25b. To complicate the matter of doctrinal affiliation still further, somewhat less than two hundred years after his death Sun was depicted as a companion of Tao-hsuan [道] 宣律師 (596-667), the founder of the Vinaya sect. See *Yu-yang tsa tsu*, 2:10a f; *T'ai-p'ing kuang chi*, I (ch. 21), 142; and *Sung kao seng chuan* 宋高僧傳 (Biographies of eminent monks of the Sung, 988; Taishō Tripitaka, no. 2061), 14:790. The earliest extant biography of Tao-hsuan himself, in the compilation *Shih shih liu t'ieh* 釋氏六帖 (mid-tenth century; Japanese woodblock ed. of 1669), 11:1b-2b, it should be noted, does not mention Sun at all. I am grateful to Takamaro Shigaraki, Ryukoku University, and Tairyū Makita, Kyoto University, for making available photographs of this extremely rare book.

## The Biography of Sun Ssu-mo

<sup>104</sup> The *terminus a quo* is determined by Sun's use of the terms "in the Chen-kuan reign period [627–649] 正 [= 貞 ; the taboo is that of Jen-tsung of the Sung (1023–1063)] 觀中" (22:6a and 23:30a) and "in the early part of the Chen-kuan reign period 正觀初" (27:28b–29a), which would not ordinarily be used by a writer until the *next* reign period, which begins in 650. The latest year specifically designated is 636 正觀十年 (21:4a). The *terminus ad quem* has been determined by Watanabe Kōzō 渡邊幸三 "Son Shibō Senkin-yohō shokujihen no bunkengakuteki kenkyū 孫思邈千金要方食治篇の文献學的研究" (A documentary study of the dietary section of Sun Ssu-mo's *Ch'ien chin fang*), *Nihon iōyō igaku-kai kaishi* 日本東洋醫學會會誌, 5 (1955): 21–34. Watanabe has given reason to believe that *Ch'ien chin fang* was written before completion of *Hsin hsiu pen-ts'ao* 新修本草 (Revised pharmacopoeia; presented to the throne 659).

The edition of *Ch'ien chin fang* which I have cited is a reproduction of a woodblock edition of ca. 1147, with a few pages replaced from later editions. The full title is *Pei chi ch'ien chin yao fang* 備急千金要方. I have collated relevant passages with the Ming edition (entitled *Sun Chen-jen Pei chi ch'ien chin yao fang*) in the *Tao tsang* (vols. 800–820) and with the annotated edition of Chang Lu 張璐 (entitled *Ch'ien chin fang yen i* 千金方衍義, preface dated December 1698; Sao yeh shan fang 掃葉山房 ed. of 1801).

<sup>105</sup> The opinion, common among modern writers, that the interval was thirty years, is based either directly or indirectly on a rather offhand statement in Yeh Meng-te's 葉夢得 (1077–1148) compendium of animadversions and scholarly chitchat, *Pi shu lu hua* 避暑錄話 (Remarks from a summer retreat, 1135 [?]; *Hsueh chin t'ao yuan* 學津討原, vols. 131–132), A:25a. I have been unable to trace Yeh's assertion to an earlier source. I doubt, in fact, that there is an earlier source; this aside, it is most unlikely that "thirty years" is anything more than a round number. These suspicions are not softened by the fact that the editors of the *Ssu-k'u Catalogue*—VII (ch. 103, s.v. *Ch'ien chin yao fang*), 2006a—characterize as "the perpetuation of old errors" Yeh's assertions that Sun was over a hundred at the time he wrote *Ch'ien chin fang*, and that *Ch'ien chin i fang* was done thirty years later. In the preface to the latter work, Sun refers to his age only by a phrase which means "seventy or over 耄及之年."

The edition of *Ch'ien chin i fang* cited here (see note 56) is a reduced photolithographic reproduction of the Chinese issue of 1878, reprinted from the blocks of a Japanese copy of the edition of 1307 大德丁未. I find no evidence that a copy of any edition of *Ch'ien chin i fang* previous to 1307 still exists.

<sup>106</sup> The Bureau for Editing Medical Treatises 校正醫書局 was set up in 1057—*Wen hsien t'ung k'ao* 文獻通考, II (ch. 222), 1796b, s.v. *Wai t'ai pi yao* 外臺祕要. While Lin, Kao Pao-heng 高保衡, and the others deserve great credit for rescuing the most important medical classics from further attrition, and for sparking a medical renaissance by making copies widely available, it is generally agreed that their lack of respect for

## Chinese Alchemy: Preliminary Studies

trusions of personal experience fit the historical rather than the legendary Sun, although Lin I and his collaborators, out of their regard for the latter, paid scant attention in their prefaces and colophons to the former. The exception, written in a style clearly either Sun's or an excellent imitation, reads: "I had seen Realized Immortals who had become Water Immortals, but I had not perused the formulas by which they did so. In the Wu-te 武德 period [618-626] a dragon imparted this Canon on the Ingestion of Water 服水經 to me. I leafed through it day and night, never laying it aside. The book was rather badly damaged by bookworms, the text much mutilated. Being at leisure, I made what sense of it I could, and colligated it into a chapter [which follows]. Gentlemen devotees of the Tao, if they practice it diligently, may thereby attain immortality."<sup>107</sup> This passage, if its authenticity could be established positively, would furnish proof of what we can

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textual integrity greatly simplified the task of producing textbook versions. The bibliophile Huang P'ei-lieh 黃丕烈 (1763-1825), who was able to compare a Northern Sung edition of *Ch'ien chin fang* with a Yuan print in the Lin I recension, noted: "The two editions differ not only in that the sense has been added to or taken from, but there are considerable discrepancies in the names of simples, the quantities used, and the methods of compounding. Can one believe that the prescriptions of the ancients have been subjected at a later time to this arbitrary emendation and abridgment!" *Jao p'u ts'ang shu t'i shih* 堯圃藏書題識 (Bibliographical inscriptions in books from the Jao-p'u collection; Miao Ch'üan-sun 繆荃孫 ed., 1919), 4:24a.

The "original" version Huang used was, so far as is known, unique, for the official status of the Lin I revision meant that no other text could compete for survival. In Huang's copy, for that matter, only twenty of the thirty *chüan* dated from the Sung—Lu Hsin-yuan 陸心源, *I ku t'ang t'i pa* 儀顧堂題跋 (Inscriptions and colophons from the I-ku Studio, preface dated 1890), 7:9a-11b). This copy, which I have not seen, was, as of 1930, in the Seikadō Bunko collection, according to Okanishi Tameto 岡西為人, *Sung i-ch'ien i-chi k'ao* 宋以前醫籍考 (Researches on medical books of the Sung and earlier; Peking: People's Hygiene Press, 1958), p. 824. For another early text of *ch. 1* only, printed in Japan in 1832, see pp. 820-822. Okanishi also provides (pp. 802-812) a table comparing the contents of Huang's copy with that of two "modern" editions.

<sup>107</sup> *Ch'ien chin i fang*, p. 158a (*ch. 13*). This passage introduces a magical procedure, including an exorcism chanted in an Indian language (p. 159a).

## The Biography of Sun Ssu-mo

only suspect: that one of the prime movers of the legend of Sun Ssu-mo was Sun himself. It is certainly neither necessary nor justifiable to reject this passage out of hand as an interpolation.

There is no point in detailed examination of the autobiographical material in Sun's medical masterpieces. Those passages which throw light on Sun's own medical history are translated in Appendix A; the information which is relevant to the present inquiry needs only brief consideration.

It appears, first, that Sun traveled much more widely than one would gather from his official biographies—on the basis of which, taken alone, one would never suspect that he even left the vicinity of his home. But we learn from *Ch'ien chin fang* that in 633 he contracted erysipelas 丹毒 in Szechuan, where he had gone some time after the Ta-yeh 大業 period (605–616).<sup>108</sup> That he is linked with Szechuan in a number of legends can thus be rationally accounted for.<sup>109</sup>

About a dozen of the case histories and other records in the two medical works are dated. Those unquestionably taken from Sun's experience all fall within the Wu-te and Chen-kuan

<sup>108</sup> 22:30a and 12:32a.

<sup>109</sup> The story of Sun's appearing to Emperor Hsuan-tsung (r. September 712–July 756, long after Sun's death) in a dream to ask for a grant of realgar, and of the extraordinary circumstances of its delivery on the peak of Mount O-mei 峨嵋 is told concisely in *Yu yang tsa tsu* (ca. 860), 2:10b–11a, and with much more circumstantial detail in *TPKC*, I (ch. 21), 142–143, quoting *Hsuan shih chih* or *Hsien chuan shih i*.

The writer's dictionary *Hai lu sui shih* 海錄碎事 (1149; Woodblock ed. of the Wan-li period, 1573–1619, 24 vols.), 13A:12a–12b, quotes from the no longer integral collection *I shih* 逸史 (preface dated 847) an anecdote which makes Sun, this time located at the court of Hsuan-tsung, an old friend of the God of Wine.

A third legend, found in *Li shih chen hsien t'i tao t'ung chien*, 7:10b, purports to give an account of Sun's induction into the ranks of the immortals: "Sun Ssu-mo once lived on Mount O-mei, devoting himself to practice of the Way. [Wang] Chung-tu 王仲都 and several other [immortals], disguised as hunters, passed by his abode and tested him. Because of Sun's ability to discourse on the principles of immortality, [Wang] taught him the Taoist secrets, and then disappeared."



## Chinese Alchemy: Preliminary Studies

貞觀 reign periods (618–649); the earliest cannot be later than 626, and the latest year specified is 636.<sup>110</sup> That this accordingly must have been a major period of medical activity provides additional support for the hypothesis that Sun was born in 581. If Wang Ming-sheng were correct that Sun was born in 601, he would have been too young in 626 to be taken seriously as a physician. In fact, he was involved in alchemical experimentation at least a decade earlier still. “In the Ta-yeh period [605–616] I was repeatedly inconvenienced when preparing elixirs, because of the difficulty of obtaining realgar and laminar malachite.”<sup>111</sup>

There is more than sufficient thaumaturgical and alchemical content in Sun's medical works to leave an impression of the author thoroughly compatible with that gained from his biography. We have already seen that he speaks of having received a magical formula from a dragon and of having prepared elixirs of immortality. The concerns thus reflected are not merely superimposed on the medical content of his works, however, but are integral with it. Alchemy is a branch of Chinese medicine, a branch whose major goal transcends the cure of disease and the maintenance of health.<sup>112</sup> The general methods for the preparation of inorganic drugs are the same as those adopted in *Tan ching yao chueh*; they depend on the same apparatus and the same chemical substances.<sup>113</sup> *Ch'ien chin fang* recommends several treatments which involve mas-

<sup>110</sup> In addition to the passage cited earlier and another translated in Appendix A, see *Ch'ien chin i fang*, p. 236a, and *Ch'ien chin fang*, 16:20b. The case dated 636 is discussed in *ibid.*, 21:4a.

<sup>111</sup> *Ch'ien chin fang*, 12:32a.

<sup>112</sup> I intend to develop this thesis in detail elsewhere. It is explicit throughout the formative phases of the Chinese medical tradition. The first pharmacopoeia, the *Shen nung pen ts'ao* 神農本草 (first/third century after Christ), for instance, divides drugs into three classes, the highest of which confers eternal youth when taken in large quantity or for a long time.

<sup>113</sup> See especially the formula for six-one lute in *Ch'ien chin fang* (pp. 263–264 below) and the preparations by sublimation in *Ch'ien chin i fang* (pp. 67b–68a, 257f).

## The Biography of Sun Ssu-mo: A Historiographic Inquiry

sive doses of highly toxic inorganics—always including mercury, that staple of the alchemist—for disorders ranging from epilepsy to gold or silver poisoning.<sup>114</sup> It is impossible, in fact, to draw a hard and fast line between medical prescriptions which confer immortality when taken in large quantity, and alchemical elixirs which, in small dosages, cure specific diseases.<sup>115</sup>

<sup>114</sup> 14:10a-11a, 21:26a-26b, and 24:5b. Poisonous inorganics are also prescribed in large quantity or without limit of time in *Ch'ien chin i fang* (pp. 186a and 232b), which pays a great deal of attention to treating reactions caused by ingestion of minerals (pp. 262b-265a).

One comes away from Sun's writings rather puzzled by his willingness to prescribe freely what he seems to be perfectly aware are very dangerous drugs—particularly in view of his having said “I would rather eat gelsemium root than minerals” (see Appendix A below). One's puzzlement is hardly attenuated upon observing that he prescribes gelsemium root, a very unpleasant poison, too (*Ch'ien chin fang*, 12:24a)!

I do not in the least doubt, however, that Sun's reasoning was internally consistent; it is merely necessary to take into account axioms which he accepted but which we reject. The most important of these is that only crude or impure minerals are poisonous, and that the toxicity can be refined away (*Ch'ien chin fang*, 1:21b). Another, even more widespread, is that violent agents are necessary to balance off extreme departures from homeostasis so that, in the course of treatment, reactions could be interpreted as indications of efficacy: “After taking an elixir, if your face and body itch as though insects were crawling over them; if your hands and feet swell with dropsy; if you cannot stand the smell of food and bring it up when you eat it; if you feel nauseated 心惡; if your limbs feel weak; if you are prone to diarrhea or vomiting; or if your head or stomach aches, do not be disturbed. These are merely proofs that the elixir is succeeding in driving out the illness.” *T'ai ch'ing shih pi chi* 太清石壁記 (reached final form in mid-eighth century; *Tao tsang*, vols. 582-583), B:7a.

Sun's attitude toward indiscriminate dosing is most widely known from a citation (“No one should take medicine without a good reason”) in an anti-alchemical petition presented to Emperor Mu-tsung 穆宗 (821-824); see *CTS*, 171:13b-14a or *HTS*, 118:28b. The source is *Ch'ien chin fang*, 26:1a, but the words are in fact those of the great Han physician Chang Chi (Chang Chung-ching) 張機字仲景.

<sup>115</sup> One of the most striking examples of this overlap is “Grand Unity Wonderful Essence Elixir 太一神精丹”; it is listed in *T'ai ch'ing tan ching yao chueh* as a “minor elixir of immortality,” but there is a recipe for it in the chapter on panaceas in *Ch'ien chin fang* (see p. 51 above and pp. 262-264 below). For that matter, it is still recommended for demonic possession and a host of other diseases in that modern standby of Chinese phy-

## Chinese Alchemy: Preliminary Studies

Finally, it happens to be true that there is more magic — sympathetic procedures, incantations and invocations, taboos, astrology — in Sun's medical works than in his alchemical writing; in this respect he is by no means untypical.<sup>116</sup> All in all, though very little of what we are told about Sun's life commands our credence, that little does hang together reasonably well.

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sicians, *Chung-kuo i-hsueh ta tz'u-tien* 中國醫學大辭典 (Unabridged dictionary of Chinese medicine, 1921; 4 vols., Taipei: Commercial Press, 1958), p. 488a.

<sup>116</sup> To cite only a very few additional examples, *Ch'ien chin fang* speaks of fairies, male and female 童子玉女, guarding one's internal organs (11:1b, 17:1b), and the curing of malaria in children by pasting a magic signet on the forehead of the Kitchen God's image (10:31a–32a); *Ch'ien chin i fang* gives a number of charms in an Indian language (pp. 159a, 165b, and 360a), uses astrological indications to control acupuncture and other therapy (pp. 338a–340a), gives directions for controlling demons by pressing on joints of the fingers and lines of the palm (p. 346), and in fact emphasizes the complementary utility of drugs, acupuncture, incantations, amulets, and calisthenics in medicine (p. 341a).



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#### IV

## *Tan Ching Yao Chueh:* Annotated Translation

If people will think that translators are traitors, they will think it; and, alas, they do not know how strong their case is.—Edward Seidensticker

THE TRANSLATION which follows has been prepared from a new critical punctuated edition (Chapter V), based on the two Ming dynasty printed texts of *T'ai-ch'ing tan ching yao chueh* described in Chapter II. The form of the translation reflects that of the Chinese original to the fullest extent practicable. A number of commentator's notes are set off in the translation by the phrase "Note in text." When these were added, and by whom, is not clear. Several additional annotations appear in Chang Hsuan's *Ch'ing chen kuan* edition; these are generally cited in the footnotes. References to corresponding pages of the Chinese text appear in the margins.

Notes which explain and justify the translations adopted for



*Dreaming of Immortality in a Thatched Hut*. Attributed to the Ming painter Chou Ch'en 周臣 . Courtesy of the Smithsonian Institution. Freer Gallery of Art, Washington, D.C.

## *Tan Ching Yao Chueh: Annotated Translation*

names of ingredients and of diseases are found in Appendixes G and H. In order maximally to facilitate further research the notes are arranged as glossaries of Chinese terms. The General Index may be used to look up a note when only the English name of a substance or illness is known.

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### PREFACE

I have read in succession the lore books of ancient times; they agree that, without exception, cases of men's bodies sprouting feathered wings and rising weightlessly in flight were due to the taking of elixirs.<sup>1</sup> Never did I read or speak of these things without feeling an ardent longing in my heart. My

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<sup>1</sup> Sun refers to modes of transfiguration of those who have become Taoist immortals. This sentence is reminiscent of a statement by T'ao Hung-ching 陶弘景 (451-536) in the preface to his *Pen-ts'ao ching chi chu* 本草經集注 (The [Shen-nung] Pharmacopoeia with collected annotations): "The prolongation of life and avoidance of aging by ingesting special substances and by abstention from cereals as directed in the Taoist classics and the immortality formularies; the wonders due to sublimed elixirs and mineral substances prepared by cyclical transformation; the mysteries [? or marvels 妙] of ascending into the clouds and of becoming a feathered immortal: for all of these the taking of drugs is an essential forerunner. The principles according to which drugs are thus employed are identical with those of the Pharmacopoeia; it is only that the methods of preparation are slightly different."

This preface exists only in a manuscript dated 718 but possibly written at least 150 years earlier than that; for the text of this passage see page 24

## Chinese Alchemy: Preliminary Studies

sole regret was that the divine Way is so remote,<sup>2</sup> the pathway through the clouds so inaccessible. I gazed in vain at azure heaven, not knowing how to ascend it. I began to practice the techniques of preparing elixirs by cyclical transformation<sup>3</sup> and of fixing substances in the fire,<sup>4</sup> and the formulas for making

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of the photolithographic reprint issued by the Ch'un-lien 羣聯 Press, Shanghai, in 1955.

The feathered bodies of the immortals are depicted in Joseph Needham, *Science and Civilisation in China* (7 vols. projected; Cambridge, Eng.: At the University Press, 1954—), II, 141. The feathery growth is characterized less usually as wings than as simply a covering of the limbs.

<sup>2</sup> See the *I ching* (Book of changes), hexagram 20, *t'uan t'zu* (extract from the treatise on the explanations of the hexagrams): "Observe the divine Way of heaven, how the [alternation of the] four seasons is without irregularity." *Shen tao* 神道, "the divine Way," is thus the Way of heaven, here a symbol of natural process on one level and of Taoist transfiguration on another.

<sup>3</sup> Cyclical transformation (轉 or 還, translated by writers before Ho Ping-yü and Joseph Needham as "turn"), the key process in most of Chinese alchemy, is essentially repeated sublimation in a hermetically sealed vessel. If we begin enumeration with preparation of the reactants in the first cycle, or pulverization and optional additional treatment of the previous product in later cycles, the subsequent steps in one complete cycle are: (2) charging into the reaction vessel; (3) closing, hermetical sealing, and preheating to dry the lute; (4) the sublimation itself, usually after a gradual raising of the fire temperature; (5) cooling and opening of the reaction vessel; and (6) collection of the sublimate. One finds that the term is not always used in this rigorous sense, especially in the Sung and later periods. In some formulas for complex multicycle elixir preparations, one or more of the cycles may not involve sublimation at all. See, for instance, the fourth cycle ("turn") in the Sung formula translated in Roy C. Spooner and C. H. Wang, "The Divine Nine Turn Tan Sha Method, a Chinese Alchemical Recipe," *Isis*, 38 (1948): 238-242. In that instance the reactants are simmered to obtain a precipitate.

<sup>4</sup> As used rigorously the term "*fu* 伏" or "*fu huo* 伏火" means "chemical treatment of a volatile substance so that it is no longer volatile under normal conditions"; it is also used more loosely to describe certain products merely earthy in appearance or, when mercury is fixed, merely solid. The term "*ssu* 死," (lit., "kill") is used with the same meaning as "*fu*" in some texts. The parallel with Western alchemical terminology is most suggestive.

A formula for fixing mercury is given below (p. 198); in a more elegant example in the cognate formulary *T'ai-ch'ing shih pi chi* 太清石壁記 (*Tao tsang* 道藏, vols. 581-582), B:10a, the "fixing" is conversion of mercury to chlorides by heating in a sealed vessel with salt (NaCl); the

*Tan Ching Yao Chueh: Annotated Translation*

potable jade and liquid gold 金液.<sup>5</sup> But they are obscure and difficult to fathom, abstruse and unpredictable. How can one without occult virtue comprehend them? Therefore I made the Quintuple-Supernatural and Triple-Emissary potions, the Ninefold-Radiance and Seven-Luminary elixirs, formulas of this sort being relatively feasible.<sup>6</sup> From that time on, as I indulged my fancy it grew apace. Despite difficulty or distance I was impelled to progress in [alchemy]; minor art 小道 though it be,<sup>7</sup> I sought to master it. I feared no labor, from start to finish; how

1B

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product (if one is indeed obtained in the circumstances specified) is still volatile.

<sup>5</sup> According to the Taoist classic *Pao p'u tzu nei p'ien* 抱朴子內篇 (early fourth century; *P'ing chin kuan ts'ung-shu* 平津館叢書 ed., translated in *Alchemy, Medicine, Religion in the China of A.D. 320: The Nei P'ien of Ko Hung [Pao-p'u tzu]*, James R. Ware, tr.; Cambridge: The M.I.T. Press, 1967, with integral references to original page numbers), 4:11a-11b, *yü li* 玉醴 (lit., "jade wine") is prepared by dissolving jade in the blood-like sap of a magical plant. A similar potion may be made from gold.

One sees here the similarity to Indian *rasayana* which S. Mahdihassan has so long advocated; a careful study of a wide range of sources is required before the fact of transmission, and its direction, can be considered seriously. It is significant that Chang Heng 張衡 (78-139) earlier used the term "yü li" in an apparently nonalchemical sense in his "Rhyme-prose on Pondering the Mysteries" (*Ssu hsuan fu* 思玄賦), quoted in his biography in the Standard History of the Later Han Dynasty, *Hou Han shu chi chieh* 後漢書集解 (Basic Sinological Series ed.), XI (ch. 59), 2079.

<sup>6</sup> The first two are listed as "Great Elixirs of the Immortals" below, and in *Shih yao erh ya* 石藥爾雅, List A (see note 9 below), as elixirs for which the methods of preparation are known. Since the time of Tu Yü 杜預 (third century after Christ), "五靈" has been taken to refer to the five numinous animals—*ch'i-lin* 麒麟, phoenix, tortoise, dragon, and white tiger—whose appearance was auspicious for an emperor's reign. As will become even more apparent anon, the alchemical sense is quite different. I have found no locus for "三使" in general literature prior to the tenth century. If, as is likely, the "three emissaries" are in chemical terms the three ingredients of the elixir, we may identify them as calomel, cinnabar, and realgar, according to the recipe in *Shih pi chi*, B:1a (see also note 14 below). In astrology, the term "九光" means a "ninefold radiance of the sun." "Ninefold-Radiance Elixir" is listed in *Shih yao erh ya*, List A, as a synonym for "massicot 鉛黃華" "Seven luminaries" customarily signifies the sun, moon, and five classical planets.

<sup>7</sup> The Confucian paragon is warned against going too far along the by-roads of Knowledge—by which are meant practical as opposed to moral



## Chinese Alchemy: Preliminary Studies

could I shirk fatigue at morning or evening — ceaselessly investigating, hoping for special knowledge. The Way of Heaven being impartial, my sight and hearing were opened through [my persistence]. My wishes were not frustrated, nor was my determination broken. How could I have expected a quick recompense of success? [But success was bound to come, for] surely I could never [be confused with one who] exaggerates [his] powers in chase of mundane profit. No, my purpose was to save the sick, to aid the imperiled.

I have personally tried the several alchemical formulas compiled here; there was not the slightest discrepancy in the results. I have furthermore given full directions. Following them will bring sure success.

Now, man's aspiration being what it is, he values above all else his physical existence 性命. But it is evanescent as the dew of spring, perishing easily as the frost of autumn. It seems that everything passes in the flicker of an eye. Magnificence and penury truly are not enduring, melancholy and jubilation never last. How saddening to speak of these things!

2A

The formulas I have studied are by no means few. On the whole they are obscure and enigmatic. Those who dip into them become increasingly bemused, and amateurs only more addled. That devotees of the Refining Art have had no prospect of success is surely not because the ancients have spoken deceiving words! It must be that students of the Way themselves have been unable to reach the essential meanings.

In the formulas I have set out, the meaning is patent in the text, as plain as looking at something in the palm of one's hand. Once one flips through these pages, all is brilliantly clear.

Since friends and eminent cognoscenti have adduced evi-

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pursuits—in a famous passage in the Analects (XIX.4; trans. Arthur Waley, *The Analects of Confucius*, New York: Random House, n.d., p. 225).

*Tan Ching Yao Chueh: Annotated Translation*

dence which is not in agreement, I have arranged my formulas in three chapters.<sup>8</sup>

Compiled by the recluse scholar Ssu-mo.

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A CATALOGUE OF ELIXIRS, ARRANGED  
IN THREE GRADES

First are presented thirty-four variant names of minor elixirs of immortality.<sup>9</sup>

<sup>8</sup> That is, so that they may be circulated for criticism. This is a completely conventional sort of formula, and does not necessarily have anything to do with Sun's actual motives.

In the present text there is no trace of a division into chapters. The word "p'ien 篇" originally designated bundles of the bamboo tablets on which books were written. By the beginning of the T'ang, however, authors wrote on paper or silk, and a "p'ien" was a conventional division like our "chapter." It is not possible to be sure whether, at the time this work was written, the three p'ien would most likely be divided by subject matter or by length; see Tsuen-hsuei Tsien, *Written on Bamboo and Silk. The Beginnings of Chinese Books and Inscriptions* (Chicago: The University of Chicago Press, 1962), pp. 92 and 109. The full text printed in the *Tao tsang* falls naturally into three parts: (a) the lists of elixirs (the preface would not count), (b) the section on apparatus and six-one lute, and (c) the collection of formulas.

<sup>9</sup> Note my emendation of 大, "great," to 小, "minor," required by the sense of the text and the statement at the end of the list.

Despite the statement that these are variant names, there is no indication of how they were grouped—that is, of which are synonyms of the designation of a single elixir. It has been possible to reconstitute the original grouping by recourse to lists of synonyms in *T'ai-ch'ing shih pi chi* (also referred to below as *Shih pi chi*) and *Shih yao erh ya*, both of which, as has been noted in Chapter II, are closely related to the book translated here.

In making the reconstruction (indicated by designations in brackets) I have held to the following principles. (1) Identifications made in *Shih pi chi* or *Shih yao erh ya* are acceptable evidence, even when the primary name of the elixir differs slightly (that is, within the bounds of imperfect transmission), in the absence of negative evidence. (2) Inclusion in *Shih yao erh ya*, List A (see below), or occurrence of a recipe in *Shih pi chi*, is evidence for a name's being primary. (3) If several names in this list are identified in the sources with one primary name, an unidentified name situated between them here is included in the group.

These points of method, while open to criticism on strict grounds, are the necessary minimum if the original grouping is to be reconstructed at all.

## Chinese Alchemy: Preliminary Studies

2B

- [A]. Grand Unity Jade Powder Elixir
- [B1]. Grand Unity Spirit-Summoning Elixir <sup>10</sup>
- [B2]. Spirit-Returning Elixir
- [B3]. Resurrection Elixir
- [B4]. Life-Preserving Destiny-Entrusting Elixir
- [C1]. Elixir of the Four Wonderful [Substances] <sup>11</sup>
- [C2]. Grand Unity Wonderful Essence Elixir <sup>12</sup>
- [C3]. Wonderful Metamorphosis Elixir
- [C4]. Wonderful Liquid Elixir
- [D]. Envoy Elixir for Communion with Spirits
- [E1]. Elixir of the Five Supernatural [Methods] <sup>13</sup>

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By the use of considerably less valid assumptions the list can be further reduced to only four groups of synonyms (see footnotes 10, 18, and 19); the four primary titles of elixirs would then be A, Fl, I, and Kl. In the text below, formulas are given for only five elixirs in this list: A, Fl, I, J2, and K1.

Reference to the lists in *Shih yao erh ya* (*Tao tsang*, vol. 588) is as follows. List A: Elixirs for which the method is known, and which can be prepared (B:1a-1b). List B: Variant names of elixirs (pp. 2a-3a). List C: Great elixirs of immortality, of which the names but not the formulas are known. Only those so destined and deserving receive the formulas in dreams (pp. 6b-7a).

A summary table which compares elixir names in Sun Ssu-mo's lists with those in other sources is provided in Appendix C; it includes page references, most of which need not be repeated in the notes which follow.

<sup>10</sup> Identified with E1 in *Shih pi chi*; if this single piece of evidence be accepted, groups A through E are reduced to one group.

"Grand Unity" is in philosophy a term for the all-embracing *Tao*, and in popular Taoism the name of a deity (greatly patronized in the Han dynasty) whose seat is near the celestial pole.

<sup>11</sup> *Shih pi chi* gives two formulas, in which the "four wonderful substances" are cinnabar, realgar, orpiment, and laminar malachite. From a recipe for another elixir in *Shih pi chi*, 2:1a, it may be inferred that they are nodular malachite, magnetite, quartz, and stalactite. A recipe in the miscellaneous compilation *Chu chia shen p'in tan fa* 諸家神品丹法 (Wonderful elixir formulas of the masters, probably Sung; *Tao tsang*, vol. 594), 6:13a-13b, specifies cinnabar (raw and resublimed) and the "three yellows," realgar, orpiment, and sulphur. This is a good example of variability in the content of numerical categories not only in different traditions, but even (in the case of *Shih pi chi*) within the same compilation.

<sup>12</sup> See Chapter III, note 115.

<sup>13</sup> *Pao p'u tzu nei p'ien*, 4:10a, cites a canonical work on this elixir (*Wu ling tan ching* 經), which gives five methods for preparing it from nine in-

## Tan Ching Yao Chueh: Annotated Translation

[E2]. Elixir of Ascent into the Roseate Clouds

[E3]. Supernatural Transformation Elixir

[F1]. Three Envoys Elixir <sup>14</sup>

[F2]. Fragrance-Presentation Elixir <sup>15</sup>

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redients—hence my translation. An annotation on the same page points out that a citation from *Pao p'u tzu* in the Sung encyclopedia *T'ai-p'ing yü lan* 太平御覽 (984) omits one of the nine ingredients. Actually the name of the canonical work is given in *T'ai-p'ing yü lan* (Chung Hwa Book Co. reprint of 1960, based largely on a Sung text), 985:2b, not as *Wu ling tan ching* but as *Wu ti yun tan fang* 五帝雲丹方 (The five emperors' cloud elixir formula), an evident corruption. Two formulas are given in *Shih pi chi*, A:12a–12b. One uses five ingredients and the other four. The same treatise (A:13a) says that this elixir is identical with Five Mineral Elixir (*Wu shih tan* 五石丹), but the character “*ling* 靈” must be a copyist's error for “*hsia* 霞”; see *Shih yao erh ya*, list B, for the correct identification.

<sup>14</sup> In the formula given in *Shih pi chi* (B:1a) the ingredients are calomel, cinnabar, and realgar. In the formula below (p. 171) for “Grand Unity Three Envoys Elixir,” amorphous sulphur is also used. Lu Hsiang's 盧襄 commentary (1111/1117) to the *Ts'an t'ung ch'i wu hsiang lei pi yao* 參同契五相類祕要 (Arcane essentials of fivefold categorization based on the *Chou i ts'an t'ung ch'i*) states that the “three envoys” are kalinite, yellow alum, and white alum; see Ho Ping-yü and Joseph Needham, “Theories of Categories in Early Medieval Chinese Alchemy,” *Journal of the Warburg and Courtauld Institutes*, 22 (1959):185, note 77.

Ever since, as was inevitable in China, the bureaucratic parallel was applied to pharmacology in the Shen-nung Pharmacopoeia (*Shen-nung pen-ts'ao* 神農本草, second century after Christ?), an “envoy” (also called “assistant 佐”) has been the lowest grade of simple—toxic, unfit for prolonged ingestion, and therefore useful primarily for the curing of disease; the “monarchs” and “ministers” were to be taken by healthy people, the former to procure longevity or immortality, and the latter as tonics and restoratives. In another medical theory, every prescription was to be compounded of a certain number, varying with the theoretician, of each. The rules of the T'ang Imperial Pharmacy, for instance, stipulated that medicines prepared for the emperor contain one “monarch,” three “ministers,” and nine “assistants.” See the collection of T'ang statutes, *T'ang liu tien* 唐六典 (Kuang ya shu chü 廣雅書局 ed. of 1895), 11:9b, cited in E. H. Schafer, *The Golden Peaches of Samarkand. A Study of T'ang Exotics* (Berkeley and Los Angeles: University of California Press, 1963), p. 179.

<sup>15</sup> This elixir appears twice in *Shih yao erh ya*, List B, identified with two different elixirs, one of which (according to the same work's List C, and Sun's second list below) is a great elixir of the immortals. This suggests, although there is no positive statement to that effect, that two elixirs share this name.

## Chinese Alchemy: Preliminary Studies

- [F3]. Grand Unity Elixir
- [F4]. Envoy Elixir
- [F5]. Elixir of Flight into the Clouds
- [F6]. Crane-Reining Elixir
- [G1]. Eight Mineral Elixir <sup>16</sup>
- [G2]. Fine Day Elixir
- [G3]. Pale Moon Elixir
- [G4]. Elixir for Salvation from Distress <sup>17</sup>
- [H]. Elixir of Holding the Tally <sup>18</sup>
- [I]. Crimson-Colored Empyrean-Roaming Elixir <sup>19</sup>
- [J1]. Scarlet Elixir of Realgar

<sup>16</sup> There is a list of variants in *Shih pi chi* (A:10a–10b), with four recipes. One uses four ingredients, the others eight each, but the assortment varies. In a fifth formula (A:14a) it is stated that the “white 白 eight minerals” are the “five minerals” (laminar malachite, cinnabar, arsenolite, magnetite, and realgar) with the addition of niter, amethyst, and stalactite. See also *Chu chia shen p'in tan fa*, 3:14a.

<sup>17</sup> Liu Ts'un-yan is of the opinion that the term “度厄” is derived from a sentence in the *Prajñāparamitāhṛdava sutra* 般若波羅密多心經; see his *The Authorship of the Feng Shen Yen I* (Buddhist and Taoist Influences on Chinese Novels, vol. I; Wiesbaden: Otto Harrassowitz, 1962), p. 263.

<sup>18</sup> The significance of this title is unclear. In his great medical work *Ch'ien chin i fang* 千金翼方 (Revised prescriptions worth a thousand; Peking: People's Hygiene Press, 1955), p. 348a, Sun Ssu-mo includes a spell for exorcising seasonal fevers 時氣 which is recited while holding a tally in the left hand. Identical with equivalent of F1 in *Shih yao erh ya*, List B.

<sup>19</sup> This name does not occur elsewhere; there are, however, recipes for “Empyrean-Roaming Elixir” below and in *Shih pi chi*. That elixir is also listed in *Shih yao erh ya*. In an interesting recipe in *Kan ch'i shih-liu chuan chin tan* 感氣十六轉金丹 (Sixteen-fold cyclically transformed gold elixir made by the “responding to *ch'i* [= pneuma]” process; *Tao tsang*, vol. 591), a Sung text belonging to a much later tradition, “Empyrean-Roaming Elixir” is identified as that fraction of the Great Elixir which collects on the sides of the closed reaction vessel (pp. 1a–9a).

One is tempted, particularly in view of the specification of color, to put this elixir at the head of the next group rather than leave it in isolation, but there is no independent evidence to justify the change. It is, however, not without interest that *Shih yao erh ya*, List A, also includes a “Purple Oil 紫油 Elixir of Realgar”; in the original Chinese the terms for “Empyrean-Roaming” and “Purple Oil” are homonyms.

*Tan Ching Yao Chueh: Annotated Translation*

- [J2]. Scarlet Snow and Flowing Pearl Elixir <sup>20</sup>
- [J3]. Red Luminosity Elixir <sup>21</sup>
- [J4]. Scarlet Brilliance Elixir
- [J5]. Double Radiance Elixir
- [J6]. Mingled Red and Purple Elixir
- [K1]. Calomel Elixir
- [K2]. Beaming Moonlight Elixir
- [K3]. White Sublimate of Quicksilver Elixir

Although the minor elixir processes listed above are mentioned and used from time to time, their variant names are by no means known to all. I have therefore included them.

Next are presented thirteen variant names of great elixirs by the use of which one leaves the world as an immortal.<sup>22</sup>

- [1]. Nine Caldron Elixir of the Yellow Emperor <sup>23</sup>

3A

<sup>20</sup> Note that this is not considered by Sun to be the same as “Flowing Pearl Elixir,” a recipe for which is also found below. *Shih yao erh ya* identifies “Scarlet Flowing Pearl Elixir” with “Grand Unity Single-Ingredient Elixir of Realgar,” while *Shih pi chi* identifies “Scarlet Flowing Elixir” with “Grand Unity Elixir of Realgar.” There are three formulas for “Scarlet Flowing Elixir” in *Shih pi chi*; the first is very similar to Sun’s below. The formula for “Grand Unity Elixir of Realgar” is simpler (no salt is admixed before sublimation) but again the “active” ingredient is realgar alone.

The usual alchemical meaning of the esoteric term “flowing pearl” as not realgar but mercury goes back to the earliest extant alchemical book, the *Chou i ts’an t’ung ch’i* 周易參同契 (see pp. 37–40 above; *Ssu pu pei yao* 四部備要 ed., p. 10b and *passim*).

<sup>21</sup> *Shih pi chi* identifies this elixir with “Grand Unity Elixir of Realgar” in one place and with “Flowing Pearl Elixir” in another. Apparently the compiler considered *one* of the two elixirs of this name to be identical with “Scarlet Flowing Elixir.”

<sup>22</sup> To reconstruct the original groups of synonyms has proved impossible. Although in classical Chinese it is often difficult to know whether a noun is used in the singular or plural sense, the author has taken pains to indicate by his syntax that these are not simply synonyms of a single elixir.

<sup>23</sup> A “caldron” is a closed reaction vessel, originally three-legged. A number of elixirs with similar names are found in alchemical literature. The popularity of this genre, without doubt, springs from the famous passage in *Pao p’u tzu nei p’ien* (4:5a–7a), in which Ko Hung describes the powers

## Chinese Alchemy: Preliminary Studies

- [2]. Nine Cycle Elixir
- [3]. Great Cyclically Transformed Elixir <sup>24</sup>
- [4]. Minor Cyclically Transformed Elixir <sup>25</sup>
- [5]. Ninefold Completion Elixir
- [6]. Immortal Child Elixir
- [7]. Ninefold Metamorphosis Elixir
- [8]. Roseate Cloud Elixir of the Grand Immortal

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and preparation of the nine elixirs which were the subject of the *Huang-ti chiu ting shen tan ching* 黃帝九鼎神丹經 (Canon of the Wondrous Nine-Caldron Elixir[s] of the Yellow Emperor). It is quite clear from the text that these are nine separate preparations. In *Hsuan pien Yuan chün pien chin hu ch'ien hung tsao ting ju chin pi chen chou hou fang* 玄辨元君辨金虎鉛汞造鼎入金秘真肘後方, an alchemical treatise, apparently of the T'ang, which is equally interesting from the viewpoints of theory and practice, we find a statement which implies, as does the present listing, that "nine caldrons" meant nine stages in the preparation of a single elixir: "The formula says 'The nine cyclical transformations take 270 days. Every month the caldron is changed, until nine caldrons have been used. If [the vessel] is so changed, the product is most excellent; it is also feasible for it not to be changed'" (in *Yun chi ch'i ch'ien* 雲笈七籤, *Tao tsang*, vols. 677-702, 63:7a).

<sup>24</sup> *Pao p'u tzu nei p'ien*, 4:9a-9b, has this to say on the subject of "Cyclically Transformed Elixir," by which he meant a particular preparation: "If the elixir which has been cycled nine times is put into a Wondrous Caldron [that is, a closed reaction vessel] and, after the summer solstice, is exposed to the sun until the caldron is hot, and one *chin* of cinnabar [朱兒] put [inside] under the lid, and it is watched until the seminal essence of the sun strikes it, in a moment it will rise up suddenly, dazzling the eye with a wondrous multicolored light, transformed into Cyclically Transformed Elixir."

In what I have described in Chapter II as the theoretical tradition, this term "*huan tan* 還丹," rendered herein as "cyclically transformed elixir," is often used in the more literal sense "returned cinnabar." The original meaning of "*tan*" is cinnabar, but it was extended to mean elixir in general. For instance, the Sung commentary to *Pao p'u tzu shen-hsien chin cho ching* 抱朴子神仙金鈞經 (*P'ing chin kuan ts'ung-shu* ed., A:3b), a short recipe ascribed to Ko Hung but almost certainly later, says: "Quick-silver is originally cinnabar [*tan*], which is roasted to make quicksilver. In this case quicksilver is roasted and becomes returned cinnabar [*huan tan*]; the cinnabar returns to its original substance. That is why it is called 'returned cinnabar.'"

<sup>25</sup> In view of the author's remarks at the end of this list, it is odd that he provides two formulas for this elixir below.

*Tan Ching Yao Chueh: Annotated Translation*

- [9]. Grand Concord Dragon Womb Elixir
- [10]. Supernatural Flight Elixir of Grandee Chang <sup>26</sup>
- [11]. Elixir of Ascension as an Immortal
- [12]. Divine Dragon Elixir
- [13]. Elixir of Ma the Immortal's Ascension to Heaven in Broad Daylight <sup>27</sup>

The great elixirs listed above are not to be known at large. Although I record their names in this list, all in all they are not expeditiously come upon. Therefore the methods of their preparation are not appended. Amateurs have only a rough idea of them.<sup>28</sup>

Next are presented the names of twenty elixirs not employed by the uninitiated

<sup>26</sup> In the corresponding entry in *Shih yao erh ya* the gentleman is identified rather as Chang Chen-jen, Chang the Realized Immortal. Unfortunately, neither appellation suffices to identify him. One candidate is Chang Tzu-ho 張子和, whose elixir recipes are given in *Pao p'u tzu nei p'ien* (4:13a) and in the present work.

The title "grandee" by no means implies participation in the Imperial civil service. The *Chen kao* 真誥 (Annunciations of the Immortals), one of the classics of Taoist hagiography, says of adepts: "Those who comprehend the great mysteries become Chief-Minister-Immortal 仙卿; those who take liquid gold and elixirs become Grandees 大夫; those who eat the divers *Fomes fungi* [? 芝] become Inspectors-General 御使; those who obtain the Supreme Pole Hidden Fungus and ingest it become Dukes-Immortal of the Left." The extant text (*Tao tsang*, vols. 637-640), 5:15a-15b, reads "Dukes-Immortal of the Left and Right and Realized Immortals," but the author points out earlier that *all* of the higher offices in the hierarchy of Mount K'un-lun are occupied by Realized Immortals. I therefore follow the variant in *T'ai-p'ing yü-lan*, 670:1a.

The *Chen kao* is usually ascribed to the great Taoist alchemist T'ao Hung-ching 陶弘景 (451-536), but internal evidence indicates that he is responsible only for *ch.* 19 and 20 and for the annotations to *ch.* 1-18. Ch'en Kuo-fu 陳國符 believes that the book was written by Yang Hsu 楊許 in 363/365; see *Tao tsang yuan-liu k'ao* 道藏源流考 (Researches in the history of the Taoist patrologies, 1949; revised and enlarged ed., 2 vols., Peking: Chung Hwa Book Co., 1963), pp. 233-235.

<sup>27</sup> *Shih yao erh ya* identifies him with Ma Ming-sheng (see above, p. 58).

<sup>28</sup> I would suggest, purely in terms of the sense of the passage, that "宜" is a better reading than "但." This last sentence would then read "Amateurs would do well to have a rough idea of them."



## Chinese Alchemy: Preliminary Studies

3B

- [1]. Eightfold Luminosity Elixir
- [2]. Golden Flower Elixir
- [3]. Jade-Ingredient Calamity-Allaying Elixir <sup>29</sup>
- [4]. Wondrous Brightness Fragrance-Disseminating Elixir
- [5]. Congealed Frost and Deep Snow Elixir
- [6]. Elixir of Meteors' Halting at the Moon
- [7]. Elixir of Fright at the Falling of the Moon
- [8]. Liquid Gold and Jade Flower Elixir
- [9]. White Snow Elixir of Master Mao <sup>30</sup>
- [10]. White Cloud and Scarlet Snow Elixir <sup>31</sup>
- [11]. Pink-and-Crimson *Ch'ui-pi* Elixir <sup>32</sup>
- [12]. Seven Stars Evil-Averting Elixir <sup>33</sup>

<sup>29</sup> *Shih yao erh ya* gives "*San-mei* 三昧 *hsiao tsai tan*"; the first two characters are the customary Chinese transliteration of *samādhi*, the Buddhist term for the state in which the meditator is united with the object of meditation. These two characters are so similar in form to "*yü wei* 玉味" that one phrase is certainly a corruption of the other. Either possibility is likely enough that it would be pointless to speculate, in the absence of ancillary evidence, about which is the correct form.

<sup>30</sup> This is quite possibly Mao Ying 茅盈, the only one of the early immortals with that surname who was connected with alchemy. In his extensive biography in *Yun chi ch'i ch'ien*, ch. 104, the stories of his major activities take place in the last half-century B.C.

<sup>31</sup> I follow *Shih yao erh ya* in emending the first "雪" to "雲," thus reducing this title to the usual parallel form.

<sup>32</sup> The *Ch'ui pi* (the *pi* stone from Ch'ui-tsoo 垂棘之璧) was a priceless stone from Mount Ching 荆 in present Hupei province, and was first heard of in 658 B.C. In the third century B.C. it was carved into the Seal of Transmission of the Empire at the order of the First Emperor of the Ch'in. It passed from one dynasty to another until it was lost in the tenth century. For a colligation of relevant documents, and speculations as to the mineral identity of this "jade," see Chang Hung-chao 章鴻釗, *Shih ya* 石雅 (Lapidarium sinicum; 2d ed., Peking: The Geological Survey of China, 1927), pp. 134-143.

One is tempted to accept the *Shih yao erh ya* reading, "Crimson Tumulus *Ch'ui pi* Elixir," because of a statement in *T'ai shang pa ching ssu jui tzu chiang wu chu chiang sheng shen tan fang* 太上八景四藥紫漿五珠降生神丹方, a complex elixir formula of the tenth century or earlier (in *Yun chi ch'i ch'ien*, 68:2a), to the effect that "Crimson Tumulus Vermilion Boy 絳陵朱兒" is an esoteric term for cinnabar.

<sup>33</sup> The "Seven Stars" may denote either the Great Dipper or the twenty-fourth of the twenty-eight lunar mansions, the determinative star of which

*Tan Ching Yao Chueh: Annotated Translation*

- [13]. Seven Luminary Supernatural Realization Elixir
- [14]. Flowing Roseate and Fresh Turquoise Elixir <sup>34</sup>
- [15]. Radiance-Containing Brilliance-Emitting Elixir
- [16]. Grand Purity Multicolored Elixir
- [17]. Dark Pearl Elixir of the Emperor of the North <sup>35</sup>

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is  $\alpha$  Hydrae. Because of its Taoist associations, the former is more likely meant here.

<sup>34</sup> Accepting the reading in *Shih yao erh ya*, List C, I translate "Flowing Roseate" rather than "Flowing Stone." The latter term does appear occasionally in esoteric Taoism to describe conditions in the world-age when the deity T'ien-i 天乙 ruled, but the former term is a common element in elixir titles (for example, *ibid.*, List B, and *Shih pi chi*, A:11a), and has relevant connotations as early as the Han dynasty. In the famous polemical work *Lun Heng* 論衡 (A.D. 82/83), Wang Ch'ung 王充 refutes the story of Hsiang Man-tu 項曼都, who claimed that a group of immortals escorted him into the sky, stopping "a couple of miles from the moon . . . Whenever I was hungry and wished to eat, the immortals gave me a cup of 'flowing roseate cloud' to drink. Each time I drank a cup, I was not hungry for several months." See Liu P'an-sui 劉盼遂 (ed.), *Lun heng chi chieh* 集解 (Peking: Ku-chi ch'u-pan she, 1957), p. 150; cf. Alfred Forke, *Lun-Hêng* (2 vols., reprint, New York: Paragon Book Gallery, 1962), I, 340.

<sup>35</sup> In the Great Pharmacopoeia (*Pen-ts'ao kang mu* 本草綱目, first printed 1596; *Wan yu wen k'u* 萬有文庫 ed.), 11:54, Li Shih-chen says that niter is called "Dark Pearls of the Emperor of the North 北帝玄珠" in the *Lien fen t'u* 鍊粉圖 (Pictorial exposition of the preparation of powders by heat treatment) of Hu Kang-tzu 狐剛子. Hu Kang-tzu is a wholly legendary character, some of whose "works" are ascribed to Ko Hsien-kung 葛仙公, uncle of Ko Hung, and to Chang Ling 張陵, founder of popular cult Taoism. The treatise is first listed as *Fen t'u* in the bibliography of Cheng Ch'iao's 鄭樵 *T'ung chih lueh* 通志畧 (Treatises from the General history, ca. 1150; Basic Sinological Series ed.), XIX, 138. This may or may not make it a late production. The earliest extant source of the identification with niter is *T'ai shang pa ching*, p. 2a.

There is what seems to be a trace of an earlier stage of this identification in a statement attributed to the pharmacologist Lei Hsiao 雷斅 (fifth century), but more probably of the T'ang period, quoted in the Pharmacopoeia of 1249 (*Ch'ung hsiu Cheng-ho ching shih cheng lei pei yung pen-ts'ao* 重修政和經史證類備用本草, 12 vols.; People's Hygiene Press, 1957), 3:16b-17a, but not in the Great Pharmacopoeia. In his directions for "fixing" niter, pseudo-Lei specifies that it be mixed with two herbs and formed into pellets, "the size of 'small Emperor's pearls' 如小帝珠子." The pills are then thrown into a red-hot vessel and left there until they disintegrate.

## Chinese Alchemy: Preliminary Studies

- [18]. Elixir of [Securing] Response from the Supernatural and Descent of the Realized Immortals
- [19]. Elixir of Ascension to the Clouds by the Assembled Demons
- [20]. Seminal Essence Elixir of Venus

According to their formulas, taking the above elixirs results in immortality. Because the components are difficult to gather, and the preparation difficult, only their names are listed; the methods of preparation will not be given. Amateurs may well be more widely versed in this terminology.

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### METHOD OF MAKING SIX-ONE LUTE

4A The six-one [lute] is uniquely important in the sublimation of metallic substances and the cyclical transformation of minerals.<sup>36</sup> Since distant antiquity the sages of the Melting and Refining Art have been unanimous in keeping this matter obscure. The greater number of those who have handed down formulas use arsenolite 礬石 [As<sub>2</sub>O<sub>3</sub>], red bole 赤石脂 [a red siliceous clay], shell of left-oriented oyster 左顧牡蠣, kalinite 礬石 [KAl(SO<sub>4</sub>)<sub>2</sub>·12H<sub>2</sub>O], talc 滑石 [3MgO·2SiO<sub>2</sub>·2H<sub>2</sub>O], Turkestan salt 戎鹽 [impure NaCl], lake salt 滷鹼 [Na<sub>2</sub>CO<sub>3</sub>·NaHCO<sub>3</sub>·2H<sub>2</sub>O], and so forth; and there were those who foolishly employed earthworm excreta 蚯蚓糞. The ancients have also set down, each in a different way, the processes by which these materials are prepared. As a rule one cannot bring about a result of high quality.

There is not a famous formula or essential technique, from antiquity on, which I have not tried. Of these, there is none

<sup>36</sup> This section should be compared with the recipe for this lute, which is used to seal reaction vessels, in Sun Ssu-mo's *Ch'ien chin fang* 千金方 (Prescriptions worth a thousand); see Appendix D for a translation, and pp. 66-67 above for my comments on the divergencies.

## *Tan Ching Yao Chueh: Annotated Translation*

the principles of which I have failed to fully comprehend, and of which sense could not be made.<sup>37</sup> Often, because of this, I was greatly stirred; I would sigh without ceasing and remind myself that the ancients had concealed these techniques, deceiving later students.

I further note: the old formulas agree that kalinite heated overnight with yellow clay will form a fine powder. I therefore heated it as the formula indicated, but after two or three days I was unable to detect any change. It was only because I was at leisure that I then followed an old recipe and treated the kalinite in the fire for ten days or so. Upon light pressure from my fingers it crumbled to a soft powder, lustrous and lovely 可愛, smooth and extraordinary. I further took new kalinite and heated it for more than twenty days before it became quite dry. [Various specimens of] a mineral are by no means all the same. Then I began to realize that in these processes carelessness is impermissible. Making the trial lightly, failing to follow the ancient formulas, leads to failure; everywhere one finds such cases.

4B

Furthermore, there are diverse types of kalinite, varying according to place of origin. Those produced at Ping-chou 并州 and Mount Sung 嵩嶽 are superior; the rest are not suitable for this use.<sup>38</sup>

### *Method of Refining Kalinite*

The vessel for refining kalinite should be made of yellow clay. Its shape is like that of a bamboo tube, its length five or

<sup>37</sup> It is surely ironic that this sentence is corrupt to the point of demanding the same facility of its translator. There are no grounds for a specific emendation, and my version must be regarded as merely a tentative attempt to interpret the characters so that they fit the context. The third and fourth sentences from the end of the next paragraph are also attempts to make sense of a badly mangled portion of the original.

<sup>38</sup> The first is in present central Shansi, the second in Honan. *Pen-ts'ao kang mu*, 11:68, specifies white alum for medical use. The blue variety must have contained copper, since it "turns iron to copper," affecting only the surface.

## Chinese Alchemy: Preliminary Studies

5A

six *ts'un* and its width three or four *ts'un*.<sup>39</sup> Two or three *fen* of kalinite are taken. The top of the vessel is covered by a piece of tile used as a stopper. After the kalinite is placed in the tube, the latter is completely plastered to a thickness of one to two *fen* or so with a lute made of equal parts of fine sand and yellow clay. It is baked to dryness over a warming fire and again plastered over. After plastering it is baked once more. When it is dry and hot it is put into the oven and roasted. So long as one sees that watch is kept until the fire is at the proper level, there will not be one failure in a myriad tries.

*Instructions for constructing the oven for roasting kalinite.*

5B

The oven has a base height of two *ch'ih* and an exterior width of one *ch'ih*. In the lower part a small opening is made in each of the four sides in order to draw in air which will blow up the fire, and to remove accumulated ash from time to time. In the head is further placed an iron pan, of a size to fit the reactant tube and three to four or so *ts'un* high. The iron pan is placed in the oven with the tube on it and heated with charcoal for seven days. Make certain that the flames are not interrupted day or night, and this period will be exactly sufficient; protracted heating is unnecessary. When the time has elapsed, take out the material and grind it to extreme fineness. Take red bole separately, pound it to a coarse powder, sift it, and mix it to the consistency of mud. Form it into a cake one-half *ts'un* thick and four *ts'un* across, and dry it in the sun. It is then placed in the kalinite furnace and heated for one day, then pounded fine, sifted, and ground to extreme fineness. Take separately untreated red bole, pound fine, sift, and mix with equal parts of the already treated substance. The whole is then mixed with two *fen* of kalinite and red bole to a lute of properly thin consistency.<sup>40</sup> Stir it until it is extremely homogeneous, and

<sup>39</sup> Modern equivalents for T'ang measures are given in Appendix B.

<sup>40</sup> "*Fen* 分" is ambiguous; it can be used as a unit of weight or simply to mean "parts." Usually the context makes the sense clear, but in the case of this sentence it is impossible to choose one interpretation or the other with any confidence.

## Tan Ching Yao Chueh: Annotated Translation

use it for plastering two-part reaction vessels to form a tight seal. After one luting the vessel may be taken [off the fire after combustion and cooling] with one hand. Nor should the vessel be examined repeatedly [while in the furnace]. It is impossible for the *ch'i* [= vapors] of the ingredients to escape 永不畏失.<sup>41</sup> I have used this lute many times and I consider it unsurpassably excellent.

*The kalinite.* It is best to take that which comes from Tun-huang 燉煌. It is pounded gently, passed through a sieve woven from the hairs of a horse's tail, and heated in a footed iron vessel 鑪 over a strong flame until it melts, and then until none of the liquid is left. Again pound and sift fine. After the treated red bole is mixed with two parts of the kalinite [mixture as directed in the previous paragraph], to each five *liang* or less of the product may be admixed one *liang* of Turkestan salt and two *liang* of lake salt. There is no harm in omitting these two ingredients.

6A

The sole object of making six-one lute is firmness in sealing. In this case the lute is made with only two ingredients. Even if one or two more are added, it is still a reduction in number; but why bother with more? The name "six-one" is an esoteric usage of the ancients. Six and one are seven. Seven ingredients were used to make the lute and so it was called "six-one." The uninitiated are not discerning; they do not know why it is named "six-one."

### Talc

As to the origin of talc, this mineral originally comes from Tung-lai 東萊 prefecture.<sup>42</sup> These days people do not inquire into provenances. They use the product of K'un-lun<sup>43</sup> 崑崙

<sup>41</sup> At the suggestion of Ho Ping-yü, I have made sense of this passage by emending "先" to the very similar "失."

<sup>42</sup> The text has "Tung-hua" 東華, a copyist's error. Tung-lai, in Shantung province, is a major source of talc.

<sup>43</sup> "K'un-lun" is the name of a mountain in Kwangsi. The term has a number of geographical referents, but identification is certain in this case;

## Chinese Alchemy: Preliminary Studies

to make six-one lute—a case of “going south when one has designs on the north,” and rationally quite inadmissible. There are several types of this mineral, varying in nature. The hard sort has the finest structure. When pounded fine, sifted, and ground to even texture, it is especially suitable for this application.<sup>44</sup>

6B

### *Method of Using Shell of Left-Oriented Oyster*

The point of using the shell of left-oriented oyster is to incorporate its smoothness [into the lute]. I have tried this substance in various ways, using both that which had been refined in the fire and that which had not; in no case did it serve any purpose. I realized, therefore, that this is useless as an ingredient. If there is another superior method of use, it is not known to me.

### *Method of Using Turkestan Salt*

The formulas in my sources 本方 do not precisely state where the salt used comes from. Since that provenance is unknown, even if [all] the places of origin of Turkestan salt be known, one does not know which variety of the material is best for this application. I have seen people who state that they can tell the real thing, but actually there is no way to ascertain who is correct. But how could it be “that produced in the south,” since in the south there is none of this salt?<sup>45</sup> I therefore take the product of Shensi 關中 to be the correct material. I reiterate this idea of mine, but I do not know whether this is indeed the variety others recognize. The matter should be

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only one of them is in an area from which talc was obtained. There is no indication that talc was being imported at this time via either Central Asia or the Malay Peninsula (where two of the more familiar K'un-lun Mountains are located). See also p. 264 below.

<sup>44</sup> I suspect that the character “石” is erroneously duplicated. If this be so, the translation should read: “The hard sort, when pounded fine, sifted, and ground to even texture, is especially suitable for this application.”

<sup>45</sup> These two sentences are obscure in the original. Turkestan salt was always rare in the alchemical period, but this is the only indication I have seen that a substitute produced in the south was ever recommended.

looked into further before using Turkestan salt. "Capability may lie in high station, but those who wield nothing but power do rather well."<sup>46</sup> This is for the information of the virtuosi.

*Method of Using Lake Salt*

7A

This material originally comes from the terrace ponds which are found in the northeast corner of T'ung-chou 同州 [Shansi], seven or eight *li* [two to three miles] from the prefectural capital. Its form is similar to that of the fine-grained salt of Ho-chung 河中 [Shansi, about twenty miles east of T'ung-chou]. Its taste is bitter without being salty. My sources do not mention, in this case either, the origin of the material to be used. Because people use the material taken from flatland ponds in places where there is a salty *ch'i* [= aroma] 鹹炁, they judge the mineral of white, delicate color to be the correct one. Now, rationally deducing the basis of this, it is seen to be completely wrong. The latter material is without efficacy. I particularly wish to put this on record here.<sup>47</sup> If the product of T'ung-chou is used as a constituent, the six-one lute will prove to be extremely fine in texture, cohesive and excellent. If, however, in the present case kalinite, red bole, and arsenolite are used carefully in accordance with the formula set out, this ingredient is unnecessary. Let the virtuosi hesitate no longer.

The sources also say to use earthworm excreta to make the lute. I have used it, and do not find it different from ordinary earth. In point of principle it is not at all suitable.

Generally, as to the ingredients discussed in connection with six-one lute, those who use them have no way of being expert on these complexities. Although occasionally one finds a connoisseur, he turns out to be unversed in practical methods.

7B

<sup>46</sup> The point of what seems to be a proverb here is that, though use of the Shensi material is not sanctioned by classical precedent (which is true), it is available and quite satisfactory.

<sup>47</sup> Chao T'ai 趙泰, of the Department of Chinese Studies, University of Singapore, has offered a possible solution to a nasty textual problem by suggesting that "為" is an error for "記" or a character of similar meaning.



## Chinese Alchemy: Preliminary Studies

Those who search for the wonderful principles of stove and fire are not likely to discover them all. Although the six-one lute disposed 條件 in this work is of few ingredients, it is most excellent in use. One may frankly call it a “magical glue for the sealing [of reaction vessels],”<sup>48</sup> worthy of place among the finest. Why insist on “six-and-one” ingredients?

That mixing and heating according to the old formulas seldom leads to success is simply because the ancients, fearing that their writings would be too involved, could not record everything. This being so, the operator has not a single formula he can cleave to. How can one who does not have a deep understanding of the whole process be clear as to where the ingredients should come from?

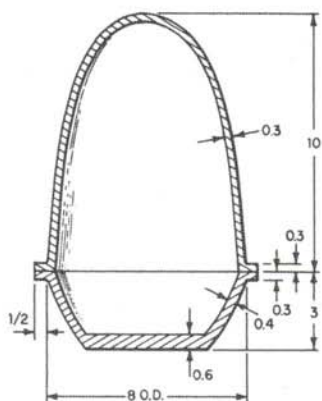
### *Directions for Making the Two-Part Reaction Vessel*<sup>49</sup>

8A The lower vessel is cast of iron, three *ts'un* deep with an outer diameter of eight *ts'un*. It is six *fen* thick at the bottom and four *fen* thick at the sides. The lip, one-half *ts'un* wide and three *fen* thick, should be made even and solid; do not allow undulations in the surface.

The upper vessel should be made one *ch'ih* tall, eight *ts'un* wide outside, and three *fen* or so thick, except that for subliming realgar the upper vessel should be five *ts'un* or more high (there is no fixed rule). The rim of the lower vessel should be made of the same circumference as that of the upper. All those who desire to try the Refining Art should make their reaction ves-

<sup>48</sup> I am inclined to think that this panegyric can be taken at face value, although there are indications that “*shen chiao* 神膠,” which I have rendered as “magical glue,” is a technical term. See the undated alchemical treatise *Lung hu huan tan chueh* 龍虎還丹訣 (*Tao tsang*, vol. 590), A:1b, where it is defined to mean “quicksilver.” That meaning is, of course, inapplicable here.

<sup>49</sup> For a general discussion of reaction vessels see Ho Ping-yü and Joseph Needham, “The Laboratory Equipment of the Early Medieval Chinese Alchemists,” *Ambix*, 7 (1959):69–71. They translate “*yao-fu* 藥釜” as “closed reaction-vessels.” Their description and conjectural diagram are based on *Shih pi chi*. The measurements given are closely similar, except that the general thickness is greater and the lip narrower in Sun’s vessel.



Conjectural reconstruction of Sun Ssu-mo's two-part reaction vessel. Compare the diagram cited in note 49.

sels on this pattern. On the whole, there is no configuration which surpasses this plan. If only two-part vessels of this type be treated with care, there is no possibility of breakage.

For over twenty years I have loved the Taoist arts. I have successively tried the many methods, experienced 經涉 them all. Indeed, there was nothing I was unwilling to try, but there was no way to success. My resources were exhausted, and I was unable to avoid hardship and poverty. Only through the use of this two-part reaction vessel have I been freed of my straits.

The two-part reaction vessel must be plastered with six-one lute. The lute is to be mixed to a properly thin consistency. Smear it all over [the two sections], using a coir brush, and dry the vessel in the sun. After the vessel is dry, cover it with lute and dry it in the sun as before. The process is repeated for a total of three or four times, so that the lute is three *fen* or more thick. It will never break. One or two layers over the upper vessel is good enough, or it need not be plastered at all.<sup>50</sup> This luting of the two-part reaction vessel with six-one lute is quite durable; what need is there to [further] plaster the vessel with

8B

<sup>50</sup> The point is that the lip where the vessels join must be tightly sealed by the mortar. A layer of lute over the upper vessel is often specified, apparently in order to increase retention of heat.

## Chinese Alchemy: Preliminary Studies

earth? Admixture of sugar is the old method,<sup>51</sup> but it has no practical effect. What if it be old? Not knowing something is a situation in which there is no distinction between modern and ancient times. That the ancients were worthy is quite true, but they were not rigorous in this matter, and in most cases were unable to understand its principles.<sup>52</sup>

### *Method of Making the Furnace*

The door is six *ts'un* high and five *ts'un* broad. The furnace should be made of iron. The chimney should open downward, not upward. Its opening may be three and a half *ts'un* or so high and two and a half *ts'un* broad. If it were to open upward the fire would be smothered and weak; thus a downward opening is superior.

9A

### *Method of Luting the Two-Part Reaction Vessel with Six-One Lute*

For the above,<sup>53</sup> the lute previously mixed should be kept. Use a small iron spoon to plaster it on to an even thickness of three *fen* or more. Then fit the upper vessel to the lower. Press the parts together lightly, avoiding excessive pressure. Then plaster around with six-one lute, completely luting the joint. When it has dried, start heating with a gentle flame and with great care allow it to increase gradually until the lute is [bone] dry. If cracks have developed, again take six-one lute on the iron spoon and plaster it all around. There will be no necessity for further attention to the seal throughout the alchemical process. This method is simple and, moreover, essential.

<sup>51</sup> Sugar mixed with mortar makes a cement of extreme hardness and durability. This trade secret of traditional Chinese statuary practice is still used, for instance by the Taiwanese sculptor Yang Ying-feng 楊英風.

<sup>52</sup> This must rank, for its time, as a skeptical statement of the first order.

<sup>53</sup> The word “*yu* 右,” meaning “[for] the above,” appears at the beginning of many of the formulas which follow. I have translated it here to demonstrate that, while the word reads perfectly well in classical Chinese, its English equivalent is singularly graceless. “*Yu*” is left untranslated where it occurs further on.

FORMULA FOR GRAND UNITY  
JADE POWDER ELIXIR

|             |    |          |                                      |
|-------------|----|----------|--------------------------------------|
| Cinnabar    | 朱砂 | 1 chin   | HgS                                  |
| Realgar     | 雄黃 | 1 chin   | As <sub>2</sub> S <sub>2</sub>       |
| Jade powder | 玉粉 | 10 liang | NaAl(SiO <sub>3</sub> ) <sub>2</sub> |

The jade powder is extremely hard and difficult to pound fine, but if it is pounded in a cast-iron mortar and sifted through loosely woven pongee, and this process repeated, it will be suitable for use.

9B

Powdered magnetite 磁石粉 10 liang Fe<sub>3</sub>O<sub>4</sub>

It is extremely hard in nature. It should be given the same treatment as the jade powder, then put into water.<sup>54</sup> The finest portion is taken for use. It may be sifted instead.

|                    |     |          |                                        |
|--------------------|-----|----------|----------------------------------------|
| Amethyst           | 紫石英 | 5 liang  | SiO <sub>2</sub> ; Mn, Fe impurities   |
| Quartz             | 白石英 | 5 liang  | SiO <sub>2</sub>                       |
| Silver powder      | 銀粉  | 5 liang  | Ag                                     |
| Malachite, nodular | 空青  | 10 liang | CuCO <sub>3</sub> ·Cu(OH) <sub>2</sub> |
| Calomel            | 流貝雪 | 1 chin   | HgCl                                   |

(Use the sublimate prepared from [quick-] silver.)

Pound into a thin layer and mix with salt from Ho-tung [Shansi]. Pound the combination, grind it fine, and sift it through pongee. Add salt to that which does not go through the sieve, grind, and sift as before, repeating as necessary until the whole batch has passed through the sieve. Then mix the powdered ingredients, moisten them slightly with concentrated vinegar, and mix. Dry in the sun, and repeat the process for a total of ten times or more. Before placing the mixture in the reaction vessel, arrange therein a bed of white salt. Then place

<sup>54</sup> That is, it is fractionally separated by flotation, a process common in Chinese alchemy and usually denoted by the term "shui fei 水飛."

## Chinese Alchemy: Preliminary Studies

10A

the ingredients inside and cover them with white salt. Fit together the two parts of the vessel and seal tightly with six-one lute. Heat over a gentle and then a strong flame for nine days and nights, and allow the vessel to cool for one day and one night. Open it and examine the product, which will be suffused with brightness and will resemble cool frost or virgin snow, or will be of the shape of stalactites or tassels of grain. Every color will be there; no simile is adequate to it.

Take the product again and mix three times with vinegar as before. Place it in the vessel with a bed and cover of powdered white salt according to the previous method. The rest of the process is exactly the same, for a total of four or five cyclical transformations. After the product is [further] treated in the fire according to the formula for Golden Petal Elixir,<sup>55</sup> it is taken orally.

Its efficacy is not comparable to that of Golden Petal Elixir, but both medicines are capable of extending life and curing diseases. I have given [*or* There are] formulas for other elixirs which dispel toxicity, but they are abstruse and difficult to decipher. How can one who lacks a wondrous familiarity with the elixir formulary attain precipitate understanding? But there is not an iota of mystification in this formula I have set out. It is my hope that gentlemen who give it their cultivated favor will not entertain doubts at this point.

10B

<sup>55</sup> A recipe for "Golden Petal Elixir" appears in *Shih pi chi*, C:14b-15b. The treatment after sublimation is as follows: "Next place 'heavy salt' 重鹽 in boiling water. The salt dissolves to a metallic color like that of copper. Let the amount of solution diminish considerably by boiling. When you wish to make use of the elixir, take the salt [the text is not clear as to whether the recrystallized salt or the concentrated solution is used], mix, and heat for half a day. When you take it out it will still be red. Cyclically transform it as before for seven cycles. Take it out hot and it may be used."

"Heavy salt" is made from a dark brine of high specific gravity taken from the deepest salt wells. See Lien-che Tu Fang (trans.), "An Account of the Salt Industry at Tzu-liu-ching. *Tzu-liu-ching chi* by Li Jung," *Isis*, 39 (1948):230-231.

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FORMULA FOR GRAND UNITY  
THREE ENVOYS ELIXIR

|                   |     |                        |      |
|-------------------|-----|------------------------|------|
| Calomel           | 水銀霜 | 1 chin                 | HgCl |
| Cinnabar          |     | 10 liang <sup>56</sup> |      |
| Amorphous sulphur | 石亭脂 | 10 liang               | S    |
| Realgar           |     | 10 liang               |      |

The last three ingredients are pounded separately, then mixed and placed in the reaction vessel, the method being in no way different from that of the previous formula. Then spread the calomel over all the other ingredients. Cover with silk cloth. Fit together the upper and lower sections of the reaction vessel, lute, and sublime the ingredients.

If subcutaneous fat from the back of a pig is used, it should be the lard from the region near the backbone of a sow.<sup>57</sup>

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FORMULA FOR MAKING EMPYREAN-  
ROAMING ELIXIR

Cinnabar

Realgar

Malachite, laminar 曾青  $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$

Amorphous sulphur

5 liang of each. Pound and grind separately.

Quicksilver 水銀 10 liang Hg

Grind separately [sic].

11A

<sup>56</sup> The *Ch'ing chen kuan* edition reads "chin" instead of "liang," but this does not fit the scale of the reaction.

<sup>57</sup> According to *Pao p'u tzu nei p'ien* (11:9b), as quoted in the Pharmacopoeia of 1249 (4:5a) and the Great Pharmacopoeia (9:66), realgar may be prepared for ingestion by steaming it with lard. The term which appears in the modern texts of *Pao p'u tzu* is not the one used here, but "元胴腸"; this is an esoteric name if not a corruption. Sun's term, "猪負革脂," appears in *Pao p'u tzu nei p'ien*, 4:18a, where the lard is melted and used with vinegar as a dip to soften gold so that it may be eaten. See also 4:15b.

## Chinese Alchemy: Preliminary Studies

Chalcanthite      石膽    3 *liang*       $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Pound and sieve separately.

Quartz

Heat separately to a boil until no further change takes place. Take 3 *liang*.

[Note in text:] I fear that this particular ingredient is erroneous. White alum is generally used here. Quartz does not boil.

Actinolite      陽起石    3 *liang*       $\text{Ca}(\text{Mg},\text{Fe})_3(\text{SiO}_3)_4$   
or similar

Pound separately.

Chalcanthite      6 *liang*

Pound separately and sift. Take that which comes from Mount T'ai 東嶽 for this application.

Kalinite      5 *liang*

Take the untreated 直爾 substance, sift it, and use it raw [rather than roasted].

Mirabilite      朴消    6 *liang*       $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ ,  
crude

Grind and sift separately.

Magnetite      3 *liang*

Pound and sift separately.

Further, three *liang* of the mirabilite is mixed with the other ingredients, and the other three *liang* used to cover them; in other respects the process is as before [that is, as in the formula for Grand Unity Jade Powder Elixir]. Treat as previously, and mix with vinegar ten or more times in the way specified. Arrangement in the combustion chamber, the number of days' heating, and the number of cyclical transformations are precisely as before.

After refining the ingredients to the essential state by sublimation according to the above procedure, two or three further cyclical transformations are necessary before the product is suitable for use. I have seen with my own eyes elixirs which

*Tan Ching Yao Chueh: Annotated Translation*

were ineffective—the only result of taking them would be poisoning—because the number of cyclical transformations was few. In products which have been refined by sublimation, but without *repeated* cyclical transformations, in this motley of minerals which has never become an elixir, the *ch'i* 氣 [= pneuma] permeates the ingredients, and what can we expect but toxicity?

11B

When the sages developed these processes, their motive was to save the distressed and afflicted, but the vulgar and stupid of the world are stirred instead by fame and profit. On the one hand, they are not acquainted with the principles of the ingredients; on the other, they have not studied the books of formulas. If they chance upon a superficial formula or hear tattle of some nostrum, they become rash and obstinate and claim that there is no formula to compare with theirs. Then there are those ignoramuses whose senses have never broadened and who are bound by ills of the flesh. How can they concert their forces? They never attain their goal. And there are those creatures of fashion 偃仰風神 whose object is material gain. In order to spare them embarrassment, I prefer not to discourse upon them here.<sup>58</sup> But matters relating to human life are not to be taken lightly. Although mineral potpourris can be taken orally, this is really not a practice to be continued over long periods. I request adepts<sup>59</sup> to give my argument their careful consideration. If I have in whatever small way lost sight of the principles, it will be my good fortune to be set right.

12A

<sup>58</sup> It may be that the mote in Sun's eye is a remnant of the romantic neo-Taoist dilettantism (*feng-liu* 風流) of the early fourth century.

<sup>59</sup> The phrase *yu tao chün-tzu* 有道君子, literally "gentlemen who possess the Way," has a wide range of conventional denotation. In a more Confucian context it might simply mean "a man of wide learning and mature judgment," and this is certainly also implied in its more specifically Taoist use here. As conventionally used in the innumerable "biographies" of immortals, this and synonymous terms indicate one whose motives for seeking occult knowledge are irreproachable, who has been initiated into the arcana by an immortal or by a master in a recognized tradition, and who has attained a high level of learning and skill.



## Chinese Alchemy: Preliminary Studies

### FORMULA FOR MAKING MINOR CYCLICALLY TRANSFORMED ELIXIR

|                                                                                                                                                                                         |     |                |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------|-----|
| Mercury                                                                                                                                                                                 |     | 1 <i>chin</i>  |     |
| Sulphur                                                                                                                                                                                 | 石硫黃 | 4 <i>liang</i> | S   |
| Treat by sublimation so that it is the color of vermilion 朱, as in the formula for Great [Cyclically Transformed] Elixir. When its toxicity has all come out, grind to a powdery state. |     |                |     |
| Pure cinnabar                                                                                                                                                                           | 光明砂 | 3 <i>liang</i> | HgS |
| Pound and grind separately.                                                                                                                                                             |     |                |     |
| Powdered rhinoceros horn                                                                                                                                                                | 犀角末 | 4 <i>liang</i> |     |
| Pound and grind separately.                                                                                                                                                             |     |                |     |
| Musk                                                                                                                                                                                    | 麝香  | 2 <i>liang</i> |     |
| Grind separately.                                                                                                                                                                       |     |                |     |

The five ingredients above are stirred together to even consistency, and are mixed with the flesh of jujubes<sup>60</sup> to form pills the size of large hempseeds or slightly larger.<sup>61</sup> Take one pill

<sup>60</sup> A recipe for jujube-pulp paste 棗膏 to be used as a vehicle for ingestion of elixirs is given in a formulary of the pragmatic tradition, *T'ai ch'ing chin yeh shen tan ching* 太清金液神丹經 (*Yun chi ch'i ch'ien*, 65:16b; see also *Tao tsang*, vol. 582): "For one full course of treatment [with an elixir] use thirty *sheng* of fire-dried jujubes and sixty *sheng* of water. Simmer until the jujubes are cooked up. Then add thirty *sheng* more of water and boil; in all ninety *sheng* of water will have been used. [Strain and] press out the solids, allowing the liquid to settle until it is clear, so that there are thirty *sheng* [of juice]. Pour sixty *sheng* of cart-goat marrow [? 駕羊髓] into the juice, simmering over a low flame until the mixture resembles taffy. If there is no cart-goat marrow to be had, cart-goat tallow 膏 will do."

Henri Maspero has suggested that the part of *T'ai ch'ing chin yeh shen tan ching* in which this passage occurs may well date from the early fifth century; see his "Une Texte Taoïste sur l'Orient Romain," in *Etudes historiques (Mélanges posthumes sur les religions et l'histoire de la Chine, III)*, Paris: Civilisations du Sud, 1950), pp. 97-98.

<sup>61</sup> This standard of size is in no way fortuitous. See Appendix B, "Apothecaries' Measure' in the T'ang Period."

*Tan Ching Yao Chueh: Annotated Translation*

after eating.<sup>62</sup> It cures nervous palpitations 心忪, symptoms due to unseasonable hot winds 熱風, possession by demonic forces 鬼氣, malevolent epidemic possession 邪症, *ku* poisoning 蠱毒, contagious seasonal illnesses 天行, and intermittent fevers 瘧瘧; it pacifies the mind 鎮心, aids the viscera, and benefits the articulation of the joints.<sup>63</sup> It gets rid of ascites 脹滿, myocarditis 心痛, and heart attacks 中惡; aids the complexion, and sharpens hearing and eyesight. For diseases caused by hot poisonous winds take five hundred pills. For intermittent fevers take one hundred pills. For contagious seasonal illnesses take ten pills with liquid. For *ku* poisoning, as above. For anxiety, twenty pills. No more than two or three pills may be taken after each meal; let the number ingested accumulate to the total given above. The efficacy of this preparation cannot be fully recorded here; I have given only an epitome. The rest is according to the pharmacopoeia.<sup>64</sup>

12B

*Another Method*

|                   |     |                |     |
|-------------------|-----|----------------|-----|
| Amorphous sulphur |     | 4 <i>liang</i> |     |
| Mercury           |     | 1 <i>chin</i>  |     |
| Massicot          | 鉛黃華 | 3 <i>liang</i> | PbO |
| Gold              | 金   | 1 <i>liang</i> | Au  |

Made into leaf.

The mercury, gold, and massicot are forcefully ground fine. Take a large iron vase and grind it clean and shiny. Three *liang*

<sup>62</sup> This is apparently a tonic or restorative dose. Dosages for several of the diseases named in the next sentence are given further on.

<sup>63</sup> Since a new list of diseases conquered and functions improved begins here, it is possible that Sun is referring to a different dosage, mention of which has dropped out of the text. Full conviction on this point is impossible, since it would depend on the untenable premise that Sun's style is characteristically well-organized and free from repetition.

<sup>64</sup> No extant pharmacopoeia written before Sun's time makes reference to this elixir, but when Sun refers to "the Pharmacopoeia" in the formula for "Greater Yang Powder" below, it is obvious that he means the Shen-nung Pharmacopoeia with the annotations of T'ao Hung-ching 陶弘景.

## Chinese Alchemy: Preliminary Studies

13A

of the powdered sulphur is first spread in the bottom of the vase as a bed. Then place the aforementioned three ingredients inside and spread the remaining one *liang* of sulphur on top as a cover. Lastly put the lid of the vase in place. When all this is done, seal the vase tightly with six-one lute. It is heated, first with a gentle and then with a strong flame, for seven days and nights. At the end of that time it is cooled for a half day and opened. The contents will be completely transformed into elixir. It will be of a blazing luminosity, dazzling the eye. For each *liang* of this elixir take half a *ch'ien* each of "cow bezoar" 牛黃 and musk and grind the mixture extremely fine with a jade pestle in a bowl of Hung-chou 洪州 [Kiangsi] earthenware. Use jujube pulp 棗穰 to make pills the size of a kola nut 梧桐子. Every day after eating take three pills wrapped in jujubes. It cures epilepsy 風癲癇, melancholia 失心, possession by goblins 鬼魅魍魎, and so forth. Taken over a long period, it hardens the bones and marrow, aids circulation of the blood, moistens the skin, brings out color in the face, quiets the soul, and puts one in touch with the immortals.

---

### FORMULA FOR MAKING CALOMEL ELIXIR

|             |   |                 |    |
|-------------|---|-----------------|----|
| Mercury     | 汞 | 1 <i>chin</i>   | Hg |
| Resublimed. |   |                 |    |
| Tin         | 錫 | 13 <i>liang</i> | Sn |
| Broken up.  |   |                 |    |

This ratio is calculated on the basis of immediate amalgamation of eight *liang* of mercury with six and a half *liang* of tin.<sup>65</sup> The miscellaneous ingredients follow:

---

Only the preface and a bit more of this work still exist in their original form (see above, note 1), but it is quoted copiously in all important subsequent pharmacopoeias.

<sup>65</sup> That is, the basic ratio is doubled.

*Tan Ching Yao Chueh: Annotated Translation*

White alum from Wu

[Kiangsu] 吳 6 *liang*

Melt in a footed iron vessel and continue heating until the alum boils, and then until it becomes completely dry [= solid], afterwards pounding and sifting it to produce a powder. It is this heat-purified alum which is to be used. In this case, when six *liang* [of crude alum] is treated one obtains five *liang* weight [of pure alum].

Halotrichite 黃礬 4 *liang*  $\text{FeSO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 22\text{H}_2\text{O}$

Powder and heat in a footed iron vessel until the halotrichite resolidifies. Pound and sift again to obtain a powder.

Selenite 太陰玄精 2 *liang* Monoclinic  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

Pound and sift to obtain a powder.

Mirabilite 2 *liang*

Crush by pounding and heat until the water *ch'i* [= vapor] is exhausted; powder.

Stove deposit 伏龍肝 4 *liang* Mostly impure metallic silicates, Al and Fe oxides.

Powder. Take one *liang* and mix it with salt and the other ingredients.<sup>66</sup> Add

Salt 鹽 6 *liang*

Pound and sift to obtain a powder. Heat in a footed iron vessel and take for use when dry.

First treat the tin with heat three times.<sup>67</sup> Melt it once more and pour it into good vinegar to kill the toxicity of the tin. Melt the tin in a footed vessel and pour in the quicksilver, stirring with an iron rod to mix. Spread the product out in a thin layer.

Dig a shallow pit in the ground. Place a sheet of paper in the bottom. Take [the amalgam] and pour it in; do not let it flow onto the earth. That which is left upon the paper is the amalgam

<sup>66</sup> "Other ingredients" includes only the "miscellaneous ingredients" listed above.

<sup>67</sup> According to *Shih pi chi*, A:6a, the preliminary melting allows dross impurities to be skimmed off the top.

## Chinese Alchemy: Preliminary Studies

of mercury and tin.<sup>68</sup> Then wet it by spraying good vinegar over it<sup>69</sup> and cover it immediately.

14A

Next heat the salt to dryness, take two *liang* each of halotrichite, alum, and stove deposit, and mix and pound them all together. Do not allow any to remain in the mortar; pound to a powder. Pass through a loosely woven sieve. Add a little vinegar and mix, but do not allow the mixture to become wet. Take two *liang* of stove deposit and place it in the bottom of a pan as a bed.<sup>70</sup> Press it with an iron spoon to make it even and firm. Next add two *liang* of salt, dried and powdered, and press it with the spoon to make it even and firm. Next the mirabilite is added and spread evenly and firmly with the spoon. Then the [remaining] ingredients are simply spread evenly; they need not be firmly packed. Smooth them a bit with the spoon to make the surface even and neat.

Then cover the pan with the basin and lute to make a tight seal. Apply the fire for three days and two nights, then open the vessel and collect the product. If you fear that the process has not gone to completion, mix the spoiled material and the residues from the footed iron vessel together in a small basin. Take a little vinegar and spray the mixture until it is just moist. Grind it fine. When this is done, put it into the reaction vessel with a spoon and cover it with salt. Lute the reaction vessel tightly according to the method used for the initial sublimation. Afterward apply the fire for two days and one night. Then open the vessel and examine the contents. All of the mercury will have been used up. It remains only to collect the product.

14B

This medicine controls pacification of the mind, repose of the viscera, elimination of malignant miasmatic diseases and diseases due to virulent *ch'i* [= vapors, disease vectors] 昇

<sup>68</sup> I assume, in accepting the reading of the *Ch'ing chen kuan* edition, that the point of this step is purification of the amalgam. The *Tao tsang* text has "is an amalgam of mercury and silver."

<sup>69</sup> Chinese women when ironing clothing still use the technique of blowing a liquid out of the mouth in an even, fine spray of substantial spread.

<sup>70</sup> This pan corresponds to the lower part of a two-part reaction vessel.

## Tan Ching Yao Chueh: Annotated Translation

瘴惡氣, of epidemic possession 瘡忤, and of epilepsy in children and adults 風癲風癇 and similar diseases.

After the medicine has been sublimed for several cyclical transformations, it may be ground to extreme fineness and mixed with jujube pulp to form pills the size of hempseeds. Take four pills a day. If no change in condition is felt, gradually increase the dose to six or seven pills. Take no more than two or three pills in the morning. As a medicine it is slightly cold in nature; one who already suffers from a disease due to cold factors had best not take it. If it is used to treat cadaver vector disease 傳尸, autumnal intermittent fevers 瘧, miasmatic diseases 瘴, leprosy 癘, seasonal fevers 時氣, and all sorts of other illnesses caused by heat factors, the patient is cured as soon as the medicine enters his mouth; it is wonderfully efficacious. If it is put into face cream it may be used to treat lentigo 奸黧.

Selenite comes from the brine pools on the border of Chieh 解 county, Shansi 河東, where it is picked out of the water. Its color and patterning are in every respect like that characteristic of jade; its shape resembles that of tortoise shells. The type which is heavy and very dark is not suitable. The yellow, clear sort is superior.

### Commentary

Two formulas for this elixir are given in *Shih pi chi*.<sup>71</sup> The second is very similar. Mirabilite is not used, and “crimson alum 絳礬” (melanterite, native  $\text{Fe}_2\text{SO}_4 \cdot 7\text{H}_2\text{O}$ , decomposed by strong heating) is used instead of halotrichite. The amounts of ingredients roughly correspond and the process is, although simpler, fundamentally the same. The first recipe is more complex, but despite corruption of the early part of the text it may be observed that the active ingredients, so to speak, and the salient points of the process coincide. The first recipe contains a description of selenite worded so similarly to Sun’s description

<sup>71</sup> A:5b-7a and B:4a-4b. See also B:2a-3a.

## Chinese Alchemy: Preliminary Studies

at the end of the present formula that, except for the negligible possibility of interpolation (who would bother?), it is evidence of the most positive sort that the two works are closely related. The likeness is apparent in translation: "I fear that selenite is difficult to come by. You can go to the brine pools at Chieh, Shansi, where it is picked up [‘滄’ should be ‘採’] near the water. Its color and patterning are like that characteristic of jade; its shape resembles that of tortoise shells. The type which is heavy and dark is not suitable. The yellowish, transparent and clean sort is superior."

15A

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### FORMULA FOR MAKING SCARLET SNOW AND FLOWING PEARL ELIXIR

One *chin* of realgar is pounded and sifted through silk gauze. It is then mixed with wine vinegar 苦酒 to a creamy consistency and is dried in the sun. When dry the mixing is repeated, the process being carried out a total of ten times. The material is mixed with powdered white salt and [placed in a two-part reaction vessel] with a bed and cover of salt. The vessel is luted and after a day and a night is warmed with a low flame to render the six-one lute bone dry. The fire is gradually increased—there is no need [at this stage] for a roaring fire—for a day and a night longer, and then a roaring fire is applied. The lower part of the combustion chamber must be kept the same color as the fire the whole day through; the intensity of the fire should not be allowed to slacken even momentarily. The heating is continued in this way for three days and three nights. The reaction vessel is then cooled for twenty-four hours 一復時. Open it and gather the medicinal essence in the upper section. It is further ground slightly. The dregs in the lower section are also pounded, mixed with the essence, and then with cooked rice 飯 until moist.<sup>72</sup> The mixture is placed in the reaction vessel

<sup>72</sup> I am inclined to suspect an irregularity in the text, for moistening by mixing with cooked rice does not make good sense—and, equally important,

as before and heated first by a gentle and then by a strong flame just as was done previously. When the medicine is done it will have a brilliant radiance. It will be of the shape of a pendant string of pearls or of colored silken threads. Again, its configuration will be that of stretched knotted netting. Its fresh brilliance dazzles the eye. Those who see it will, unawares, feel a shock. But it is well to be calm. For those suffering from an illness following a sudden fainting attack, those on the point of death, and those who have already expired, grind the elixir fine [and make pills] the size of three or four hempseeds. They are washed down with raw egg yolk and a little wine. Put the medicine into the patient's mouth and hold his head up. In a short while he will recover. If his mouth is firmly shut and will not receive the medicine, his upper teeth are to be prized up and the medicine washed into his mouth. It is pushed down on its way to the stomach with the fingers. The patient is shaken so that the *ch'i* [= activity] of the medicine will be disseminated. In a moment the patient will come to life again. The elixir also cures diseases of malevolent possession and minor autumnal intermittent fevers as soon as it is taken. This medicine has wonderful efficacy, which cannot be fully described. My regret is that in these unsettled times 造次 there is no one who will understand its preparation and use.<sup>73</sup>

*Commentary*

I carried out the first part of this preparation — up to the adding of the rice — at the University of Singapore in 1962. The

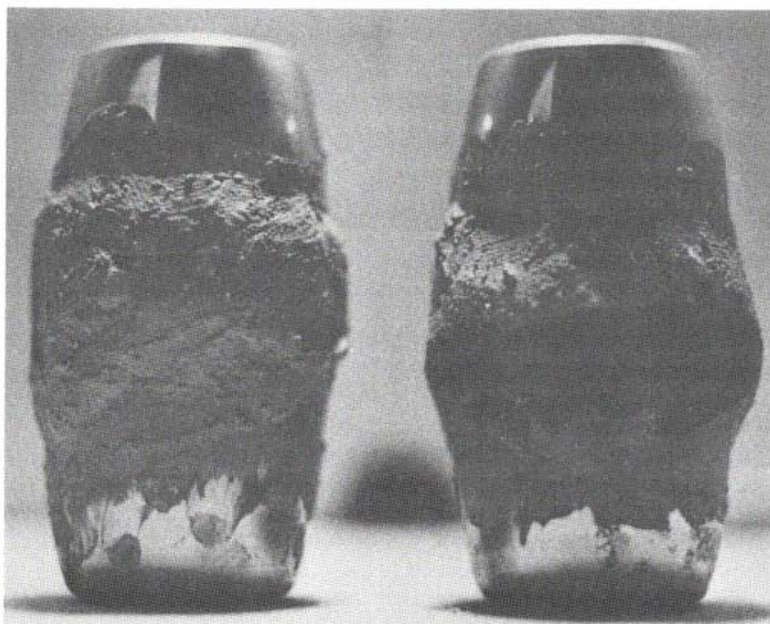
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does not appear elsewhere in alchemical literature. The main laboratory application of rice is, oddly enough, the timing of steaming operations. In Sun's medical works, the steaming of quartz and other substances is considered complete when a layer of rice on top is thoroughly cooked. See *Ch'ien chin fang* (*Pei chi ch'ien chin yao fang* 備急千金要方, Edo Igaku 江戸醫學 ed. of 1849), 17:24b and 22:18a, and *Ch'ien chin i fang*, pp. 258 and 293.

<sup>73</sup> This last sentence is ambiguous. Yang Lien-sheng has pointed out an alternative interpretation: "My regret is that in times of emergency there may be no one who will understand its preparation and use."



## Chinese Alchemy: Preliminary Studies



Sealed two-part reaction vessels used by the author for experimental preparation of Scarlet Snow and Flowing Pearl Elixir.

realgar was chemically pure, but the vinegar was a household rice wine vinegar of local manufacture. The reaction vessel was two laboratory crucibles placed mouth to mouth and luted with "six-one lute" made according to Sun's instructions from red bole and alum. Very careful drying was required to keep the lute from cracking. The combustion was carried out at  $900^{\circ}\text{C}$  in an electric furnace. This is, roughly speaking, the temperature at which iron glows the same bright red as a charcoal fire. The sublimed "essence" proved to be metallic arsenic, which badly corroded the nickel crucibles I was forced to use. Reference to a phase diagram indicates that this elixir would have been equally destructive to an iron vessel. The chemical identity of the elixir which results from the second sublimation cannot, of course, be determined until the apparent textual corruption is dealt with. If cooked rice (or any other reducing agent) is in fact not added, it is possible that the final product contains crystalline or fibrous arsenic trioxide, which could more or less

tally with the description. The lute is sufficiently porous—and sufficiently likely to crack—to allow the diffusion of air into the reaction vessel during long heating, particularly if slight variations in the temperature of a charcoal fire cause the container to “breathe.”

I am indebted to Cyril Stanley Smith for many delightful conversations about the laboratory operations of the ancient alchemists.

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METHOD OF PREPARING  
GREATER YANG POWDER

|                     |    |    |              |                      |
|---------------------|----|----|--------------|----------------------|
| Amorphous sulphur   |    | 10 | <i>chin</i>  |                      |
| Recrystallized salt | 鹽花 | 5  | <i>sheng</i> |                      |
| Stove deposit       |    | 2  | <i>chin</i>  |                      |
| Vinegar, fortified  | 左味 | 3  | <i>tou</i>   | HAc with added salts |

16A

The sulphur is broken into pieces the size of soy beans. It is boiled with the salt and the vinegar for seven days and nights. Then this sulphur is put into a hempen bag and hung [inside an iron vessel] in such a way that it does not touch the iron. It is cooked<sup>74</sup> to completely expel its toxicity. Take out the sulphur, grind, and mix it with the previously mentioned stove deposit until homogeneous. The mixture is then placed in a two-part reaction vessel. First arrange a bed of recrystallized salt; then put the sulphur mixture in. When all is in place, a cover of white salt is added. Then lute the vessel. For three days and nights it is heated over gentle and strong fires, the combustion being carried out as in the formula given earlier. Afterwards cool the vessel half a day and open it.

I note that the pharmacopoeia says amorphous sulphur “is sour in taste, warm, and toxic. It controls, in women, vaginal ulcers 陰蝕, carbuncles 疽, hemorrhoids 痔, and post-

<sup>74</sup> The choice of verb implies that the sulphur is immersed in liquid, which in the typical case would be vinegar.

## Chinese Alchemy: Preliminary Studies

16B

partum bleeding 惡血 . It hardens the muscles and bones; cures baldness, accumulations of morbid *ch'i* [= pneuma] in the heart and stomach 心腹積聚 , swellings with cold morbid influences in the rib region 邪氣冷癖在脇, reflexive coughing<sup>75</sup> with rising *ch'i* [= pneuma] 嘔逆上氣, rheumatism of the feet 腳冷疼弱無力, chronic nosebleed with malignant sores 鼻衄惡瘡, and running sores 漏瘡 on the lower part of the body; stops bleeding and kills itching worms 疥蟲.”<sup>76</sup>

[Greater Yang Powder] cures beri-beri 腳氣, impotence 陰萎 and wasting of the sexual organ 陽道衰弱 in males, and anemia with sensitivity to cold 體冷血氣 and rumbling of the stomach 腹內雷鳴 in women. If anyone suffering from a cold malady for which other medicines are ineffective takes this elixir for a few 三五 days, he will be cured.

As to the method of administration, grind the product to extremely fine powder and mix it with rice to form pills, each pill the size of a kola nut. Each day take five or six pills on an

<sup>75</sup> As quoted in the Pharmacopoeia of 1249 (4:6b), the Great Pharmacopoeia (11:63), and other medical works, the first character of this term is not *ou* 嘔 but *k'o* 欬 . I emend accordingly.

<sup>76</sup> This passage is taken from the lost portion of the *Pen-ts'ao ching chi chu* (see above, note 1), but it is quoted with only minor textual variations in a Japanese copy (dated A.D. 731) of Su Ching's 蘇敬 *Hsin hsiu pen-ts'ao* 新修本草 (Revised pharmacopoeia, promulgated 659), photographically reproduced in *Chuan hsi lu ts'ung-shu* 養喜廬叢書, 4:6b, and in a separate edition (Shanghai: Shanghai Hygiene Press, 1957), pp. 47-48. This text with T'ao Hung-ching's annotations is also quoted in most later pharmacopoeias, often more reliably.

My closing of the quotation is based on the extent of coincidence; it is at least possible that the remainder of Sun's medical discussion is taken from *Pen-ts'ao ching chi chu*, but was not picked up in *Hsin hsiu pen-ts'ao* or subsequent compilations.

The name of the compiler of *Hsin hsiu pen-ts'ao* is very often given as Su Kung 恭; see, for instance, Joseph Needham, *Science and Civilisation in China*, III, 717, and Pierre Huard and M. Wong, "Evolution de la matière médicale chinoise," *Janus*, 47 (1958):12 ("Sou Kong"). This mistake, which has also been made by a few modern Chinese writers, is due to the fact that in the Sung dynasty the synonym "*k'ung*" was substituted for the character "*ching*" in order to avoid a taboo on use of the personal name of Chao Ching, grandfather of the founding emperor. See Chapter II, note 7, for another obscurity due to the same taboo.

*Tan Ching Yao Chueh: Annotated Translation*

empty stomach, washing them down with wine. Taking pills made by the addition of appropriate herbal simples is even better.

*Commentary*

The product is probably sulphur, partly converted to the monoclinic form by sublimation but not greatly altered by the chemical processes to which it has been subjected. The boiling with salt and fortified vinegar would serve in the long run merely to diminish the quantity of sulphur, since the liquid is evidently discarded and only the solid material recovered. The stove deposit might contribute some volatile impurities. In wet treatment it would convert some of the sulphur to sulphides, but the extent of reaction under the conditions of this preparation is impossible to gauge without a clearer idea of the stove deposit's composition.

---

FORMULA FOR MAKING GOLD ELIXIR

Gold 8 *liang*

File to powder.

Quicksilver 8 *liang*

The above powdered gold and mercury are stirred overnight to change them to the consistency of a mortar.

Realgar 1 *chin*

Orpiment 雌黃 1 *chin*  $As_2S_3$

The previously enumerated realgar and orpiment are ground fine as flour and then mixed. All the ingredients are placed in a reaction vessel made of earthenware [thickly plastered inside and out with] six-one [lute and then dried] 六一土釜. The vessel is sealed tight and roasted over a charcoal fire for nine days and nights. Cool it for two days. Scrape out and collect the sublimed essence.

17A

## Chinese Alchemy: Preliminary Studies

Have a tube ready.<sup>77</sup> Make a mortar of fortified vinegar and minium [? 鉛釵丹 ] and plaster the inside of the tube with it. Allow the tube to become extremely dry. Then mix vinegar and the sublimed essence to the consistency of soft clay. Pack the mixture into the tube. Put a copper cover on the open end of the tube and plaster the joint with six-one lute. Prepare an iron hook and suspend the tube so that its bottom is two or three *ts'un* from the ground. Warm it over a fire fueled with manure in such a way that the bottom of the tube is always just warm, for sixty to seventy days. Cool it, open it, and collect the medicine. If it be of the same red color as cinnabar, it is finished.

Grind it again and mix it with jujube pulp to form pills, each the size of a red mung bean 小豆 . One pill is taken at sunrise with the first water drawn from the well, as you face the sun. After seven days fairies <sup>78</sup> 玉女 will come to serve you; in two hundred days you will be able to “summon the mobile kitchen<sup>79</sup> 行廚 ”; at the end of three hundred days you will become as immortal as sky and earth. This formula is like that for Liquefied Gold <sup>80</sup> 金液 , with only slight differences. If manure is difficult to come by, a fire of chaff will do.

17B

<sup>77</sup> The material is not designated. A copper (or bronze) tube is specified for an analogous treatment in *T'ai-ch'ing chin yeh shen tan ching* (*Yun chi ch'i ch'ien* ed.), p. 14b, and is probably also used here.

<sup>78</sup> Literally, “jade girls,” a general term for female attendants of Taoist divinities and immortals. The whole of this sentence is perfectly conventional; these manifestations are mentioned in countless elixir formulas.

<sup>79</sup> This is a technical term for what seems to be a rather common accomplishment of adepts. It is explained in *Pao p'u tzu nei p'ien* (4:10a), although there is no evidence in other occurrences that the method is typical: “If you wish to ‘summon the mobile kitchen,’ mix Black Elixir 黑丹 with water and smear it on your left hand. Whatever you wish will appear of itself precisely as orally requested. Anything in the world may be so summoned.”

<sup>80</sup> *Shih yao erh ya*, the T'ang alchemical synonymy which is in many respects closely linked with the present text, states (p. 1) that *chin yeh* is an esoteric term for *shui yin shuang* 水銀霜 , calomel purified by resublimation. I do not, however, believe that it would be legitimate to so interpret Sun's statement.

---

FORMULA FOR MAKING LEAD ELIXIR

[Note in text:] Cures all diseases due to hot factors, possession by demonic forces, epilepsy, and autumnal intermittent fevers.

Lead 鉛 4 *chin* Pb

Ripen in the fire to . . .<sup>81</sup>

Quicksilver 1 *chin*

Clean by grinding with salt.

Take two *tou* of millet 黍穀 and steam it until the grains decompose. When it is ready, make it into vinegar by adding vinegar leaven 醋漿水 and stopping it up tightly for five or six days. Next take earth collected from cart tracks 車轍中土, sift it, and put it into the container, stirring to mix, until the contents resemble wheat paste which has been fried in cakes. Take the lead, melt it, and pour it into the paste and mix. After mixing, heat the lead again in a good footed vessel until melted. Warm the mercury and pour it into one *chin* of the lead. Wait until the whole flows and then resolidifies. Bind it with cord and suspend it in a kettle [of vinegar] for fourteen days. Its essence will of itself descend into the vinegar. Col-

---

A complex recipe for *chin yeh* given in *Pao p'u tzu nei p'ien* has been discussed above in Chapter II, note 18. It is by no means like the present formula. Another method is provided in *T'ai-ch'ing chin yeh shen tan ching*, pp. 9a-11a: Prepare a lead amalgam at high temperature, heat with basic lead carbonate, and grind with vinegar. Mix with cinnabar, realgar, and orpiment, and heat carefully in a hermetically sealed vessel. One *chu* (1/24 *liang*) of the sublimed product is "projected" onto sixteen *liang* of mercury, turning it to gold. This alchemical gold is softened by steeping in vinegar for a hundred days, and mixed with six-one lute to form *chin yeh*. In the late tract *Keng tao chi* 庚道集 (*Tao tsang*, vols. 602-603), 8:23a, "*chin yeh*" refers simply to mercury prepared artificially at one stage in the procedure for making an elixir. None of these formulas is close enough to Sun's to be necessarily the one he means.

<sup>81</sup> This sentence is either incomplete or the last two characters are inverted. In the latter case the meaning would be simply "Ripen in the fire."

## Chinese Alchemy: Preliminary Studies

18A

lect it and wash it clean. Mix it with one *liang* each of mirabilite and Epsom salts 消石 [MgSO<sub>4</sub>·7H<sub>2</sub>O].<sup>82</sup> Sublime the combination three times, three days for each cycle, following the method for preparing elixir by sublimation 飛丹.<sup>83</sup> Collect the essence and mix it with cooked rice to form pills, each the size of a hempseed. It will cure anyone afflicted with a disorder due to hot factors.

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### FORMULA FOR PREPARING PURPLE ESSENCE ELIXIR

|                   |                           |
|-------------------|---------------------------|
| Quicksilver       | 1 <i>chin</i>             |
| Amorphous sulphur | $\frac{1}{2}$ <i>chin</i> |

These two ingredients are placed in a vase. To lute the vase, make a mortar of yellow clay and paper pulp and plaster it over the body of the vase three times, to a thickness of one large *ts'un*<sup>84</sup> or more. Use a porcelain cup to stop up the mouth of the vase. Seal the joint with a half-*ts'un* thickness of six-one lute. Fire is applied for three days and three nights, a gen-

<sup>82</sup> The *Tao tsang* version reads “*hsiao* 消”; the *Ch'ing chen kuan* edition has the homophone “硝.” These are by no means equivalent. The first means “Epsom salts” and the second “niter” (sodium and potassium nitrates). I adopt the first reading because the *Ch'ing chen kuan* edition always uses the character “硝” for “消,” even in terms where it is clearly incorrect (for example, in “*p'o hsiao* 朴硝,” mirabilite). Since this argument assumes rigorous consistency, however, I do not put it forward with overwhelming conviction.

<sup>83</sup> It is impossible to be sure what process Sun means. “*Fei tan*” is a cover name for mercury in the Sung treatise *Huang ti chiu ting shen tan ching chueh* 黃帝九鼎神丹經訣 (*Tao tsang*, vol. 585), 12:2b, but nowhere in the literature does it clearly stand for a specific technique. One has no choice but to take the term in its general alchemical sense. It is perfectly possible, simply following the most literal meaning of the compound, that it refers to cinnabar sublimed from mercury and sulphur—or, for that matter, to any elixir prepared by sublimation.

<sup>84</sup> A “large *ts'un*” is one-tenth of a “large *ch'ih*,” or 1.2 *ts'un* in apothecaries’ measure. See Appendix B.

*Tan Ching Yao Chueh: Annotated Translation*

tle fire for a day and a half and a strong fire for a day and a half. When the time is up, extract the medicine and pulverize it. Take a fresh tube of green bamboo and fill it with the medicine, which is mixed with vinegar inside the tube. Boil the tube in brine 重湯 in a large pan for three days and nights, adjusting the temperature so that fish-eye bubbles constantly rise. When the time is up, wash the vinegar off the product with cold water and dry the product in the sun for a day. Return it to the tube. Mix a solution of mirabilite in clear water. Boil [the tube in it] as before for twenty-four hours. Take out the medicine, wash it clean, dry in the sun, and pound it to extremely fine powder. Make it into pills with jujube pulp and a little musk. When the pills are to be made, mix them with a little butter fat 酥. It should also be smeared on the hands, or the elixir will stick to them. The pills should be the size of kola nuts. They are to be taken every day with meals. Five pills will cure illnesses due to winds and will improve the eyesight and act as a tonic to the heart. Two *chin* or more will turn white hair black 變白. The efficacy of this elixir is so great that it cannot be set forth fully here. Foods which may not be taken with this elixir are the same as in the Flowing Pearl formula. One *ch'ien* of musk may be used; it should be weighed out. The Flowing Pearl formula follows.

18B

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FORMULA FOR MAKING  
FLOWING PEARL ELIXIR

Sulphur

1 *chin*

Boil it with a little sesame oil in a kettle until it turns black. Then boil the mixture with lixivium 灰汁 to get rid of the oil. When this has been done, grind the sulphur with salt and fix 伏 it. This operation is to be carried out in a footed iron vessel. Use six-one lute to seal the mouth of the vessel, which

19A



## Chinese Alchemy: Preliminary Studies

should be heated over a gentle fire for one day and two nights, after which a strong flame is used. It should be gradually increased until the vessel is red hot. Remove the vessel from the fire 去火 ; when it has cooled take out the medicine. Wash away the salt with clear water.

Take seven *sheng* of wine and one-half *sheng*<sup>85</sup> of honey (the quantity "one *sheng*" is also given for the honey) and boil [the reactants in] it according to the procedure given for Empyrean-Roaming Elixir, for three days and three nights. Extract the medicine and wash away the wine with clear water. Dry the medicine in the sun, pound and sift it, and make it into pills with jujube pulp. They should be further pounded for five or six thousand strokes; up to ten thousand strokes is still better. Again form the materials into pills the size of a kola nut. Take them on an empty stomach 空心 , thirty pills a day. If you feel hot after taking them, reduce the dose to 15 pills. Those who take this medicine throughout the year may take only five pills a day. There is no disorder due to cold or wind factors which this medicine will not cure. (Avoid eating garlic and rice vinegar.)

### Commentary

It is evident that in the preliminary treatment of the sulphur most of it is polymerized. The lixivium (aqueous infusion of ash), if prepared from vegetable matter, would contain enough sodium and potassium carbonates to separate the oil from the sulphur.

<sup>85</sup> I adopt the *Tao tsang* reading, although the *Ch'ing chen kuan* edition's "one-half *chin*" is not impossible. The characters "*chin* 斤" and "*sheng* 升" are so much alike that occasional confusion is inevitable. Weight and volume are used indifferently for honey in early medical literature. See, for instance, the prescriptions recorded in the Pharmacopoeia of 1249, 20:2b-4b.

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FORMULA FOR SEVEN-CYCLE CINNABAR

Mercury

1 large *chin*

19B

Place it in a porcelain vase, which is closed with a porcelain bowl and the joint sealed with six-one lute. The vessel is then gradually heated over a gentle flame for up to six or seven days. A strong fire is then applied for one day, and it is done. After this process is repeated for a total of seven cycles the medicine may be taken. The fire must be reduced for each cycle; if not, it may be impossible to keep the medicine confined within the vessel.

*Commentary*

The product is quite evidently not cinnabar but mercuric oxide. Long heating makes it possible, as remarked earlier, for air to diffuse in through the porous lute. Without anticipating a more rigorous reconstruction of the most basic “cyclical transformation” processes, it may be remarked here that their success would seem to depend, just as did Lavoisier’s famous gravimetric demonstration, on the remarkable reversibility of the mercury–mercuric oxide transformation at 630°. By suitable control of temperature, that is, it is possible to change mercury into what appears to be cinnabar and back indefinitely—with gradually decreasing yield, of course, due to leakage of mercury vapor—without adding anything. This particular formula provides a clue that the cooling process must have played as large a part in temperature control as heating, for the strong flame specified for the final phase would be too hot to yield HgO if the vessel were cooled immediately after combustion. That would be one reason for using a porcelain rather than an iron vessel. It would also be one reason for packing the reagents in beds of various salts in other recipes.

## Chinese Alchemy: Preliminary Studies

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### FORMULA FOR MAKING JADE FOUNTAIN EYE MEDICINE <sup>86</sup>

Take two *liang* of quartz 水精 [SiO<sub>2</sub>] and powder it. Mix with one-half *ko* of milk and put the mixture into a porcelain vase. Lute it tightly so that vapor may not escape. Bury the vase in the ground, taking it out after a hundred days. Place it at the lower opening of a stove and smoke it for one day, then open it. It will be greenish-white like jade. Take two *chin* of lead [?鉛錫] already purified in the fire, and melt it. Make the medicine into pills the size of a kola nut, and pour them into the molten metal while stirring it. The product will be pure white. If the eyes have lost their sight and are red, but the pupil is undamaged, pressing one pill the size of a grain of glutinous millet 黍米 into the canthus is most excellent.

20A

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### THE STONE-COOKING METHOD OF CHANG HO OF T'AI SHAN <sup>87</sup>

|                   |     |                |                                         |
|-------------------|-----|----------------|-----------------------------------------|
| Poke root         | 章柳根 | 6 <i>chin</i>  | Phytolacca acinosa,<br>Roxb.            |
| Apricot pits      | 杏仁  | 5 <i>sheng</i> | Prunus armeniaca, L.                    |
| Wild jujube pits  | 酸棗仁 | 5 <i>sheng</i> | Ziziphus vulgaris, v.<br>spinosa, Bunge |
| Pagoda tree fruit | 槐子  | 1 <i>sheng</i> | Sophora japonica, L.                    |
| Pound separately. |     |                |                                         |

<sup>86</sup> "Jade fountain" is an elixir the medical properties of which were first described in the Shen-nung Pharmacopoeia, with emphasis on its embalm-ing action. T'ao Hung-ching describes it as a soluble white jade; if we could be sure he was not speaking a priori, we might identify it as a jadelike car-bonate mineral, possibly dolomite, soluble in weak acids. Later pharmaco-logical writers speak of it as a naturally occurring liquid jade, a solution of jade, or a suspension of jade powder, giving a distinct impression that they

## Tan Ching Yao Chueh: Annotated Translation

The first three ingredients are first pounded. The pagoda tree fruit is stirred with water; the juice is decanted off the dregs and mixed with the other drugs. Put the mixture in a vessel free of leaks 不津,<sup>88</sup> which is to be buried one *ch'ih* deep and covered with earth in a shady place to the north of the laboratory [? 舍]. After a hundred days dig the vessel up and collect the product, which is called "Grand Unity Magic Water 太一神水." Take 5 *chin* [?] <sup>89</sup> of alluvial stones of greenish-white color, the size of peaches or gages. Take 9 *sheng* of water from a northward-flowing stream 北流水 and heat it [with the stones in it] until it just comes to a boil. Stir in two *ko* of the Magic Water. Again just bring it to a boil and wait until the stones are well cooked. They may be taken internally as desired. After they are taken for five days, every disorder will be cured. After taking them for one year, one's life span is lengthened infinitely. After taking them for a longer period, one ascends into the sky in broad daylight.

20B

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were by no means sure of its identity, if indeed it were anything more than one of the stage properties of Taoist hagiography. See the Pharmacopoeia of 1249, 3:8b-10b. Recipes for jade suspensions are given in the late *San-shih-liu shui fa* 三十六水法, translated in Ts'ao T'ien-ch'in, Ho Ping-Yü, and Joseph Needham, "An Early Medieval Chinese Alchemical Text on Aqueous Solutions," *Ambix*, 7 (1959):131-132.

This formula does not appear in the *Ch'ing chen kuan* text. In *Ch'ien chin i fang* (p. 150), Sun does recommend the ingestion of quartz in milk for eye diseases and other afflictions.

<sup>87</sup> I have been unable to locate this worthy in any of the Taoist hagiographical writings. He may be the Chang Tzu-ho 子和 for whose elixir *Pao p'u tzu nei p'ien* gives a recipe (4:13a); as is well known, in the Han (and to a lesser extent throughout history) elements of compound personal names were freely dropped. Ko Hung's recipe has nothing in common with the one Sun provides.

<sup>88</sup> Yang Lien-sheng has pointed out (personal communication) that this rather unusual sense of "*chin* 津" also occurs in the agricultural handbook *Ch'i min yao shu* 齊民要術 (Essential techniques for the common people, ca. 540). See Shih Sheng-han 石聲漢 (ed.), *Ch'i min yao shu chin shih* 今釋 (4 vols., Peking: Science Press, 1958), IV, 524, line 70.1.2.

<sup>89</sup> I provisionally adopt the reading of the *Ch'ing chen kuan* edition, although it is not impossible that the volume measure "*sheng*" might be applied to stones. See note 85 above.

## Chinese Alchemy: Preliminary Studies

Take two *sheng* of Magic Water and soak in it two *chin* of cast iron 生鐵 for ten days. The iron will be transformed into silver.

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### FORMULAS FOR AUGMENTING *LI* 離 BY THE USE OF *TUI* 兌<sup>90</sup>

[Note in text:] Four formulas.

|            |                            |                                                      |
|------------|----------------------------|------------------------------------------------------|
| <i>Li</i>  | 1 <i>liang</i>             | cinnabar?                                            |
| <i>Tui</i> | $\frac{1}{2}$ <i>liang</i> | white lead, $\text{Pb(OH)}_2 \cdot 2\text{PbCO}_3$ ? |

[Note in *Ch'ing chen kuan* text only:] Take paktong 白銅 made by heat treatment with red salt 赤鹽 [ $\text{NaCl}$ , impure] as *tui*.

Melt the above ingredients in an earthenware crucible 埙; first the *li* is put in, then the *tui* is added. Stir with a piece of willow until the ingredients are evenly mixed. Next add one *fen* of halotrichite and stir until homogeneous as before. Pour the mixture out to form an ingot.

Make a crucible of yellow clay mixed with fortified vinegar and allow it to dry. Mix one *liang* each of halotrichite, sal ammoniac 硃砂 [ $\text{NH}_4\text{Cl}$ ], and tacamahac resin 胡同律, and one *sheng* of red clay 赤土 with vinegar to form a mortar in which [the ingot] is packed. Put it into the crucible, which is then tightly sealed with three or four layers of lute. Fire it ten times or more, [opening the crucible and] wiping [the ingot] with felt between firings, until the black *ch'i* [= smoke] is no longer evolved.

<sup>90</sup> These arcane terms, originally names of two of the eight trigrams from which the symbols of the Book of Changes were compounded, are part of the stock in trade of the alchemical tradition which descends from the *Chou I ts'an t'ung ch'i* (see above, pp. 37-40). *Li* is "philosophical (lit., 'realized') mercury 真汞"—metallic mercury, its transformation cinnabar, the "element" fire for which it stands, and so on. See *Hsuan chieh lu* 玄解錄 (Record of an explication of the mysteries, 855; in *Yun chi ch'i*

If it proves impossible to exhaust the black *ch'i*, take red salt and mix it with vinegar to form a mortar. Pack [the ingot] in it, binding the whole with human hair 亂髮. Put the crucible in the fire and heat it strongly. The red salt will emit a sound. Repeat this process a number of times, until the black [*ch'i*] is exhausted.

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*ch'ien*, ch. 64; see also *Tao tsang*, vols. 597, *Hsuan 懸 chieh lu*, and 599, *Ying men kung miao chieh lu 鷹門公妙解錄*), p. 9a, and the annotated editions of *Chou I ts'an t'ung ch'i* in *Tao tsang*, vol. 622, B:19a, and vol. 624, A:14a. In Sun's treatise *li* stands for a particular substance; cinnabar fits the various contexts best. It is spoken of below as melting, but never alone, and always in such a way that it could give the appearance of melting without actually doing so.

*Tui*, analogously, stands for "philosophical lead 真鉛"—metallic lead and its transformations, the "element" Metal, and its various correlates, as may be seen from the early and lost *Chin pi ching 金碧經*, quoted in *Tan lun chueh chih hsin ching 丹論訣旨心鏡* (tenth century or earlier; in *Yun chi ch'i ch'ien*, ch. 66), p. 7b, and the undated *Ta tan chi 大丹記* (Record of the great elixir; *Tao tsang*, vol. 588), p. 1b.

It is not nearly so simple to determine from context what *tui* means here. The note added to the text by the editor Chang Hsuan, identifying *tui* as paktong (a copper-nickel alloy which often also contains zinc) is not logically acceptable, since in the "Primeval Realization Method of Augmenting Paktong with *Tui*" (p. 201 below), (1) the formula would not make sense if paktong were to be augmented with paktong, and (2) *tui* is identified in the list of ingredients as "*hsi* 錫," which may refer to tin or lead. In the "Persian Method for Using Lilac Fruit to Augment Brass" (p. 204 below), both "refined tin 鍊錫" and "white *tui*" appear in the list of ingredients. If *tui* were metallic tin this would be redundant; even if *tui* were metallic lead, "white *tui*" would be the "white variety of lead," which to the alchemist of the time was still tin, and the redundancy remains.

The last reasonable hypothesis is that *tui* is a *compound* (that is, a "transformation") of lead or tin, capable of augmenting cinnabar and paktong as specified. On p. 201 we find an otherwise unexplained statement about white lead turning red when fixed. This arouses the suspicion that, since *tui* is included (as tin) in the ingredients for that preparation and white lead is not, the two are identical. The symmetry with the color change of the *li* cycle, too, is striking. If we insist upon positing that "*tui*" means something, and that it means the same thing throughout, this is a most plausible identification. White lead (artificial basic lead carbonate) is easily oxidized to red minium, which is indeed used in China to adulterate cinnabar (see Bernard E. Read and C. Pak, *A Compendium of Minerals and Stones Used in Chinese Medicine*, second ed., Peiping: Peking Natural History Bulletin, 1936, p. 8, item 13), and is easily reduced to lead with which to adulterate paktong.

## Chinese Alchemy: Preliminary Studies

Even better is to mix sal ammoniac to a paste 漿 [with vinegar] and to heat the crucible over a flame of bovine dung.

### *Another Method*

|                |                    |
|----------------|--------------------|
| Li             | 1 <i>liang</i>     |
| Tui            | 7 <i>ch'ien</i>    |
| Refined copper | 熟銅 1 <i>ch'ien</i> |

Mix, melt, and cast into an ingot. Wait until it has cooled, and then put it into the fire again and bake it until it is exceedingly hot. Pour it into manure to cool. Pound [the metal] out with a pestle 鎚, put it into the fire, and bake it. Pound it again so that the *li* ingot is thin as paper. Cut and break the sheet into pieces the size of a finger.

Take one *chin*<sup>91</sup> of halotrichite and powder it. Pound three *fen* of tacamahac and two *fen* of sal ammoniac to a powder.

Prepare a mortar of yellow clay and make it into a crucible, to which another crucible is fitted to serve as a cover. When that is done, arrange the *li* leaves inside, enclosing them with alternating layers of the ingredients enumerated above. Lute the joint between the crucibles. Bake in a fire of bovine dung for one day and one night, keeping the crucible at red heat until the product is finished.

21B

### *Another Method*

|     |               |
|-----|---------------|
| Li  | } equal parts |
| Tui |               |

|                     |               |                                                          |
|---------------------|---------------|----------------------------------------------------------|
| Persian zingar 波斯鹽綠 | } equal parts | Impure artificial<br>copper carbonates<br>and/or acetate |
| Red clay            |               |                                                          |
| Tacamahac resin     |               |                                                          |
| Sal ammoniac        |               |                                                          |

<sup>91</sup> Both texts read "*sheng*," but this is almost certainly a copyist's error for "*chin*." Quantity of salts like halotrichite is usually specified by weight rather than volume.

*Tan Ching Yao Chueh: Annotated Translation*

Mix [the last four ingredients] to a mortar with fortified vinegar and wrap [the first two in it] to a thickness of three *fen*. Heat over a strong fire, repeating fifty or more times.

Then powder one *liang* of iron pyrites 金牙 [FeS<sub>2</sub>] and boil it in three *sheng* of vinegar leaven 漿水 from dawn to dusk. The *li* [mixture] is wrapped in cloth and suspended from a horizontal bar [so that it dips into the solution]. Do not let it touch the container. [After unspecified boiling or soaking] the product may be used.

*Another Method*

|                 |    |                |
|-----------------|----|----------------|
| Sal ammoniac    |    | 1 <i>liang</i> |
| Gum lac         | 紫釧 | 1 <i>liang</i> |
| Chalcanthite    |    | 1 <i>fen</i>   |
| Tacamahac resin |    | 1 <i>liang</i> |

22A

Mix with lard 猪脂 to form a mortar, and line the bottom of a crucible with it. Melt *li* in the crucible and take it out. It will look like vermilion, but will be more lustrous. After this melting it should be formed into thin ingots. Take

|                 |     |                 |                     |
|-----------------|-----|-----------------|---------------------|
| Red clay        |     | 10 <i>liang</i> |                     |
| Powder.         |     |                 |                     |
| Air-slaked lime | 風化灰 | 3 <i>liang</i>  | Ca(OH) <sub>2</sub> |
| Sal ammoniac    |     | 3 <i>liang</i>  |                     |
| Red salt        |     | 5 <i>liang</i>  |                     |
| Red bole        |     | 5 <i>liang</i>  |                     |
| White halite    | 石鹽  | 3 <i>liang</i>  | Impure mineral NaCl |

The above ingredients, which should be given preparation of the highest quality, are mixed to a mortar with fortified vinegar, and [formed to] the same size as the *li* ingots by spreading on paper, to a thickness of one or two *fen*. The ingots are enclosed in the mortar to a thickness of three *ts'un*. Melt them in the fire. The treatment is complete when red smoke is no longer evolved.



## Chinese Alchemy: Preliminary Studies

Open [the ingots] and wash them with vinegar.<sup>92</sup> Wrap and heat as before, washing with vinegar leaven<sup>93</sup> between heatings, a total of thirty times. The product will then be red and shining inside and out, a veritable Treasure of Brahmalo<sup>94</sup> 梵天寶.

### ESSENTIAL METHOD FOR FIXING MERCURY

22B

When mercury encounters fire it volatilizes 飛 and cannot be made to stay where it is. Now many things can be made from it, but only if it is first fixed 制伏 by other substances 物. If it is fixed with these medicines there is not the slightest chance of failure:

|                                                  |     |                                            |
|--------------------------------------------------|-----|--------------------------------------------|
| Tuber of Chinese aconite,<br>collected in spring | 烏頭  | Aconitum, L.                               |
| Red bole                                         |     |                                            |
| White halite                                     |     |                                            |
| White salt                                       | 白鹽  | NaCl, purified                             |
| Indian pepper                                    | 胡椒  | Piper nigrum, L.                           |
| Realgar                                          |     |                                            |
| Long pepper                                      | 華撥  | Piper longum, L.                           |
| Crude halotrichite                               | 黃礬石 |                                            |
| Yellow sal ammoniac                              | 黃硃砂 | NH <sub>4</sub> Cl with much S<br>impurity |
| Black salt                                       | 黑鹽  | NaCl, impure.                              |

<sup>92</sup> The text does not state whether or not a crucible is used, as usual, to enclose the coated ingot; if so, the verb "open" here and "heat" in the next but last sentence refer to the crucible.

<sup>93</sup> The text has simply "*chiang* 漿" (lit., "starch"), but this must be a contraction for "*ts'u chiang shui* 醋漿水."

<sup>94</sup> "*Brahmaloka*" is a Buddhist term for "the heavens of the realm of form." It was taken over by Taoism at an early date. According to the *Tao chiao hsu* 道教序, a tractate probably of the sixth to eighth centuries (when the velocity of syncretism was still great), *brahmaloka* is a set of four superior heavens which are exempt from birth, death, and other calamities (*Yun chi ch'i ch'ien*, 3:6b). Sun uses the term as a familiar word, equivalent to "paradise." I am indebted to Ho Ping-yü for this reference.

## *Tan Ching Yao Chueh: Annotated Translation*

Pound into powder and mix with fortified vinegar to form a mortar. Turn it to the shape of a crucible. Put mercury inside the crucible, and wrap it in a napkin the ends of which are pierced by a horizontal stick, thus allowing the crucible to hang inside a pan 釜. Boil it thus in fortified vinegar for three days and nights. Remove the mercury and put it into a sublimatory 霜鉢.

Again take fortified vinegar, mix it with equal parts of acornite root, sal ammoniac, and muscovite 雲母 [ $H_2KAl_3(SiO_4)_3$ ] and grind [the mercury with] it [; leave the mixture in contact with the mercury] for seven days, changing the ingredients three times. Wash the mercury. Put a little oil, salt, and sal ammoniac into the vessel and boil [the mercury in it] for one day and night. It will then be suitable for use.

### *Commentary*

This formula serves as an exceptionally clear reminder that in the pragmatic tradition of alchemy, as in the pharmacological tradition from which it sprang, some alchemists followed Ko Hung's example, specializing in the literary transmission of recipes to the exclusion of real laboratory work. The author of *Tan ching yao chueh* was clearly not one of these, but here he gives the benefit of the doubt to a method which could not succeed. The mercury would be somewhat diminished in volume by the weak mineral acids in the fortified vinegar, but would otherwise be unchanged. If the liquids and accompanying solid matter were collected and treated rather than the mercury, however, they could indeed be made to yield a small amount of "fixed mercury" in the form of mercury salts. Whether this was the intent of this method's originator we cannot know, but in any case most of the ingredients are superfluous.

PRIMEVAL REALIZATION <sup>95</sup> METHOD FOR USING  
TIN TO GET RID OF HALO <sup>96</sup>

Take white [tin] without limitation of quantity. Pound it into leaf the thickness of paper and two *ts'un* square. For this preparation, at least ten *chin* [of tin] must be used. With a large quantity the hot *ch'i* [= active essence] will ascend; a smaller amount is unsuitable. Take a porcelain vessel of such size that it will be more or less filled by the ingredients. Put [a layer of the tin] in the bottom of the vessel, then a layer of onion 蒜薹 [Allium cepa, L.], alternating layers in this way until the vessel is full. Put on a cover of appropriate size and seal the junction tightly with lacquer. Bury the container in the ground. After a hundred days take it out; it will be finished. The time may not be shortened by a single day. It should be buried under the place where dung is stored <sup>97</sup> and taken out when the time is up. Melt one *chin* of the product and mix with it one *liang* of superior brass 鋤. If the alloy is too soft, add more brass; if too hard, add more tin. As to the onion, that with the red skin is preferable; as to the fortified vinegar, only that three years old may be used. Add a little salt, as in the formula for oral administration.<sup>98</sup>

<sup>95</sup> I have been unable to find the compound “*su chen* 素真” elsewhere in a context which would establish its import in alchemical practice. It first occurs in *Chen kao*, 5:1a–1b, where it means “the pristine and the genuine”—two aspects of undifferentiation, in the sense of Chapters XX and XXI of the *Lao-tzu*. In the title of Sun’s formula it seems to be the name of a secret tradition or school, hence my tentatively more arcane rendering.

<sup>96</sup> “*Yun* 晕 (lit., ‘halo’)” is a general term for surface discolorations or films. For an exceptionally clear-cut example of its use, see *Chu chia shen p'in tan fa*, 3:6a: “First one requires one *chin* of white alum and one *chin* of mercury. Grind them together and discard the black film [*yun*].” See also 4:5a and 5b, and 5:7a.

<sup>97</sup> This does not make perfect sense, and may be corrupt.

<sup>98</sup> I am unable to furnish a documented explanation of this last sentence.

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PRIMEVAL REALIZATION METHOD FOR  
AUGMENTING PAKTONG WITH *TUI*

Paktong            1 *chin*  
Tin                 1 *liang*

23B

The above ingredients are melted and poured into wine.<sup>99</sup>  
Retrieve the alloy and crush it.

Take one *liang* of fixed mercury 伏汞, two *liang* of tacamahac resin, and one *sheng* of fat 油脂. Boil the mixture [with the “alloy”] until there is no further change 盡 in the fat. When the white lead [Pb(OH)<sub>2</sub>·2PbCO<sub>3</sub>] becomes red, it is fixed.<sup>100</sup>

Take the *tui* alloy [lit., “substance”] 兑體 described above and melt it; then pour it into water. [Retrieve it and with it] mix and melt two *liang* each of white alum, black alum 黑礬 [glockerite? 2Fe<sub>2</sub>O<sub>3</sub>·SO<sub>3</sub>·6H<sub>2</sub>O approximately], tacamahac resin, sal ammoniac, and white salt. Allow the resulting substance to flow into an ingot mold 錠池, and it is finished. If it is too brittle for use, heat it red hot and throw it into bovine fat. After ten times it will be soft.

[*Note in Ch'ing Chen Kuan text only:*] The “white lead” is tacamahac resin.<sup>101</sup>

<sup>99</sup> There is no point in this operation unless “wine 酒” stands for “wine vinegar 苦酒.”

<sup>100</sup> A formula for “fixed mercury” is given earlier. See also note 90 above. It is not altogether impossible that this paragraph does not belong to this formula.

<sup>101</sup> This is another stab in the dark (see note 90).

## FORMULA FOR REMOVING HALO FROM COPPER

24A

Take refined copper and beat it into leaf, three *ts'un* long and three *ts'un* wide. Take cowskin glue and boil it in water to the consistency of congee 粥. Put the copper leaf in it and seal off the surface with salt. Place the container in the furnace and leave it there until smoke is no longer evolved and it is an extremely bright red. Take it out and cool it. Put it on an anvil 砧 and pound it. The black crust will thereupon fall off. Repeat the treatment for a total of ten times or more.

Then cook the metal in vinegar leaven which is kept at a very fast boil. Heat the copper leaves red hot and put them into the liquid. Take them out and brush them with a brush; then melt them in a crucible and pour the liquid metal into lixivium. It will scatter into "pearls" of yellow-white color. The copper is thus treated ten times. There is no need for further pouring; it will have become *tui*. From each ten *liang* [of purified copper] one obtains three *liang* [of product]. When it is done, put the pearls into "plum bath 梅漿" and wash to whiten them.<sup>102</sup>

### Commentary

This context tends to support my tentative identification of *tui* as white lead. The product of this treatment obviously would not be white lead, but the author seems to be so identifying it by its whitish coloration. Only a poor grade of white lead would be yellow-white, but I can suggest no other identification which would be superior in this respect; clearly no copper salt would fill the bill in other formulas. I do not see how the "pearls" *could* be of the color described—copper oxides, carbonates, and other likely products would be black—but that is another problem.

<sup>102</sup> A formula is given further on.

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THE PERSIAN METHOD FOR USING PERSIAN  
LILAC FRUIT TO AUGMENT BRASS <sup>103</sup>

|                                  |     |                |                                         |
|----------------------------------|-----|----------------|-----------------------------------------|
| Prunes                           | 烏梅  | 1 <i>shih</i>  | Dried Prunus<br>mume, Sieb. et<br>Zucc. |
| Persian Lilac Fruit              | 苦楝子 | 1 <i>shih</i>  | Melia Azedarach,<br>L.                  |
| Sal ammoniac                     |     | 1 <i>chin</i>  |                                         |
| Persian brass                    | 波斯鑰 | 2 <i>chin</i>  |                                         |
| Sparrow feces                    | 雀糞  | 1 <i>sheng</i> | Passer montanus<br>montanus, Brisson.   |
| Pewter from Ho-chou<br>[Kwangsi] | 賀州鑞 | 1 <i>chin</i>  |                                         |
| Tui                              |     | 5 <i>liang</i> |                                         |

Take two *sheng* of the Persian lilac fruit and grind it with aged rice wine. Two *sheng* of new vinegar is ground with one-half *sheng* of sparrow feces. These substances are then mixed to an even consistency with one *ko* of salt.

Make a trough, eight *ts'un* long, three *ts'un* wide, and seven *ts'un* deep, of mulberry wood. Put the previously enumerated ingredients into it. Melt one *chin* of Persian brass and add to it a little sal ammoniac. Stir the mixture thoroughly. Wait until it clears, and then pour it into the solution in the trough. When it has cooled take it out, wipe it with felt, wash it clean, and dry it by gentle heating. The next day it may be used. Avoid using an iron implement to stir the mixture. The treatment is carried

<sup>103</sup> This formula seems to be a link between the alchemical (or at least "multiplying") techniques of the West, presumably transmitted via Sasanian Persia, and those of T'ang China. One is tempted to argue that Sun characterized it in this way simply because the key ingredient was an import from Persia, but we have in the Pharmacopoeia of 1249 (14:13a-13b) statements from the time of T'ao Hung-ching on that Persian lilac grew widely in China; there is no indication that it was imported at all.

## Chinese Alchemy: Preliminary Studies

out ten times—melting the brass and pouring it into the trough of medicines—after which the product will be excellent.

### [Another Method]

|                  |    |                 |
|------------------|----|-----------------|
| White <i>tui</i> |    | 10 <i>liang</i> |
| Persian brass    |    | 4 <i>liang</i>  |
| Refined tin      | 鍊錫 | 1 <i>liang</i>  |

The *tui* must be melted first. Next the Persian brass is added; next add the tin and sal ammoniac. Stir and cast into ingots. This product is most excellent. If it is too brittle, put it into bovine fat and boil to soften; if its color is not clear, wash it with “plum bath.”

25A

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### THE PRIMEVAL REALIZATION ESSENTIAL FORMULA FOR USING BRASS

|                                  |    |                           |
|----------------------------------|----|---------------------------|
| Previously refined Persian brass |    | 2 <i>liang</i>            |
| <i>Tui</i>                       |    | 2 <i>liang</i>            |
| Sal ammoniac                     |    | a bit over 3 <i>tou</i> 豆 |
| Large salt crystals              | 大鹽 | 3 pinches 指撮              |

Put the ingredients into a crucible, mix them and melt them. Shortly after they have completely melted, apply the fire again, heating [the crucible] to redness. Pour the mixture into salt water. Repeat the treatment for a total of four or five times. Then wash the product in “plum bath” six or seven times, until it is white. Before putting it into the “plum bath” heat it red hot. The “plum bath” is also to be heated in a porcelain vessel until hot.

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THE PRIMEVAL REALIZATION FORMULA  
FOR USING REALGAR

[Note in text:] It seems that the orpiment in this formula actually belongs to the recipe for fixing realgar [or] orpiment which follows shortly.<sup>104</sup>

Realgar                    1 *liang*  
Orpiment                 1 *liang*

Put the ingredients into lard and heat it to a boil three hundred times. Then take ten *liang* of refined copper and three *liang* of *tui*. Melt [with the product of the first phase of treatment] and stir. Take powdered black alum and throw it into the melt. The product is excellent.

25B

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THE PRIMEVAL REALIZATION FORMULA  
FOR USING IRON

Take cast iron, pound it into pieces, sift and grind fine. Ten *liang* [of the powder will be needed]. Beat tin into a thin sheet and shape it into the form of a cup, wrapping the above powder in it. Burn wood of the white wax tree 攪木 [Ligustrum

<sup>104</sup> The annotator is concerned because the *title* of this formula does not mention orpiment, whereas the *use* of orpiment is not specified in the formula below entitled "Formula for Using Tin to Fix Realgar [or] Orpiment." His view is that the one ingredient was transferred from the latter recipe to this—a conclusion which explains the facts quite adequately at the same time that it posits what would seem to be an unnecessarily complicated variety of textual corruption. There is no conjunction between "Realgar" and "Orpiment" in the text of the latter title. My insertion of "or" is dictated by my solution of this problem, which also involves regarding the orpiment in the present recipe as one of the substances used *to fix realgar*. Following the solution of the annotator, the conjunction "and" would be called for.



## Chinese Alchemy: Preliminary Studies

japonicum, Thunb., or related] to ash and grind it thoroughly, so that it becomes a lustrous powder.<sup>105</sup> Then put it into the tin cup, which is in turn put into a refractory crucible 甘塢. The latter is placed inside a forced-air ["blast"] furnace 風爐 and fired. Wait until the iron seems about to stir within its container; then take [tin] (which should not be broken too small), wrap it in paper, and put it inside the furnace, on top of the iron. The iron will then boil. When you see that the tin has solidified, add *tui* to augment it.<sup>106</sup> Allow the *tui* to begin boiling. If it does not then penetrate the iron phase, add *wu-lang-t'eng* 勿郎藤<sup>107</sup> The *tui* and iron will thereupon blend. Then rub the *tui* down [into the iron] with an iron spatula. Skim off any impurities. When the *tui* no longer moves, lower the crucible to the interior of the furnace, covering it with hot ash. After some time has passed, probe with the spatula to expel the remaining hot *ch'i* [= gas]. With a bunch of bamboo fiber, "wash off" the tin by daubing water onto it two or three times. The product may be used as desired.

26A

As to *wu-lang-t'eng*, its stem is as big around as one's finger; its fruit are also edible, having a slightly sweetish taste. It grows in the mountains or sometimes in level areas. It wraps itself about other vegetation. On its stem there are thorns, which grow in opposed pairs. Its leaves resemble those of male-fern [? 邊鴈齒]; each is as big as one's finger. The leaves [also] grow in opposed pairs. When gathering it, do not disturb [the rest of the plant], but take only the root.<sup>108</sup> It must be dried in the shade, not in the sun. In the seventh

<sup>105</sup> If my emendation of "攪" to "攪" (which is based on the close similarity of the characters and on the author's tendency to specify ingredients exactly) should be unjust, the translation would read "faggots" instead of "wood of the white wax tree."

<sup>106</sup> It is particularly necessary that this preparation be carried out in the laboratory to determine what sense, if any, can be made of these enigmatic directions.

<sup>107</sup> This vine, which seems to be ignored elsewhere in alchemical, medical, and botanical literature, is described immediately below.

<sup>108</sup> My interpretation of this sentence is conjectural.

*Tan Ching Yao Chueh: Annotated Translation*

and eighth lunar months the fruit is ripe; then it is red in color.

As to the iron, take that used for plowheads. That white in color is superior; the rest are unsuitable for this use.

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FORMULA FOR USING TIN TO FIX  
REALGAR [OR] ORPIMENT

[Note in text:] This formula should include orpiment, but in the present case it is missing from the original text.

|           |                 |
|-----------|-----------------|
| Realgar   | 10 <i>liang</i> |
| Powdered. |                 |
| Tin       | 3 <i>liang</i>  |

Melt together in a kettle. Take the mixture out, put it into a leather pouch, and deform it by hand until it is broken up. Place it in a refractory crucible to be heated. After the crucible is charged, put its cover on and lute it tight. Put it into a forced-air furnace and feed air until the crucible is the same color as the interior of the fire. Cool and open the crucible. The color of its contents will resemble that of gold. The product is excellent for fixing other substances. The two materials [realgar and orpiment] may be fixed separately according to the proportion given.

26B

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FORMULA FOR MAKING SAL AMMONIAC  
BATH RESERVOIR

|                   |                            |
|-------------------|----------------------------|
| Sal ammoniac      | 5 <i>liang</i>             |
| Prunes            | $\frac{1}{2}$ <i>sheng</i> |
| Crushed.          |                            |
| Fortified vinegar | 1 <i>sheng</i>             |

## Chinese Alchemy: Preliminary Studies

Simmer the ingredients together in an earthenware vessel until the volume is diminished by two fifths, after which it is ready for use.

### *Commentary*

No directions for, or allusions to, the use of this product have been found, but it would function very satisfactorily as a dip for preliminary or final cleaning of metals, especially because of the co-presence of whatever hydrogen and chloride ions are left after boiling.

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### FORMULA FOR MAKING PLUM BATH

|       |                  |                                     |
|-------|------------------|-------------------------------------|
| Plums | 梅 2 <i>sheng</i> | <i>Prunus mume</i> , Sieb. et Zucc. |
|-------|------------------|-------------------------------------|

Remove seeds and crush.

Boil in an earthenware vessel with one *sheng* of water and one-half *sheng* of salt. Heat [the metal to be whitened] red hot and wash it [in this bath].<sup>109</sup>

27A

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### FORMULA FOR MIXING DEMON-KILLING PELLETS FOR USE IN THE PREPARATION OF ELIXIRS

Cinnabar

Realgar

Orpiment

|                     |    |                             |
|---------------------|----|-----------------------------|
| Black veratrum root | 黎蘆 | <i>Veratrum nigrum</i> , L. |
|---------------------|----|-----------------------------|

|                       |     |                               |
|-----------------------|-----|-------------------------------|
| Bittersweet fruit [?] | 鬼比目 | <i>Solanum dulcamara</i> , L. |
|-----------------------|-----|-------------------------------|

|            |    |                                |
|------------|----|--------------------------------|
| Peach pits | 桃仁 | <i>Prunus persica</i> , Stoker |
|------------|----|--------------------------------|

<sup>109</sup> *Pao p'u tzu nei p'ien* (4:13a) mentions cooking artificial "gold" with white plums to harden it.

*Tan Ching Yao Chueh: Annotated Translation*

|                                               |     |                                                                |
|-----------------------------------------------|-----|----------------------------------------------------------------|
| Chinese aconite tuber,<br>collected in spring |     |                                                                |
| Same, collected in<br>autumn                  | 附子  |                                                                |
| Pinella tuberifera bulb                       | 半夏  | <i>P. tuberifera</i> , Ten.                                    |
| Sulphur                                       |     |                                                                |
| Croton seed                                   | 巴豆  | <i>Croton tiglium</i> , L.                                     |
| Rhinoceros horn                               |     |                                                                |
| [A rhizome of a <i>Hosta</i><br>species]      | 鬼白  |                                                                |
| Musk                                          |     |                                                                |
| Atractylis root                               | 白赤朮 | <i>A. ovata</i> , Thunb., or <i>A. macrocephala</i> , Koidzumi |
| Spindle tree wings                            | 鬼箭  | <i>Evonymus alatus</i> , Regel                                 |
| Centipedes, dried                             | 蜈蚣  | <i>Scolopendra morsitans</i> , L.                              |
| Gelsemium root                                | 野葛  | <i>Gelsemium elegans</i> , Benth.                              |
| “Cow bezoar”                                  |     |                                                                |

Take two *fen* of each, pound and sift to obtain a powder. Mix with an infusion of Japanese anise follicles 茴草汁 [*Illicium religiosum*, Sieb. et Zucc.] to form pellets, each the size of a hen's egg. Burning one pellet will kill every sort of demon. Pao P'u tzu used this medicine while subliming Triply-Wondrous Elixir 三奇丹.<sup>110</sup>

*Commentary*

Almost every ingredient of this incense is a poison. It would provide an intensely irritating smoke. Its effects on demons are, no doubt, inferred from its effects on humans.

<sup>110</sup> I presume he used it for its stated purpose, although it would be as correct syntactically to translate “to sublime” instead of “while subliming.” Neither the formula for nor the name of “Triply-Wondrous Elixir” appears in either of the two works named for Pao P'u tzu (*Pao P'u tzu wai p'ien* 外篇—the “exoteric chapters”—is a very eclectic Confucian work ordinarily printed together with the Taoist *nei p'ien*). Since the elixir is listed

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FORMULA FOR REFINING KALINITE  
TO FIX MERCURY

Kalinite from Ping-chou 并州

10 *chin*

27B

Pound to powder. Mix with alum from Kua-chou [Kansu] and fortified vinegar [, dry, and mix again with vinegar] thirty times. Put it into a reaction vessel 釜 and sublime it. Open the vessel once each twenty-one days and add one-third part of raw kalinite. Mix with the raw kalinite and sublime again. (The raw kalinite is sharp in nature). Stop as soon as it is united [with the treated alum]. The product, sublimed for thirty days or more, will be of the shape of ants, and will be lustrous and lovely. That sublimed for one hundred days will be even finer.

Collect the product, wrap it in silk, put it into a bamboo tube, and steam it for three days and nights. Pulverize the resulting substance. Each *liang* will fix 制 one *chin* of mercury. If [the treated mercury] is then heated to redness, boiled in fortified vinegar, dried [, and the process repeated as necessary] until the color of the material is purple or dark red, it will no longer ascend in the reaction vessel.<sup>111</sup> It may then be roasted according to the procedure given. Sorrel 赤瑾 [Rumex acetosa, L.]<sup>112</sup> is packed around the sides and top of the reactants. The charged vessel is placed in a forced-air furnace and heated for

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in *Shih yao erh ya* (List A) as one for which the formula is known, this sentence can be interpreted as referring to what might be called a hagiographical tradition.

<sup>111</sup> That is to say, it is fixed.

<sup>112</sup> I emend “瑾” to the closely related homonym “莖,” so that this ingredient is sorrel instead of scarlet glass. *Ch'ih chin* is an alchemical term for sorrel shoots, defined only in the Sung compilation *Chu chia shen p'in tan fa* (4:1a,2a,3a). The Great Pharmacopoeia says of sorrel (19:94, s.v. 酸模) “juice obtained from the roots and leaves is used to prepare sublimes; it may be used to fix realgar and mercury 制雄汞.”

## Tan Ching Yao Chueh: Annotated Translation

one hundred days, after which time it will change into ash when exposed to air 風化為灰。

For each three *chin* of the kalinite use one *chin* of fat 脂 . Fry and stir them together in an iron vessel until the fat is completely used up. Ten *chin* of mercury is put into an iron vessel with this kalinite and heated strongly, stirring the while; the process is completed when fumes are no longer emitted 煙入 .<sup>113</sup> Afterward pack earth about the treated mercury, sealing it in tightly. Place the whole in a reaction vessel and heat for nine days and nights. It may then be used.

28A

If it is possible to first simmer the fat until no further change takes place, and then put it into an earthenware crucible and heat for one hundred days [before mixture with the kalinite], it will be even better. Take a footed iron vessel, put the fat in, heat it to boiling, and add the powdered kalinite. If this is done once, the product will be [hard] as tin; if repeated, it will be [hard] as stone.<sup>114</sup>

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### FORMULA FOR MAKING WHITE JADE

Take large clamshells 蛤蜊 , pulverize, and grind fine. Put one *chin* of the ground shells into a bamboo tube, insert some Epsom salts, and seal the ends of the tube tightly. Immerse the tube in fortified vinegar. After twenty days the oyster shells will have liquefied. Then take one-half *chin* of quartz, pulverize, and pour into the tube, whereupon the solution will coagulate. Extract the product and heat it to redness over a good charcoal fire; it will become white jade, which may also be taken internally.

<sup>113</sup> This is only the probable meaning, for the text is unclear at this point; the literal sense of the last part is "[when] fumes enter."

<sup>114</sup> The properties inserted are only probable guesses.

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FORMULA FOR MAKING PEARLS <sup>115</sup>

[Note in text:] Two recipes.

28B Take lustrous oyster shells 蚌殼 [Pinctada], remove and discard the outer layer, and boil the rest [namely, the mother-of-pearl] in vinegar until cooked up. Remove from the flame and pull the product into thin filaments. Roll these into pearls of any desired size. Take a carp [Cyprinus carpio], lay its stomach open, place the pearls within, and close up the carp again. Steam it until it is extremely well done, and then remove the pearls.

Before steaming the pearls [in the carp] use a pig's bristle to pierce holes for stringing. Then take muscovite and heat it in the milk of a white goat. After the milk has been raised to the boiling point several times, remove the mica. Warm the milk again, immerse the pearls in it, and let them steep overnight. Wash them clean and they are done.

*Another Formula*

Mix powdered oyster shell with fish glue to form pearls. They may be of any size desired. Pierce holes for stringing. Dry the pearls by gentle heating, placing them in the vicinity of a fire of straw. Prop up a roof tile <sup>116</sup> with two bricks. Place the pearls on the tile and then place another tile on top, plaster-

<sup>115</sup> Taking the literal meanings of the two characters, "chen chu 真珠" would be rendered "real pearls," but that is not an accurate translation of this wholly conventional term. *Chen chu* need no more be genuine than a *pao chien* 寶劍 (lit., "precious sword") need be precious. On no account may this title be taken as evidence that the author believed he was making the real thing.

<sup>116</sup> I have found it impossible to make sense of these directions unless "甃" is emended to "瓦." While it is difficult to see precisely how such a corruption would take place, I offer it with some diffidence because it appears indispensable. The possibility was first suggested by Yang Lien-sheng. The adjacent concave faces of the two tiles would form a combustion chamber.

*Tan Ching Yao Chueh: Annotated Translation*

ing bricks all round to make the form of the whole that of an oven. Heat it to redness by application of a fire of straw; then extract the pearls. Put this [preparation of] powdered oyster shell into a bamboo tube. Seal the mouth of the tube <sup>117</sup> and place it in an earthenware vessel. After steeping it in fortified vinegar for ten days there will be a change of color; the pearls will be finished.

29A

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FORMULA FOR MAKING GRANULAR MALACHITE

石碌 [CuCO<sub>3</sub>·Cu(OH)<sub>2</sub>]

|             |    |         |                                          |
|-------------|----|---------|------------------------------------------|
| Verdegris   | 銅青 | 1 chin  | CuAc <sub>2</sub> ·CuO·6H <sub>2</sub> O |
| Indigo      | 石黛 | ½ chin  | [see next formula]                       |
| Orpiment    |    | 5 liang |                                          |
| Cypress sap | 栢汁 | 1 chin  | Thuja orientalis, L.                     |

The ingredients are thoroughly mixed, dried in the sun, placed in a reaction vessel, and heated until there is no further change. The product is most excellent in use.

*Commentary*

Here verdegris is dyed to give it the bluer color of the more valuable pigment malachite.

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FORMULA FOR MAKING INDIGO

Sappan wood 蘇方木 ½ chin Caesalpinia sappan, L.  
Broken into tiny pieces.

Boil the wood in two *tou* of water until the volume of liquid is reduced to eight *sheng*. Then add two *fen* of lime 石灰

<sup>117</sup> This translation is extremely problematical. The text is unclear and corrupt at this point; the least rapacious emendation which I can suggest is “固筒” for “四筒.”



## Chinese Alchemy: Preliminary Studies

[CaO or Ca(OH)<sub>2</sub>] and stir until the material reaches a creamy consistency. Continue simmering until the liquid is gone. Remove the residue and soak it in vegetable blue infusion 藍汁 for five days. It is then finished and may be put to use.

### *Commentary*

This recipe for counterfeiting indigo was no doubt prompted by the high value of the genuine material, which was imported in the T'ang. "Shih tai" ordinarily means "graphite," not "indigo" (which was called "ch'ing tai 青黛"), but there is no doubt in this case. Vegetable blue was prepared in ancient times, in fact, by stirring the raw material with lime and separating the fine blue particles by flotation. This method thus seems somewhat confused, but the basic principle of deepening the native dye with a concentrate of red sappan pigment is clear.

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V

*Tan Ching Yao Chueh: Critical  
Edition of the Text*

THE TEXT which I punctuate and edit here is photographically reproduced from the *Tao tsang* edition of *Yun chi ch'i ch'ien*. I have chosen it not because it is in better condition than the *Ch'ing chen kuan* edition (abbreviated CCK below), but because it is fuller and, as I have shown in Chapter II (p. 56), because it is the recension upon which Chang Hsuan's is based.

Most emendations (indicated by an arrow, →) which affect the sense of the text and require more than a word or two of explanation are justified in the footnotes of Chapter IV; references to the notes appear in parentheses below. Emendations which accept better readings in Chang Hsuan's edition are explained by a note of the form “甲 → CCK 12a4 乙,” which refers to line 4 on the recto of page 12 in CCK. In a few cases in CCK, the order of ingredients in a list has been altered slightly in order to fit them to a shorter line; these changes are

## Chinese Alchemy: Preliminary Studies

not noted here. Emendations which substitute a homophone or a visually similar character to correct an obvious corruption are recorded in a note of the form “甲 → 乙 (sense).” In order to facilitate reference to the translation in Chapter IV, the original pagination of the *Tao tsang* text has been marked in Arabic numerals in the upper left corner of each page below.

*Systematic variants in CCK:* 盖 for 蓋; 石岡 for 石岡; 烱 for 洋; 錠 for 錠 (except in 16a2 and 17a4); 硝 for 消 (n. 82); and 蚌 for 蚌.

雲笈七籤卷之七十一

政二

宋朝葉崇書本其與葉崇書經籍錄卷之七十一

金丹

太清丹經要訣并序

余歷觀遠古方書。悉云。身生羽翼。飛行輕舉者。莫不皆因服丹。每詠言斯事。未嘗不切慕於心。但恨神道懸靈。雲跡踈絕。徒望青天。莫知昇舉。始驗還丹。伏火之術。玉醴金液之方。波乎難窺。香焉靡測。自非陰德。何能感之。是以五靈三使之藥。九光七曜之丹。如此之方。其道差近。此來握玩。既久而彌篤。雖艱遠而必造。縱小道而亦求。不憚始終之勞。詎辭朝夕之倦。研窮不已。冀有異聞。良以天道無私。視聽因之而啓。不違其願。不奪其志。報施功效。其何遠歟。豈自銜其所能。趨利世間之意。意在救疾濟危也。所以撰二三丹訣。親經試鍊。毫末之間。一無差失。並具言述。按而行之。悉皆成就。然人之志所重者。性命。其危寒露。其脆秋霜。俯仰之間。相顧如失。榮華貧賤。誠為不佳之容。憂悲娛樂。並是難留之事。以此而

1A

1B

1a2-1a4, CCK 1a2-1a5 宋張君房集/明張蓋訂/金丹部/太清真人金丹  
 1a5-2a8, missing in CCK.

言深可歎矣。余比讀諸方，故亦不少。觀其梗槩，多隱秘。味之者，翻增其惑。說之者，返益其迷。遂使修鍊之流，不見成功之處。曾其古人妄說耶。抑由學道之輩，自不能考其旨趣也。余所陳方，意於文記間。如視掌中一試，彼尋莫不洞照。相知之士，通鑒名人，有所不同心之取證，故刻為三篇耳。處士孫思邈撰

諸丹目錄三品

初陳神仙大丹異名三十四種

太一玉粉丹。太一召魂丹。返魂丹。更生丹。金生歸命丹。四神丹。太一神精丹。神變丹。神液丹。假使通神丹。五靈丹。昇霞丹。靈化丹。三使丹。捧香丹。太一丹。使者丹。奔雲丹。控鶴丹。八石丹。麗日丹。素月丹。度厄丹。持節丹。絳色葉遊丹。雄黃赤丹。赤雪流珠丹。紅景丹。赤曜丹。重輝丹。紅紫相間丹。良雪丹。月流光丹。水銀素霜丹。

右所陳諸小丹法等，雖時所稱用，然其丹異名未必各知，所以今並列之。

次陳神仙出世大丹異名十三種

2A

2B

2a9 大 → 小 (n. 9).

2b8 等, missing in CCK 1b5.  
2b9 各 知 之, CCK 1b6 能 知 .

黃帝九鼎丹。九轉丹。大還丹。小還丹。九成丹。  
素子仙童丹。九變丹。太仙霞丹。太和龍胎丹。  
張大夫靈飛丹。昇仙丹。神龍丹。馬仙人白日  
昇天丹。

右諸大丹等，非世人所能知之。今復標題  
其名，記斯篇目，而終始不可逮，值也是以  
其間營構方法，並不陳附此。其有好事者，  
但知其大略也。

次陳非世所用諸丹等名有二十種

八景丹。金華丹。玉味消災丹。神光散馥丹。凝  
霜積雪丹。奔星住月丹。墮月驚心丹。金液玉  
華丹。茅君白雪丹。白雪赤雪丹。紅絡垂壁丹。  
七星辟惡丹。七曜靈真丹。流石鮮翠丹。金輝  
吐曜丹。太清五色丹。北帝玄珠丹。感靈降真  
丹。群鬼昇雲丹。太白精丹。

右按其方服之，神仙既藥物難具，營作非  
易，所以但列其名，不復陳其法式。若好事  
者，宜以廣知其名也。

造六一泥法

凡飛金轉石，唯以六一為要。自遠代諸賢，銷

1A

1B

3a7 其有，CCK 2a4 有  
3a10 味 → 三 味？  
(n. 29).

3a5 等，missing in CCK.  
3a8 但 → 虛？(n. 28).

3b2 白雪亦雪 → 白雲亦雪 (n. 31).  
3b3 石 → 石 (n. 34).  
3b3 全 → 全 (sense; see Appendix C, p. 261).  
3b9-9a9, missing in CCK. See CCK, 68:23a-28b.

鍊之流莫不咸蔽其事。大都相傳法者皆用  
 礬石、赤石脂、左顧牡蠣、礬石、滑石、戎鹽、油膩  
 等。或妄用蚯蚓糞者。以此等藥。並亦具鍊作  
 之方。其方法又各各不同。作之例皆不能精  
 了。古來名方要術。無不備經試鍊。就此之中  
 亦有不盡其理。不見一事近易歸者。余常為  
 之發憤興歎。不能已矣。自謂古人隱秘斯術。  
 且誑將來學者。又按古方並同礬石。用黃土  
 泥燒之。經夕即自然成其細粉。余遂依法燒  
 之。經兩三日。竟不覺有異。謹因閑暇。更依古  
 方燒鍊。可經十日已來。以指微捻。乃成爛粉。  
 尤潤可愛。亦細膩希奇。更取新礬石燒之二  
 十餘日。到加乾石。全不一種。始知一切方法。  
 不可率爾輕試之。不依古法。即云無驗。如此  
 者。觸目皆是。又礬有種類不同。所出之處各  
 異。并州與嵩嶽出者為良。自外者不堪入用。  
 鍊礬石法。凡鍊礬石器。以黃土作之。其狀似  
 竹管。可長五六寸。闊三四寸。以礬二三分。其  
 口已上。瓦作蓋蓋之。礬石內筒訖。別以細沙  
 并黃土等分為泥。泥筒周適可厚一二分許。

44

48

4a6 corrupt? (n. 37).

4b3 corrupt? (n. 37).

緩火炙之令乾。又更泥。泥又更多。炙令乾。然後入爐燒之。但使將息。伺候得所。必萬無一失。

造燒礬石爐法。其爐壘高二尺。明闊一尺。其下四面各開一小門子。擬牽風擊火也。又時

時去積灰。一頭別一箇鐵釜。大小與藥筒相稱。高可三四寸許。即以鐵釜置爐中。筒於釜上。以炭燒之七日。明使晝夜火氣不絕。恰好。更不勞多。日滿。取之。研極細。別以赤石脂。羅擣。節相和為泥。作餅子。可厚半寸。濶四寸。曝

之令乾。右於礬石爐中燒之一日。更細擣。節。極細研之。別入生赤石脂。細擣。節。訖。與成鍊者等分相和。和訖。又以礬石及赤石脂二分。和之為泥。稀稠得所。攪之令極熟。用之泥。全固濟。一泥以後。即一手取藥。更不得重看。其

藥氣水不畏先。余用之多遍。唯覺善。莫能加焉。

礬石宜取燉煌者。輕手擣之。以馬尾蘿下節之。訖。置鐵釜中。以猛火熬。令汁盡。又擣。節。令細。每計赤石脂與礬石二分相和。訖。計所和

5A

5B

5b6 九 → 失 (n. 41).



之粉五兩內可加戎鹽一兩、油膩二兩、合和亦無妨、不著亦得。凡作六一泥者、只爲固濟欲使牢固。今只二種藥爲泥。又加一二種亦損者。何煩多種。其六一之名、乃是古人隱秘之語。其六上加一、便是爲七。以七種藥爲泥。故云六一也。世人不識、不知何以名之六一也。滑石所出處。其石本出東華州。今人不究其根本、乃用崑崙所出者爲六一泥。所謂圖北向南。於理殊非所允。又其石性有數種。硬者細。細擣之、篩、研、令熟、用之益佳。

6A

○左顧牡蠣法。左顧牡蠣者、意本取其細膩。比試向經二三度。亦經火鍊而用者、亦經不鍊而用者、皆無意。即知此一味、乃是無用之物。若更有別法用之爲佳者、非余所知也。  
戎鹽法。戎鹽本方亦不的言出處。既不知所出。即知出戎鹽之地、亦不知用何者爲良。見人皆云識之。實不能知。孰是南人所出。以南土無有此鹽。故關中所出者爲是。余復陳此愚見。亦不知是人識者。宜詳而用之。雖貴之有能。然用礬亦相似。好事君子知之焉。

6B

6a7 半 → 菜 (n. 42).  
6a10 細和 → 藥田? (n. 44).

酒鹹法。此物本出同州東北隅、去城可七八里。生陂澤中。其狀似河中細顆鹽。其味苦而不鹹。本方亦不言出處。人用平澤中地有鹹蒸之處。因辯其土白嫩之色者為是。今推其所由於理。又全乖錯。用之無驗。特為於此。同州所出者。若入六一泥。用極理粘好。今但礬石、赤石脂、礬石等。並依所陳之法細用之。則不復須此藥矣。諸好事者。於此更勿猶豫也。本方亦云用蚯蚓糞為泥。亦曾用之。乃與常土不異。於理殊非所宜。

76

凡六一泥所言諸藥等。其有所用之徒。豈不能精識其委曲。雖時有識者。又不開將用之法。求鑪火之妙理。亦難為具悉。今着條件六一泥者。味雖不多用之極善。直云固際神膠。足得為上。何必要須六一也。凡按古方合鍊。多不見成者。古人但恐文繁。所以不能具載其事。以此作者。遂無一法能就。非深知其本末者。則孰能照其出處乎。

造上下釜法

石下釜。鑄鐵作之。深三寸。明闊八寸。底厚六

77

7a5 為一→記？(n. 47).

分四面各厚四分。其層闊半寸、厚三分。平穩作之。勿令高下之也。右。上釜。作之高一尺。明闊八寸、厚三分許。唯飛雄黃上高五寸以外。不平。下釜並圓作。凡欲有心試鍊者。其上下釜並依樣作之。大都形勢更不過此法。其間上下釜。但能將息用者。永無破壞之日。余自好道術已來。向二十載餘。種種歷試。備曾經涉。其中校殊。無所不爲之者。並無成法。資財糜竭。不免至於困弊。今用此上下釜。始離其艱辛。其上下釜。即須用以六一泥塗之。其泥和稀稠得所。攪刷遍塗之。日曝令乾。乾後依前塗。曝乾之。可三四遍。計厚三分許。必無壞時。其上釜以泥一二遍亦好。不塗亦得。今以六一泥塗上下釜者。乃久。亦何必須土塗釜也。糖和乃是舊法。用既無驗。雖舊何爲。若有所不知。亦不簡於今昔。古人賢則賢矣。然不廢於此事。多不能知其理也。

### 造竈法

右。其門高六寸、闊五寸。以鐵爲之。其坡勿令向上。宜下開之。可高三寸半許、闊二寸半。若

向上開者火則微斲。向下開之為佳也。

### 用六一泥固際上下塗法

右留前所調和泥。用小鐵匙均厚三分以來塗訖。又緣合下塗上。輕手按之。勿令過度。即以六一泥周迴遍泥其際。乾即以文火細細使積漸就乾。若有折裂處。復以鐵匙取泥泥之。周悉。直至藥成以來。更不勞再視。此法易而且要也。

### 太一玉粉丹法

朱砂一斤 雄黃一斤 玉粉十兩

右玉粉極硬難搗。但以生鐵臼搗之。以輕踈綃羅之。再度即得入用。磁石粉十兩。其性極硬。亦依玉粉法治之。以水沉取細者。用之篩用亦得。

紫石英五兩 白石英五兩 銀粉五兩

空青十兩 流良雪一斤用銀雪

右以打作薄。以河東鹽合搗研。令細。綃羅下不盡者。依前更著鹽。研篩。以盡為度。即以藥末等和。以醞醋微濕拌之。曝乾。可十遍餘。上先以白鹽為藉。次布藥末等訖。又以鹽覆之。

9A

9B

9a4 下 塗 上 上 一 下 塗 (sense).  
9a10 朱, CCK 2b6 珠.

9b1 搗, CCK 2b7 搗 twice.

即以上下釜相合。以六一泥固濟。以文武火  
 九日九夜。寒之一日一夜。開看。燥徹如寒霜  
 素雪之狀。又似鍾乳垂穗之形。五色備具。無  
 可比象。又更還取藥。三遍以醋拌如前。以白  
 鹽末覆藉。依前法布之。更無別異。如此可  
 四五轉訖。一依鍊金英丹法鍊之訖。然後將  
 服。其勢力不若金英丹。二種藥並能延人壽  
 命。愈疾。除此一小。有陳丹消毒之者。至幽深  
 難解。自非妙闕訣法。豈造次而可悟也。今所  
 陳列。一無隱秘。冀有雅好之士。請於此無感  
 焉。

10A

### 太一三使丹法

水銀霜一斤 朱砂十兩  
 石亭脂十兩 雄黃十兩

右朱砂等三味別搗訖。和布置不異前法。還  
 以銀霜布諸藥上。帛覆之。合上下釜。固濟。飛  
 之。凡用猪負革脂者。是老母猪近脊梁邊脂  
 也。

### 造紫遊丹法

朱砂 雄黃 曾青 石亭脂 各五兩

10B

10a2 徹，CCK 3a7 漱。  
 10a8 小小 → 个 = 個 (sense).

10b3 兩，CCK 3b7 斤。

右別搗研水銀十兩。別研石膽三兩。別搗。飾  
 白石英。別熬令沸盡。取三兩。此別味恐是錯。  
 多是日華。石英不沸也。陽起石三兩。別搗。石  
 膽六兩。別搗。飾。取東嶽者。用之。鑿石五兩。且  
 爾。飾。生用之。朴消六兩。別研。飾。磁石三兩。別  
 搗。飾。又朴消三兩。和諸藥。餘三兩。用覆諸藥  
 上。自外者。並依前法。治理如前。醋拌。令依法。  
 十遍餘。止。其布置飛鍊日數。重轉一依前。無  
 異同也。凡承前已來飛鍊諸藥等精訖。皆須  
 重轉三兩度。然可堪用。比見丹無驗。唯學素  
 害者。為轉數不多。所以無驗矣。但飛鍊未曾  
 重轉者。如此雜石未得丹者。氣盛在藥中。不  
 委何待。然聖人設法。意在救危難。且世中庸  
 愚情在名利。先不開藥理。復不究方書。或見  
 淺方。或聞傳說。因即孟浪頑心。自謂更無比  
 類。復有無知之輩。視聽未弘。疾疹既纏。豈與  
 力惜。未之於彼。又偃仰風神。旨在得物。為未  
 欲愧於容色。余亦不欲論之於此。然性命之  
 事非輕。但雜石稍堪服食。實為非久。請有道  
 君子審而詳之。忽有失理於毫微。幸改之從

11A

11B

正耳。

造小還丹法

水銀一斤 石硫黃<sup>四兩</sup> 飛鍊如朱色

依大升法。出毒了。研如粉。

光明砂<sup>三兩</sup> 別搗 犀角末<sup>四兩</sup> 別搗 研

麝香<sup>二兩</sup> 別研

右五味攪和令調。以棗肉和為丸。如大麻子許。每食後一九。去心忪熱風鬼氣邪疰蠱毒。天行瘟瘡。鎮心益五藏。利關節。除脹滿。心痛中惡。益顏色。明耳目。熱毒風。服五百丸。瘟瘡服一百丸。天行飲下十九。蠱毒准上。心忪二十九。每食後只可二三丸。不可多服。壘至如前。功能不可具載。略而言之。餘依本草。

12A

又法

石亭脂<sup>四兩</sup> 水銀一斤

鉛黃華<sup>三兩</sup> 金<sup>一兩</sup> 成磨音

右水銀金鉛黃等加功細研。取大鐵瓶。當磨之。末硫黃三兩。先布瓶下為籍。次下前三味訖。又布餘一日硫黃末為覆。次下蓋都單以六一泥固濟。火先文後武。七日七夜止。又寒

12B

12a5 角 木, CCK 5a6 牛  
12a9 鍊, missing in CCK.

12b9 日 → CCK 5b9 兩.

半日。開之。其中盡化為丹。煥然暉赫。光曜眼  
 目。唯此丹一兩用牛黃麝香各半錢重。於洪  
 州土鉢中。以玉錘研之極細。用景穰丸如梧  
 子。每日食後。景穰之食三九。治風顛癲。失心  
 鬼魅魘等。久服。凝骨髓。益血脈。潤肌膚。出  
 顏色。安竟鬼通神仙也。

造良雪丹法

汞一斤以鍊成。十三兩錫破。以次計之。即時  
 合者。八兩汞。六兩半錫。其中雜藥。謹錄如左。  
 白礬六兩。於鑪中鎔。以火熬。濃盡使乾。訖。  
 即搗篩為末。用此鍊白礬。今時鍊六兩。秤得  
 五兩。黃礬四兩。為末。於鑪中熬。使乾。更搗篩  
 為末。太陰玄精二兩。搗篩為末。朴消二兩。搗  
 碎。熬使水氣盡。為末。伏龍肝四兩。為末。取一  
 兩。和鹽及諸藥。增鹽六兩。搗篩為末。於鑪中  
 熬。取乾。初鍊錫三遍。訖。更鎔投好醋中。殺錫  
 毒。更於鑪中鎔。訖。以水銀投錫中。以鐵杖攪  
 使相和。置薄。掘地作淺坑子。以一張紙藉下。  
 取寫。勿流於地上。紙上留者。水銀和銀是也。  
 仍以好醋噴之。使濕。即急蓋其上。次熬鹽。使

11A

11B

13a2 錢, CCK 6a3 兩.  
 13a3 枹 → CCK 6a4-6a5 枹枹.

13b9 銀 → CCK 7a1 錫 (n. 68).



半日開之。其中盡化為丹。煥然暉赫。光耀眼目。准此丹一兩用牛黃麝香各半錢重。於洪州土鉢中。以玉錘研之極細。用棗穰丸如梧子。每日食後。棗裏之食三九。治風顛癲。失心。鬼魅魍魎等。久服凝骨髓。益血脉。潤肌膚。出顏名。安竟鬼。通神仙也。

造良雪丹法

汞一斤以鍊成。十三兩錫破。以次計之。即時合者八兩汞。六兩半錫。其中雜藥謹錄如左。  
 144 昇白礬六兩。於鑪中鎔。以火熬。濃盡使乾訖。  
 即擣篩為末。用此鍊白礬。今時鍊六兩。秤得五兩。黃礬四兩為末。於鑪中熬使乾。更擣篩為末。太陰玄精二兩。擣篩為末。朴消二兩。擣碎。熬使水氣盡為末。伏龍肝四兩為末。取一兩和鹽及諸藥。增鹽六兩。擣篩為末。於鑪中熬取乾。  
 145 初鍊錫三遍訖。更鎔投好醋中。殺錫毒。更於鑪中鎔訖。以水銀投錫中。以鐵杖攪使相和。置薄掘地作淺坑子。以一張紙藉下。取寫勿流於地上。紙上留者水銀和銀是也。  
 仍以好醋噴之使濕。即急蓋其上。次熬鹽使

14a2 蘇, CCK 7a3 粗. 14a4 二匙. 14a8 二匙. 以匙 (sense).  
 14a6 泥 → 抵 (sense). 14a8 總, CCK 7a8 總.

14b2 癩, CCK 7b2 癩.  
 14b5 三二, CCK 7b5 二 三.

乾訖。取黃礬、白礬、伏龍肝二兩，總和搗。勿留於臼中。搗之為末，以麤篩度之。入少許醋，拌勿使濕。取二兩伏龍肝，藉釜下。鐵匙投之，使平實。次以鹽燥末二匙，按使平實。次扑消還，以匙撥使平實，即內藥。但平撥不須實。以匙多少派使平整。即以盆子覆上，固濟使密。著火三日兩夜，開藥收取。如恐不盡，所有惡者，并釜中藥滓，總和於一小盆中。取少醋噴之，使纔潤。細研之訖，以一匙內底蓋鹽，依初飛法固濟訖。著火兩日一夜，即開看。所有水銀並皆盡矣。取藥即休。此藥主鎮心安藏，除邪瘴惡氣，疰忤風癩風癩等疾。飛藥三兩轉已。後可研令極細，以棗穰和為丸。丸如麻子大。每日服四丸。若不覺有異者，漸加至六七丸。每旦服之，不過三二丸。其藥性微冷。若先患冷疾，不宜服之。治傳尸瘡癩癘時氣一切熱病，入口立愈。神效。若用入面脂，治疔黯太陰玄精。出河東解縣界鹽池中。水採之。其色理如玉質，無異。其形似龜甲。以珠黑重者不堪。黃明者上也。

15A

15B

15a7 變，CCK 8a6 曾。  
15a9 飯，corrupt? (n. 72).

15b7 復 → CCK 8b5 腹。

石亭脂 十斤 鹽花 五升

伏龍肝 二斤 左味 三斗

石亭脂破如豆大。用鹽花和左味煮之七日七夜。其脂以布袋盛之。懸勿令著鐵。者毒  
 性盡出。研和前伏龍肝令均。入內釜中。先布  
 鹽花安亭脂。盡上還將白鹽為蓋了。固濟之。  
 三日三夜。文武火依前法鍛訖。寒之半日。開。  
 謹案。本草云石亭脂。味酸溫。有毒。主治婦人  
 陰蝕。瘰癧。惡血。堅筋骨。治頭禿。心腹積聚。邪  
 氣。冷癖在脇。嘔逆上氣。脚冷疼弱無力。及鼻  
 衄。惡瘡。兼下部漏瘡。止血殺疥蟲。治脚氣。男  
 子陰痿。陽遺。衰弱。婦人體冷血氣。腹內雷鳴。  
 但是患冷諸藥不能療者。服之不過三五日。  
 愈。服之法。令研粉令極細。以飯和為丸。丸如  
 梧桐子大。每日空腹服五六丸。酒送之。若兼  
 餘草藥為丸服之益佳也。

造金丹法

黃金 八兩 錯碎為末

水銀 八兩 以前金末水銀攪一宿化為泥

雄黃 一斤 雌黃 一斤

16A

16B

16a4 著, CCK 9a4 着.  
16a10 嘔 → 效 = 咳 (n. 75).

16b2 鳴, CCK 9b2 indecipherable.  
16b4 令研 → CCK 9b3 研.  
16b8 錯 → CCK 9b7 挫.

右以前雄雌二味細研如粉乃和之皆於六一土釜中密固濟炭火九日九夜煨之寒二日刮取飛精先別作筒用淳左味鉛釵丹作泥塗筒裏令極乾又以左味飛精如軟泥內筒中堅之以銅蓋覆上六一固濟作鐵鈎懸筒令底去地二三寸馬通火煨之常令筒底微煨六七十日寒之發取藥赤如丹即成也更研治以棗穰和丸如小豆大旦以井花水向日服一九七日玉女來侍二百日行厨至三百日壽與天地齊此方似金液而小異若馬通難得用糠火亦得也

造鉛丹法治一切熱及鬼蒸癩癩病及瘡疾

鉛四斤鍊熟使水銀一斤鹽研令淨

右取黍穀二斗蒸之令破蒸熟以醋漿水投穀中密蓋五六日令為醋次用車轆中土篩安祥中攪和似煎餅麩取鉛銷之投泥中持羊即於好鑄中更淨鉛令銷煖末投一斤鉛中待漏凝以繩子繫之懸於鑄中二七日其精自下醋中收淘洗令淨和朴消消石各一

17A

17B

17b4 corrupt—word(s) missing or 熱使 inverted (n. 81).  
 17a4 裏 → 裏 (sense).  
 17a8 旦, CCK 10a6 且

兩。如飛丹法，三遍飛之，每轉三日。收取精，以飯和為丸，丸如麻子大。每有諸熱病者，皆治之。

### 鍊紫精丹法

水銀 一斤 石亭脂 半斤

已上二味入瓶固濟。用黃土、紙筋為泥，泥瓶子身三遍，可厚一大寸已上。用瓷蓋合瓶子口，以六一泥固濟之，可厚半寸。用火三日三夜，一日一夜半文，一日一夜半武，日滿出藥。打碎，取新青竹筒，盛和醋於筒中。又於火釜中重湯煮之，三日夜，常令魚目沸。日滿以冷水淘去醋味，曝乾一日，還內筒中，以清水和朴消，如前煮一復時。出藥淨淘，曝乾，搗為末，極細。用棗穰和少麝香丸之。欲丸時和少酥，及用塗手，不然即著手。丸如梧桐子大。每日食上服之。五丸去諸風疾，明目補心。二斤已上變白。功力既多，卒難陳述。忌與流珠方同。亦用麝香一錢，秤之，流珠方在後。

### 造流珠丹法

硫黃一斤。鑊中，以小麻油煮之，取黑為度。即

18A

18B

18a1 精，CCK 10b7 情，  
18a10 火 → CCK 11a6 火。

用灰汁煮之去油訖。即研鹽於鑊中。伏之。用六一泥固濟鑊口。以文火經一日兩夜。又用武火漸加。以鑊赤為度。去火待寒。出藥。清水淘去鹽味。取酒七升。蜜半升。亦云一升蜜。一如紫精丹法煮之三日三夜。出藥。清水淘去酒味。曝乾。搗篩。以麩糶丸之。更搗五六千杵。至萬尤佳。丸如梧桐子大。空心服。每日三十丸。覺熱即減至十五丸。長年服者。每日只可五丸。所有冷風等病。無不愈者。忌蒜米醋

七返丹砂法

○乘一大斤。安瓷甌子中。瓷甌合之。用六一泥固濟訖。以文火漸燒。數至六七日。即武火一日成。如此七轉。堪服。其火每轉須減損之。如不減。恐藥不住也。

造玉泉眼藥方

右取水精二兩。末之。乳半合。和。瓷甌中盛之。蜜固濟。勿洩氣。埋地下。百日出之。置一竈孔。燻之一日。開之。青白如玉。取鉛錫成鍊者。二斤。鎔之。以此藥丸如梧桐子大。投中。攪之。為真白矣。若眼不見物及赤。但不損睛。取一九。

19A

19B

19a4 半升，CCK 11b8 半斤 (n. 85).

19b5-20a1, missing in CCK (n. 86).

如黍米大點目皆尤良。

太山張和煮石法

章柳根 六斤 杏仁 五升

酸棗仁 五升 槐子 一升 別搗

右三味先搗槐子以水攪之。去滓取汁和前

藥。內不津器中。埋舍北陰地。入土一尺。以土

覆之。百日發取。名曰太一神水。取河中青白

石如桃李大者。五升。取北流水九升。煮之一

沸。以神水二合攪之。又煮一沸。候石熟。任意

食。食之五日後。萬病愈。一年壽命延永。久服。

○白日昇天矣。取神水二升。漬生鐵二斤十日。

化為白銀矣。

添離用兌法 凡四法

離 一兩 兌 半兩

石以堦泔之。先下離次下兌。取柳木攪令均。

次下黃礬一分。准前攪之令均。瀉出成錠。取

黃土和左味作堦。乾之。即取黃礬。硃砂。胡同

律各一兩。赤土一升。和左味為泥。裹之內中。

三四固之。令密。火之十餘遍。以氈拭令黑氣

盡為度。如難盡取。赤鹽和左味為泥。裹之。亂

20A

20B

20a8 五升 → CCK 12b5 五斤 ? (n. 89).

20b1 升, CCK 12b8 斤.

20b4. CCK 13a2 only: 以赤鹽煉作白銅為克 (see p. 194).

20b9 火, CCK 13a6 火火.

髮纏之。入火燒之。其赤鹽作聲。如是更為數  
遍。以黑盡為限。然取硃砂作漿。牛糞火燒之  
佳也。

又法

離一兩 兪七錢 熟銅一錢

石合洋成錠。待冷。又入火燒之。令極熱。投馬  
通中。俟將錠銼之。入火燒之。又銼。令離錠薄  
如紙。剪破如指大。取黃礬一升末之。同律三  
分。硃砂二分。搗為末。取黃土為泥。作塌子。塌  
子蓋之。訖。布離葉於中。以前藥重重裹之。密  
固塌口。於牛糞火中燒之。一日一夜。常令塌  
赤。以好為度矣。

又法

離兪對作。波斯鹽綠赤土。胡同律。硃砂等分。  
以左味為泥。裹之厚三分。猛火燒之。如此五  
十遍已上。即以金牙一兩末之。以漿水三升。  
煮之。從旦至暮時。以布裹離。橫木懸之。勿使  
着器。任用之。

又法

硃砂一兩 紫鍾一兩

21A

21B

21a8 升 → 斤 (n. 91).



石膽一分 胡同律一兩

右以猪脂和為泥，攪竭底，洋離出之。如朱而尤，洋了為薄鋌，以赤土十兩末之。風化灰三兩，硃砂三兩，赤鹽五兩，赤石脂五兩，石鹽三兩。右已上藥，必須精治之，以左味和為泥，可離鋌大小，布紙上，厚一二分，裹三鋌寸。洋火之，以赤煙盡為度，閉之，以左味洗之。准前裹火之，以漿洗之三十過，即表裏赤，尤為梵天寶也。

22A

伏汞要法

夫汞遇火則飛，不能使住。凡所為者，蓋亦多矣。若非物制伏，不可為之。今以藥伏之，萬不失一。

烏頭 赤石脂 石鹽 白鹽 胡椒

雄黃 草撥 黃礬石 黃硃砂 黑鹽

右搗為末，以左味和為泥，團作鍋形，以汞置中，巾裹之，以橫木穿之，入釜，煮以左味，三日，夜出之，入霜鉢中，還以左味和烏頭、硃砂、雲母等分研之，七日，三易藥，洗之以油鹽、硃砂少許，入釜中，煮之一日夜，任用也。

22B

22a6 三鋌寸，洋火，火三寸，一鋌，火（sense）。

素真用錫去暈法

右以取白不限多少。打令薄。厚似紙。方二寸。十斤已上。始可爲之。多則熱氣相蒸。少則不堪。取一瓷器。可物多少令滿。從下布之一重。絲蓋。如此重重相次令滿。器口大小蓋之。漆固令密。埋地中。經百日出。即成。不得欠一日。其馬通屋下安置。日滿出之。鎔一斤。和上。鑰一兩。若軟加鑰。堅加白。其絲取赤皮者佳。左味取三年者。然可用。著少鹽。一如食法。

素真用允添白銅法

白銅一斤 錫一兩

右令洋之。瀉酒中。出之。打破。取伏汞一兩。胡同律二兩。油脂一升。煮令脂盡。胡粉色赤。即伏火。即以前允體鎔之。投水中。取白黑二鑿。胡同律。硃砂白鹽各二兩。合洋之。瀉安鋏池中。成矣。若脆。不任用。即火之。令赤。投牛脂中。十遍。即柔矣。

赤銅去暈法

右取熟銅。打作葉。長三寸。闊三寸。取牛皮膠。煮之如粥。以銅葉內中。以鹽封之。內鑪中。火

23A

23B

23a7 corrupt? (n. 97).  
23a9 蒸, CCK 15b5 方

23b3 即, missing in CCK.  
23b7. CCK 16a3 only: 胡粉. 即胡同律 (see p. 201).

之。令煙盡極赤。出冷之。於砧上打之。黑皮自落。如此十遍已上。止。即以醋漿水煮。令極沸。燒葉赤。內漿中。出之。以刷刷之。於鍋中泮之。瀉灰汁中。散為珠子。其色黃白。至十遍。止。不須更瀉。成兌。凡十兩。可得三兩。成入椽漿洗之。令白也。

波斯用苦棟子添輸法

|    |    |     |    |
|----|----|-----|----|
| 烏梅 | 一石 | 苦棟子 | 一石 |
| 硃砂 | 一斤 | 波斯鎗 | 二斤 |
| 雀糞 | 二升 | 賀州鐵 | 一斤 |
|    |    | 兌   | 五兩 |

○右取苦棟子二升。熱酒研之。新醋二升。雀糞半升。研之。鹽一合。相和。令調。取桑木作槽。長八寸。闊三寸。深七寸。置前藥於槽中。鎗波斯鎗一斤。下少硃砂。熱攪之。候清。瀉槽中藥汁裏。冷。出之。用氈揩洗。令淨。令乾。明時用之。攪藥忌鐵物也。如此十遍。泮瀉藥槽中。佳也。白兌十兩。波斯鎗四兩。鍊錫一兩。須先鎔兌。次下波斯鎗。次下錫。下硃砂。攪之。瀉為銀。甚妙。如脆。入牛脂中。煮柔之。色不明。以梅漿洗之。

24A

24B

24b5 爰, CCK 17a1 爰. 24b5 時 → 日 (sense).  
24b8 之, missing in CCK.

素真用鑰要法

成錄波斯鑰 二兩 兌 二兩

硃砂三豆許。大鹽三指撮

右置搗中相和。鑿之。成鑿少時。又火之令赤。湯裏鹽水中。如此四五遍止。即以梅漿洗之。六七遍。以白為度。入梅漿先燒。令赤。然後投漿中。其漿亦毫器中火之令熱。

素真用雄黃要法。此法內雄黃似合

入此後伏二黃法內

雄黃一兩 雌黃一兩

25A

○右置猪脂中煮之三百沸。即取熱銅十兩。兌三兩。令泮。攪之。取黑礬末投中。佳也。

素真用鐵法

右取生鐵。搗碎篩細。研十兩。打錫為薄如林形。裹上不用攪木為及。熱研之令光。然後入錫杯了。重入甘搗中。入風鐘內。火之候鐵欲動不動。即取勿令絕碎。紙裹著鐘中鐵上。其鐵即沸。看錫凝定。即安兌添之。沸其兌。以鐵上如不相入。即更下勿即。其兌鐵即和。即以鐵鐸研兌下。掠却不淨。看兌不動。即下鐘

25B

25b1 熱 → 熟 (sense).  
25b6 杯, CCK 18a1 盃.  
25b5 攪 → 攪? (n. 105).  
25b8 以, missing in CCK.

中。熱及覆上。良久還將餅扶餘熱氣。以竹筋  
 點水沃允上。三兩遍止。任意用之。勿即藤。其  
 莖大如指。其子亦堪食。稍飴少許。生在山中。  
 或生平地。纏草而生。莖上有刺刺相對生。葉  
 如邊鴈齒大如指。葉葉相對。取時勿驚動。仍  
 取其根。必須陰乾。勿令日乾。七月八月子熟。  
 赤色。其鐵取犁頭鐵白色佳。餘並不堪用。

伏雄雌二黃用錫法提法含有雌黃。

今元本內闕

雄黃 十兩 木之 錫 三兩

○ 鑊中合鎔。出之。入皮袋中。揉使碎。入甘槁中。  
 火之。其甘槁中安藥了。以蓋合之。密固。入風  
 鑪吹之。令槁同火色。寒之。開其色似金。堪入  
 伏火用之佳也。二物准數別行。

造硃砂漿池法

硃砂 五兩 烏梅 半升 碎 左味 一升

右以土釜中煎之。五分減二。堪用。

造梅漿法

梅 二升 去仁 碎之

右以水一升鹽半升土釜煮之。燒令赤。洗之。

26A

26B

26a4 刺刺, CCK 18a9 刺刺 .

26b5-26b10, missing in CCK.

鍊丹合殺鬼丸法

|    |    |    |    |     |
|----|----|----|----|-----|
| 硃砂 | 雄黃 | 雌黃 | 黎蘆 | 鬼比目 |
| 桃仁 | 烏頭 | 附子 | 半夏 | 石硫黃 |
| 巴豆 | 犀角 | 鬼臼 | 麝香 | 白赤朮 |
| 鬼箭 | 蜈蚣 | 野葛 | 牛黃 |     |

右各二分。搗篩為末。以蘭草汁合。每丸九如鷄子大。燒一九百鬼皆卒。抱朴子用此藥飛三奇丹也。

鍊礬石伏汞法

并州礬石十斤

○搗為末。以瓜州礬和左味拌之三十遍。入釜飛之。每二十一日一開。更加生礬石三分之一。選擇生者飛之。生者性利。相接即止。三十日已上者。螻蛄之狀。光明可愛。百日彌佳。右取泉裹之內筒中。蒸三日夜。末之一兩。粉制汞一斤。若令赤。左味煮之。令乾。色紫赤。止釜中不上。准法燒之。以赤瑾上圍之。入風爐。火之百日。風化為灰。准礬石三斤。用脂一斤。鐵器中炒之。以脂盡為度。汞十斤。礬石鐵器。猛火火之。攪令煙入。即成。然後土圍前汞密封。

27A

27B

27b2 石, missing in CCK.  
27b7 瑾 → 董 (n. 112).

內釜中火之九日夜止。任用之。能先以脂熬  
熬後入竭中火之一百日。彌勝。取鎊中熬之。  
加礬石末一度如錫。再度如石。

### 造白玉法

右取大蛤搗為末細研之。取一斤內竹筒  
中。復內消石。密固之內左味中。二十日。成水。  
後取白石英半斤搗作末。投筒中。即凝。出之。  
好炭火火之令赤。即成白玉。亦服餌之也。

### 造真珠法 二首

右取光明蚌殼削去上皮。以醋中煮之令熟。  
出。細條之。丸作珠。大小任意。取經破腹開內。  
珠置中。還隨令合。蒸之令極熱。出珠。未蒸前。  
鑽孔。以猪毛穿中。又取雲母。以白羊乳煮之。  
數沸。出。令溫。以珠著中漬之。經宿。然後洗。令  
淨。成矣。

### 又法 二

三

以鱧膠和蚌屑作珠。隨意大小。鑽孔。近草火  
後炙令乾。以兩磚支一甕。置珠甕上。復以一  
瓦蓋上。泥磚四邊作甕形。以草火烧之令赤。  
出之。取蚌屑盛筒中。四箇口。內於瓷器。以左

28A

28B

28b8 翼 → 瓦? (n. 116).

28b4 漬, CCK 20b2 清.  
28b10 四箇 → 四箇筒? (n. 117).

味煨之十日，即色變珠成。

造石碌法

銅青一斤 石黛半斤

雌黃五兩 栢汁一斤

右和合，日乾，入壺，用之精妙也。

造石黛法

蘇方木半斤，細碎之

石以水二斗，煮取八升，又石灰二分，著中，覺之令稠，煮令汁盡，出訖，藍汁浸之五日，成用。

雲笈七籤卷之七十一

29A

29a5 精，CCK 21a2 盡。  
29a8 覺 → CCK 21a5 攪。





**Appendixes**

**Index**



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## Appendix A

### Medical Case History of Sun Ssu-mo

TRANSLATED below are all the passages from Sun Ssu-mo's medical works in which he provides significant information about the various medical disorders which he had experienced. This collection of excerpts, taken together, provides what is probably the fullest record of the successive physical states of an individual to be found in early Chinese literature. These records are particularly worthy of notice as an example of the plurality of types of disorder loosely united within the overall structure of Chinese medicine. The second record explains a case of mineral poisoning (the alchemist's occupational disease) in terms of the classical theory of active pneumas (*ch'i*). In the fourth, the cure can only be described as sympathetic magic. In the fifth it seems to be perfectly empirical. In their concern with precise dating, in their lack of detail, and in their essential discreteness (for it must be remembered that they have nothing to do with each other in their original contexts), these records are typical of the reporting of medical disorders in early traditional China.

1. "In my childhood I suffered from a cold disorder due to winds, and constantly consulted physicians. My family's finances were exhausted to pay for medicine. So it was that during my student years I held the medical classics in special regard, and that even in my old

## Appendix A

age I have not set them aside. As to the reading of pulses and other techniques of diagnosis, the gathering of simples and their compounding, administration and dosage, hygiene and the various precautions associated with health—when I heard of any man who excelled me in any of these, no distance could keep me from him. I would learn what he had to teach and then apply it. When I reached maturity I became aware that I had attained some understanding. I was able to help many relatives, neighbors, and others all over the Empire who were seriously stricken. My own illness abated to the point that I no longer depended upon doctors. That is how I became convinced of the necessity of studying medicine and pharmacology” (*Ch’ien chin fang*, Edo igaku ed. of 1849, preface; a similar account appears in *Ch’ien chin i fang*, Peking: People’s Hygiene Press, 1955, preface, pp. 7b–8a).

2. “In the course of my life I have been ill a number of times with carbuncles . . . Investigating the cause of this disorder, [I find that] it is mostly due to the *ch’i* of medicines [that is, to toxic activity from ingested inorganics]. In some cases, one’s forebears have taken mineral preparations, predisposing many of their descendants to this disease” (*Ch’ien chin fang*, 22:10a).

3. “At the age of 38 or 39 (*sui*) I ingested five or six *liang* [66–80 gm.] of stalactite [石鐘] 乳 . . . from the time that I became aware of its properties, I saw more than one person in public or private life suffer because of it. Therefore I would rather eat [poisonous] gelsemium root than minerals. Understanding their virulent toxicity, one must needs be cautious” (24:9b. If Sun was born in 581, this experiment must have taken place about 619).

4. Under the heading “earwig 蠋螋,” an insect “which urinates on a man’s shadow, causing a sore on the place [on the body which corresponds to that] hit”: “In the Wu-te period [618–626], in a sixth month, I contracted this illness; after five or six days I felt oppressed and uneasy. After I had tried other methods, which did not result in a cure, someone taught me to draw a likeness of the earwig on the ground, and with a knife to cut out with great care all the earth enclosed by the insect’s stomach. Then I spit into this earth, mixed it to the consistency of mud, and plastered it twice on [the afflicted spot], which healed forthwith. We must realize that everything in nature [interacts by] mutual resonance, although no one understands the causes [of particular instances]” (25:12b).

5. On August 17, 631, Sun rammed his left middle finger into a

## Appendix A

tree. The finger was broken and infection developed. It was treated with a salve after ten days (25:27b).

6. Under the heading “erysipelas 丹毒”:<sup>1</sup> “On April 21, 633, when I was in Nei-chiang 内江 county [in modern Szechuan], I had a great deal to drink. That night while asleep, I felt pain throughout the flesh and bones of my extremities. By dawn, my head was aching and my vision unclear; there was a blister the size of a crossbow pellet on my left temple, which ached so badly I could not bring my hand near it. By noon the swelling had spread to my right temple, and by night had become general. My eyes, once closed, could not be reopened. I came very close to death. The county magistrate, Squire Chou, treated me with every sort of medication, but without remission. After seven days I myself worked out this prescription, which was magical in its efficacy” (22:30a).

7. Under the heading “Method for ingestion of powdered quartz”:  
“While I was in Ch’ang-an I took [quartz] according to this method until the beginning of spring, when my head ached as though my temples were about to burst. When I took enough “purple snow”<sup>2</sup> 紫雪 to fill two dates I recovered immediately” (*Ch’ien chin i fang*, p. 260a).

<sup>1</sup> The literal meaning of this term is “cinnabar poisoning,” but my identification (necessarily loose and partial) is based on Sun’s own description in *Ch’ien chin i fang* (p. 287a). There he merely condenses the account given earlier in *Chu ping yuan hou lun* 諸病源候論 (610; see below, p. 311), p. 164b (I have corrected a mispunctuation):

“One’s body suddenly develops an inflammation which looks as though cinnabar had been rubbed on the skin, hence the name *tan* [lit., cinnabar]. The inflammation, which sometimes occurs on the extremities and sometimes on the stomach, is about the size of a fist. It is caused by virulent toxic agents due to wind or heat factors. Some serious cases resemble carbuncles. If they are not promptly treated the pain becomes unbearable. After some time the affected part becomes gangrenous, exuding several *sheng* [each 200 ml. in Ch’ao’s time] of pus and blood.

“If the disease breaks out in the joints, it is speedily transmitted throughout the limbs. When the poison enters the intestines it kills the patient. It is especially to be dreaded in small children.”

<sup>2</sup> A recipe for this antidote is given on p. 211b of the source.

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Appendix B  
“Apothecaries’ Measure” in the T’ang Period

IN ADDITION to modern metric equivalents for the units found in *Tan ching yao chueh*,<sup>1</sup> this appendix includes a translation of one of the most interesting documents in the history of Chinese metrology. In it Sun’s great predecessor as physician and alchemist, T’ao Hung-ching 陶弘景 (451–536), brought order once and for all into a chaos of empirical measures for pill sizes, relating them quantitatively and establishing equivalents for obsolete standards. From that time on, even so apparently offhand a specification as “a pill the size of a little bean” had a clearly defined value which could be determined even in the absence of little beans. This system was, in fact, tied in with conventional metrology, for T’ao remarks elsewhere that in his time 240 grains of glutinous millet weighed one *liang*.<sup>2</sup> As is ap-

<sup>1</sup> The system of measures for which equivalents are given below is that quoted from two T’ang statute collections in Wu, pp. 162, 165–166. In the second, the early text of *T’ang lü su i* 唐律疏義 in *Ssu pu ts’ung k’an* (26:22b) reads “鎰” instead of Wu’s “俞.” The precision of the metric equivalents is, for length and weight, on the order of 5 to 10 percent. That for volume looks considerably better (about 1 percent) at the moment, but may well be reduced as more old standards are recovered and evaluated.

<sup>2</sup> The translation is from his *Pen ts’ao ching chi chu* 本草經集注 (The [Shen-nung] pharmacopoeia with collected annotations; Shanghai: Ch’ün-lien Press, 1955), pp. 36–37; see also p. 33. T’ao’s “Standards for the compounding of prescriptions 合藥分劑法則” were authoritative

## Appendix B

parent from the table of modern equivalents, T'ang mensuration was also on the millet standard; the type of grain used was different, however, and metal standards existed and were widely used.

### LENGTH

The width of one medium-sized northern millet grain 北方秬黍中者

|                  |                         |                      |
|------------------|-------------------------|----------------------|
|                  | = 1 <i>fen</i> 分        | = 2½ mm.             |
| 10 <i>fen</i>    | 1 <i>ts'un</i> 寸        | 24½ mm.              |
| 10 <i>ts'un</i>  | 1 <i>ch'ih</i> 尺        | 24½ cm. <sup>3</sup> |
| 1.2 <i>ch'ih</i> | 1 large <i>ch'ih</i> 大尺 | 29.5 cm.             |
| 10 <i>ch'ih</i>  | 1 <i>chang</i> 丈        | 2.46 m.              |

### WEIGHT

The weight of one hundred medium-sized northern millet grains

|                 |                                      |           |
|-----------------|--------------------------------------|-----------|
|                 | = 1 <i>chu</i> 銖 or 6 <i>tou</i> 豆   | = 0.5 gm. |
| [6 <i>chu</i> 銖 | 1 <i>fen</i> 分 or 2½ <i>ch'ien</i> 錢 | 3.3 gm.]  |
| 24 <i>chu</i>   | 1 <i>liang</i> 兩                     | 13.2 gm.  |
| 3 <i>liang</i>  | 1 large <i>liang</i>                 | 39.6 gm.  |
| 16 <i>liang</i> | 1 <i>chin</i> 斤                      | 211.6 gm. |

### VOLUME

The volume of 1200 medium-sized northern millet grains

|                            |                                |           |
|----------------------------|--------------------------------|-----------|
|                            | = 1 <i>yueh</i> 龠              | = 9.9 ml. |
| 2 <i>yueh</i> <sup>4</sup> | 1 <i>ko</i> 合                  | 19.8 ml.  |
| 10 <i>ko</i>               | 1 <i>sheng</i> 升               | 198 ml.   |
| 10 <i>sheng</i>            | 1 <i>tou</i> 斗                 | 1.98 l.   |
| 3 <i>tou</i>               | 1 large <i>tou</i>             | 5.94 l.   |
| 10 <i>tou</i>              | 1 <i>hu</i> 斛 or <i>shih</i> 石 | 19.81 l.  |

in later pharmacology, and were often quoted. Every modern Chinese practitioner is familiar with them from Li Shih-chen's 李時珍 *Pen ts'ao kang mu* 本草綱目, The Great Pharmacopoeia (first printed 1596; 6 vols., *Wan yu wen k'u* ed.), 1:38.

<sup>3</sup> This figure is an average of Mori's (24.3) and Wu's (24.88). Here as elsewhere in the table I have rounded off figures so as to avoid giving a misleading impression of precision.

<sup>4</sup> The disagreement between the statutes as to whether two or ten *yueh* make a *ko* goes back much further. The classic exposition of the "millet standard," in Pan Ku's 班固 (A.D. 32-92) Standard History of the Former



## Appendix B

### *T'ao hung-ching's Standards for Compounding Pills*

For drugs to be made up into pills, when the prescription specifies "the size of a 'fine oilseed'" it is the present-day sesame seed 胡麻 which is referred to. A standard sieve need not be used so long as the seed chosen is of roughly average size. The specification "the size of a grain of glutinous millet or short millet [*Setaria italica*, Kth. var. *germanica*, Trin.]" is to be interpreted similarly. Sixteen grains of glutinous millet are equivalent to one soya bean.<sup>5</sup> "The size of a 'large oilseed'" refers to the seed of common hemp [*Cannabis sativa*, L.], equivalent to three "fine oilseeds." "The size of a 'northern bean'" refers to what we now call a pea 青斑豆 [*Pisum sativum*, L.], equivalent to two hempseeds. "The size of a 'little bean'" refers to what is now called the red mung bean [*Phaseolus mungo*, L.]; the size of the bean varies, but the measure is equivalent to three hempseeds. "The size of a soya bean" is equivalent to that of two "little beans." "The size of a kola nut" is equivalent to that of two soya beans. An inch-square-spatula measure of powdered medicine should be so mixed into pills with honey that ten of the pills are equivalent to the size of one kola nut. "The size of a projectile pellet (or of the yolk of an egg)" is equivalent to that of ten kola nuts.

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The surface of traditional Chinese metrology has hardly been scratched in European languages. The following are the most important secondary sources for early weights and measures.

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Han Dynasty (*Ch'ien Han shu pu chu* 前漢書補註, Basic Sinological Series ed.), III (ch. 21A), 1653, contains an enigmatic statement, "合龠為合," which is the basis for both interpretations. I tentatively choose the larger value for the *yueh* simply because it is more commensurate with the volume which 1200 grains of millet would occupy. For the historical background of millet-grain metrology, see Joseph Needham, *Science and Civilisation in China* (Cambridge, England: At the University Press, 1954—), IV (pt. I), 199–202, and Pan Ku, *The History of the Former Han Dynasty* (Homer H. Dubs, tr.; Baltimore: Waverly Press, Inc., 1938—), I, 276–280.

<sup>5</sup> This sentence is missing from the version in later pharmacopoeias.

## Appendix B

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- Wang Ta 王達. "Shih p'ing 'Chung-kuo tu liang heng shih' chung Chou Ch'in Han tu liang heng mou chih chih k'ao-cheng 試評 '中國度量衡史' 中周秦漢度量衡畝制之考證" (Attempt at a critique of the determinations of the mensural systems of the Chou, Ch'in, and Han periods in *A History of Chinese Metrology*), *ibid.*, pp. 137–145. This and the two preceding items make a number of improvements upon the work of Wu Ch'eng-lo, taking into account recent finds. Many criticisms are compromised by the failure to make realistic estimates of precision.
- Liu Shih-ju 劉世儒. *Wei Chin Nan pei ch'ao liang tz'u yen-chiu* 魏晉南北朝量詞研究 (A study of measure words of the Wei, Chin, and Northern and Southern Dynasties). Peking: Chung Hwa Book Co., 1965. Although a linguistic analysis of a certain word class in the third to sixth centuries is the aim of

## Appendix B

this book, it contains much valuable material on the development of metrology.

Sung Ying-hsing (E-tu Zen Sun and Shiou-chuan Sun [tr.]). *T'ien-kung K'ai-wu. Chinese Technology in the Seventeenth Century*. University Park: The Pennsylvania State University Press, 1966, Appendix C (pp. 362-363). "The Equivalence of Chinese Weights and Measures in Metric Units," a table based on Wu Ch'eng-lo. No justification is offered for reproducing the meaningless pre-Chou length measures.

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Appendix C  
Comparison of Elixir Names in Sun Ssu-mo's  
Lists with Those in Other Sources

THESE tables, which will be of interest only to sinologists, relate the titles in the three lists of elixirs in *Tan ching yao chueh* (pp. 2a-2b; see Chapter IV, pp. 151-160) with references elsewhere in alchemical literature. They are meant to document my emendations and annotations, and to display the extent of coincidence with the two cognate texts discussed in Chapter II (pp. 76-79). An equal sign indicates equivalence of elixir names. Thus, "(B)=C1" means "according to list B, this elixir name is equivalent to elixir name C1." References to lists A, B, and C in *Shih yao erh ya*, and to pages in other books, are in parentheses. The abbreviation "R" stands for "recipe"; "do" means "same as above." A key to the acronymic citations follows the tables.

Table I. Comparison of elixir names in first list with citations in other sources

| Number | Name  | SYEY, Lists A-C        | SPC                                                   | Remarks                                    |
|--------|-------|------------------------|-------------------------------------------------------|--------------------------------------------|
| A      | 太一玉粉丹 | (A)                    |                                                       |                                            |
| B1     | 太一白魂丹 | (AB)=白魂丹               | (B:1b)=白魂丹<br>(A:12a)=E1; (A:4b, B:1b)R<br>(B:1b)=白魂丹 | R below                                    |
| B2     | 返魂丹   | (B)do                  |                                                       |                                            |
| B3     | 更生丹   | do                     |                                                       |                                            |
| B4     | 全生歸命丹 | 全生丹, do                | 全生丹, 歸命丹, do                                          | SYEY corrupt                               |
| C1     | 四神丹   | (A)                    | (B:10b-11a)R                                          | SPTF(6:13a-13b)R                           |
| C2     | 太一神精丹 | 太一神丹 = C1(B)           |                                                       | CCF(12:29a-32a)R                           |
| C3     | 神變丹   | (B)=C1                 |                                                       |                                            |
| C4     | 神液通神丹 | do                     |                                                       |                                            |
| D      | 假使通神丹 |                        |                                                       |                                            |
| E1     | 五靈丹   | (A)                    | (A:12a-12b)R                                          | PPT(4:10a)R                                |
| E2     | 昇霞丹   |                        |                                                       |                                            |
| E3     | 靈化丹   | 靈華丹 = E1(B)            | (A:12a)=E1                                            | ST(32:13b f) cites                         |
| F1     | 三使丹   | 太一三使丹 (AB)             | (B:1a)R                                               | 太一三使丹, R below<br>Textual error in SYEY(A) |
| F2     | 捧耆丹   | (B)=太一三使丹<br>(B)=太和龍胎丹 |                                                       |                                            |

|    |           |                      |                     |                         |
|----|-----------|----------------------|---------------------|-------------------------|
| F3 | 丹         | (B)=太 一 一 三 使 丹      | (A:10a, 13a-14a)R   | SPTF(3:14a) cites       |
| F4 | 一 丹       | do                   | (A:10a)=G1          |                         |
| F5 | 者 丹       | (AB)                 | do                  | Either reading possible |
| F6 | 雲 丹       | (B)=G1               | do                  | Cf. F2                  |
| G1 | 控 鶴 丹     | 度 死 丹 = G1(B)        | 紫 遊 丹 (A:5b)R       | 紫 遊 丹, R below          |
| G2 | 八 石 丹     | (B)=太 一 一 三 使 丹      |                     | See KC(1a-9a)           |
| G3 | 麗 素 丹     | (B)=太 太 和 龍 胎 丹      |                     | SPTF(3:9b-10a)R         |
| G4 | 度 厄 丹     | 雄 黃 紫 油 丹 (A)        |                     | R below                 |
| H  | 持 節 丹     | 紫 遊 丹 (AB)           |                     | Form "耀" in SYEY        |
| I  | 絳 色 紫 遊 丹 | 赤 流 珠 丹              |                     | R below                 |
| J1 | 雄 黃 亦 丹   | =太 一 一 一 味 雄 黃 丹 (B) | 赤 流 丹               |                         |
| J2 | 赤 雪 流 珠 丹 |                      | = 太 一 雄 黃 丹 (A:11a) |                         |
| J3 | 紅 景 丹     |                      | (A:11a)=太 一 雄 黃 丹   |                         |
| J4 | 赤 耀 丹     |                      | (B:1b)=流 珠 丹        |                         |
| J5 | 重 輝 丹     |                      | (B:1b)=流 珠 丹        |                         |
| J6 | 紅 紫 相 間 丹 | (B)=太 一 一 一 味 雄 黃 丹  | do                  |                         |
| K1 | 良 雪 丹     | do                   | (A:11a)=太 一 雄 黃 丹   |                         |
| K2 | 月 流 光 丹   | (AB)                 | (A:5b-7a; B:4a-4b)R |                         |
| K3 | 水 銀 霜 丹   | 水 銀 霜 丹 = K1(B)      | 水 銀 霜 (B:2a-3a)R    |                         |
|    |           |                      | 水 銀 霜 丹 (A:5b) = K1 |                         |

Table II. Comparison of elixir names in second list with citations in other sources

| Number | Name     | SYEY, Lists A-C | Other sources                    | Remarks               |
|--------|----------|-----------------|----------------------------------|-----------------------|
| 1      | 黃帝九鼎丹    | (C)             | SPC(A:2a)R; PPT(4:5a)            |                       |
| 2      | 九轉丹      |                 | PPT(4:9a)                        |                       |
| 3      | 大還丹      | (C)             | SPC(A:1b-2a)R<br>SPTF(1:14a-14b) |                       |
| 4      | 小還丹      | (C)             |                                  | R below               |
| 5      | 九成丹      |                 |                                  |                       |
| 6      | 素子仙童丹    | 紫青仙童丹 (C)       |                                  |                       |
| 7      | 九變丹      | (C)             |                                  |                       |
| 8      | 太仙霞丹     | 太仙昇霞丹 (C)       |                                  |                       |
| 9      | 太和龍胎丹    | (BC)            |                                  |                       |
| 10     | 張大龍飛丹    | 張真人靈飛丹 (C)      |                                  | SYEY editions differ  |
| 11     | 昇仙丹      |                 |                                  |                       |
| 12     | 神龍丹      |                 |                                  |                       |
| 13     | 馬仙人白日昇天丹 | 馬明生白日昇天丹 (C)    | 昇仙大丹 KTC(8:1a)R                  | Attrib. to 許真君 in KTC |

Table III. Comparison of elixir names in third list with citations in other sources

| Number | Name  | SYEY, Lists A-C | Remarks                            |
|--------|-------|-----------------|------------------------------------|
| 1      | 八景丹   | 太一八景丹 (C)       |                                    |
| 2      | 金華丹   | (B) = 太一金液華丹    |                                    |
| 3      | 玉味消災丹 | 三味消災丹 (C)       | Either reading possible            |
| 4      | 神光散瓊丹 | (C)             |                                    |
| 5      | 凝霜精雪丹 | (C)             |                                    |
| 6      | 奔星住月丹 | 奔星卻月丹 (C)       | Synonymous variant                 |
| 7      | 墮月驚心丹 | (C)             |                                    |
| 8      | 金液玉華丹 |                 |                                    |
| 9      | 茅君白雪丹 | 茅君白靈丹 (C)       | SYEY reading corrupt               |
| 10     | 白雪赤雪丹 | 白雲赤雪丹 (C)       | SYEY reading better                |
| 11     | 紅絳垂壁丹 | 絳陵垂壁丹 (C)       | Either reading possible            |
| 12     | 七星辟惡丹 | 七精辟惡丹 (C)       | TCYC reading more likely           |
| 13     | 七曜靈真丹 |                 |                                    |
| 14     | 流石鮮翠丹 | 流霞鮮翠丹 (C)       | SYEY reading more likely           |
| 15     | 金輝吐曜丹 | 含暉吐曜丹 (C)       | do, but SYEY editions differ       |
| 16     | 太清五色丹 | (C)             |                                    |
| 17     | 北帝玄珠丹 | (C)             | “元” for “玄” in Ch'ing eds. of SYEY |
| 18     | 感靈降真丹 | (C)             |                                    |
| 19     | 辟鬼昇雲丹 |                 |                                    |
| 20     | 太白精丹  |                 |                                    |

Key to abbreviations (all editions are those cited in Chapter IV).

|      |                                                                         |          |
|------|-------------------------------------------------------------------------|----------|
| CCF  | <i>Ch'ien chin fang</i>                                                 | 千金方      |
| KC   | <i>Kan ch'i shih-liu chuan chin tan</i>                                 | 感氣十六轉金丹  |
| KTC  | <i>Keng tao chi</i>                                                     | 庚道集      |
| PPT  | <i>Pao p'u tzu nei p'ien</i>                                            | 抱朴子內篇    |
| SPC  | <i>T'ai-ch'ing shih pi chi</i>                                          | 太清石壁記    |
| SPTF | <i>Chu chia shen p'in tan fa</i>                                        | 諸家神品丹法   |
| ST   | <i>Li shih chen hsien t'i tao t'ung chien</i> (See Chapter II, note 43) | 歷世真仙體道通鑑 |
| SYEY | <i>Shih yao erh ya</i> (See Chapter IV, note 9)                         | 石藥爾雅     |
| TCYC | <i>T'ai-ch'ing tan ching yao chueh</i>                                  | 太清丹經要訣   |



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**Appendix D**  
**Directions for Preparing the Reaction Vessel and Lute**  
as given in *Ch'ien chin fang*

Texts used: Edo igaku edition (EI) of 1849, 12:31a–31b; *Tao tsang* (TT), vols. 800–820, 39:10b–11a; *Ch'ien chin fang yen i* (YI), 12:59a–62a.

*Method for Two-Part Reaction Vessel*

Take two earthenware bowls, each of which holds one large *tou* or so, and coat their insides with refractory clay 甘土. Let them dry thoroughly. Another method is to make one earthenware pot and one wrought-iron 熟鐵<sup>1</sup> pot, each to hold nine *sheng*. The earthenware [vessel] goes on top, the iron [vessel] below. Their shapes and sizes depend on the amount of reactants [to be sublimed], and need not be according to these specifications.

[Note in the text:]<sup>2</sup> One edition 一本 says: Pound good refractory clay to powder, sift through pongee, and mix with water to form one *sheng* of a clay as pliable as that used to make tiles. Add fine paper pulp [?] and mix to even consistency 內細紙均停.<sup>3</sup> The ves-

<sup>1</sup> TT: 熟鐵.

<sup>2</sup> Omitted from YI.

<sup>3</sup> Sense questionable.

## Appendix D

sel can be made to hold ten *sheng*<sup>4</sup> or to accommodate a given quantity of reagents.

Dry the vessel in the shade for thirty days, and then put it in the sun to dry for thirty days. It should be turned daily to face the sun. Take five *shih*<sup>5</sup> of chaff and put the vessel in it, piling earth closely on all sides so as to keep the vessel surrounded on the sides, top, and bottom with a layer of chaff seven *ts'un* thick. Fire it from below for five days and five nights, letting no one approach it. Remove the ash,<sup>6</sup> and, after the vessel has cooled for a day and a night, retrieve it and brush it clean. Mix minium 黃丹 with vinegar to the consistency of thin gruel and brush it on the interior to form a coat one *fen* thick. Then the reactants may be put in place. When this vessel is used for mixing the Nine Elixirs or the Eight Mineral, Spirit-Summoning, Grand Purity Wonderful,<sup>7</sup> and other great elixirs it will be successful in every case, never giving out. The old [methods for] six-one reaction vessel lute and iron vessels are to be rejected and used no more. This particular [earthenware] vessel can be used dozens of times without its changing; it becomes stronger<sup>8</sup> with protracted use. This method was treated as a great secret by my teacher. I wish that in the future learned gentlemen of the Empire understand it, and so I put it down in detail.

### *Six-One Lute*

Red Bole

Oyster Shell

Talc

Arsenolite

Halotrichite

"Earthworm Excreta" 蚯蚓屎

Salt-impregnated Earth 鹵土

Two *liang* each.

Take as much strong vinegar 醱酢 as required [to mix with each ingredient?]. If you have no salt-impregnated earth, use salt in its place. First prepare a mortar of refractory clay, and with this mortar coat each of the first five ingredients (up to halotrichite) separately to form them into balls, making sure that no *ch'i* [= vapor] can es-

<sup>4</sup> Emending 斤 to 升, since the sense calls for a measure of volume, not weight.

<sup>5</sup> TT: 項.

<sup>6</sup> EI only.

<sup>7</sup> EI: 太清神; TT: 太清神仙.

<sup>8</sup> EI: 轉牢; TT: 轉.

## Appendix D

cape. Bake on the fire, preferably for three days, although one day will do. Then remove the balls from the fire, break them open, and collect the ingredients. After pounding them up and sifting them through pongee, mix with equal parts of "earthworm excreta" and salt-impregnated earth, using vinegar [as a binder,] to the consistency of a thin gruel. It is then finished. If the vinegar is of high quality, two parts may be mixed with one part of water for this application. Take the earthenware bowls previously described and coat with this lute. The laminar malachite which resembles earthworm excreta or coptis root 黃連 [Coptis chinensis, Franch.] is best. The uninitiated who lack this type prefer granular malachite from Mount K'un-lun [in modern Kwangsi],<sup>9</sup> which may also be used for curing diseases. Cinnabar is also very scarce; the inferior variety of the size of millet grains [? 粟砂] may be used instead. Formerly magnetite and pyrites 金牙 were not used, but in modern times they are added.

<sup>9</sup> See YI, 12:60a-60b.

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## Appendix E

### Table of Dates Concerned with the Life of Sun Ssu-mo

**THIS** appendix is intended merely to allow the reader a broad vista of the thickets through which he has picked his way in Chapter III. It includes nothing new, therefore, and the arguments and documentation which support these dates, many of them conjectural, are not repeated. The three columns segregate dates in Sun's life (those which, according to Chapter III, pertain to events that fall within the realm of possibility are marked with an asterisk), dates in the lives of people who are involved with him, and dates of early sources (in that order).

- 
- 537/540 Tu-ku Hsin  
meets Sun  
578/579 Sun goes to  
live on Mount T'ai-  
po  
580/581 Sun given of-  
ficial appointment  
581\* Sun born, ac-  
cording to his asser-  
tion to Lu Chao-lin  
627/ca. 637\* Inter-  
view with T'ai-tsung  
629/636\* Interviewed  
by Wei Cheng *et al.*

## Appendix E

- 650/660\* Interview  
with Sun Ch'u-yueh
- 650/659 *Ch'ien chin  
fang*
- 650/683 *Floruit of  
Sung Ling-wen*
- 652, *March 29* Sun  
dies, acc. to Taoist  
sources
- 659\* Called to court  
by Kao-tsung
- 660/680\* Interview  
with Lu Ch'i-ch'ing
- 673\* Accompanies  
Emperor to Summer  
Palace
- 673 "Rhyme-prose on  
a Diseased Pear  
Tree"
- 674\* Retires from  
court
- 682\* Sun dies, acc. to  
Old History
- 682 Date adopted by  
many modern writers  
for *Ch'ien chin i fang*
- ca. 685/701 Meng  
Shen in capital until  
exile; retired 705
- 690/692 Sun's son  
Hsing a high official
- 712 Sun Ch'üan cap-  
tured in battle and  
killed
- 712 Latest possible  
date for *Hua-yen  
ching chuan chi*
- 713/741 Legend  
places Sun on Mount  
Chung-nan
- 713/741 *Liang ching  
hsin chi*
- 742/ca. 750 Legend  
places Sun on Mount  
O-meï
- ca. 750 *Ting ming lun*

## Appendix E

- 756/760 Date of  
Mount O-mei legend  
in another source
- 827/846 *T'an pin lu's*  
author flourished  
863 *Yu-yang tsa tsu*
- 860/874 Events in  
"transfigured child"  
story take place
- ca. 850/ca. 900  
*Hsuan shih chih*  
923/935 *Hsu hsien*  
*chuan*  
946 Old History pre-  
sented to throne  
977 *T'ai-p'ing kuang*  
*chi* completed  
988 *Sung kao seng*  
*chuan*  
ca. 1023 *Tan ching*  
*yao chueh* included in  
*Yun chi ch'i ch'ien*
- 1059\* Temple to Sun  
erected
- 1060 New History  
completed
- 1074\* Sun's old resi-  
dence in use as Bud-  
dhist monastery
- 1081 "Sun chen-jen  
tz'u chi"
- 1103\* Emperor Hui-  
tsung confers title on  
Sun
- 1149 *Hai lu sui shih*

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**Appendix F**  
**Sources for the Life and Legend of Sun Ssu-mo**

**THE TABLE** which follows provides an overall view of the sources in which anecdotes about Sun Ssu-mo appear. The earliest known version of each story can be seen, and the transmission of an anecdote from one source to another is easily followed. Reading downward, the twelve parts into which the T'ang Histories' account was divided in Chapter III are designated by Roman numerals, and are followed by various legends found elsewhere. Sources are listed horizontally, with the two Histories first and then other sources in chronological order. The two vertical lines stand for the positions of the Old and New History in the temporal scheme. A key to abbreviations, which follows the table, includes references to full citations of sources.

Appendix F

| ANECDOTE                     | CTS | HTS           | LSCC | HYC | TML           | TPL | IS | YYTT    | HSC | HHC           | SKSC              |
|------------------------------|-----|---------------|------|-----|---------------|-----|----|---------|-----|---------------|-------------------|
| I. Youth, Tu-ku T'ao         | X   | X             | -    | -   | -             | -   | -  | -       | X   | -             | -                 |
| II. Retirement, Emperor Wen  | X   | X             | -    | -   | -             | -   | -  | -       | X   | X             | -                 |
| III. T'ai-tsung, Kao-tsung   | X   | X             | -    | -   | -             | -   | -  | -       | X   | X             | -                 |
| IV. Lu's description         | X   | -             | X    | -   | -             | -   | -  | -       | X   | X             | -                 |
| V. Conversation I.           | X   | X             | -    | -   | X             | -   | -  | -       | X   | X             | -                 |
| VI. Conversation II.         | X   | X             | -    | -   | X             | -   | -  | -       | X   | X             | -                 |
| VII. Conversation III.       | -   | X             | -    | -   | Fuller        | -   | -  | -       | -   | -             | -                 |
| VIII. Age                    | X   | -             | X    | -   | -             | -   | -  | -       | X   | -             | -                 |
| IX. Consultation with Wei    | X   | X             | -    | -   | -             | -   | -  | -       | X   | -             | -                 |
| X. Sun and Lu forecasts      | X   | X-XI reversed | -    | -   | Variant of Lu | -   | -  | -       | X   | -             | -                 |
| XI. Death                    | X   | X             | -    | -   | -             | X   | -  | -       | X   | Variant       | -                 |
| XII. Heritage                | X   | -             | -    | -   | -             | -   | -  | -       | X   | -             | -                 |
| A. Exponent of Garland Sutra | -   | -             | -    | X   | -             | -   | -  | -       | -   | -             | -                 |
| B. Exponent of Lotus Sutra   | -   | -             | -    | -   | -             | -   | -  | -       | -   | -             | -                 |
| C. God of Wine               | -   | -             | -    | -   | -             | -   | X  | -       | -   | -             | -                 |
| D. Dragons of K'un-ming pool | -   | -             | -    | -   | -             | -   | -  | X       | X   | Snake version | Shorter than YYYT |
| E. Bestowal of realgar       | -   | -             | -    | -   | -             | -   | -  | Sketchy | X   | -             | -                 |
| F. Transfigured child        | -   | -             | -    | -   | -             | -   | -  | -       | X   | -             | -                 |
| G. Pharmacy post declined    | -   | -             | -    | -   | -             | -   | -  | -       | -   | X             | -                 |
| H. Tested by Wang Chung-tu   | -   | -             | -    | -   | -             | -   | -  | -       | -   | -             | -                 |



Appendix F

| ANECNOTE                     | HCTL     | HSYL | SCJ       | STCH      | ST7 | ST29          | HLSS    | HYHC          | HPL           | HVCY |
|------------------------------|----------|------|-----------|-----------|-----|---------------|---------|---------------|---------------|------|
| I. Youth, Tu-ku T'ao         | -        | -    | X         | -         | -   | X             | -       | X             | As HSC        | -    |
| II. Retirement, Emperor Wen  | -        | -    | X         | -         | -   | X             | -       | X             | X             | -    |
| III. T'ai-tung, Kao-tsung    | -        | -    | X         | -         | -   | -             | -       | X             | X             | -    |
| IV. Lu's description         | -        | -    | -         | -         | -   | As HHC        | -       | -             | X             | -    |
| V. Conversation I.           | -        | -    | X         | -         | -   | X             | -       | -             | X             | -    |
| VI. Conversation II.         | -        | -    | From HTS  | -         | -   | As HHC        | -       | -             | X             | -    |
| VII. Conversation III.       | -        | -    | From HTS  | -         | -   | -             | -       | -             | As HTS        | -    |
| VIII. Age                    | -        | -    | -         | -         | -   | -             | -       | -             | X             | -    |
| IX. Consultation with Wei    | -        | -    | X         | -         | -   | -             | -       | -             | X             | -    |
| X. Sun and Lu forecasts      | From CTS | -    | X         | -         | -   | -             | -       | -             | Lu only       | -    |
| XI. Death                    | -        | -    | X         | -         | -   | As HHC        | -       | From ST       | X             | -    |
| XII. Heritage                | -        | -    | X         | -         | -   | -             | -       | -             | Writings only | -    |
| A. Exponent of Garland Sutra | -        | -    | -         | -         | -   | -             | -       | -             | -             | X    |
| B. Exponent of Lotus Sutra   | -        | X    | -         | -         | -   | X             | -       | From ST       | -             | -    |
| C. God of Wine               | -        | -    | -         | -         | -   | -             | From IS | -             | -             | -    |
| D. Dragons of K'un-ming pool | -        | -    | -         | From HSC? | -   | Snake version | -       | Snake version | -             | -    |
| E. Bestowal of realgar       | -        | -    | From HSC? | HHC       | -   | -             | -       | X             | -             | -    |
| F. Transfigured child        | -        | -    | From HSC? | -         | -   | X             | -       | -             | -             | -    |
| G. Pharmacy post declined    | -        | -    | -         | -         | -   | X             | -       | -             | -             | -    |
| H. Tested by Wang Chung-tu   | -        | -    | -         | -         | X   | -             | -       | -             | -             | -    |

## Appendix F

### KEY TO ABBREVIATIONS (References are to footnotes in Chapter III)

- CTS *Chiu T'ang shu*, 945 (7)  
 HTS *Hsin T'ang shu*, biographies completed 1041/1048 (7)  
 LSCC *Lu Sheng-chih chi*, cited document written 673 (40)  
 HYC *Hua-yen ching chuan chi*, late seventh or early eighth century (100)  
 TML *Ting ming lu*, 827/835 (88)  
 TPL *T'an pin lu*, author fl. 827/846 (58)  
 IS *I shih*, 847 (109)  
 YYTT *Yu-yang tsa tsu*, ca. 860 (23)  
 HSC *Hsuan shih chih*, author fl. 881/884, and *Hsien chuan shih i*, author lived 850-933 (22)  
 HHC *Hsu hsien chuan*, author fl. 923/936 (17)  
 SKSC *Sung kao seng chuan*, 988 (103)  
 HCTL *Sequel to Ch'ien ting lu*, after 1041/1048 (87)  
 HSYL *Hsiang shan yeh lu*, 1068/1077 (103)  
 SCJ "Sun chen-jen tz'u chi," 1081 (28)  
 STCH *San tung ch'ün hsien lu* 三洞羣仙錄, probably early twelfth century (*Tao tsang*, vol. 994), 12:5b-6a  
 ST *Li shih chen hsien t'i tao t'ung chien*, early twelfth century (92, 109)  
 HLSS *Hai lu sui shih*, 1149 (109)  
 HYHC *Hsiao yao hsu ching*, thirteenth or fourteenth century? (92)  
 HPL *Hsuan p'in lu*, late thirteenth or early fourteenth century (16)  
 HYCY *Hua yen ching ch'ih yen chi*, seventeenth century or later (103)

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Appendix G  
Notes on the Identification of Substances Mentioned  
in *Tan ching yao chueh*

THIS appendix and the one which follows are arranged in the form of a glossary of Chinese technical terms—the first from chemistry, the second from pathology. The notes are arranged alphabetically by romanization. The Index, which incorporates all the English equivalents I have used, will lead the reader who lacks Chinese to the evidence behind my translations. Each note includes a reference to the page of the Chinese text in which the term first appears; these numbers appear in the margins of the translation in Chapter IV, and on each page of the Chinese text in Chapter V. A few terms which appear only in the *Ch'ing chen kuan* edition (marked by "CCK" following the page number which locates the corresponding note in Chapters IV and V) or in the material translated in Appendix D (marked "App. D") are also included. The notes to each item account for my translation, elucidate geographical sources, uses, and distinctive tests current in the period of *Tan ching yao chueh*, note uncertainties in identification, and explain changes in referent between the T'ang and the present. The extremely abbreviated citations are keyed to the bibliographical list at the end of Appendix I. They are not meant to exhaust the basic literature, but to lead the reader to further relevant material. Unless otherwise noted, early pharmacological writings are quoted from T'ang Shen-

## Appendix G

wei's Great Pharmacopoeia of 1249. Full references appear within the notes for a few works of too limited interest to be mentioned in the bibliographical essay (Appendix I).

CHANG LIU KEN 章柳根, POKE ROOT *Phytolacca acinosa*,  
Roxb. (20a)  
(Read 555; Roi, 122-123)

CH'E CH'E CHUNG T'U 車轍中土, EARTH COLLECTED  
FROM CART TRACKS (17b)

This does not appear in the pharmacopoeias as a specific substance, although "water collected from cart tracks" was introduced in the Great Pharmacopoeia.

CHIANG FAN 絳礬, CRIMSON ALUM  $\text{Fe}_2\text{O}_3$ , impure (14b)

A reddish-purple powder made by strongly roasting melanterite,  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ . (Read and Pak 132; T'ang, 3:25a; Li, 11:73)

CHIANG SHUI 漿水, VINEGAR LEAVEN (21b)

See *Ts'u chiang shui*.

CH'IEN 鉛, LEAD Pb (17b)

Note that in China as in the ancient civilizations of the West, tin was often considered a white variety of lead. "*Ch'ien*" is usually used for Pb specifically, but "*hsi*" is ambiguous even in some T'ang treatises. (Read and Pak 10; T'ang, 5:11a-12a)

CH'IEN CH'AI TAN 鉛釵丹, MINIMUM?  $\text{Pb}_3\text{O}_4$  (17a)

This term does not, to my knowledge, occur elsewhere in alchemical or pharmacological literature. My tentative translation is based on the possibility that it is related to, or even a copyist's error for, "*ch'ien tan* 鉛丹."

CH'IEN HSI 鉛錫, LEAD? Pb (19b)

Literally, "tin-lead." Since in Sun's time the two metals were not always adequately distinguished, this might mean lead, tin, or an alloy of the two. (Read and Pak 15)

CH'IEN HUANG HUA 鉛黃華, MASSICOT  $\text{PbO}$  (12b)

(Read and Pak 13)

## Appendix G

### CHIH 脂, LARD

See *chu chih*, *chu fu ko chih*, and *yu chih*.

### CH'IH CHIN 赤瑾, SORREL *Rumex acetosa*, L. (27b)

See Chapter IV, note 112. (Roi, 355)

### CH'IH SHIH CHIH 赤石脂, RED BOLE (4a)

A T'ang specimen was a red clay containing about 45 percent silica, 22 percent alumina, and 12 percent  $\text{Fe}_2\text{O}_3$ ; this is more aluminum and less Fe than in modern samples. Masutomi suggests that the composition of the ancient sample is close to that of laterite, but early descriptions tally with red bole, an unctuous clay containing considerable water. (Read and Pak 57e; Asahina 21; Masutomi, 81-83, 134-138; Nanking, 1314-1315; T'ang, 3:32a-33a)

### CH'IH T'U 赤土, RED CLAY (20b)

### CH'IH YEN 赤鹽, RED SALT NaCl, impure (20b-CCK)

This salt is mentioned earliest as an import from Turfan. According to Tuan Kung-lu's *段公路 Pei hu lu 北戶錄* (875), which includes much material on economic geography, this salt, the color of peach blossoms, is produced in the salt pools at Chang-yeh 張掖 (at the junction of Kansu, Ninghsia, and Chinghai), where it waxes and wanes with the moon. Li Shih-chen, who quotes Tuan (11:42), considers it one of the two varieties of *jung yen*, the other being dark blue or green. Ancient descriptions do not allow identification of the other constituents of what must be an impure sodium chloride; one might speculate that the characteristic color is that of manganese chloride. Ko Hung (16:8a-8b) gives a formula for artificial preparation.

### CHIN 金, GOLD Au (12b)

See *huang chin*. This character alone is ambiguous, for it can also mean metals in general.

### CHIN YA 金牙, IRON PYRITES $\text{FeS}_2$ (21b)

According to a T'ang writer, it occurs along the banks of a creek, and turns black if underwater for a long time. (Read and Pak 7, 98; Masutomi, 183; T'ang, 5:25a-25b)

## Appendix G

### CHIN YEH 金液, "LIQUEFIED GOLD" (17a)

See Chapter IV, note 80.

### CH'IU YIN FEN 蚯蚓糞, EARTHWORM EXCRETA (4a)

T'ao Hung-ching 陶弘景 recognized that earthworms devour very fine soil (see Chapter IV, note 1). He further said that in his time this substance was widely used by Taoists as a lute. In *Ch'ien chin fang* (see Appendix D above), Sun calls a type of laminar malachite "*ch'iu yin shih* 屎," which means the same thing, but it is expressly stated in *Tan ching yao chueh* (7a) that *ch'iu yin fen* was indistinguishable from ordinary earth. (Li Shih-chen, 42:40; T'ang, 22:14a)

### CHU CHIH 猪脂, LARD (22a)

### CHU FU KO CHIH 猪負革脂, SUBCUTANEOUS FAT FROM THE BACK OF A PIG (11a)

See Chapter IV, note 57.

### CHU SHA 朱砂, CINNABAR HgS (9a)

Ch'en Shao-wei 陳少微, who probably lived within a century of Sun (see note 29, Chapter II), has a very detailed discussion of types and locations. Cinnabar was distinguished from realgar by heating and sniffing for the pungent arsenic aroma. (Read and Pak 43; Lao; Masutomi, 192; T'ang, 3:3a-5b)

### CH'UEH FEN 雀糞, SPARROW FECES *Passer montanus montanus*, Brisson (24a)

This substance had a wide range of applications, internal and external, in Chinese medicine. It is ordinarily prepared with licorice. Read gives the nitrogen content as 5.66 percent and ash as 33.7 percent (Read 283)

### CHUNG T'ANG 重湯, BRINE (18b)

Lit., "heavy water." See Chapter IV, note 55.

### FAN 礬, ALUMS

See *chiang fan*, *fan shih*, *hei fan*, *huang fan*, *huang fan shih*, and *pai fan*.

## Appendix G

### FAN SHIH 礬石, KALINITE $KAl(SO_4)_2 \cdot 12H_2O$ (4a)

Native alum. Alunite and related alums were undoubtedly not distinguished from kalinite; “*k’u fan* 枯礬,” which Needham identifies as alum prepared by roasting alunite, is merely a general term for anhydrous alums. Note that for T’ao Hung-ching, two hundred years before Sun, *fan shih* was a light blue or green salt; some types at least would “when dissolved in vinegar and smeared on iron, turn it the color of copper. Although the exterior is copper-colored, there is no alteration of the substance within.” (Read and Pak 131; Chang Hung-chao, 170–171; Nanking, 1322; Needham, III, 653–654; Schafer, *Golden Peaches*, 217; T’ang, 3:13a–15b)

### FENG HUA HUI 風化灰, LIME, AIR-SLAKED $Ca(OH)_2$ (22a) (Read and Pak 71)

### FU LUNG KAN 伏龍肝, STOVE DEPOSIT Mostly impure metallic silicates, Al and Fe oxides (13b)

Although the identity of this substance was a secret in Ko’s time (16:6a), by the T’ang it is identified as the yellow or red deposit which accumulates over a long period in a kitchen stove, at the shoulder below the opening where the cooking vessel sits. Pseudo-Lei Kung 雷公, whose book reached final form in the T’ang or early Sung (T’ang, 3:23b), notes that it occurs in octagonal crystals. (Masutomi, 195; Nanking, 1315–1316; T’ang, 5:3a–4a)

### FU TZU 附子, CHINESE ACONITE TUBER, COLLECTED IN AUTUMN *Aconitum*, L. (27a)

See *wu t’ou*.

### HEI FAN 黑礬, BLACK ALUM (23b)

Since this substance is ordinarily connected with “green alum 綠礬” (melanterite,  $FeSO_4 \cdot 7H_2O$ ), I tentatively identify it as glockerite, approximately  $2Fe_2O_3 \cdot SO_3 \cdot 6H_2O$ , the only chemically similar mineral which is black in color. In modern Chinese mineralogical literature (Bradley and Barnes F.1.11.44, F.1.18.8) glockerite is called “*chi-hsing t’ieh fan* 基性鐵礬” or “*wei shui lü fan* 維水綠礬.” (Read and Pak 132)

### HEI YEN 黑鹽, BLACK SALT $NaCl$ , impure (22b)

Often considered a variety of *jung yen*; imported from Iran and

## Appendix G

India during the eighth century. (Read and Pak 116; Schafer, *Golden Peaches*, 217)

HO-TUNG YEN 河東鹽, SALT from Ho-tung [Shansi] NaCl (9b)  
A lake salt. See *lu hsien*.

HSI 錫, TIN Sn (13a)  
See *ch'ien*. (Read and Pak 15)

HSI CHIAO 犀角, RHINOCEROS HORN (12a)  
Normally used powdered. (Schafer, *Golden Peaches*, 241–242)

HSIAO SHIH 消石, EPSOM SALTS  $MgSO_4 \cdot 7H_2O$  (17b)  
Analysis of a T'ang sample makes this unanticipated identification possible. Epsom salts was separated from *p'o hsiao* by differential crystallization (not, as Schafer asserts, distillation); it was known much earlier that Epsom salts crystallizes out first. In modern times "*hsiao shih*" has been much confused with its homophone "硝石," the term for niter. (Read and Pak 123, 125; Masutomi, 39–46, 142–147, 188; Schafer, 218–219; T'ang, 3:16a–17b)

HSING JEN 杏仁, APRICOT PITS *Prunus armenaica*, L. (20a)  
In modern Chinese this term means "almonds," but this was not the usual meaning even a century ago. The almond was formerly considered a variety, and was called *pa-tan* 巴旦 *hsing*. (Read 444; Li Shih-chen, 29:36; Roi, 164; Wu Ch'i-chün, 749, and his *ch'ang-p'ien*, III, 838–840)

HSIUNG HUANG 雄黃, REALGAR  $As_2S_2$  (9a)  
Alchemists most often specified that from Wu-tu 武都, Kansu, red as cinnabar. Realgar was distinguished by a streak test or by odor upon heating. Modern sources often confuse it with *tz'u huang*, orpiment. (Read and Pak 49; Asahina 41; Masutomi, 100–105, 156–157, 181; T'ang, 4:3a–6a)

HU CHIAO 胡椒, INDIAN PEPPER *Piper nigrum*, L. (22b)  
An import in the T'ang; we know from an eighth-century source that it was extremely valuable. (Roi, 99; Schafer, *Golden Peaches*, 149–150)



## Appendix G

### HU FEN 胡粉, WHITE LEAD $\text{Pb}(\text{OH})_2 \cdot 2\text{PbCO}_3$ (23b)

See Chapter IV, note 90. Prepared since early times by slow treatment of lead sheets in acetic acid vapor. Although most substances whose names include the graph *hu* were first imported from or through the western regions, Schafer ("Early History," p. 428) has shown that in this case the character was originally "胡." (Read and Pak 12; Nanking, 1305-1306; T'ang, 5:12b-13a).

### HU T'UNG LÜ 胡同律, TACAMAHAC RESIN (20b)

This resin, the more orthodox designation of which is *hu t'ung lei* 胡桐淚, was an early import from Central Asia. It flowed out of a tree which Berthold Laufer (339-342) has identified as *Populus balsamifera*, var. *genuina* Wesm., and hardened in the ground, whence it was collected. It was used, among other purposes, for coating carious teeth, and by jewelers as a flux for gold and silver solder. In *Tan ching yao chueh* it also serves as a flux, to dissolve metallic oxides, and is the source of the black smoke mentioned. In later times the resin from *Calophyllum inophyllum*, L., native to China, was used under the same name. (Li Shih-chen, 34:127; Roi, 100; Schafer, *Golden Peaches*, 186-187)

### HUA SHIH 滑石, TALC $3\text{MgO} \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$ (4a)

In the early sources there are two varieties. One, which is white, comes from Kwangsi province, was used in medicine and as a fulling compound, and was carved to make funerary implements. A T'ang specimen has been analyzed and shown to be hydrated halloysite,  $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 4\text{H}_2\text{O}$ . The other, which comes from North China (mainly Shantung), is veined, dark green and white in color, and soapy in texture; it was carved only. This type, which Sun specifies, is soapstone, a massive variety of talc,  $3\text{MgO} \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$ . The hardness of soapstone does not exceed 2.5; that of halloysite is in the range 1-2. (Read and Pak 55; Masutomi, 85-88, 159-165; Nanking, 1313-1314; T'ang, 3:22b-24a)

### HUAI TZU 槐子, PAGODA TREE FRUIT *Sophorica japonica*, L. (20a)

(Read 410; Roi, 188-189)

### HUANG CHIN 黃金, GOLD Au (12b)

(Read and Pak 1)

## Appendix G

HUANG FAN 黃礬, HALOTRICHITE  $\text{FeSO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 22\text{H}_2\text{O}$   
(13b)

Masutomi (181) suggests this identification, perhaps with some admixture of alunogen,  $\text{Al}_2(\text{SO}_4)_3 \cdot \text{approximately } 16\text{H}_2\text{O}$ . If *huang fan* were a product of recrystallization like the other alums (see *huang fan shih*), it might be considerably purer ferrous sulphate. In the T'ang it was used as a mordant and to treat skin lesions. (Read and Pak 133; Schafer, *Golden Peaches*, 217; T'ang, 3:13b)

HUANG FAN SHIH 黃礬石, HALOTRICHITE, CRUDE (22b)

See *huang fan*; by analogy with *fan shih*, this would be the native form prior to purification.

HUANG LIEN 黃連, COPTIS ROOT *Coptis chinensis*, Franch.  
(App. D)

(Peking, I, 457-464; Roi, 132; T'ang, 9:39b-40a)

HUANG NAO SHA 黃硃砂, YELLOW SAL AMMONIAC  
 $\text{NH}_4\text{Cl}$  with much S impurity (22b)

(Read and Pak 126)

HUANG TAN 黃丹, MINIMUM  $\text{Pb}_3\text{O}_4$  (App. D)

T'ang specimens, which were red in color, contained considerable  $\text{PbO}$ , but lacked the considerable sulphate impurities found in modern samples. (Read and Pak 14; Asahina 58)

HUI CHIH 灰汁, LIXIVIUM (19a)

An aqueous infusion of ash (ordinarily prepared from vegetable matter) containing sodium and potassium carbonates. Proof that lixivium was in common use as a detergent during the T'ang is found in *Yu-yang tsa tsu* 酉陽雜俎 (863), a collection of supernatural anecdotes (*Ssu-pu ts'ung k'an* 四部叢刊 ed., 10:1a), which says of the water of a certain spring that "it is superior to *hui chih* for washing clothes." Ko Hung uses this term to mean "limewater," however; see *Pao p'u tzu nei p'ien* 抱朴子內篇 (*P'ing chin kuan ts'ung-shu* 平津館叢書 ed.), 9:7b and 16:8a. (Schafer, *Golden Peaches*, 220-221)

HUNG 汞, MERCURY Hg (13a)

In China mercury-bearing mineral sources often are admixed with lead compounds; mercury itself usually contains a little silver. (Read and Pak 44; Nanking, 1276-1277; T'ang, 4:14b-16b)

## Appendix G

### JUNG YEN 戎鹽, TURKESTAN SALT NaCl, impure (4a)

This was a term for lake or mineral salts, white or colored, imported from the west of China, and later for colored impure NaCl in general. Li Tang-chih 李當之 (fl. fourth century) in his lost *Yao lu* 藥錄, one of T'ao Hung-ching's sources, described Turkestan salt as bitter and malodorous; T'ao himself said that it was not very salty and had the characteristic odor of rotten eggs; on the other hand, Chang (182-184) has collected early literary sources which call it sweet. Matsuda has provided evidence that in T'ao's time it was transported to Szechuan via the Mongolic T'u-yü-hun of the Kokonor region. By the T'ang it seems to have come mostly from salt lakes in the Kokonor and Kansu, although some is said to be found in the mountains. One T'ang specimen found in an unglazed pot in the Shōsōin was analyzed and found to be "a soil containing inorganic salts—presumably a soil from some salt lake in China," 70.7 percent insoluble. The soluble portion contained mainly potassium and sodium chlorides, and calcium, sodium, and magnesium sulphates. The bitter taste of modern samples has been explained as due to excessive magnesium or niter.

(Read and Pak 116; Asahina 38; Masutomi, 49-58, 151-155; Nanking, 1300; Schafer, *Golden Peaches*, 216; T'ang, 5:17b-18a)

### KO P'U 蛤蒬, CLAMSHELLS (28a)

This term is not sufficiently definite to be identified with a particular species. (Read 216; T'ang, 20:14b-16a)

### K'U CHIU 苦酒, WINE VINEGAR (15a)

### K'U LIEN TZU 苦楝子, PERSIAN LILAC FRUIT, dried *Melia azedarach*, L. (24a)

(Nanking, 884-885; Roi, 203-204; T'ang, 14:12b-13b)

### KUANG MING SHA 光明砂, CINNABAR, PURE HgS (12a)

(Lit., "lustrous cinnabar.") According to the seventh-century pharmacologist Su Ching 蘇敬 (see Chapter IV, note 76), this is the purest and most precious kind of cinnabar; it occurs in pieces the size of a hen's egg. Pseudo-Lei Kung's description of its sub-conchoidal fracture is translated by Needham (III, 648-649), who gives the all too literal equivalent "brilliant sand." (T'ang, 3:3a-4a)

## Appendix G

KUEI CHIEN 鬼箭, SPINDLE TREE STEMS *Evonymus alatus*, Regel (27a)  
(Read 308; Roi, 212–213)

KUEI CH'OU 鬼臼 (RHIZOME OF A HOSTA SPECIES)  
(27a)

This name now applies to the Umbrella leaf plant (*Diphyllia cymosa*, Michx.), but my identification is based on analysis of a T'ang specimen, sorted out from admixture with long pepper, in the Shō-sōin. (Read 520; Asahina 19)

KUEI PI MU 鬼比目, BITTERSWEET FRUIT? *Solanum dulcamara*, L. (27a)

I have not been able to find this name elsewhere; the identification is based on the conjecture that it is a variant of “*kuei mu*.” If this is true, then “*pi mu*” is an intrusion from the legend of the “matched-eye” fish, those monocular avatars of conjugal devotion who must physically join together to swim. (Nanking, 1101–1102; Roi, 414–415)

K'UNG CH'ING 空青, MALACHITE, NODULAR  
 $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$  (9b)

This identification has not been proved for ancient times, although one finds no radical breaks in the tradition. The nodules are usually about the size and shape of a strawberry, sometimes hollow with entrapped liquid. It is consistently spoken of by early pharmacologists as extremely rare. (Read and Pak 82; Masutomi, 184–185; T'ang, 3:25b–26b)

LA 鑞 (蠟), PEWTER Sn–Pb alloy (24a)

An alloy commonly composed of 80 percent tin and 20 percent lead, used in modern times as a solder. Ho-chou, which Sun specifies as its source, is in the area of Mount K'un-lun, Kwangsi (see Chapter IV, note 43), and was a major source of tribute silver in T'ang times, as we learn from the “Treatise on geography” of the New Standard History of the T'ang (*Hsin T'ang shu* 新唐書, Palace ed., 43A:11b). “White *la*” is used by some writers (none of the T'ang, so far as I know) as a synonym for “tin.” (Read and Pak 15; T'ang, 5:11b)

## Appendix G

LA MU 攏木, WHITE WAX TREE, WOOD *Ligustrum japonicum*, Thunb., or related (25b)

See Chapter IV, note 105. (Peking, II, 34–35; Read 182; Roi, 258–259)

LAN CHIH 藍汁, VEGETABLE BLUE INFUSION (29a)

One of a number of blue dyes native to China; Schafer (212) believes that the T'ang variety was extracted from a knotweed (*Polygonum tinctorium*, Loureiro). (T'ang, 9:21a–22a; Sung, A:50a–50b, trans. Sun and Sun, 75–76)

LI 離, CINNABAR? HgS (20b)

See Chapter IV, note 90.

LI 鯉, CARP *Cyprinus Carpio* (28b)

(Read 128; T'ang, 20:20b–22a)

LI LU 黎蘆, BLACK VERATRUM ROOT *Veratrum nigrum*, L. (27a)

(Read 225; Roi, 84)

LIEN HSI 鍊錫, TIN, REFINED Sn (24b)

See *hsi*.

LIU KEN HSUEH 流良雪, CALOMEL HgCl (9b)

*Liu ken hsueh* is not described elsewhere in a context where it can be conclusively identified as calomel, but “*ken hsueh* elixir” is calomel prepared from mercury. Recipes are given further on in *Tan ching yao chueh* and in *T'ai-ch'ing shih pi chi* 太清石壁記 (See Chapter II, note 53, and pp. 77–78), A:5b–7a and B:4a–4b. Sun's instructions to “use the sublimate prepared from [quick-]silver” makes the identification certain. Note that ordinary commercial calomel is *shui yin shuang*.

LU HSIEN 滷鹹, LAKE SALT NaCl, impure (4a)

This is the most prevalent meaning of an imprecise term. According to T'ao Hung-ching *lu hsien* is bittern, which congeals in the bottoms of pans in which lake salt is evaporated. T'ang (5:18b) quotes *Tan fang ching yuan* 丹方鏡源, which may be of the late T'ang or early Sung (see Chapter II, note 61), to the effect that the substance

## Appendix G

was used as a soldering flux, but the original (*Tao tsang* 道藏 ed., B:3b) does not contain the words he quotes. Su Sung 蘇頌 (1020–1101) uses “*lu hsien*” to refer to brine from the sea. (Read and Pak 118; Masutomi, 200; T'ang, 4:12b [this is the second of *two* folios numbered 12], 5:18a)

LU T'U 鹵土, SALT-IMPREGNATED EARTH (App. D)

LUAN FA 亂髮, HAIR, HUMAN (20b–21a)

According to late sources, this term generally denotes hair collected off the comb rather than cut. In Chinese medicine, the properties of hair were a reflection of its healthy state, due to a just balance of *ch'i* (=vital pneuma) and blood in the body. According to Schafer, magical procedures “which call for the hair of the head depend on the notion of binding, tying up, and holding fast.” (Read 409; Li Shih-chen, 52:82; Schafer, *Golden Peaches*, 193–194; T'ang, 15:2a)

MANG TS'AO 茴草, JAPANESE ANISE FOLLICLES *Illicium religiosum*, Sieb. et Zucc. (27a)

This substance was classically used to stupefy fish and poison rats, and now is employed as an insecticide. Roi's doubts concerning this identification seem groundless, for *Yao ts'ai hsueh* affirms that the shrub is found in Taiwan, Hunan, and Kwangtung provinces. (Read 505; Nanking, 837; Roi, 436)

MEI 梅, PLUMS *Prunus mume*, Sieb. et Zucc. (26b)

See also *wu mei*. (Roi, 165–166)

MI 蜜, HONEY (19a)

(T'ang, 20:2b–4b; see also illustration of comb on 5a)

NAO SHA 硃砂, SAL AMMONIAC  $\text{NH}_4\text{Cl}$  (20b)

Needham has noted (III, 654) that this word is found in China in the second century; it is thus still possible that Persian “*nausādir*” does not precede Chinese “*nao sha*.” The material itself originates in “volcanic situations in Central Asia.” (Read and Pak 126; Laufer, 505–507; Nanking, 1299–1300; Schafer, *Golden Peaches*, 218; T'ang, 5:9a–10b)

## Appendix G

### NIU HUANG 牛黃, "COW BEZOAR" (13a)

The bezoar was the most renowned of the medicinal calculi found in the bodies of various animals and described by writers from Aristotle on. It came from the stomach of the goatlike Oriental Bezoar. For a discussion, based on primary sources, of the Western lore of animal stones, see Adams, 103–112. At least some *niu huang* is biliary calculi. Read reports that modern samples are mainly calcium bilirubin and small amounts of cholic acids. Manganese and zinc were found in a few analyses. (Read 337; Schafer, *Golden Peaches*, 191–192)

### PA TOU 巴豆, CROTON SEED *Croton tiglium*, L. (27a)

A violent poison used in medicine as a drastic purgative; introduced into European therapy from China in the seventeenth century. (Read 322; Roi, 204–206; T'ang, 14:3a–4b)

### PAI CH'IH SHU 白赤木, ATRACTYLIS ROOT (27a)

See *shu*.

### PAI FAN 白礬, ALUM, RECRYSTALLIZED

$\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$  (13a)

This is the recrystallized variety, more often called "*ming fan* 明礬." See *fan shih*. (Masutomi, 194–195)

### PAI SHIH YING 白石英, QUARTZ $\text{SiO}_2$ (9b)

This is milky quartz; *shui ching* is transparent rock crystal. Masutomi (158–159) provides a photograph of hexagonal pillar-form crystals of the T'ang period. They were cooked in milk and soaked in wine to make a geriatric tonic (Sun, *Ch'ien chin i fang*, 150). That sold in some parts of China in the last decade was calcite. (Read and Pak 40; Nanking, 1293–1294; T'ang, 3:29b–30b)

### PAI T'UNG 白銅, PAKTONG Cu-Ni alloy, often also containing Zn (20b–CCK)

See Chapter IV, note 90. (Read and Pak 6; Needham, vol. IV, pt. I, p. xxxi; Schafer, *Golden Peaches*, 257).

### PAI YEN 白鹽, SALT, WHITE NaCl, purified (22b)

This is a common name for the common substance. Within the context of *Tan ching yao chueh*, it is probably synonymous with *yen* but would seem to represent a less pure compound than *yen hua*.

## Appendix G

PAN HSIA 半夏, PINELLIA TUBERIFERA, BULB P. tuberifera, Ten. (27a)

The bulbs contain hamolysine, a toxic substance. (Read 911; Roi, 70, illustration)

PANG HSIEH 蚌脣, OYSTER SHELL, POWDERED (28b)

See *pang k'o*.

PANG K'O 蚌殼, OYSTER SHELLS Pinctada (28a)

"Pang" includes fresh-water mussels as well as oysters in modern use, but the concensus of early pharmaceutical writers makes it the pearl oyster. (Read 217; Li Shih-chen, 46:24-25; T'ang, 20:10b-11b)

PEI LIU SHUI 北流水, WATER FROM A NORTHWARD-FLOWING STREAM (20a)

This was not an officinal substance, although water from an eastward-flowing stream was used for a number of purposes, including washing down pills of elixirs. (Sun, *Ch'ien chin i fang*, 342; T'ang, 5:33b)

PI PO 萼撥, LONG PEPPER Piper longum, L. (22b)

A variant form of "*pi pa* 菱," from Sanskrit "*pippali*." (Read 630; Roi, 98-99; Schafer, *Golden Peaches*, 150-151; T'ang, 9:25b-26a)

PIAO CHIAO 鱧膠, FISH GLUE (28b)

(Li Shih-chen, 44:130)

PIEN YEN CH'IH 邊鴈齒, MALE-FERN? *Dryopteris crasirhizoma*, Nakai (26a)

This provisional identification is based on ordinary lexicographical sources, which make "*pien yen ch'ih*" synonymous with "*yang ch'ih* 羊齒." In his *Ch'ien chin i fang* (p. 257), Sun compares the size of large stalactites with that of "*yen ch'ih*"; this could hardly be real duck's teeth (the literal meaning) or the plant identified with "*yang ch'ih*" in Wu Ch'i-chün, 730. (Huang, 80-97; Peking, I, 428-439)

PO CHIH 栢(柏)汁, CYPRESS SAP *Thuja orientalis*, L. (29a)

The editors of *Yao ts'ai hsueh* prefer "*Biota orientalis* (L.), Endlicher." The fruit is classically steamed and sun-dried, and the seeds



## Appendix G

extracted and taken for their tonic qualities. (Nanking, 965-966; Roi, 49-50)

P'O HSIAO 朴消, MIRABILITE  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$  (11a)

The crude material is formed in the ground near brine ponds or salt stores. Since sodium sulphate is relatively insoluble at low temperatures, it is deposited in fairly pure form. Epsom salts, the only important contaminant, made up about 10 percent of T'ang samples. Some writers call the product of a single recrystallization "*p'o hsiao*." Su Ching, for instance, applies the name "mineral spleen (*shih p'i* 石脾)" to the native substance. In the 'five elements' system, the spleen is a correlate of Earth. (Read and Pak 123; Masutomi, 40-43, 144; Nanking, 1318-1319; Schafer, *Golden Peaches*, 218; T'ang, 3:39a-40b)

PO-SSU T'OU 波斯鎊, BRASS, PERSIAN (24a)

See *t'ou*.

PO-SSU YEN LÜ 波斯鹽綠, ZINGAR, PERSIAN (21b)

See *yen lü*.

SHE HSIANG 麝香, MUSK (12a)

(Schafer, *Golden Peaches*, 158; T'ang, 16:4a-5b)

SHENG T'IEH 生鐵, CAST IRON Fe, C impurities (20b)

Cast iron, which is as characteristic of Chinese metallurgy as is wrought iron of European, has been produced for nearly 2500 years. Its history has been treated in some detail in Joseph Needham, *The Development of Iron and Steel Technology in China* (Second Biennial Dickinson Memorial Lecture, 1956; London: The Newcomen Society, 1958), which should be supplemented with Yang K'uan 楊寬, *Chung-kuo ku-tai yeh t'ieh chi-shu ti fa-ming ho fa-chan* 中國古代冶鐵技術的發明和發展 (The invention and development of iron smelting techniques in ancient China; Shanghai: Shanghai People's Press, 1956).

SHIH HUI 石灰, LIME CaO or  $\text{CaCO}_3$  (29a)

This is a general term, which includes limestone (distinguished when necessary as *shih hui shih* 石), and both unslaked (*sheng* 生) and slaked (*shu* 熟 or *hsiao* 消) lime. (Read and Pak 71; Li Shih-chen, 9:96-98; Nanking, 1294-1295)

## Appendix G

### SHIH LIU HUANG 石硫黃, SULPHUR S (12a)

Imported since early times from Indonesia. In *Ch'ien chin i fang* (261), Sun specifies a yellow, presumably monoclinic, type which leaves a residue when burnt. (Read and Pak 128; Masutomi, 191; Nanking, 1277-1278; T'ang, 4:6b-8a)

### SHIH LÜ 石碌, MALACHITE, GRANULAR $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$ (29a)

Chinese alchemy also made extensive use of the special formations *k'ung ch'ing* and *ts'eng ch'ing*. (Read and Pak 84; Schafer, *Golden Peaches*, 229-230; T'ang, 3:25a)

### SHIH TAI 石黛, INDIGO (29a)

See Chapter IV, "Formula for Making Indigo," which is actually a formula for faking it. The true indigo from *Indigofera tinctoria*, L., was a rare import, and so naturally attempts were made to produce a substitute based on native blue vegetable dyes. "Shih tai", which usually means "graphite," is used in *Tan ching yao chueh* instead of "ch'ing 靑 tai." (Schafer, *Golden Peaches*, 208, 212; T'ang, 9:27a-27b)

### SHIH TAN 石膽, CHALCANTHITE $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ (11a)

According to Su Ching, a contemporary of Sun, *shih tan* is shaped like *ts'eng ch'ing*, with green color interspersed. The color is probably iron impurity if the mineral is formed from chalcopyrite,  $\text{CuFeS}_2$ . (Read and Pak 87; Masutomi, 190; Nanking, 1322-1323; Schafer, *Golden Peaches*, 194; T'ang, 3:24b-25b)

### SHIH T'ING CHIH 石亭脂, SULPHUR, AMORPHOUS S (10b)

(Read and Pak 129; T'ang, 4:7a)

### SHIH YEN 石鹽, HALITE, WHITE NaCl, impure (22a)

See the comprehensive article in T'ang, 4:9b-14b. (Read and Pak 117)

### SHU 朮, ATRACTYLIS ROOT *A. ovata*, Thunb., or *A. macrocephala*, Koidzumi (27a)

This drug has been associated with the cult of immortality since very early times. (Read 14; Nanking, 426-434; Roi, 305-306)

## Appendix G

SHU KU 黍穀, MILLET, GLUTINOUS *Panicum miliaceum*,  
L. (17b)

Usually referred to simply as “*shu*.” (Roi, 60)

SHU MI 黍米, MILLET, GLUTINOUS *Panicum miliaceum*, L.  
(20a)

See *shu ku*.

SHU T'UNG 熟銅, COPPER, REFINED Cu (21a)

This term evidently means “refined copper” in *Tan ching yao chueh*, for “*shu t'ung*” is used synonymously with “red copper” (*ch'ih t'ung* 赤銅, that is, the metal, as distinguished from such alloys as bronze or brass) in the “Formula for Removing Halo from Copper.” Much earlier, T'ao Hung-ching used the terms “*sheng t'ung* 生銅 (lit., ‘raw copper’)” and “*shu t'ung* (lit., ‘ripe or well-done copper’)” in apposition to mean copper which has merely been smelted and that which has been further purified, and states that the latter is used for plating; see T'ang, 3:13b. In the early eighth century, however, the pharmacologist Ch'en Ts'ang-ch'i 陳藏器 distinguished *shu t'ung* from “red copper,” and recommends only the latter substance for ingestion to promote the healing of fractures (T'ang, 5:14a). Long after Sun Ssu-mo's time, *T'ien kung k'ai wu* 天工開物, the great technological encyclopedia of the early seventeenth century, used the term “*shu t'ung*” to denote a coinage brass made of seven parts copper and three parts zinc oxide 倭鉛 (prepared by heating smithsonite 爐甘石,  $ZnCO_3$ , in closed earthenware crucibles). (Sung, C:12b-13a, trans. Sun & Sun, 247)

SHUI 水, WATER

See *pei liu shui*.

SHUI CHING 水精 (晶), QUARTZ  $SiO_2$  (19b)

This is the normal term for transparent rock crystal. (Read and Pak 37; Schafer, *Golden Peaches*, 227-228)

SHUI YIN 水銀, QUICKSILVER Hg (11a)

See *hung*.

SHUI YIN SHUANG 水銀霜, CALOMEL  $HgCl$  (10b)

Divers has given reason to believe that the Chinese heated Hg

## Appendix G

with salt and alum at a low enough temperature to produce pure HgCl. Medicinal calomel (also called *fen shuang* 粉霜) was re-sublimed with great care. Masutomi (102) reports that one ancient sample was 99.55 percent pure. See also *liu ken hsueh*. (Read and Pak 46; Li Shih-chen, 9:61-62; Nanking, 1297-1298)

### SU 酥, BUTTER FAT (18b)

"Su" is short for "su yu 油," prepared by boiling milk, removing the skin which forms on cooling, and boiling it separately, according to a recipe of the Ming period. (Li Shih-chen, 50:90-91)

### SU FANG MU 蘇方木, SAPPAN WOOD *Caesalpinia sappan*, L. (29a)

An aqueous infusion of this imported wood, because of its red color, was held in Chinese medicine to benefit the blood circulation. (Nanking, 312-313; Roi, 173-174; Schafer, *Golden Peaches*, 211)

### SUAN CHIU 蒜薹, ONION *Allium cepa*, L. (23a)

A more common name is *suan ts'ung* 葱. (Read 664; Roi, 337)

### SUAN TSAO JEN 酸棗仁, WILD JUJUBE PITS *Ziziphus vulgaris* v. *spinosum*, Bunge (20a)

Peking (II, 448-449) distinguishes the Chinese variety as *Z. jujuba* Mill v. *spinosus* Hu. (Read 294; Roi, 388)

### TA YEN 大鹽, SALT, LARGE CRYSTALS NaCl (25a)

This must be what is ordinarily called "seal salt 印鹽," a carefully recrystallized product whose shape suggested the large cubic format of Chinese seals of office. (Chang Hung-chao, 181; Schafer, *Golden Peaches*, 216-217; T'ang, 5:18a-18b)

### T'AI YIN HSUAN CHING 太陰玄精, SELENITE $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ , monoclinic (13b)

This compound as used in Chinese medicine and alchemy is ordinarily formed in the ground near brine ponds or salt stores; it is the least soluble major component of sea water. Its chemical identification was made certain by the detailed description of the crystals given by the Sung polymath Shen Kua (496). (Read and Pak 120; Masutomi, 23-25; Nanking, 1320-1321; T'ang, 4:36a-37a, where illustration shows flat six-sided crystals)

## Appendix G

T'AO JEN 桃仁, PEACH PITS *Prunus persica*, Stoker (27a)  
(Roi, 166-167)

T'IEH 鐵, IRON Fe (20b)  
See *sheng t'ieh*.

T'OU 鑰, BRASS Cu-Zn alloy (23a)  
This alloy originally came from Sassanian Persia; the Chinese name corresponds to Persian *tutiya*. (Laufer, 513; Schafer, *Golden Peaches*, 256-257; Ch'en Wen-hsi)

TSAO JANG 棗穰, JUJUBE PULP (13a)  
See *tsao jou*.

TSAO JOU 棗肉, JUJUBE PULP (12a)  
A customary vehicle for the ingestion of elixirs. See Chapter IV, note 60. "Tsao" is a general term for jujubes (*Ziziphus vulgaris*, Lam., and its varieties), which are native to China, and dates, which in the T'ang were an imported delicacy. Peking (II, 28-30) reclassifies the jujube as *Z. jujuba*, Mill.

TS'ENG CH'ING 曾青, MALACHITE, LAMINAR  
 $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$  (10b)  
Associated with nodular malachite, *k'ung ch'ing*. (Read and Pak 83; T'ang, 3:26b-27a)

TSO KU MU-LI 左顧牡蠣, SHELL OF LEFT-ORIENTED OYSTER (4a)

This term was introduced in the literature by T'ao Hung-ching (quoted in T'ang, 20:7a): "It grows on rocks with the mouth upwards. If it is picked up by the belly [that is, with the mouth horizontal and facing the observer] and if to the observer, orienting himself toward the south and looking at it, the mouth inclines leftward, it is [left-oriented]. Some say that the variety whose shell is pointed at the end [opposite the hinge] is left-oriented. I have not made an exhaustive determination of which explanation is true."

The corresponding quotation in Li (46:22) was mistranslated by Read (*Turtle and Shellfish Drugs*, 216), but reference to a similar passage in K'ou (105-106) makes the meaning much clearer.

The preparation given by T'ao Hung-ching specifies "discard the meat," indicating that the shell is used. (T'ang, 20:6b-8a)

## Appendix G

### TSO WEI 左 (佐) 味, VINEGAR, FORTIFIED (16a)

In the time of T'ao Hung-ching (452-536), the term "*hua ch'ih* 華池 *tso wei*," of which this is a contraction, was a technical designation for vinegar with other reagents added. Since saltpeter and alum appear most commonly in early texts, the point was apparently to make the vinegar a more efficient solvent. By Sun's time, however, this term as well as "*hua ch'ih*" were coming to be mere synonyms for "vinegar." See Wang K'uei-k'o 王奎克, "Chung-kuo lien-tan-shu chung ti 'chin yeh' ho hua ch'ih 中國煉丹術中的'金液'和華池" ("Liquefied gold" and "flower trough" in Chinese alchemy), *K'ohsueh shih chi-k'an* 科學史集刊 (Journal of the History of Science, Peking), 7 (1964):53-62.

### TS'U 醋, VINEGAR

See *k'u chiu*, *tso wei*, *ts'u chiang shui*, and *yen ts'u*. Vinegar was the most important acid in ancient China; its solvent ability was often increased by addition of salts.

### TS'U CHIANG SHUI 醋漿水, VINEGAR LEAVEN (17b)

This ingredient is also referred to as *chiang shui*, literally, "starch water." Li Shih-chen (5:54) quotes a recipe from the *Pen-ts'ao meng ch'uan* 本草蒙筌 pharmacopoeia (preface dated 1565) of Ch'en Chia-mo 陳嘉謨: "'Starch' in this case means 'vinegar.' Heat short millet 粟米 until it is quite hot. Pour it into cold water and let it soak for five or six days. Its taste is like that of vinegar, and a white mold is formed. Its color is like that of starch, hence the name."

### T'U 土, EARTH

See *ch'e ch'e chung t'u*, *ch'ih t'u*, and *lu t'u*.

### TUI 兌, WHITE LEAD? $Pb(OH)_2 \cdot 2PbCO_3$ (20b)

See Chapter IV, note 90. "*Fen hsi* 粉錫" is the common Chinese name for white lead.

### T'UNG 銅, COPPER Cu

See *pai t'ung*, *shu t'ung*, and *t'ou*.

### T'UNG CH'ING 銅青, VERDIGRIS $CuAc_2 \cdot CuO \cdot 6H_2O$ (29a)

In modern times there has been confusion with basic copper carbonate. (Read and Pak 9; Nanking, 1305; Masutomi, 193)

## Appendix G

### TZ'U HUANG 雌黃, ORPIMENT $As_2S_3$ (16b)

Realgar and orpiment are often found together. Antimony sulphide,  $Sb_2S_3$ , is a common impurity. (Read and Pak 50; Masutomi, 100-105, 186; Nanking, 1281; Schafer, *Golden Peaches*, 213-214)

### TZU K'UANG 紫釧, GUM LAC (21b)

This insect product came from Annam or Cambodia in the T'ang; it was first mentioned in the fourth century. The wax content of a T'ang specimen is greater (12.7 percent) than that on the contemporary market, indicating a different host plant. (Asahina 20; Laufer, 475-478; Li Shih-chen, 39:69; Schafer, *Golden Peaches*, 210)

### TZ'U SHIH 磁石, MAGNETITE $Fe_3O_4$ (9b)

Produced widely in China. Pseudo-Lei Kung ranks various types by attractive power. (Read and Pak 76; Masutomi, 186; Nanking, 1288-1289; Needham, vol. IV, pt. I, p. 234; T'ang, 4:23b)

### TZU SHIH YING 紫石英, AMETHYST $SiO_2$ ; Mn, Fe impurities (9b)

This is true amethyst, not so-called Oriental amethyst, but fluorite is often confounded with it, and most medicinal amethyst on the market today is fluorite. (Read and Pak 41; Masutomi, 186; Nanking, 1295; T'ang, 3:30b-31b)

### WU KUNG 蜈蚣, CENTIPEDES, DRIED *Scolopendra morsitans*, L. (27a)

(Nanking, 1186-1187; T'ang, 22:16b-17b)

### WU LANG T'ENG 勿郎藤, (UNIDENTIFIED) (25b-26a)

See Chapter IV, note 107.

### WU MEI 烏梅, PRUNES *Prunus mume*, Sieb. et Zucc., dried (24a)

See *mei*; this is the dried immature plum.

### WU T'OU 烏頭, CHINESE ACONITE TUBER, COLLECTED IN SPRING *Aconitum*, L. (22b)

There are so many species of Chinese aconite, Roi notes, that "to know for certain [which are used in medicine] it would be necessary to accompany the peasants who collect them into the moun-

## Appendix G

tains. The majority of aconites come from Szechuan, where it is cultivated." In modern times this poisonous herb has been applied to the skin as a local anaesthetic. (Read 523; Roi, 128-129)

**YANG CH'I SHIH** 陽起石, ACTINOLITE  $\text{Ca}(\text{Mg},\text{Fe})_3(\text{SiO}_3)_4$   
or similar (11a)

*Yang ch'i shih* is taken by modern writers to refer to asbestos tremolite, actinolite, or hornblende (Read and Pak 46). Early writers speak of it as the "root" of mica, in proximity with which it occurs, and generally agree that the product with some brown or black coloration is superior. The name clearly stands for a range of substances rather than a single compound. (Read and Pak 75; Masutomi, 198; Nanking, 1312-1313; T'ang, 4:25b-26b)

**YEH KO** 野葛, GELSEMIUM ROOT *G. elegans*, Benth., or similar (27a)

A T'ang specimen of this extremely toxic substance is found in the Shōsōin. In modern times the root or leaf of poison ivy (*Rhus toxicodendron*, L., var. *radicans*, Miq.) has also been sold under this name. (Read 174, 317; Asahina 39; Roi, 405)

**YEN 鹽**, SALT, COMMON

See *ch'ih yen*, *hei yen*, *Ho-tung yen*, *jung yen*, *lu hsien*, *pai yen*, *shih yen*, and *yen hua*.

**YEN HUA** 鹽花, SALT, RECRYSTALLIZED NaCl (16a)

Fine salt crystals, purified for domestic use. See *shih yen*.

**YEN LÜ** 鹽綠, ZINGAR, PERSIAN Impure artificial copper carbonates and/or acetates (21b)

In the T'ang zingar was brought from Central Asia as well as Iran, and was counterfeited in China. Also known as "*lü yen*." (Read and Pak 121; Masutomi, 199 [incorrect]; Schafer, *Golden Peaches*, 194)

**YEN TS'U** 釀醋, VINEGAR, concentrated (9b)

See *ts'u*.

**YIN FEN** 銀粉, SILVER, powdered Ag (9b)

Sun's contemporary Su Ching prepared finely divided silver by amalgamating silver leaf with mercury, grinding with Epsom salts



## Appendix G

and salt, heating to drive off the mercury, and washing away the salts. (Read and Pak 2; T'ang, 4:20a-21a)

YU CHIH 油脂, FAT (23b)

YÜ FEN 玉粉, JADE, powdered  $\text{NaAl}(\text{SiO}_3)_2$  (9a)

Jadeite was only the most precious of a number of minerals included in this category. (Read and Pak 29; Masutomi, 183; Needham, III, 663-667; Schafer, *Golden Peaches*, 223-227; T'ang, 3:8a-9b)

YÜ SHIH 礬石, ARSENOHITE  $\text{As}_2\text{O}_3$  (4a)

Su Ching distinguished arsenolite from marble, a common substitute in the T'ang, because when heated the former decomposes but does not lose its "hardness." (Read and Pak 88; Masutomi, 198; Nanking, 1286; T'ang, 5:6a-7a)

YUN MU 雲母, MUSCOVITE  $\text{H}_2\text{KAl}_3(\text{SiO}_4)_3$  (22b)

This is the common variety of mica, according to analysis of material dating from the T'ang. (Read and Pak 39; Asahina 37; Masutomi, 147-150, 181; Nanking, 1310-1311; Sun, *Ch'ien chin i fang*, 157; T'ang, 3:5b-7b)

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Appendix H  
Notes on the Identification of Medical Disorders  
Mentioned in *Tan ching yao chueh*

WHILE I have attempted to document my translations of medical terms as fully as the availability of sources coeval with *Tan ching yao chueh* allows, my very limited knowledge of modern medicine requires that these notes be used with caution. It has been possible in some cases to find equivalent names of disorders in English, but very often even the best possible correspondence would be specious. Where it seemed necessary, therefore, I have rendered the Chinese term more or less literally and explained its meaning in a note. The dividing line between the identifiable and the merely describable is even so a matter of judgment; *no* Chinese disease entity corresponds perfectly with one recognized by modern science—even “*ssu* 死,” the common word for “death,” often means only “a faint”—but although the overlap was different the total area covered—the range of human illness—was roughly the same.

The forms of citation and other conventions observed below are explained at the beginning of Appendix G; *chüan* numbers in Ch’ao are given in parentheses following page numbers.

CHANG 瘴, MIASMAL DISEASES (14b)

Diseases contracted in the miasma prevailing in areas of the southern coastal provinces. This group includes not only malaria and yel-

## Appendix H

low fever, but typhoid as well, for Ch'ao describes *chang* as analogous to the north Chinese group of disorders due to unseasonable cold factors. (Ch'ao, 64–65 [10])

### CHANG MAN 脹滿, ASCITES (12a)

It was recognized in the pseudo-Yellow Emperor's *Ling shu ching* 靈樞經—which was fabricated in the eighth century but incorporates much material from about the beginning of our era—that the fluid was in the peritoneum. This would define the condition as ascites, normally a manifestation of heart or kidney disease, or of portal obstruction of the liver. Sun uses the term more loosely; he tries to clearly distinguish it from *chung* 腫, a general term for dropsies with swelling (*Ch'ien chin fang*, 21:20a–20b), and distinguishes varieties in which pain is present or absent when the stomach of the patient is pressed (16:15a). Ch'ao confines the term "*chang man*" to a disorder caused by an accumulation of cold *ch'i* (= pneuma) in the stomach and viscera, and indicated by a full feeling when the stomach is pressed; at the same time the patient "is so restless he is unable to lie down." (Ch'ao, 93 [16]; Ochiai, 19; Yü, 254–255)

### CHI CHÜ 積聚, ACCUMULATIONS OF MORBID CH'I (= PNEUMA) (16a)

See *hsin fu chi chü*.

### CHIAO CH'I 脚氣, BERI-BERI (16b)

This identification is an ancient one. See Ch'ao (79 [13]), for a detailed description which recounts the characteristic symptoms in the lower legs. Later material is discussed in Needham and Lu. See also *chiao leng t'eng jo wu li*.

### CHIAO LENG T'ENG JO WU LI 脚冷痿弱無力, RHEUMATISM OF THE FEET (16a)

Lit., "feet cold, aching, and debilitated." The description in Ch'ao, 79 (13), translated in Wong and Wu, 212, fits these symptoms into the complex which determines beri-beri, but the particular term Sun uses, and his employment of the customary term for beri-beri separately elsewhere (see *chiao ch'i*), as well as the fact that Ch'ao does not treat rheumatism (*pi* 痺) as a separate entity, prompt the translation which I have tentatively adopted.

## Appendix H

### CHIEH CH'UNG 疥蟲, ITCHING WORMS (16b)

The term *chieh* is now used for scabies, but Ch'ao, 186 (35), gives a description of five types of infestation. Sun himself says "the species of insects are numerous in the extreme, to the point that medicines cannot control them; one must not overlook the consequent necessity of preventive measures." (*Ch'ien chin i fang*, 292 [24]; Hoeppli, 321-341)

### CHIH 痔, HEMORRHOIDS (16a)

This term has had the same meaning since early times, but Ch'ao and Sun specify the advanced stage in which the stool is bloody. (Ch'ao, 183 [34]; *Ch'ien chin i fang*, 292; Ochiai, 86; Yü, 232)

### CHÜ 疽, CARBUNCLES (16a)

Some works use this term for cold abscesses in contrast to *ying* 癰, abscesses in general, but in Sun's tradition the distinction depends primarily upon the size of the infection. The association of carbuncles with diabetes is also clearly recognized. (Ch'ao, 171-173 [32]; Ochiai, 79; Yü, 126-127, 214)

### CHU WU 瘧忤, EPIDEMIC POSSESSION (14b)

The *chu* diseases are a broad group of chronic wasting diseases with intermittent attacks of alarming symptoms; after the victim dies the malevolent *ch'i* moves on to attack someone else. From Ch'ao Yuan-fang's description of the many kinds of *chu* it is clear that no simple correspondence with a Western pathological entity can be found; some types seem to be pulmonary tuberculosis, others to be grand mal epilepsy, and others to be psychoses. The initial symptoms of *chu wu* are sudden pains in the heart and stomach accompanied with mental dullness. These can be allayed, but the toxic factor remains in the body, gradually being carried throughout by the blood and *ch'i* circulation. In the advanced stage it intermittently attacks the flesh of the extremities, or the five viscera, and is ultimately fatal.

Ch'ao gives an odd diagnostic test: "Put a piece of paper over the painful spot. Heat hair from the head until it is hot and press it against the paper. If the disease is *chu*, the hair will stick to the paper; it is attracted by the *ch'i* [= pneuma, activity?] of the *chu*."

See also *ch'uan shih*.

(Ch'ao, 130, 132 [24]; Yü, 223)

## Appendix H

### CH'UAN SHIH 傳尸, CADAVER VECTOR DISEASE (14b)

A variety of *chu*. Wang T'ao provides a clear description: "Cadaver vector disease strikes without rhyme or reason; it is contracted by young and old, male and female. In general, this disease arises through operation of the mutual conquest [order of the 'five elements']; first a poisonous *ch'i* [= agent] passes into the body, and then it circulates through the five viscera. The patient gradually becomes thinner and more debilitated until death ensues. After his death the disease transfers itself to one of his family. That is why it is called 'cadaver vector disease' or 'rotating *chu* 轉注.'" Wang goes on to enumerate the gradual development of symptoms: "When [the disease] is first contracted, [the patient] is semi-ambulatory . . . [later] his breath comes fast and he coughs . . . [later] the marrow of his bones becomes hot." Despite the contention of some contemporary Chinese practitioners that this disease is transmitted by insects and often caught while weeping by the corpse of a victim, there is every reason to accept Yü's hypothesis that *ch'uan shih* generally corresponds to tuberculosis. There were at least two monographs devoted to it in the T'ang. (Lee, 307; Wang T'ao, I, 355-356; Yü, 28)

### CHUNG O 中惡, HEART ATTACKS (12a)

Like many of the entities of Chinese medicine, this seems more properly a symptom than a disease. Ch'ao (126 [23]) gives the symptoms as sudden pricking pains in the heart and stomach, causing nausea and faintness. It is brought about by a demonic, poisonous *ch'i* (= pathological agent) which attacks suddenly when, due to poor hygiene, the vital spirits are debilitated. Ochiai (54) apparently interprets "*ch'i*" in its modern dictionary sense as "gas," for he identifies the disorder as gas poisoning. See also Yü, 94.

### FENG HSIEN 風癇, EPILEPSY (IN CHILDREN) (14b)

The age which demarcates this disease from *feng tien* is ten *sui*, roughly equivalent to nine years. (Sun, *Ch'ien chin fang*, 5A:10a; Ch'ao, 241 [45]; Yü, 111)

### FENG TIEN 風癇, EPILEPSY (14b)

Ch'ao's descriptions establish without doubt that this is grand mal epilepsy: "The attack consists of falling to the ground, frothing at the mouth, and loss of consciousness . . . during an attack, the eyes cross, there are convulsive movements, arching of the back, and a

## Appendix H

shriek like that of a goat; it passes in a few moments.” Epilepsy in children is called *feng hsien*. (Ch'ao, 11–12 [2]; Yü, 109–113)

### FENG TIEN HSIEN 風顛癇, EPILEPSY (13a)

See *feng tien* and *feng hsien*.

### FU NEI LEI MING 腹內雷鳴, RUMBLING OF THE STOMACH (16b)

Neither Ch'ao nor Sun treat this as a disease entity. The former does, however, describe sounds in the intestines as a symptom of *yin* disorders of the stomach (*fu t'ung* 腹痛). (Ch'ao, 92–93 [16])

### HSIEH CHANG 邪瘴, MALIGNANT MIASMAL DISEASES (14b)

See *chang*.

### HSIEH CH'I LENG P'I TSAI HSIEN 邪氣冷癖在脇, SWELLINGS WITH COLD MORBID CH'I (= INFLUENCES) IN THE RIB REGION (16a)

Ch'ao (113 [20]) discusses this disorder under the name “*han p'i* 寒癖”: “The pathology 為病 of swellings with cold influences comes from liquids which, after drinking, remain and accumulate under the ribs. Diagnosis is by a strong taut pulse. On encountering cold influences there is pain, and so it is called ‘swelling with cold influences.’” Note that “*ch'i*” also carries, as always, the sense of “pneuma” here.

### HSIEH CHU 邪疰, MALEVOLENT EPIDEMIC POSSESSION (12a)

This is one of the milder disorders in the *chu* group (see *chu wu*), in which the pathological *ch'i* settles in the viscera and bowels. The major symptom is emotional instability and depression.

### HSIN FU CHI CHÜ 心腹積聚, ACCUMULATIONS OF MORBID CH'I (= PNEUMA) IN THE HEART AND STOMACH (16a)

Disease activity (*ch'i*), due to winds, enters an organ which is in a condition of deficiency and weakness. This activity cannot be transmitted further for reasons which are deduced from the ‘five elements’ theory: “An accumulation in the heart is called ‘*fu-liang*

## Appendix H

伏梁.' It arises above the navel and spreads to an area extending from the arms to below the heart. It is caught on a *keng* or a *hsin* day [that is, on the seventh or eighth day of the ten-day 'week'] in autumn. How is [the fact that it is caught in autumn] to be explained? A disease of the kidneys spreads to the heart; from the heart it should spread to the lungs [according to the 'mutual conquest' order of the 'elements']. But in autumn the lungs have just assumed kingship [of the viscera, for the lungs are the correlate of the autumnal element Metal]; a king does not accept evil. The heart then wants to return the disease activity to the kidneys, but the kidneys are unwilling to accept it. Thus it becomes knotted up, forming an accumulation. That is how we know that *fu-liang* is caught in autumn." The most common symptoms are pain or a feeling of fullness. Prognosis is by pulse measurement. Weak, fast pulsations indicate that the patient will die. (Ch'ao, 105 [19])

HSIN SUNG 心忪, NERVOUS PALPITATIONS (12a)  
(Ochiai, 9)

HSIN T'UNG 心痛, MYOCARDITIS (12a)

Lacking a detailed description from Ch'ao or Sun, I tentatively adopt Ochiai's identification, which would at least suitably localize the pain. It would be difficult, however, for an ancient physician to distinguish this disorder from angina pectoris. (Ch'ao, 92 [16]; Ochiai, 8; Yü, 218)

HSUEH CH'I 血氣, ANEMIA OF THE BLOOD AND CH'I  
(= PNEUMA) (16b)  
See *t'i leng hsueh ch'i*.

JE FENG 熱風, SYMPTOMS DUE TO UNSEASONABLE  
HOT WINDS (12a)

I can find no early source for this disorder, which is a particularly loathsome entity, perhaps based on leprosy, in modern Chinese medicine. It infects the spleen, kidneys, and lungs when they are in a damp condition due to a *yin* deficiency. A wind reacts with the dampness to generate fever; the disease factor rises to clog openings in the lungs, so that the nose runs a smelly yellow cloudy mucus and the patient coughs up a dirty-looking sputum. Since the eyes are *yang*, reaction causes a stoppage in the flow of *ch'i* (= vital pneuma)

## Appendix H

and blood, causing great pain in the eyes. If the disease is not speedily treated, insects grow in the dampness and eat the viscera, causing the eyes and ears to drop off; the patient dies.

### JE TU FENG 熱毒風, DISEASES CAUSED BY HOT POISONOUS WINDS (12a)

In modern Chinese medicine, this disease is like “symptoms due to unseasonable hot winds,” but with a decisive preponderance of the pathological factor. I have not found an early description of its causes or symptoms.

### KAN TSENG 奸黥, LENTIGO (14b)

Yü distinguishes *kan an* 黥 as ephelis, but it is clear from Ch'ao's description of *kan tseng* that he would see no difference between the two. (Ch'ao, 146 [27]; Ochiai, 59, 70; Yü, 73-74)

### K'O NI SHANG CH'I 欬逆上氣, REFLEXIVE COUGHING WITH RISING CH'I (= PNEUMA) (16a)

See Chapter IV, note 75. Ch'ao (82-83 [14]) says: “When there is a deficiency in the lungs, they respond to slight cold influences by giving rise to coughing. As one coughs the *ch'i* returns and accumulates in the lungs, which then swell with it. This is reflexive coughing. The morbid *ch'i* [= activity] and healthy *ch'i* [= vital pneuma] are locked in struggle so that the healthy *ch'i* cannot be disseminated; it backs up in [or between?] the esophagus and windpipe. When the morbidity is at rest the *ch'i* is also quiescent; when the former moves, the latter rushes upward, giving one a feeling of suffocation and faintness. For this reason it is called ‘reflexive coughing with rising *ch'i*.’”

### KU TU 蠱毒, KU POISONING (12a)

About the beginning of our era, this disease was identified as a painful inflammation of the urinary bladder accompanied by exudation of a white liquid; Yü (325) suggests that this condition may be cystitis. From the T'ang on, however, this is a term for a type of witchcraft especially practiced in south and southwest China. Most typically, worms and other poisonous creatures are placed together in a closed vessel and left to eat each other until only one, the *ku*, is left. Its keeper must use it or its excrement to poison people, or his own family is harmed. As recompense, after the victim dies (the delay can be controlled) his property is removed to the house of the



## Appendix H

keeper, whose servant the victim's spirit becomes. A collection of *ku* anecdotes is found in Feng and Shryock. In no case are the symptoms presented with enough clarity or consistency to allow identification with any known disease, although certain of them point to schistosomiasis and infectious hepatitis. (Ch'ao, 135 [25])

### KUEI CH'I 鬼氣, POSSESSION BY DEMONIC FORCES (12a)

A sudden attack in which the patient feels "as if stuck by someone with a knife or spear. In his chest, rib region, and stomach there is a sharp, constricting pain which cannot be suppressed. He may spit blood, his nose may be bloody, or he may defecate blood." It is often fatal. (Ch'ao, 127 [23], s.v. "kuei chi 鬼擊")

### KUEI MEI WANG LIANG 鬼魅魍魎, POSSESSION BY GOBLINS (13a)

These are malevolent spirits of mountain and stream. The first character often appears as "ch'ih 魑."

### LENG P'I 冷癖, SWELLING WITH COLD MORBID INFLUENCES IN THE RIB REGION (16a)

See *hsieh ch'i leng p'i tsai hsieh*.

### LI 癩, LEPROSY (14b)

Although in pre-Han sources this and its cognates (癩, 烈) are general terms for contagious diseases, by the first century B.C. "li" is regularly used with its modern meaning. (Yü, 130-131)

### LOU CH'UANG 漏瘡, RUNNING SORES (16b)

Ch'ao distinguishes many varieties according to their origins, which can be emotional as well as ordinary physical factors. (Ch'ao, 179 [34]; Yü, 10-11)

### NUEH 瘧 [=瘧], INTERMITTENT FEVERS, AUTUMNAL (14b)

A general term for intermittent fevers due to a hot factor which enters the body in the summer and becomes active in the fall. Although the fundamental difference between *nueh* and *wen* is thus etiological, the diagnostic distinction is based on the season in which the disease breaks out. Ch'ao's description of one form might well

## Appendix H

apply to tertian fever, since a 48-hour interval is mentioned. (Ch'ao, 66 [11]; Sun, *Ch'ien chin i fang*, 202; cf. Hoeppli, 273-285)

### O CH'I 惡氣, DISEASES DUE TO VIRULENT CH'I (= VAPORS OR DISEASE VECTORS) (14b)

One may plausibly identify this entity with *o chi ta feng* 惡疾大風, of which Sun gives a sufficient description in *Ch'ien chin fang* (23:29b) to allow equation with anaesthetic leprosy, and perhaps with psoriasis for light cases. Sun specifies that in severe cases fingers and toes drop off.

### O HSUEH 惡血, POST-PARTUM BLEEDING (16a)

Sun considers this a medical problem when it does not cease after seven days. (*Ch'ien chin fang*, 2:30a, 3:1b)

### OU NI SHANG CH'I 嘔逆上氣, REFLEXIVE COUGHING WITH RISING CH'I (= PNEUMA) (16a)

See *k'o ni shang ch'i*.

### PI NÜ O CH'UANG 鼻衄惡瘡, CHRONIC NOSEBLEED WITH MALIGNANT SORES (16a-16b)

(Ch'ao, 153 [29], s.v. "*pi sheng ch'uang* 鼻生瘡")

### SHIH CH'I 時氣, SEASONAL FEVERS (14b)

This group comprises minor epidemic illnesses thought to be caused by unseasonable weather upsetting the balance of the body, which was attuned to the normal rhythm of the seasons. (Ch'ao, 53 [9]; Yü, 130-131)

### SHIH HSIN 失心, MELANCHOLIA (13a)

By about 1600 this was a colloquialism for acute and chronic melancholia, which Yü (112) believes was the depressive stage of a manic-depressive psychosis.

### T'I LENG HSUEH CH'I 體冷血氣, ANEMIA WITH SENSITIVITY TO COLD (16b)

This is a tentative rendering based on the use of the term "*hsueh ch'i*" in contemporary Chinese medicine. In "*hsueh ch'i hsin t'ung* 心痛," for instance, a pathological agent due to winds takes advantage of anemia of *both* blood and *ch'i* (= pneuma) in women to attack the pericardium and cause pain.

## Appendix H

### T' IEN HSING 天行, CONTAGIOUS SEASONAL ILL- NESSES (12a)

I have found no early basis for determining whether it is indeed contagion which distinguishes this condition from *shih ch'i*. Wang T'ao does not differentiate them (I [3], 105).

### T'OU T'U 頭禿, BALDNESS (16a) (Ch'ao, 144 [27])

### WEN 瘟 (= 溫), INTERMITTENT FEVERS, SPRING (12a)

Like *nueh*, this is a broad term for attacks of alternating chills and fevers, either intermittent or of specific term. In addition to malaria, it includes such disorders as suppurative fever, typhoid, and even, Yü Yun-hsiu suggests, hectic fever accompanying pulmonary tuberculosis. It is caused by cold factors which enter the body during the winter and become active in the spring. Ch'ao Yuan-fang's chapter on *wen* diseases has been capably translated by Rall. See *wen nueh*. (Ch'ao, 61 [10]; Yü, 132-133)

### WEN NUEH 瘟瘡, INTERMITTENT FEVERS (12a)

See *nueh* and *wen*. Although Sun seems to be using this as a general term, there is also a particular disorder called *wen nueh*, a type of *nueh* which breaks out in the summer. The pathological agent is spoken of as storing itself in the kidneys, which are indeed congested in malaria. (Ch'ao, 67 [11])

### YANG TAO SHUAI JO 陽道衰弱, WASTING OF THE SEX- UAL ORGAN (16b)

See *yin wei*.

### YIN CH'IH 陰蝕, VAGINAL ULCERS (16a)

It is likely that this is the disorder treated by Ch'ao (216 [40]) under the heading "*yin yang* 陰痒," lit., "itching of the vagina": "Itching of the sexual organ in women is due to its being eaten by insects. There are the Three or the Nine Worms distributed between the intestines and stomach. Because of a deficiency in the viscera the Worms become active, and feed on the vagina. If the activity of the Worms is weak, the result is an itch; if powerful, pain." The Three Worms and the Nine Worms are described in Ch'ao, 103, and in Hoeppli. These conceptions clearly arose from the effect of the Chi-

## Appendix H

nese fondness for explanation by a priori numerical categories upon observations of intestinal parasites. *Yin ch'ih* might in most cases be a tubercular ulcer. Sun (*Ch'ien chin i fang*, 290) prescribes a dusting powder containing mercury. In modern medicine "*yin ch'ih*" is used for "vaginal chancre," while the ulcerations are called "*k'uei yang* 潰瘍." (Yü, 192)

### YIN WEI 陰痿, IMPOTENCE (16b)

Neither Ch'ao nor Sun in his medical works (*Ch'ien chin i fang*, 233-234) recognize this as a disease entity; it is treated rather as a symptom.

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Appendix I  
On Understanding the Language  
of Early Chinese Chemistry and Pathology:  
A Bibliographical Essay

**BEFORE** sense can be made of the literature of Chinese alchemy, we must learn to understand dead technical terminologies. Of these, the jargon least amenable to comprehension is imposed by alchemy's place in the Taoist complex of techniques for the attainment of immortality. Alchemical language was meant explicitly to confound the uninitiated and preserve secrecy in transmission, and is in this sense a code which can be cracked only by wide reading with close attention to contexts. The tradition of oral transmission, at least for that alchemy which operates on chemical substances rather than on the internal organs of the adept, was cut at least half a millennium ago. The scholarly initiate no longer exists (I do not mean to say that there are no practicing alchemists in China today); at the same time, the publication of the Taoist Patrology about forty years ago (see Chapter II, note 34) has made an enormous body of arcane literature available to the profane inquirer for the first time. The task of decipherment is at least feasible now, although the enormous extent of the sources makes colligation onerous, and the generally poor state of early texts necessitates access to as many editions as still exist. For Taoist books sufficiently "classic" to have entered general

## Appendix I

literature (Ko Hung's *Pao p'u tzu nei p'ien*, for instance), the best editions are usually found outside the Patrology.<sup>1</sup>

While the consciously recondite language in Chinese alchemy can be understood only from the inside, by a kind of study to which bibliographies and research guides can contribute little or nothing, there remain two equally important kinds of terminology—the names of chemical substances and of medical disorders—which have long been studied from the viewpoint of another tradition. The ingredients of the elixirs of immortality are all constituents of Chinese medicines (as what natural substance is not?), studied and described in a line of pharmacopoeias which stretches back for nearly two thousand years. The diseases which the elixirs cure are defined in a succession of treatises on rational medicine—etiology, symptomology, diagnosis, and therapeutics—just as old, in which deductive theory continuously imposes a structure upon clinical experience. The pharmacological and pathological traditions are intimately connected at every point, but it is convenient for heuristic purposes to consider them separately.

### *Chemical Substances in Chinese Alchemy*

There are three major sources of information on the identities of drugs: analysis of samples bought on the modern Chinese drug market, analysis of ancient samples which have been preserved intact, and colligation and evaluation of descriptions in classical sources.

Until very lately students of Chinese alchemy have been content to rely more or less exclusively on data of the first kind. The collection and systematic examination of drugs by sinologists and scientists has a long history (summarized in Needham, III, 644); the findings have been made accessible to the most casual inquirer in the works of Bernard E. Read and his collaborators—a bibliographical index to the work of Stuart and others for the plant world, a set of translations from Li Shih-chen's Great Pharmacopoeia for the animal kingdom, and a set of well-documented if poorly digested notes for the mineral realm—and in the monograph by Satō. The more recent and now standard treatise of Jacques Roi on medicinal plants must still be used in conjunction with Read and Liu; for reasons which only a publisher can comprehend, Roi's posthumous work lacks an index of Chinese terms. The bibliographies of Merrill and Ouchi and the sur-

<sup>1</sup> See the bibliographical list at the end of this essay for full citations of all books and articles mentioned.

## Appendix I

veys of Allen, Chu, Pope, and C. F. Wu are primarily concerned with taxonomy, but for the present purpose they make available precise scientific descriptions of plants and animals. Glossaries such as that of Bradley and Barnes provide access to the structural nomenclature of modern mineralogy.

A student of T'ang natural philosophy who looks up the identity of a mineral in Read and Pak may be assuming that the association of name and substance has not altered for twelve hundred years. In fact long gradual evolutions and radical changes have often taken place behind the constant facade of a Chinese word. *Mang hsiao* 芒消 is now purified Glauber's salt ( $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ ), but in the T'ang period it was Epsom salts ( $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ); to determine when the alteration took place would be no trivial task. Clearly, if a terminology has a history, terms must be defined out of sources which date from the period being investigated. Earlier and later materials may provide hypotheses and substantiating evidence, but, at the very least, no definition can be accepted which does not tally with reliable contemporary descriptions.

It is a most fortunate circumstance that a collection of thirty-nine well-attested Chinese medicinal minerals presented to the Japanese emperor in the eighth century is preserved in the Shōsōin at Nara, and has been scientifically investigated with a thoroughness, and the results reported by Asahina and Masutomi with an elegance, which befits one of the greatest cultural treasures of Japan. The analysis of the Shōsōin specimens provides a second temporal fixed point of identification. For at least a few minerals we now know whether or not their identities were the same twelve hundred years ago as today. This finding will have only limited value in the case of a mineral of which many varieties are known to have existed, and for the period between the eighth and twelfth centuries interpolation remains necessary, but most of the variables may be controlled—or their uncontrollability ascertained—by reference to the continuous chain of classical pharmacopoeias and to other relevant early literature. For minerals whose names appear in the classics, much of the data has been gathered and judiciously evaluated by Chang Hung-chao. Schafer's recent discourse on T'ang exotics, even more than the classic work of Laufer on Sino-Iranian exchanges, is a model of imaginative and skillful coordination of a broad spectrum of sources.

There remain, of course, countless problems for which access to

## Appendix I

the documents is essential. Okanishi's is the standard guide to medical (including pharmaceutical) bibliography up to the fourteenth century; Lung Po-chien's survey of nearly three hundred extant Chinese and Japanese works on materia medica provides more concise information. Huard and Wong's "Evolution de la matière médicale chinoise," although it repeats many of the errors of Chinese reference works, is the best available history of pharmacognosy.

The pharmacopoeias provide close and accurate descriptions of their materials; it is by no means unusual to find, for minerals, remarks on crystalline form, fracture, and geological ambience, and chemical tests for genuineness. The classics of materia medica quote their predecessors copiously, so that despite the customary high rate of attrition of Chinese books there are few broken links in the transmission. The enormous compilations produced from the Sung on are frequently better sources for important quotations from early works than are the mutilated remains of the originals. Li Shih-chen's Great Pharmacopoeia (printed 1596), the crowning glory of the tradition, because of its size, its authority among Chinese physicians, and its consequent availability, has been the work from which most historians have drawn early descriptions. The series of reprints of basic medical works by various Chinese publishers over the past ten years has made excellent editions widely available. K'ou Tsung-shih's *Pen-ts'ao yen i* (1116), a set of brilliant critical notes on materia medica, for instance, is available in a critical edition for the first time. T'ang Shen-wei's Pharmacopoeia of 1249, reprinted photographically from the first edition, provides fuller and usually less arbitrarily abridged notes than Li's work, and should quickly replace it for historical studies (collation is of course advisable for passages quoted in both books). T'ang's compilation has the additional advantage of providing seven-hundred-year-old woodcuts of all major therapeutic minerals, plants, and animals.

It is also possible to exploit a line of research whose goal is raising the status of contemporary Chinese medicine as a science. In research institutes throughout East Asia, traditional drugs are being examined with all the tools of twentieth-century pharmacology and chemistry in order to make sense of ancient therapeutic claims. A reevaluation of the descriptions in the pharmacopoeias is an integral part of this effort. The literature, to which Liu Shou-shan provides a guide, is very large, and varies greatly in quality. Huang Lan-sun's collection of short articles, some general and some technical, reflects



## Appendix I

current Chinese approaches and aims. The materia medica published by Nanking and Peking organizations in 1961 organize and report in detail on a great deal of serious scientific research. The wider context of this research is described in a recent article by Crozier.

Although it has not yet been done in a systematic way, there is much to be gained by throwing the light of modern geology on ancient descriptions of minerals. The physician or alchemist usually specified the geographical provenance of his minerals, for that was his main means of controlling purity (see Chapter II, pp. 68-70). Many knotty problems of identification can be unraveled when a knowledge of actual mineral deposits and the general outlines of their occurrence in China is applied. Schafer and Wallacker's study of minerals and other local specialties presented to the government as tribute is particularly convenient for tracing origins. Monographs on the geology of China are not easy to come by in American libraries; one normally begins with the bibliography of Wang Chung Yu. A history of Chinese geology will of course impose a perspective upon a mass of discrete traditional observations; perhaps by the time it is begun there will exist a better Western paradigm than the bibliographical synthesis of Adams.

The catholicity of herbal medicine made botany in a sense superfluous in China. There is a large and valuable literature, but it is scattered in books of every kind. The nineteenth-century surveys of Wu Ch'i-chün and Bretshneider are indispensable for its exploration. For artificial minerals there is much to be learned in the great technological treatises, from Chia Ssu-hsieh's *Ch'i min yao shu* (ca. 540) to Sung Ying-hsing's *T'ien kung k'ai wu* (1637). The miscellaneous jottings found in the collected works of historical figures interested in science and technology often contain acute descriptions of materials and processes; Shen Kua's *Dream Creek Essays* is the best-known example.

To summarize, there is much in secondary sources in both Western and Oriental languages to simplify the identification of alchemical ingredients. There is not nearly enough, however, to obviate constant recourse to classical literature.

### *Diseases in Chinese Alchemy*

For medicine the situation is much worse. The dearth of critical scholars among traditional physicians and modern doctors, and their common inability to suspend their preconceptions long enough to

## Appendix I

fully comprehend each other's points of view from the inside, have made for a most unrealistic analysis of the ancient art. There is not even agreement among practicing acupuncturists, Chinese and European alike, as to whether the system upon which their needles act is the vascular, the nervous, the lymphatic, or quite another, a pneuma system which does not precisely exist in the sense that internal organs ordinarily exist. Practically every writer on Chinese medicine assumes that every Chinese disorder can be translated into a modern counterpart—symptom, disease, or group of diseases—or he is sorely confused to find, say, that the half-dozen terms for what seems to be tuberculosis stand for quite distinct entities, and are not synonyms at all. A pause for investigation into the taxonomy of Chinese diseases is surely overdue.

This combination of uncritical historiography and lack of systematic comprehension has made the general level of work on the history of Chinese medicine abysmal. Fortunately the classical sources are voluminous, lucid, and well organized, but if the histories of, and translations from, Chinese medicine which are current today dealt with classical Greek medicine instead, their publication would in most cases have amounted to academic suicide. Huard and Wong's writings do contain some workmanlike descriptions of Chinese physiological conceptions. The almost unobtainable survey of Hartner, despite the very difficult circumstances of its composition, is almost alone in its discernment, far transcending the sloppy "chronicle" of Wong and Wu from which it begins. There is an interesting series of descriptive articles by Lee T'ao in the *Chinese Medical Journal*, and a scholarly and important contribution by Miyashita Saburō on the treatment of disease in the Sui and T'ang in Yabuuchi's omnibus (pp. 259–288). Through these technical researches one may enter the conceptual world of Chinese medicine, but for identifying specific pathological entities it is necessary to go directly to the sources, choosing one or another as close as possible to the period being studied. Okanishi is a trustworthy guide to what is available.

Let us take as an instance the question of the diseases mentioned in the *Tan ching yao chueh*, which very likely was written in the seventh century. The most important monograph on etiology and symptomology in Chinese medicine, Ch'ao Yuan-fang's *Chu ping yuan hou lun*, was completed in 610, and survives intact as one of the canons of contemporary Chinese medicine. As is well known, this work, which relates the origin and course of about two thousand

## Appendix I

disorders to the general theory of pathology, is the major source of the discussions in Sun Ssu-mo's two collections of prescriptions. The other medical masterpiece of the T'ang, Wang T'ao's *Wai t'ai pi yao* (752), takes most of its material on pathology from Ch'ao and Sun (see Okanishi, p. 874). All of these books saw heavy use when Tamba no Yasuyori compiled his *Ishin hō* (982), the last of the major repositories of T'ang material. Ch'ao's authority was so overwhelming that for a period of several centuries his is the first work to consult.

So far the ancient medical literature has been little used. Studies of disorders, such as that of Feng and Shryock, have tended to rely upon late handbooks or textbooks, or upon nonliterary sources. Hoeppli is the most notable exception. The work of Joseph Needham and Lu Gwei-djen, of which very little has yet been published, will surely raise studies of Chinese pathology to a new level. Jutta Rall's recent article is perhaps the first satisfactory Western-language translation from a major medical work.

Finally, there is a small literature devoted specifically to matching the traditional terminology with that of modern medicine. A number of Japanese works, of which Ochiai's is the handiest, perform the same function for illnesses that the works of Bernard E. Read do for simples. Their value is similarly restricted in that their approach is not at all historical. Ochiai may quote old authorities, but he is not concerned with the possibility that the entity behind the name may have changed over the centuries. One has only to compare Ch'ao's or Sun's descriptions with those in any modern dictionary or textbook of Chinese medicine to see that there have been considerable changes in almost every case—and by no means always in the direction of rationality and objectivity.

The most directly useful researches are philological studies of the names of diseases which occur in the classics or in early lexicons. As to European writings, the only work of this sort which could be examined, that of Schramm, cannot be taken seriously. Schramm's book, since it is not provided with an index of Chinese words, has not even that virtue of convenience which has qualified many a worse book for active service. The glosses of Yü Yun-hsiu, on the other hand, are highly successful. Yü is trained in modern medicine and has mastered both the ancient classics and the literature of the medical tradition. One cannot take his every identification on faith, but his monograph consistently reflects an awareness that the denotations

## Appendix I

of medical words have often changed with time, and that equations with the terminology of Western medicine usually need considerable qualification.

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The list which follows includes only books and articles cited above and in Appendixes G and H. For a few ancient books, instead of translating the titles below I have provided concise characterizations, which are placed in brackets rather than parentheses to avoid confusion.

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## Appendix I

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## Appendix I

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## Appendix J

### Published Translations of Chinese Alchemical Treatises

1. *Chou i ts'an t'ung chi* 周易參同契.

The concordance of the Three, an apocryphal tradition of interpretation of the Book of Changes, A.D. 142? (see p. 37).

Wu Lu-ch'iang, "An Ancient Chinese Treatise on Alchemy Entitled 'Ts'an T'ung Ch'i,' Written by Wei Po-Yang about 142 A.D. with an Introduction and Notes by Tenney L. Davis," *Isis*, 18 (1932): 210-289.

2. *Pao p'u tzu nei p'ien* 抱朴子內篇.

The inner chapters of the philosopher Pao p'u tzu, ca. 320 (see p. 41), *ch.* 4 and 16.

Wu Lu-ch'iang, "An Ancient Chinese Alchemical Classic. Ko Hung on the Gold Medicine and on the Yellow and the White. The Fourth and Sixteenth Chapters of Pao-p'u-tzu with an Introduction, etc. by Tenney Davis," *Proceedings of the American Academy of Arts and Sciences*, 70 (1935): 221-284.

Eugene Feifel, "Pao-p'u-tzu Nei-p'ien," *Monumenta Serica*, 9 (1944): 1-33. (*Ch.* 4 only.)

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3. *Ts'an t'ung ch'i wu hsiang lei pi yao* 參同契五相類秘要.

Arcane essentials of the fivefold categories, based on The Concor-

## Appendix J

dance of the Three, third to eighth centuries?

Ho Ping-yü and Joseph Needham, "Theories of Categories in Early Mediaeval Chinese Alchemy," *Journal of the Warburg and Courtauld Institutes*, 22 (1959): 173-210.

4. *Tan fang ching yuan* 丹方 (or 房) 鏡源 of Tu-ku T'ao  
獨孤澹

Source-mirror of alchemical formulas (or "of the alchemical laboratory"), ninth or tenth century? (see p. 69).

Fung Chia-loh and H. B. Collier, "Outline of Alchemical Prescriptions," *Journal of the West China Border Research Society*, 9 (1937): 199-209. Competent; includes only the first of three *chüan*.

5. *T'ai shang wei ling shen hua chiu chuan tan-sha fa* 太上衛靈  
神化九轉丹砂法.

Exalted(?) life-protecting(?) method for the wondrous transformation of ninefold cyclically transformed elixir, tenth to thirteenth centuries.

Roy C. Spooner and C. H. Wang, "The Divine Nine Turn Tan Sha Method, a Chinese Alchemical Recipe," *Isis*, 38 (1948): 235-242. Since the translators were working under conditions which precluded a reconnaissance of the alchemical literature, this version is highly unsatisfactory.<sup>1</sup>

6. *Wu chen p'ien* 悟真篇 of Chang Po-tuan 張伯端.

On awakening to Realization, preface dated 1075.

Tenney L. Davis and Chao Yun-ts'ung, "Chang Po-tuan of T'ien-t'ai, his Wu Chên P'ien, Essay on the Understanding of the Truth, a Contribution to the Study of Chinese Alchemy," *Proceedings of the American Academy of Arts and Sciences*, 73 (1939): 97-117.

7. *Tu Chou i ts'an t'ung ch'i* 讀周易參同契, attributed to Chang Po-tuan.

On reading the Concordance of the Three, eleventh century?

Tenney L. Davis and Chao Yun-ts'ung, "Three Alchemical Poems by Chang Po-tuan," *Ibid.*, 73 (1940): 377-378.

<sup>1</sup> I have prepared a new version entitled "A Revised Translation of 'T'ai shang wei ling shen hua chiu chuan tan-sha fa' (Taoist Patrology, Volume 587), an Anonymous Mediaeval Chinese Alchemical Text," which I do not plan to publish separately. One copy has been deposited in the Harvard-Yenching Library with the provision that it be available for interlibrary loan.

## Appendix J

8. *Tseng Pai-lung tung Liu tao jen ko* 贈白龍洞劉道人歌, attributed to Chang Po-tuan.  
A song for the Taoist Liu of the White Tiger Cave, eleventh century?  
*Ibid.*, pp. 378-379.
9. *Shih ch'iao ko* 石橋歌, attributed to Chang Po-tuan.  
Song of the Stone Bridge, eleventh century?  
*Ibid.*, p. 379. A propaedeutic allegory.
10. *San-shih-liu shui fa* 三十六水法  
Thirty-six methods for bringing solids into aqueous solution, not later than eleventh century.  
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# Index

This index is arranged without regard to diacritics or aspiration marks. Besides the usual names and subjects, it includes titles of Chinese books published up to about 1900, since such books are customarily cited by title rather than by author. Full references will normally be found on the first page cited. Names of chemical substances and diseases are indexed by English translation. The last page reference in each case will lead the reader to the glossaries in Appendixes G and H (pp. 272-305), which are arranged in order of Chinese romanization.

- Accumulations of morbid *ch'i*, 184, 299-300  
Aconite, Chinese: *fu tzu*, 209, 276; *wu l'ou*, 198, 209, 292-293  
Actinolite, 172, 293  
Acupuncture, xix, 311  
Adams, Frank Dawson, 310, 313  
Agriculture, 7  
Alchemy, Alexandrian, 20, 23-24, 26, 39  
Alchemy, Chinese  
  aims, 26-27  
  as branch of Chinese science, 6  
  and chemistry, 24  
  definition, 19  
  documents, 11-12; evaluation, 16-18; forgery in, 18n; transmission, 16-17, 52-54  
  drugs in, 25, 307-310  
  and hagiography, 16  
  and medicine, 49-51, 142, 306-313.  
  *See also* Medicine  
  origins, 19-26  
  physiological. *See* *Nei tan*  
  and psychology, 29-30  
  and Taoism, 52-54. *See also* Taoism  
  *See also* Apparatus; Laboratory operations; Theories; Translations  
Allen, Glover M., 308, 313  
Almonds, 277  
Al-Rāzī, 52  
Alum, 210, 275; black, 201, 205, 276; crimson, 179, 273; white (recrystallized), 177, 201, 284  
Amethyst, 169, 292  
An-ch'i, Master, 104-105  
An Lu-shan, 130n; rebellion of, 87  
Anemia of the blood and *ch'i*, 184, 303  
Anise, Japanese, 209, 283  
Annam: imports from, 292  
Apparatus: furnace, 168, 206; general, 28; iron vase, 175; oven, 162-163; pig's bristle, 212; reactive container, 46; in Sun's writings, compared, 65-66; tube, bamboo, 189; two-part reaction vessel, 166-168, 262-264  
Apricot pits, 192, 277  
Aristotle: divisions of science, 5-8 *passim*; and historiography of science, 3  
Arsenic compounds: embalming properties, 41  
Arsenolite, 160, 263, 294  
Asahina Yasuhiko, 308, 313  
Ascites, 175, 296  
Asia, Central: imports from, 52, 274, 278, 280, 283, 293  
Astrology: as applied astronomy, 8-10; horoscopic, 9  
Astronomy, mathematical, 8-10  
Ásvaghosa, 58  
Atractylis root, 209, 287  
Avicenna, 65n  
Azo, R. F., 65n  
Baldness, 184, 304  
Barnes, A. C., 308, 313  
Barnes, William H., 86n  
Beasley, W. J., 82n  
Beri-beri, 184, 296  
Berthelot, Marcellin, 20  
Bezoar. *See* "Cow Bezoar"  
Bielenstein, Hans, 83n  
Biggerstaff, Knight, 95  
Biology, Chinese, 78  
Bittersweet fruit, 208, 281  
Black alum, 201, 205, 276  
Black salt, 198, 276-277  
Black veratrum root, 208, 282  
Bleeding, post-partum, 183-184, 303



## Index

- Bole, red, 160, 162–163, 197, 198, 263, 274
- Book of Changes. *See I ching*
- Bradley, J. E. S., 308, 313
- Brahmaloka, 198
- Brass, 200, 290; Persian, 203, 204, 286
- Breathing techniques, 31, 38; modern popularity, 55n
- Bretshneider, Ėmilii Vasil'evich, 310, 313
- Bridgman, R. F., 105n
- Brine, 170n, 189, 275
- Buddhism: and alchemy, 31; Chinese terminology of, 51; Sun and, 137; Taoists and, 84
- Butter fat, 189, 289
- Cadaver vector disease, 179, 298
- Calomel: *liu ken hsueh*, 169, 282; *shui yin shuang*, 171, 186n, 288–289
- Cambodia: imports from, 292
- Carbuncles, 183, 250, 297
- Carp, 212, 282
- Carr, Edward H., 136
- Cart-goat: marrow, 174n; tallow, 174n
- Cast iron, 194, 205, 286
- Categories, theories of, 28, 47–48, 153n
- Causality, 10; in China and West, 6
- Celestial kinematics: and cosmology, 9
- Centipedes, dried, 209, 292
- Chalcanthite, 44, 172, 197, 287
- Chamfrault, A., 111n
- Ch'ang-an (city), 251; topography, 102
- Ch'ang-an chih*, 89n
- Chang Chi (Chang Chung-ching), 143n
- Chang Chün-fang, 54
- Chang Chung-ching. *See* Chang Chi
- Chang Heng, 149n
- Chang Ho, 157n; stone-cooking method of, formula for, 192–194
- Chang Hsin-hui, 111n
- Chang Hsuan, 56, 58–59, 145
- Chang Hung-chao, 158n, 308, 313
- Chang Jen-yuan, 129n
- Chang Ling, 159n
- Chang Lu, 139n
- Ch'ang Pi-teh, 94n
- Chang Po-tuan, 37n, 323
- Chang Tao-ling. *See* Chang Ling
- Chang T'ien-yü, 92n
- Chang T'ing-chi, 137n
- Chang Tu, 93
- Chang Tzu-ho. *See* Chang Ho
- Chang Tzu-kao, 14, 33, 44n, 76n, 313–314
- Chang Wen-chung, 88n
- Chao I, 88n
- Chao T'ai, 165n
- Chao Tao-i, 131n
- Ch'ao Yuan-fang, 13, 311–312, 314; translated, 251n, 298–304 *passim*
- Chao Yun-ts'ung, 37n, 323–324
- Ch'en Chia-mo, 291
- Chen Ch'üan, 113n
- Chen chung su shu*, 119n, 132
- Chen jen* (realized immortal), 58n
- Chen kao*, 157n
- Ch'en Kuo-fu, 54n, 58n, 72; on Sun's birthdate, 123n
- Ch'en Pang-hsien, 112n
- Ch'en Shao-wei, 47
- Ch'en Shih-hsiang, 120n
- Ch'en Ts'ang-ch'i, 288
- Ch'en Wen-hsi, 314
- Ch'en Yin-k'o (Ch'en Yin-ch'ueh), 105
- Ch'en Yuan, 39n, 72n
- Ch'eng Hung-chao, 102n
- Cheng lei pen-ts'ao*. *See* *Ch'ung hsiu Cheng-ho ching shih cheng lei pei yung pen-ts'ao*
- Cheng Te-k'un, 22n
- Ch'i*, xviii–xix.
- active essence of reactants, 200
  - activity of medicine, 181
  - disease vectors, 178, 303
  - morbid influences, 184, 299
  - pneuma, 184, 296, 299–300; motion in body, 107, 109, 111–112, 283, 301; toxic agent in minerals, 173, 250
  - smoke, 194
  - toxic activity, 178, 250
  - vapors, 163, 178, 303
- Ch'i-chou (prefecture), 130
- Ch'i fan ling sha lun*: date of, 47–48; style of, 65; on transmission of secrets, 57n
- Chi Han, 7
- Ch'i hsing* (Seven Stars), 158–159n
- Ch'i min yao shu*, 310, 314
- Ch'i yao* (seven luminaries), 149n
- Chia Ssu-hsieh, 310, 314
- Chiang Liang-fu, 122n
- Chiang ling chu erh* (Crimson Tumulus Vermilion Boy), 158n
- Chieh (county), 179
- Ch'ien chin fang*, 319; apparatus and drugs in, 28–29n; editing of, 138;

## Index

- on laws of resonance, 111n; and medical ethics, 63n; on use of rice, 181n; sources of, 107; on Sun's illnesses, 249-251; meaning of title, 51n; mentioned, 51, 63-80 *passim*  
*Ch'ien chin fang yen i*, 139n  
*Ch'ien chin i fang*, 319; drugs listed in, 50n; editing of, 138; magic in, 154n; on taking quartz, 251; on Sun's illnesses, 251; mentioned, 63-80 *passim*  
 Ch'ien Mu, 59n, 92n, 100n  
*Ch'ien ting lu*, 129n  
*Ch'ien tzu wen*, 56  
 Chih-ch'ien, 104n  
*Ch'ih ching chai ts'ang shu chi yao*, 39n  
*Chih hsuan p'ien*: translation of, 324  
*Chih wu ming shih t'u k'ao*, 7, 310, 320  
 Chikashige, Masumi, 43n  
 Children, epilepsy in, 179, 298  
 Ch'in dynasty, First Emperor, 25, 100n, 158n  
*Chin pi ching*, 195n  
*Chin tan ssu pai tzu*: translation of, 324  
*Chin yeh* (liquefied gold), 43n, 186n, 275  
 Chinese Academy of Medical Sciences, 310, 317  
 Chinese aconite tuber. *See* Aconite  
 Ching-chao (prefecture), 89, 90  
 Ch'ing-hua (immortal), 324  
*Ch'ing i ko chin-shih t'i shih*, 137n  
*Chiu kuang* (ninefold radiance), 149n  
*Chiu T'ang shu*, 45n; bibliography, 133; biography of Sun, 87n, 89-132; compilation of, 87; place names, 71n  
 Chou, Squire, 251  
 Chou Hsing-jen, 137n  
*Chou i ts'an t'ung ch'i*: in alchemical tradition, 36-40; sal ammoniac in, 52n; theory in, 26; translation of, 322; mentioned, 14, 19  
*Chou li*, 112n  
*Chou shu*: biographies, 90n  
 Chronic nosebleed with malignant sores, 184, 303  
 Chronology: and astronomy, 10  
 Chu, Yuan-ting T., 308, 314  
*Chu chia shen p'in tan fa*, 75-76; elixir formula in, 152n; quoted, 200n  
 Chu Hsi, 37n  
*Chu ping yuan hou lun*, 314; on erysipelas, 251n; mentioned, 13, 107n, 311-312  
*Ch'u T'ang ssu chieh wen chi*, 104n  
*Ch'u-tse ching*, 78  
 Chü-tz'u, Mount, 102n  
*Ch'üan T'ang shih*, 137n  
*Ch'üan T'ang wen*, 137n  
 Chuang-tzu: Sun compared to, 103  
*Chuang-tzu*, 58-59n, 91-92; on immortals, 100n; Sun as expert on, 89, 90, 91-92, 132  
*Ch'ui pi* (stone from Ch'ui-tsao), 158n  
*Ch'un ch'iu fan lu*, 112n  
*Ch'un-hua Pi-ko fa-t'ieh yuan-liu k'ao*, 137n  
*Ch'ün shu ssu (pu) lu*, 133n  
*Ch'ung hsiu Cheng-ho ching shih cheng lei pei yung pen-ts'ao*, 50n, 58n, 69n, 319-320; evaluated, 309  
 Chung Lu, 129n  
 Cinnabar: *chu sha*, 44-45, 169, 171, 208, 264, 275; *li*, 194-197, 282; pure, 174, 280; Seven-cycle, formula for, 191; solution, 43-47; transformation into gold, 25  
 Clamshells, 211, 280  
 Clay: red, 194, 196, 197, 274; refractory, 262, 263; yellow, 161, 188, 194; 196  
 Cohen, I. Bernard, 30n  
 Cold disorders, 249  
 Cold morbid *ch'i* in the rib region, swellings with, 184, 299  
 Collier, H. B., 69n, 323  
 Confucianism: and natural philosophy, 52  
 Contagious seasonal illnesses, 175, 304  
 Copper, refined, 196, 202, 205, 288  
 Coptis root, 264, 279  
 Cosmic process, chemical model of, 25  
 Cosmology: and astronomy, 8-10; as branch of Chinese science, 6  
 Coughing with rising *ch'i*, reflexive, 184, 301  
 "Cow Bezoar," 176, 209, 284  
 Crimson alum, 179, 273  
 Croton seed, 209, 284  
 Crozier, Ralph, 310, 314  
 Cyclical transformation: definition, 148n  
 Cypress sap, 213, 285-286  
 Davis, Tenney L., 15n, 37n, 316, 322-324; on alchemical theory, 27; on artificial gold, 42n; on origins of alchemy, 23-25

## Index

- Debus, Allen G., 20n  
Demon-killing Pellets: formula for, 208–209  
Demonic forces, possession by, 175, 302  
Dialectical materialism, 32  
Didacticism, in Standard Histories, 82n  
Diogenes Laertius, 18  
Diseases caused by hot poisonous winds, 175, 301  
Diseases due to virulent *ch'i*, 178, 303  
Divers, Edward, 314  
Dragon: and Sun, 140  
Dualism in alchemy, 27  
Dubs, Homer H., quoted, 20–23  
Dyes, 287; adulteration, 213–214
- Earth: collected from cart tracks, 187, 273; salt-impregnated, 263, 283  
Earthworm excreta, 160, 165, 263, 275  
Earwig, 250  
Economics: as limiting factor, 10  
Egg yolk: elixir administered with, 181  
Eliade, Mircea, 38n  
Elixir  
  of Ascension to the Clouds by the Assembled Demons, 160  
  of Ascension as in Immortal, 157  
  of Ascent into Roseate Clouds, 153  
  Beaming Moonlight, 155  
  Calomel, 155; formula for, 176–180  
  Congealed Frost and Deep Snow, 158  
  Crane-Reining, 154  
  Crimson-colored Empyrean-roaming, 154  
  Crimson Tumulus *Ch'ui pi*, 158n  
  Dark Pearl, of the Emperor of the North, 159  
  Divine Dragon, 157  
  Double Radiance, 155  
  Eight Mineral, 154  
  Eightfold Luminosity, 158  
  Empyrean-roaming, formula for, 171–176  
  Envoy, 154; for Communication with Spirits, 152  
  Fine Day, 154  
  of the Five Supernatural (Methods), 152  
  of Flight into the Clouds, 154  
  Flowing Pearl, formula for, 189–190  
  Flowing Roseate and Fresh Turquoise, 159  
  of the Four Wonderful (Substances), 152  
  Fragrance-presentation, 153  
  of Fright at the Falling of the Moon, 158  
  Gold, formula for, 185–186  
  Golden Flower, 158  
  Golden Petal, 170  
  Grand Concord Dragon Womb, 157  
  Grand Purity Multicolored, 159  
  Grand Unity, 154; of Realgar, 155n  
  Grand Unity Jade Powder, 152; formula for, 169–170  
  Grand Unity Single-ingredient, of Realgar, 155n  
  Grand Unity Spirit-summoning, 152  
  Grand Unity Three Envoys, formula for, 171  
  Grand Unity Wonderful Essence, 152  
  Great Cyclically Transformed, 156  
  Greater Yang Powder, formula for, 183–185  
  of Holding the Tally, 154  
  Immortal Child, 156  
  Jade-ingredient Calamity-allaying, 158  
  Lead, formula for, 187–188  
  Life-preserving Destiny-entrusting, 152  
  Liquefied Gold, 186  
  Liquid Gold and Jade Flower, 158  
  of Ma the Immortal's Ascension to Heaven in Broad Daylight, 157  
  of Meteors' Halting at the Moon, 158  
  Mingled Red and Purple, 155  
  Minor Cyclically Transformed, 156; formula for, 174–176  
  Nine Caldron, of the Yellow Emperor, 155  
  Nine Cycle, 156  
  Ninefold Completion, 156  
  Ninefold Metamorphosis, 156  
  Ninefold Radiance, 149  
  Pale Moon, 154  
  Pink and Crimson *Ch'ui pi*, 158  
  Purple Essence, formula for, 188–189  
  Purple Oil, of Realgar, 154n  
  Quintuple-supernatural, 149  
  Radiance-containing Brilliance-emitting, 159  
  Red Luminosity, 155

## Index

- Elixir (continued)  
Resurrection, 152  
Roseate Cloud, of the Grand Immortal, 156  
for Salvation from Distress, 154  
Scarlet: Brilliance, 155; Flowing, 155n; Flowing Pearl, 155n; of Realgar, 154  
Scarlet Snow and Flowing Pearl, 155; formula for, 180-183; prepared by author, 181-183  
of (Securing) Response from the Supernatural and Descent of the Realized Immortals, 160  
Seminal Essence, of Venus, 160  
Seven-cycle Cinnabar, formula for, 191  
Seven Luminary, 149; Supernatural Realization, 159  
Seven Stars Evil-averting, 158  
Spirit-returning, 152  
Supernatural Flight, of Grandee Chang, 157  
Supernatural Transformation, 153  
Three Envoys, 149, 153  
Triple-emissary. *See* Three Envoys  
Triply Wondrous, 209  
White Cloud and Scarlet Snow, 158  
White Snow, of Master Mao, 158  
White Sublimate of Quicksilver, 155  
Wonderful Liquid, 152  
Wonderful Metamorphosis, 152  
Wondrous Brightness Fragrance-disseminating, 158  
Ephemerides, 9  
Epidemic possession, 179, 297; malevolent, 175, 299  
Epilepsy: in children, 298; *feng tien*, 176, 298, 299; *feng tien hsien*, 179, 299  
Epsom salts, 48, 188, 211, 308; note on, 277  
Erysipelas, 251  
Eye Medicine, Jade Fountain: formula for, 192  
  
Fan Hsing-chun, 314  
Fang, Lien-che Tu, 170n  
*Fang* (magical methods), 23  
Fat, 201, 211, 294. *See also* Butter fat; Lard; Subcutaneous fat from the back of a pig  
Feces, sparrow, 203, 275  
Feifel, Eugene, 322  
*Fen t'u*, 159n  
  
Feng Chia-sheng, 76-77n  
Feng Han-yi, 312, 314  
*Feng-liu* dilettantism, 173n  
*Feng shui* (geomancy): as branch of Chinese science, 6  
Feng Yu-lan. *See* Fung Yu-lan  
Fever: seasonal, 179, 303 *See also* Intermittent fevers  
Filliozat, Jean, 31-32n  
Fish glue. *See* Glue  
Five-elements theory, 32-33  
Flame tests, 45n, 68  
Forgery: in Taoist literature, 18n  
Forke, Alfred, 40n, 86n, 159n  
Franke, Herbert, 83n  
Frankel, Hans H., 83n  
*Fu huo* (fixation), 148n; of mercury, formula for, 198-199, 210-211  
*Fu lu lun*, 132  
Fung Chia-lo, 69n, 323  
Fung Yu-lan, 112n  
  
Gall, large, 114-115  
Gardening, 7  
Garland Sutra, 134, 137n  
Gauchet, L., 54n  
Gelsemium root, 209, 250, 293  
Genitals. *See* Wasting of the sexual organ  
Geography, 70-71  
Geomancy. *See* *Feng shui*  
Gillispie, Charles Coulston, 32  
Glauber's salt. *See* *Mang hsiao*  
Glue: cowskin, 202; fish, 212, 285  
Gnomon: ritual associations of, 46  
Gnosticism, 24; and alchemy, 26; and science, 5  
Goblins, possession by, 176, 302  
God of Wine, 141n  
Gold: artificial, 25, 42, 101n; *chin*, 175, 274; *huang chin*, 185, 278; testing of, 22, 45n. *See also* *Chin yeh*; Elixir; Goldmaking  
Goldmaking: Han dynasty, 25; in West, 22  
Grand Imperial Secretariat, 127, 132  
Grand Unity Magic Water, 193  
Gulik, R. H. van, 31n, 37n; on Taoist legend, 95  
Gum lac, 197, 292  
Gunpowder, 76-77n  
  
Hagiography, 16  
*Hai lu sui shih*, 141n  
Hair, human, 195, 283

## Index

- Halite, white, 48, 197, 198, 287. *See also* Salt
- Hallucinations, 30
- Halotrichite, 177, 194, 196, 263, 279; crude, 198, 279
- Han shu*, 105n, 253–254n
- Harmonics: as branch of Chinese science, 5
- Hartner, Willy, 311, 314
- Heart, small, 114–115
- Heart attacks, 175, 298
- Hemorrhoids, 183, 297
- Hermeticism: and science, 5
- Hiraoka Takeo, 102n, 255
- Histories, Standard: compilation, 125–126. *See also individual titles*
- Historiography, 1–11; Marxist, 32–33; and Sun's biographies, 81–136 *passim*; traditional, evaluated, 134–136; verification in, 17–18
- History of science, comparative, 1, 10–11
- Ho-chou (prefecture), 281
- Ho-chung (place), 165
- Ho Ping-yü (Ho Peng Yoke), 163n; on alchemy, 15, 24n, 37n, 39n, 43n, 46n, 77n, 148n, 314–315; on apparatus, 166n; dating technique used by, 60–61n; on elixir poisoning, 30n, 41n; on Taoist literature, 54n; on theory of categories, 27–28; translations, 323–324
- Hoepli, R., 312, 315
- Holmyard, Eric John, 20n
- Honey, 190, 283
- Hosta (rhizome), 209, 281
- Hot poisonous winds, diseases caused by, 175, 301
- Hot winds, symptoms due to unseasonable, 175, 300–301
- Hou Han shu*, 108n
- Hsiang-erh, 120n
- Hsiang Man-tu, 159n
- Hsiang shan yeh lu*, 138n
- Hsiao (county), 126
- Hsiao yao hsu ching*, 131n
- Hsien chuan shih i*, 93
- Hsien-men-tzu, 98–100
- Hsin hsiu pen-ts'ao*: and date of *Tan ching yao chueh*, 139n; drugs listed in, 50n
- Hsin T'ang shu*, 47n, 71n, 77n; bibliography, 59n, 132n, 133; biographies, 79n, 103n; biography of Sun, 87n, 90–131; compared with *Chiu T'ang shu*, 88–136 *passim*; compilation of, 87–88; divination, treatise on, 132n; geography, treatise on, 281
- Hsin T'ang shu chiu miu*, 110n
- Hsing ch'u* ("Summoning the mobile kitchen"), 186
- Hsing chuang* (Account of Conduct), 86, 100n
- Hsu-chou (prefecture), 126
- Hsu hsien chuan*, 92–95, 100n; date, 92n; on Sun's death, 131
- Hsu shen hsien chuan*. *See Hsu'hsien chuan*
- Hsu Ssu-po: letter of, 64n
- Hsu Sung, 102n
- Hsu T'ung chih*, 128n
- Hsuan, Emperor, Northern Chou, 47n, 96–97
- Hsuan chieh lu*, 194–195n
- Hsuan pien Yuan chün pien chin hu ch'ien hung tsao ting ju chin pi chen chou hou fang*: quoted, 156n
- Hsuan p'in lu*, 92n; on Meng Shen, 101n
- Hsuan shih chih*, 93–95; authenticity, 94
- Hsuan-tsang, 104n
- Hsuan-tsung, Emperor, T'ang, 48n, 141n
- Hu Ch'ü, 120n
- Hu Kang-tzu, 159n
- Hu Yü-chin, 8n
- Hua T'o, 105n
- Hua yen ching ch'ih yen chi*, 137n
- Hua-yuan (place), 89, 90
- Huai-nan-tzu. *See* Liu An
- Huan K'uan, 25
- Huan tan* (cyclically transformed elixir), 156n. *See also* Cyclical transformation
- Huan tan chung hsien lun*, 40n
- Huang, Father (physician), 112n
- Huang-fu Mi, 18
- Huang Lan-sun, 309–310, 315
- Huang pai ching*, 11n
- Huang P'ei-lieh, 140n
- Huang Tertius (alchemist), 77n
- Huang ti chiu ting shen tan ching*, 156n
- Huang ti chiu ting shen tan ching chueh*, 188n
- Huang ti nei ching*: meaning of title, 111n
- Huang ti wai ching*, 111n

## Index

- Huang Tzu-ju, 324  
 Huard, Pierre, 309, 311, 315  
 Hui. *See* Taboos  
*Hui san chiao lun*, 132  
 Hui Shih, 91  
 Hung-chou (prefecture), 176  
 Hung Mai, 110n  
 Hung, William, 40n  
 Husain, M. Hidayat, 65n
- I ching*, 14; and alchemy, 37; Su Yuan-ming on, 79n; symbols of, 6  
*I hsin fang*. *See* *Ishin hō*  
*I ku t'ang t'i pa*, 140n  
*I yao*, 56n  
*I yuan pao chuan*, 79n  
 Immortality, 52; belief in, 25; early concept of, 26; verification of, 41  
 Imperial Chancellery, 127  
 Impotence, 184, 305  
 Incantations: in medical works, 51  
 India: and breathing techniques, 32n; and Chinese medicine, 51, 140n; imports from, 276, 277  
 Indian pepper. *See* Pepper  
 Indigo, 213, 287; formula for, 213–214  
 Indonesia: imports from, 287  
 Initiation. *See* Transmission, oral  
 Intermittent fevers, 175, 304; autumnal, 179, 181, 302–303; spring, 304  
 Iran. *See* Persia  
 Iron, 194, 290; cast, 194, 205, 286; from plowheads, 207  
 Iron pyrites, 197, 264, 274  
*Ishin hō*, 319; sources of, 312  
 Islam: science, 3, 11n  
 Itching worms, 184, 297
- Jade: powdered, 169, 294; white, formula for, 211  
*Jao p'u ts'ang shu t'i shih*, 140n  
 Jao Tsung-i, 120n  
 Japan: reign title, 48n  
 Japanese anise. *See* Anise  
*Jih chih lu*, 73n  
 Jimbun kagaku kenkyūsho. *See* Zimbun kagaku kenkyūsho  
 Johnson, Obed Simon, 15n  
 Jujube, wild, 192, 289  
 Jujube pulp: *tsao jang*, 176, 179, 186, 189, 190, 290; *tsao jou*, 174, 290  
 Jung, Carl, 29  
*Jung-chai sui pi*, 110n
- Kalinite, 160–163, 172, 210–211, 276  
*Kan ch'i shih-liu chuan chin tan*, 154n  
 Kan Te (Kan Kung), 105  
 Kao Chung-shu, 129–130  
 Kao Hsiang-hsien, 324  
 Kao Pao-heng, 139n  
 Kao-tsu, Emperor, Posterior Chin, 87  
 Kao-tsung, Emperor, T'ang, 103–106; interview with Sun, 98–103; taboo of, 72n  
 Karlgren, Bernhard, 17n, 23n; syntactical analysis, 62  
*Keng tao chi*: on *chin yeh*, 187n  
 Kitchen God, 144n  
 Klickstein, Herbert S., 15n, 316  
 Ko Hsien-kung, 159n  
 Ko Hung, 14n, 307, 315; contempt for uninitiated, 40, 63n; and Demon-killing Pellets, 209; Forke on, 86n; and *T'ai ch'ing* tradition, 58  
 K'ou Tsung-shih, 69n, 309, 315  
*Ku chin shu lu*, 133n  
*Ku poisoning*, 175, 301–302  
*Ku-wen* (ancient style) movement, 87  
 Ku Yen-wu, 73n  
 Kuang-ch'eng-tzu, 98–100  
 Kuang-te (ward), 103  
*Kuei ching*, 133n  
 Kuhn, Thomas, 4  
 K'un-lun, Mount: as source of talc, 163–164, 264  
 K'ung Min-hsing, 83n  
*Kuo shih* (national history), T'ang, 87
- Laboratory equipment. *See* Apparatus  
 Laboratory operations, 28–30; amalgamation, 293–294; augmenting, 201, 203–204; dip-cleaning, 208; flotation, 169n; in *Pao p'u tzu nei p'ien*, 43–47; spraying, 178n; steaming in fish, 212; in Sun's writings, compared, 65–66; temperature control, 182; in *Tan ching yao chueh*, 49–51, 160–214 *passim*  
 Lac, gum, 197, 292  
 Lake salt, 160, 163, 165, 282–283  
 Lamotte, Etienne, 104  
 Language: as obstacle to science, 10  
 Lao Kan, 315  
 Lao-tzu: Sun as expert on, 89, 90  
*Lao-tzu*: Sun's commentaries on, 132  
 Lard, 171n, 197, 205, 275. *See also* Fat

## Index

- Laufer, Berthold, 308, 315  
Law, natural: unimportance in China, 10  
Lead: *ch'ien*, 187, 273; *ch'ien hsi*, 192, 273; Elixir, formula for, 187–188  
Leaven, vinegar. *See* Vinegar leaven  
Lee T'ao (Li T'ao), 63n, 136n, 311, 316  
Legends, 92, 94–95  
Legge, James, 112n  
Lei Hsiao, 159n  
*Lei shuo*, 94n  
Leicester, Henry M., 15n, 20n, 316  
Lentigo, 179, 301  
Leprosy, 179, 302  
Levey, Martin, 45n  
Lewis, G. L., 65n  
Lexicography, 8n  
Lexicons, 7  
*Li* (cinnabar?): meaning, 194–195. *See also* Cinnabar  
Li Ch'i, 82n, 101n  
Li Ch'iao-p'ing, 316  
Li Shih-chen, 8n, 46n, 307, 309, 316  
*Li shih chen hsien t'i tao t'ung chien*, 57n, 131n; quoted, 141n  
Li Tang-chih, 280  
Li T'ao. *See* Lee T'ao  
Li Wen-chu, 11n  
Li Yü-t'ien, 318  
*Liang ching hsin chi*, 102n  
*Lien fen t'u*, 159n  
Lime, 213–214, 286; air-slaked, 197, 276  
*Ling shu ching*, 296  
Liu An (Huai-nan-tzu), 75  
*Liu hsia* (flowing roseate), 159n  
Liu I-chih, 45n  
*Liu-i ni*, 66; formula for, 160–168, 263–264  
Liu Ju-ch'iang, 318  
Liu P'an-sui, 159n  
*Liu shih* (flowing stone), 159n  
Liu Shih-ju, 255  
Liu Shou, 31n  
Liu Shou-shan, 309, 316  
Liu Ts'un-yan, 154n  
Liu Yu-liang, 67n  
Liu Yü-sung, 122n  
Lixivium, 189, 202, 279  
Lo-chou (place), 90  
Lo-hsia Hung, 104–105  
Long pepper. *See* Pepper  
Lotus Sutra, 138n  
Lu Chao-lin, 98–99, 101–102; on Sun, 103–106, 120–124; conversations with Sun, 106–120  
Lu Ch'eng-t'ai, 128n  
Lu Ch'i-ch'ing: prognostications of, 83n; and Sun, 126–130  
Lu Gwei-djen, 312, 317  
Lu Hsiang, 153n  
Lu Hsin-yuan, 140n  
*Lu Sheng-chih chi*, 104n  
Lü Ssu-mien, 87n, 98n, 126n  
Lü Tao-sheng, 129  
*Lun heng*, 159n  
*Lun yü*, 150n  
*Lung hu huan tan chueh*, 166n  
Lung Po-chien, 309, 316  
Lute. *See* *Liu-i ni*
- Ma K'an-wen, 89n  
Ma Ming-sheng (Ma Ming), 58, 157n  
Magic: and alchemy, 23, 42; in medicine, 140n, 250, 301–302; Water, Grand Unity, 193. *See also* Incantations  
Magnetite, 169, 172, 264, 292  
Mahdihassan, S., 149n  
Malachite  
    granular, 264, 287; formula for, 213  
    laminar, 48, 171, 264, 290  
    nodular, 48, 169, 281  
Male-fern, 206, 285  
Malevolent epidemic possession, 175, 299  
Malignant miasmal diseases, 178, 299  
Manchuria, 128  
*Mang hsiao* (Glauber's salt), 308  
Mao Tse-tung, thought of, 33  
Mao Ying, 158n  
Marble, 48, 294  
Maspero, Henri, 105n, 174n, on breathing techniques, 26n, 37n; on Sun's biography, 93n  
Massicot, 175, 273  
Masutomi Junosuke (Kazunosuke), 43n, 308, 316  
Mathematics: and calendrical astronomy, 9  
Matsuda Hisao, 316  
Mechanics, Newtonian: causality in, 6  
Medicine: acupuncture, 311; and alchemy, 49–51, 142, 306–313; as branch of Chinese science, 6; diagnostic tests, 297; doctor as sage in, 109, 110; elixirs in, 68; history, state of studies, 12–14; microcosm theory, 106–112. *See also* Magic

## Index

- Mei Piao, 78  
Melancholia, 176, 303  
Meng (place), 104  
*Meng hsi pi t'an*, 310, 319  
Meng K'ang, 22n  
Meng Shen, 45n, 98–99, 101–102; biographies of, 88  
Mercury, 176, 191, 199, 210–211, 279; compounds, embalming properties of, 41; fixed, 201. *See also* Quick-silver  
Merrill, Elmer D., 307, 316–317  
Method, scientific: as limiting factor, 10  
Metrology: bibliography, 254–256; as branch of Chinese science, 6; fourth century, 43n; T'ang, 72–74, 252–256; Sung, 75n  
Miasmatal diseases, 178, 179, 295–296; malignant, 178, 299  
Milk, 192, 212. *See also* Butter fat  
Millet, glutinous: and metrology, 252–253; *shu ku*, 187, 288; *shu mi*, 192, 288  
Minerals: geographical origins of, 68–70, 310  
*Ming hsueh* (semantics), 12  
Minium: *ch'ien ch'ai tan*, 186, 273; *huang tan*, 263, 279  
Mirabilite, 172, 177, 188, 189, 286  
Miyashita Saburō, 74n, 77n, 311, 317  
*Mo o hsiao lu*, 12n  
Mo Yu-chih, 39n  
Monarchy, theory of, 112  
Morbid *ch'i*: accumulations of, 184, 299–300; in the rib region, swellings with cold, 184, 299  
Mori Shikazō, 255  
Mote, Frederick W., 81n  
Mu-tsung, Emperor, T'ang, 143n  
Muscovite, 199, 212, 294  
Musk, 174, 176, 189, 209, 286  
Myocarditis, 175, 300
- Nakayama Shigeru, 9n, 11n, 46n  
*Nan-fang ts'ao mu chuang*, 7  
Nanking College of Pharmacy, 310, 317  
Nasr, Seyyed Hossein, 11n  
National character: as obstacle to science, 10  
Natural law: unimportance in China, 10
- Natural philosophy  
  China, 1–11, 27–28, 32–33; microcosm theory, 106–112  
  Greece, 3. *See also* Stoicism  
Needham, Joseph, 1n, 148n, 317; on alchemy, 15, 24n, 37n, 39n, 43n, 46n, 77n; on apparatus, 166n; on theory of categories, 27–28; on cosmology, 115n; dating technique used by, 60–61n; on elixir poisoning, 30n, 41n; on evolution, 7; library of, 12n; on medicine, 312, 314–315; on metrology, 254n; on pharmacognosy, 307; on Taoist literature, 54n; translations, 323–324  
Nei-chiang (county), 251  
*Nei tan* (physiological alchemy), 12n, 15; and European alchemy, 26, 30–31; modern popularity, 55n  
Nemoto Makoto, 82n  
Nervous palpitations, 175, 300  
*Nien-erh-shih cha-chi*, 88n  
Nosebleed, chronic, with malignant sores, 184, 303
- Ochiai Taizō, 312, 317  
Official titles: use in dating, 60–61n  
Oil, 199  
Okanishi Tameto, 67n, 140n, 309, 311, 317  
Onion, 200, 289  
Organization, levels of, 7  
Orpiment, 185, 205, 207, 208, 213, 292  
Ou-yang Hsiu, 87–88  
Ouchi, Yoshio, 307, 317  
Oven, for roasting kalinite, 162–163  
Oxgall, 43  
Oyster shell: *pang k'o*, 212, 263, 285; powdered, 212, 285; *tso ku mu li*, 160, 164, 290
- Pagoda tree fruit, 192, 278  
Pak, C., 195n, 307, 308, 318  
Paktong, 194, 195n, 201, 284  
Palpitations, nervous, 175, 300  
*Pao p'u tzu nei p'ien*, 14, 40–47, 279, 307, 315; on elixirs, 193n; on *huan tan*, 156n; on lard in alchemy, 171n; on “mobile kitchen,” 186n; on *chin yeh*, 187n; quoted in *Chu chia shen p'in tan fa*, 75n; translation of, 41n, 322  
*Pao p'u tzu shen-hsien chin cho ching*: quoted, 156n  
*Pao p'u tzu wai p'ien*, 209n



## Index

- Paper, pulp, 263  
Paracelsus, 1–5 *passim*  
Partington, J. R., 52n  
Peach pits, 208, 290  
Pearls: formulas for, 212–213  
*Pei chi ch'ien chin yao fang*. See  
    *Ch'ien chin fang*  
*Pei hu lu*, 274  
*Pei shih*: biographies, 90n  
*Pei ti hsuan chu* (dark pearls of the  
    Emperor of the North), 159n  
Peking, Research Institute of Pharma-  
    cology. See Chinese Academy of  
    Medical Sciences  
Pelliot, Paul, 94n  
*Pen-ts'ao ching chi chu*: quoted, 147n,  
    254  
*Pen-ts'ao kang mu*, 307, 316; on alum,  
    161n; apparatus in, 46n; classifica-  
    tion in, 8; evaluated, 309; on pill  
    sizes, 253n; quoted, 210n  
*Pen-ts'ao meng ch'üan*, 291  
*Pen-ts'ao yen i*, 69n, 315; evaluated,  
    309  
Pepper: Indian, 198, 277; long, 198,  
    285  
Permutation studies, *I ching*: as branch  
    of Chinese science, 6  
Persia: alchemy, 203n; imports from,  
    51–52, 276, 293, 308  
Persian lilac fruit, 203, 280  
Persian zingar, 196, 293  
Pewter, 203, 281  
Pharmacognosy, 7  
Pharmacology: standards for pills, 254  
Pharmacopoeias, 50n; classification in,  
    8; descriptions in, 309; elixirs in, 77;  
    first appearances of drugs in, 61n;  
    See also individual titles  
Philology, Chinese, 8  
Phonology, 8n  
Physics: Chinese, 5; Stoic, 6  
Physiognomy, 129  
*Pi shu lu hua*, 139n  
Pien Ch'ueh, 105  
Pinellia tuberifera, 209, 285  
Ping-chou (prefecture): as source of  
    kalinite, 161  
Plants, domestic: literature of, 7  
Plum Bath, 202, 204; formula for, 208  
Plums, 208, 283. See also Prunes  
Po-yang, Princess of, 98, 99, 102–103  
Poison ivy, 293  
Poisoning, *ku*, 175, 301–302  
Poke root, 192, 273  
Pope, Clifford H., 308, 318  
Positivism, 1, 10, 32–33  
Possession: by demonic forces, 175,  
    302; epidemic, 179, 297; by goblins,  
    176, 302; malevolent, 181; malevo-  
    lent epidemic, 175, 299  
Post-partum bleeding, 183–184, 303  
Pragmatic tradition, 40–41, 199; and  
    *Tan ching yao chueh*, 49  
*Prajñāparamitāhrdava sutra*, 154n  
Primeval Realization. See *Su chen*  
Princeton University: library, 12n  
Prognostication, 91, 126–130  
Projection, 41  
Prunes, 203, 207, 292  
Prusek, Jaroslav, 84n  
Psychology: and alchemy, 29–30  
Pulleblank, E. J., 82n, 87n  
Purity of reagents, 68–69  
Purple snow. See *Tzu hsueh*  
Pyrites, iron, 197, 264, 274  
Quantitative relations, 29  
Quartz: *pai shih ying*, 169, 172, 211,  
    284; *shui ching*, 192, 288  
Quicksilver, 41, 171, 174, 175, 185,  
    187, 188, 288. See also Mercury  
Rall, Jutta, 312, 318  
*Rasayana*, 149n  
Read, Bernard E., 195n, 307, 308, 318  
Read, John, 22n  
Realgar, 43, 169, 171, 185, 205, 207,  
    208, 277  
Recluses, 81–82  
Red bole, 160, 162–163, 197, 198, 263,  
    274  
Red clay, 194, 196, 197, 274  
Red salt, 194–197, 274  
Reflexive coughing with rising *ch'i*,  
    184, 301  
Renaissance: science, 3  
Resin, tacamahac, 194, 196, 197, 201,  
    278  
Resonance, laws of, 7; in medicine, 111  
Rhazes. See Al-Rāzi  
Rheumatism of the feet, 184, 296  
Rhinoceros horn, 174, 209, 277  
Rhizome, Hosta, 209, 281  
Rice: in elixir, 180; in compounding,  
    184, 188  
Roi, Jacques, 307, 318  
Rotours, Robert des, 96n  
Rumbling of the stomach, 184, 299  
Running sores, 184, 302

## Index

- Sal ammoniac, 194, 196, 197, 201, 203, 204, 207, 283; yellow, 198, 279
- Sal Ammoniac Bath Reservoir: formula for, 207–208
- Salt, 177, 189, 208, 293; black, 198, 276–277; Ho-tung, 169, 277; lake, 16J, 163, 165, 282–283; large crystals, 204, 289; recrystallized, 183, 293; red, 194–197, 274; Turkestan, 44, 160, 163, 164–165, 280; white, 170, 180, 198, 201, 284. *See also* Halite
- Salt-impregnated earth, 263, 283
- Saltpeter, 45
- Salvation: Taoist conception of, 30
- Samādhi*, 158n
- Sambursky, S., 6n
- San kuo chih*: quoted, 105n
- San shih* (three emissaries), 149n
- San-shih-liu shui fa*: translation of, 324
- San tung ch'ün hsien lu*, 271
- Sanskrit, 51
- Sappan wood, 213, 289
- Satō Gimpei, 307, 318
- Schafer, Edward H., 52n, 153n, 308, 310, 318
- Schram, Mathias, 11n
- Schramm, Gottfried, 312, 318–319
- Science: Chinese, divisions of, 6; Greek, 3; historiography of, 1–11, 32–33; Islamic, 3, 11n; and technology, distinction, 9
- Scientific method: as limiting factor, 10
- Scientific revolution, failure to occur in China, 1, 10
- Seasonal fevers, 179, 303
- Seasonal illnesses, contagious, 175, 304
- Selenite, 48, 177, 179–180, 289
- Semantics, 12
- Sensitivity to cold, anemia with, 184, 303
- Sexual organ, wasting of the, 184, 304, 305
- Sexual techniques, 31n, 38
- Shan-hsi t'ung-chih*, 103n
- She sheng chen lu*, 132
- She-yang chen chung fang*, 119–120n
- Shell of left-oriented oyster, 160, 164, 290
- Shen chiao* (magical glue), 166
- Shen Fen, 92n
- Shen Kua, 310, 319
- Shen-nung pen-ts'ao*, 69n; quoted in *Tan ching yao chueh*, 75. *See also Pen-ts'ao ching chi ch'u*
- Sheng chi tsung lu*, 77n
- Sheppard, H. J., 24n
- Shih chi*, 100n, 105n
- Shih-ch'i-shih shang-ch'ueh*, 88n
- Shih ch'iao ko*: translation of, 324
- Shih chieh* (liberation from the corpse), 41
- Shih-huang, Emperor, Ch'in, 25, 100n, 158n
- Shih lu* (veritable records), T'ang, 87
- Shih p'i* (mineral spleen), 286
- Shih pi chi*. *See T'ai-ch'ing shih pi chi*
- Shih Sheng-han, 193n
- Shih shih liu t'ieh*, 138n
- Shih yao erh ya*: described, 78; elixir lists in, 151; on *chin yeh*, 186n
- Shōsōin, 43n, 308
- Shryock, J. K., 312, 314
- Shu shih hui yao*, 137n
- Shui fei* (separation by flotation), 169n
- Shuo fu*, 94n
- Shuo wen chieh tzu*, 44n
- Silver: artificial, 42; powdered, 169, 293–294
- Singapore, University of: alchemical experiments at, 181
- Six-one lute. *See Liu-i ni*
- Social structure: as obstacle to science, 10
- Sores: chronic nosebleed with malignant, 184, 303; running, 184, 302
- Sorrel, 210, 274
- Sparrow feces, 203, 275
- Specific gravity: test for gold, 22
- Spindle tree wings, 209, 281
- Spooner, Roy C., 148n, 323
- Ssu* (fixation), 148n. *See also Fu huo Ssu hsuan fu*, 149n
- Ssu-k'u* Catalogue. *See Ssu-k'u ch'üan shu tsung mu t'i yao*
- Ssu-k'u ch'üan shu tsung mu t'i yao*, 8n, 92n; on Sun's birthdate, 122–123
- Ssu-ma Ch'eng-chen*, 110n
- Ssu-ma Kuang*, 128n
- Ssu shen* (four wonderful substances), 152n
- Stalactite, 285; eaten by Sun, 250
- Standard Histories, 87; function of biographies in, 82. *See also individual titles*
- Stapleton, Henry E., 65n

## Index

- Stoicism, 6, 24; and alchemy, 26; and science, 5
- Stones: in elixir, 193
- Stove deposit, 177, 183, 276
- Stuart, J. A., 307, 319
- Style, literary: in Chinese alchemy, 61-65
- Su chen* (Primeval Realization), 200-201, 204-207
- Su Tung-p'o, 39n
- Su Yuan-ming, 79n
- Subcutaneous fat from the back of a pig, 201, 211, 275
- Sulphur, 174, 189, 209, 287; amorphous, 171, 175, 183, 188, 287
- Summer Palace, T'ang, 106
- Sun, E-tu Zen, 8, 256, 319
- Sun, Shiu-chuan, 256, 319
- Sun chen-jen pei chi ch'ien chin fang*. See *Ch'ien chin fang*
- Sun chen-jen tan ching*, 76
- Sun Ching, 126-128
- Sun Ch'u-yueh, 126-128
- Sun Ch'ian, 126-128
- Sun Chün, 126-128
- Sun Hsing, 132-134
- Sun Hsing-chen. See Sun Hsing
- Sun Hsing-yen, 44n
- Sun Mao-tao. See Sun Ch'u-yueh
- Sun P'u, 126-127
- Sun Ssu-miao. See Sun Ssu-mo
- Sun Ssu-mo: birth, 120-124; youth, 89-90; accomplishments, 137; career, 96-103, 124-130; and Lu Chao-lin, 103-124; prognostications, 126-130; travels, 141; writings, 60, 119, 132-133, 138, 319; son, 132, 133-134; medical disorders, 249-251; death, 130-131; and alchemy, 142, 167; and Buddhism, 132, 137; and esoteric Taoism, 104, 117-120; and gunpowder, 76-77n; and medicine, 106-112, 142-144
- Sun Ssu-mo ching*, 60n, 78
- Sun T'ing, 126-128
- Sun Yu, 126-128
- Sun Yuan-i. See Sun Hsing
- Sung, Z. D. (Shen Chung-t'ao), 6n
- Sung, Mount: as source of kalinite, 161
- Sung Ch'i, 88n
- Sung Chih-wen, 101n
- Sung kao seng chuan*, 138n
- Sung Ling-wen, 98, 101-102
- Sung Min-ch'iu, 89n
- Sung shih*, 119n; bibliography, 55n, 129n
- Sung Ying-hsing, 256, 310, 319
- Swellings with cold morbid *ch'i* in the rib region, 184, 299
- Symptoms due to unseasonable hot winds, 175, 300-301
- Ta tan chi*, 195n
- Ta tung lien chen pao ching hsiu fu ling sha miao chueh*. See *Ch'i fan ling sha lun*
- Taboos, 39n, 69n, 71-72
- Tacamahac resin, 194, 196, 197, 201, 278
- T'ai, Mount, 192
- Tai Ch'i-tsung, 324
- T'ai ch'ing chen jen: title of Sun, 58-59
- T'ai ch'ing chen jen lien yun mu chueh*, 59
- T'ai ch'ing chen jen ta tan*. See *Tan ching yao chueh*
- T'ai ch'ing chin yeh shen tan ching*: on *chin yeh*, 187n; on copper tube, 186n; date of, 174n
- T'ai ch'ing shih pi chi*: described, 77-79; elixir synonyms in, 151-155n; on fixing mercury, 148n; style of, 65; quoted, 179-180
- T'ai ch'ing tan ching yao chueh*. See *Tan ching yao chueh*
- T'ai ch'ing tradition, 57-59
- T'ai-ch'u* calendar reform, 105n
- T'ai i* (Grand Unity), 152n
- T'ai-p'ing kuang chi*, 92-95; condition of text, 95
- T'ai-p'ing sheng hui fang*, 77n
- T'ai-p'ing yü lan*, 58n
- T'ai-po, Mount, 96
- T'ai shang pa ching ssu jui tzu chiang wu chu chiang sheng shen tan fang*, 158n
- T'ai shang wei ling shen hua chiu chuan tan-sha fa*, translation of, 323
- T'ai-tsung, Emperor, T'ang: eulogy on Sun, attributed to, 136; interview with Sun, 98-100; taboo of, 72n
- "T'ai-tsung ssu Sun Chen-jen sung," 136n
- Takikawa Kametarō, 100n
- Talc, 160, 163-164, 263, 278
- Tamba no Yasuyori, 312, 319
- Tan*: meaning in medicine, 67n
- Tan ching yao chueh*: in alchemical tradition, 49-52; authenticity, 58-

## Index

- 59; date, 67n, 79–80; editions, 54–56; title of, 56–59; and *Yun chi ch'i ch'ien*, 55
- Tan fang chien yuan*. See *Tan fang ching yuan*
- Tan fang ching yuan*, 69n; translation of, 323
- T'an K'ai, 95
- Tan lun chueh chih hsin ching*, 195n; title of, 39n
- T'an pin lu*, 107n; characterized, 113; quoted, 118; and T'ang Histories, 116–117
- T'ang hui yao*, 103n
- T'ang liang ching ch'eng fang k'ao*, 102n
- T'ang liu tien*, 153n
- T'ang lü su i*, 252n
- T'ang Shen-wei, 309, 319–320
- T'ang shu*. See *Chiu T'ang shu*; *Hsin T'ang shu*
- Tao chiao hsu*, 198n
- Tao-hsuan, 138n
- T'ao Hung-ching: on effects of drugs, 147n; and esoteric Taoism, 103n; on pill sizes, quoted, 252, 254; on oysters, quoted, 290; and *Shen-nung pen-ts'ao*, 75, 175n
- Tao tsang*, 320; alchemical books in, 11, 15, 53, 307; successive compilations, 53–54; taboos in, 72. See also *individual titles*
- Tao tsang chi yao*, 55n
- Tao tsang chü yao*, 55n
- T'ao Tsung-i, 137n
- Taoism: and alchemy, 11, 52–54; and Sun, 81–86
- Taoist Patrology. See *Tao tsang*
- Taxonomy, 8
- Taylor, Frank Sherwood, 20n
- Technology: and science, distinction, 9
- Teng Ssu-yü, 94–95
- Theories, 27–28, 37–38; Marxist evaluation, 32–33. See also *Categories*, theories of
- T'ien kung k'ai wu*, 256, 288, 310, 319
- T'ien Yu-yen, 101n
- Tin, 176, 200, 201, 205–206, 207, 277; refined, 204, 282
- Ting ming lu*: quoted, 129–130
- Ting ming lun*, 129n
- Topoi*, in biography, 83
- Touchstone, 22
- Translations, alchemical, 15, 322–324. See also *individual titles*
- Transmission, 51. See also *Annam*; *Asia*, Central; *Cambodia*; *India*; *Indonesia*; *Persia*
- Transmission, oral, 57, 59–60
- Transmutation, 41, 194
- Tsan Ning, 39n
- Ts'an t'ung ch'i k'ao i*. See *Chou i ts'an t'ung ch'i*
- Ts'an t'ung ch'i wu hsiang lei pi yao*, 153n; translation of, 322–323
- Ts'ao T'ien-ch'in, 15, 43n, 324
- Ts'ao Yuan-chung, 102n
- Ts'ao Yuan-yü, 14n, 86n
- Tseng Pai-lung tung Liu tao jen ko*: translation of, 323–324
- Tsien, Tsuen-hsuin, 151n
- Tso chuan*, 112n
- Tsou Yen, 21
- Tu Chou i ts'an t'ung ch'i*: translation of, 323
- Tu-ku Hsin, 90–93
- Tu-ku T'ao, 69n, 323
- Tu Kuang-t'ing, 93
- Tu shih* (transcendence), 22n
- Tuan Ch'eng-shih, 94
- Tuan Kung-lu, 274
- Tui* (white lead?): meaning, 194–195n, 202. See also *White lead*
- Tun-huang (place), 163
- T'ung chih lueh*, 55n, 59n, 90n. See also *Hsu T'ung chih*
- T'ung-chou (prefecture), 165
- Tung Chung-shu, 112n
- T'ung i t'ang wen chi*, 122n
- Tung-lai (prefecture), 163
- Turfan. See *Asia*, Central
- Turkestan salt, 44, 160, 163, 164–165, 280
- Twitchett, Denis, 82n, 86n, 100n
- Tzu chih t'ung chien*, 128n
- Tzu hsueh* (purple snow), 251
- Ulcers, 183, 304–305
- Ung Kang Sam, 111n
- University of the Sons of the State, 127
- Vaginal ulcers, 183, 304–305
- Van Gulik, R. H. See *Gulik*, R. H. van
- Vegetable blue infusion, 214, 282
- Veith, Ilza, 111n
- Verdigris, 213, 291
- Vietnam. See *Annam*
- Vimalakīrti: Sun compared to, 103
- Vimalakīrti-nirdeśa* sutra, 104n
- Vinegar, 178, 186, 189, 194, 198, 203,

## Index

- 212, 263–264, 291; concentrated, 45, 169, 293; fortified, 183, 186, 194, 199, 200, 207, 211, 213, 291; wine, 180, 201n, 280  
Vinegar leaven: *chiang shui*, 197, 198, 273; *ts'u chiang shui*, 187, 202, 291
- Wai t'ai pi yao*, 320; sources of, 312; quoted, 298  
Waley, Arthur, 20n, 92n  
Wallacker, Benjamin E., 310, 318  
Wan Kuo-ting, 255  
Wang, C. H., 148n, 323  
Wang, Chung Yu, 310, 320  
Wang Ch'ang, 136n  
Wang Chin, 14n  
Wang Ch'ung, 159n  
Wang Chung-tu, 141n  
Wang Hsien-ch'ien, 112n  
Wang Jen-chün, 94n  
Wang K'uei-k'o', 15n, 42n, 291  
Wang Li-ch'i, 26n  
Wang Mang, 73n  
Wang Ming-sheng: on Sun's birthdate, 122–123; on T'ang Histories, 88n, 131n  
Wang Ta, 255  
Wang T'ao, 312, 320  
*Wang-wu chen-jen k'ou shou yin tan pi chueh ling p'ien*, 31n  
Ware, James R., 41n, 100n, 111n, 149n, 322  
Wasting of the sexual organ, 184, 304  
Watanabe Kōzō, 139n  
Water from a northward-flowing stream, 193, 285  
Watson, Burton, 119n  
Wei Cheng, 124–125  
Wei Shu, 102n  
*Wei Wen-chen ku-shih shih i*, 125n  
Wen, Emperor, Sui: and Sun, 96, 97–98  
*Wen hsien t'ung k'ao*, 103n  
Weng Tu-chien, 53n, 320  
White lead: *hu fen*, 201, 278; *tui*, 194–197, 201, 202, 203, 204, 205, 291  
White wax tree, wood: 205–206, 282  
Wieger, Leon, 14n, 54n, 320  
Wild jujube pits, 192, 289  
Wilhelm, Hellmut, 6n  
Wilhelm, Richard, 31n  
Wilson, William Jerome, 15n, 320  
Winds: cold disorders due to, 249; diseases caused by hot poisonous, 175, 301; symptoms due to unseasonable hot, 175, 300–301  
Wine, 201n, 203; elixir administered with, 181, 185; God of, 141n  
Wine vinegar, 180, 201n, 280  
Witchcraft, 301–302  
Wong, K. Chimin, 311, 320  
Wong, Ming, 309, 311, 315  
Worms, 304–305; itching, 184, 297  
Wright, Arthur F., 82n  
Wu, Chenfu F., 308, 320  
Wu, Emperor, Han: bilked, 25, 105n  
Wu, Lu-ch'iang, 42n, 322  
Wu Chen, 110n  
*Wu chen p'ien*, 37n; translation of, 323  
Wu Ch'eng-lo, 254–255  
Wu Ch'i-chün, 310, 320  
Wu Chiung, 133n  
*Wu-lang-t'eng* (vine), 206–207  
*Wu lei hsiang kan chih*: author of, 39n  
Wu Lien-teh, 311, 320  
*Wu ling* (five supernatural animals), 149n  
*Wu ling tan ching*, 152n  
Wu Te-lin, 8  
*Wu ti yun tan fang*, 153n  
Wu Tse-t'ien, 45n, 101n, 133  
Wu Tseng-ch'i, 113n  
Wu-tu (place), 277
- Yabuuchi Kiyoshi, 14n, 311, 319, 321  
Yang, Emperor, Sui: and metrology, 74n; taboo of, 72n  
*Yang hsing* (nourishing the vital principle), 117–120  
Yang K'uan, 255  
Yang Lien-sheng, 103n, 181n, 319; on historiography, 86n; on metrology, 255  
Yang Tsai, 40n  
Yang Ying-feng, 168n  
*Yao lu*, 280  
Yeh Meng-te, 139n  
Yellow Emperor, 100n  
Yellow sal ammoniac, 198, 279  
*Yen t'ieh lun*, 25  
*Yin-yang*, 27, 31n; and alchemy, 38, 47–48; as objective concept, 32–33; Sun's command of, 104; and Tsou Yen, 21  
*Ying men kung miao chieh lu*, 195n  
Yogas, 32n. *See also* Breathing techniques  
Yoshida Mitsukuni, 14n, 321  
*Yü ching chin ssu Ch'ing hua pi wen*

## Index

- chin pao nei lien tan chueh*: translation of, 324  
Yu Ching-mei, 318  
Yu-chou (prefecture), 128  
*Yü li* (jade wine), 149n  
*Yü nu* (fairies), 186  
*Yu-yang tsa tsu*, 94, 279  
Yü Ying-shih, 23n  
*Yu-yu-tzu chi*, 104n  
Yü Yun-hsiu, 312, 321  
Yuan Han-ch'ing, 13n, 14n, 20n, 39n, 321  
Yuan Mei, 101n  
Yuen, H. B., 86n  
*Yun* (halo), 200, 202; defined, 200n  
*Yun chi ch'i ch'ien*, 119; editions, 54–56  
Zimbun kagaku kenkyūsyō, 12n  
Zingar, Persian, 196, 293







