BOOK ONE

HODOWANEC'S RHYSMONIC COSMOLOGY

A collection of Papers, Notes and Articles authored by Gregory Hodowanec reflecting some of his theoretical and experimental findings as well as his 1985 monograph RHYSMONIC COSMOLOGY.

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Greg, Thanks for sharing with me and many others your insights, experimental findings and, most of all, your enduring integrity as a scientist.
Bill Ramsay
21 May 1998

PREFACE

I think there is something in this collection for everyone striving to go beyond popularized beliefs and dogma to try to better grasp the true nature of All That Is within the miracle of continuing creation. True whether one is a theorist with little or no mastery of physical evidence gathering or a curiosity guided hands-on experimenter with little interest or concern for theory building. Ultimately theory and evidence must mutually confirm to be considered true knowledge.

I feel careful readings and reflections will yield an appreciation of how well this mutual confirmation process has been attempted and achieved by the author; well enough to warrant serious attention to this fledgling cosmology.

Within is theoretical prediction of fundamental nearly instantaneous universe-wide forces, thought to be those of gravity, with preliminary confirmations evidenced during solar eclipses. This one discovery alone ought to draw special attention since every Space Shuttle orbit is an opportunity for further confirmation.

Also discovered by the author are simple physical and electronic means for observing these likely instantaneous universe-wide forces created by the billions upon billions of matter-energy gravity sources as these interact with earth's gravity 'fields.' Numerous observations using these means when compared with known universe 'structure' earth meridian transits yield considerable confirmations for the reality and viability of these simple means becoming a new 'window' through which universe energy-matter forms can be observed and mapped as they are now and not as they were when their light-speed delayed images reach present astronomical instruments. Comparing the images from the past with those from the present could not help but yield startling new insights into the dynamics of this universe's 'life history' thus far with implications for predicting its future developments. Does not this potential deserve very special attention?

Yet another discovery by the author is the apparent existence of a universe gravity background, perhaps the instantaneous force equivalent of the famed Universe Microwave Background Radiation?, which can be perturbed in such a way as to set up a possible universe-wide 'resonant' reaction; one which persists for long periods even after the perturbing source is removed. What are the many implications of this discovery and, whatever they are, is not special attention warranted here as well?

The list of original discoveries by the author goes on and continues to grow. Of course all of these must be thoroughly confirmed by many others. I know it was and is the author's intent to invite such attention since he always remains a pragmatist. The results of my limited experimentation thus far yield general confirmations for the author's findings and conclussions. None of this is reported here since such might distract attention.

It seems likely few, if any, of those reading this collection will have the mastery of both theory development and evidence gathering the author does; I certainly don't; which means co-operative efforts will be required to pursue very much within the wealth of the author's discoveries. If enough readers are impressed enough with what they find within, this should be a natural and logical process of finding others to compliment what each one has. I am essentially a Technician, a curiosity guided hands-on experimenter.

The reader will find considerable redundancy in much of the material in this collection. No attempt was made to edit this out. The same material with slightly diffent wording may be key to someone's understandings.

Some of the material has been published elsewhere but most of this not in any single publication making it difficult if not impossible to source directly since some sources have gone out of business. Some material, that stamped CONFIDENTIAL by the author, was accepted and paid for but never published-all this some years ago. I have included it here since, to my understanding, excluding it would have amounted to de facto suppression and a possible violation of the author's Constitutional rights to 'free speech.' It was included without the author's consent or knowledge so let any who may feel 'harmed' by my actions quarrel with me and not the author. Besides, this is not a 'for profit' undertaking and I will consider myself fortunate indeed to come near breaking even.

Some effort was put into trying to group together material which seemed to me to logically fit this way. That which didn't seem so or which I didn't get around to organizing is grouped in the back. No INDEX or TABLE OF CONTENTS was attempted so several blank pages are included, following this PREFACE, so that interested readers can do their own in ways that make logical sense to them, not me. All of the author's material is page numbered to aid with this.

My enthusiasm and respect and admiration for the considerable decades long work of the author is such that I feel copies of this collection should be in every college's science and engineering departments libraries. This seems unlikely so it is my hope that the few which might will, at the very least, inspire some to break with current scientific beliefs, dogmas and ritualistic practices for the greater adventure of discovery. Who knows, there may even be a Nobel Prize in this for someone!

Compiling this collection and my nine year long on and off experimentations with but a few of the author's discoveries have been labors of love. So, appropriately, I dedicate this latest effort to my friend and colleague Greg.

Bill Ramsay
Grand Junction
May 10th 1998

INDEX/NOTES

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RHYSMONIC COSMOLOGY

GREGORY HODOWANEC

FIRST EDITION

FIRST PRINTING

Printed in the United States of America

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To my wife, Mary, for her patience during the many hours of seclusion needed to prepare this manuscript, the contents of which she had only the faintest of notions.

(2)

Preface

Cosmology, in its broadest sense, may be defined as the study of the universe in terms of its origin, its fundamental make-up, and its development in time. Many theories of cosmology have been proposed, and each assumes one or more models by which various phenomena, which are sensed by man or his instruments, are explained. Most of these theories and models are incomplete and thus leave room for alternate theories and explanations. Rhysmonic cosmology is a 'new' theory which starts from fundamental premises and therefore builds-up a model of the universe from a firm foundation. It is the aim of this monograph to introduce the reader to these new concepts and to lead the reader in the development of this cosmology in a logical manner.

The theory will not only explain much of what is assumed to be known of this universe, but will also develop new knowledge which will lead to testable predictions and perhaps new and fascinating technologies. The theory also provides logical explanations for many present-day enigmas, especially those of an astronomical nature. While the author recognizes that this material is yet incomplete, sufficient information and data will be provided to enable many other independant investigations into this new cosmology. The author hopes that many opt to do so.

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Chapter 1

Introduction to Cosmology

Early man, as the more rational and inquisitive member of the species inhabiting Earth in his time, has always been interested in his own origins, and also that of the other creatures and objects which surrounded him. While he also respected the power of the sun which provided him with light and warmth during the day, he was especially awed by the night view of the heavens, which were exceptionally brilliant as light pollution was very minimal in his time. Therefore, to satisfy his innate desire to know 'why', early man developed explanations for these objectivities and phenomena which were further developed by successive generations as folk lore and eventually became the basis for various established religions. These may be considered the very beginnings of cosmology; therefore, cosmology is as old as man himself.

Cosmology today may be defined in many other ways, but, in general, it may be considered as a branch of astronomy in that it is a study of the universe, its origins, structure, and development in time. There are many cosmological theories, but most theories today are based on Einstein's relativity theory. The earlier classical theories of cosmology, which were developed from the times of the ancient Greeks to about the end of the nineteenth century, were largely based on a mechanistic universe involving a hypothetical substratum which eventually became known as the aether. This transparent and weightless medium was imagined by the latter period classicists to fill all space and to be medium in which electromagnetic radiation could propagate. Since this medium was believed to have rigid properties, attempts were made to detect its properties. However, failure to detect this medium in the Michelson-Morley experiments (and in many other versions since then) finally led to the abandonment of the aether and also the resulting Newtonian concepts of absolute space and time.

Cosmology, as developed in relativity-based theories of recent years, has generated many new terms and concepts which have aroused the human curiosity. Among the more popular concepts are such items as the redshift in the positions of the spectral lines of distant astronomical objects and thus the inferred expansion of the universe; the 'big bang', oscillatory, and steady-state cosmological models; the microwave background or 'fossil' radiation; and the various large-scale structures of the universe. In addition, many new and exotic items such as novae and supernovae, black holes, pulsars, quasars, neutron stars, etc., to name but a few, have been discovered in fact or in theory. Present cosmological models and theories offer many ad hoc explanations for these observations and thus have many shortcomings, problems, and questions. However, there is one consistent factor emerging from all these theories and that is the belief that there should be a fundamental simplicity behind the observed complexity of the universe. Therefore, it is largely the objective of present day cosmologists to determine this basic simplicity and thus unite the many forces and particles of nature in a unified whole. Thus the emphasis today on various so-called unified theories of cosmology.

Rhysmonic cosmology proposes to offer a firm base on which to build-up a cosmology from fundamental premises which will provide realistic and consistent explanations for all the above phenomena and many others. Since it is a basic cosmology, it will also be shown to be a unified cosmology. In addition, it will be shown to be capable of new predictions of phenomena which are testable in simple direct experiments. This will all flow from the basic premises as presented in the next chapter of this short monograph.

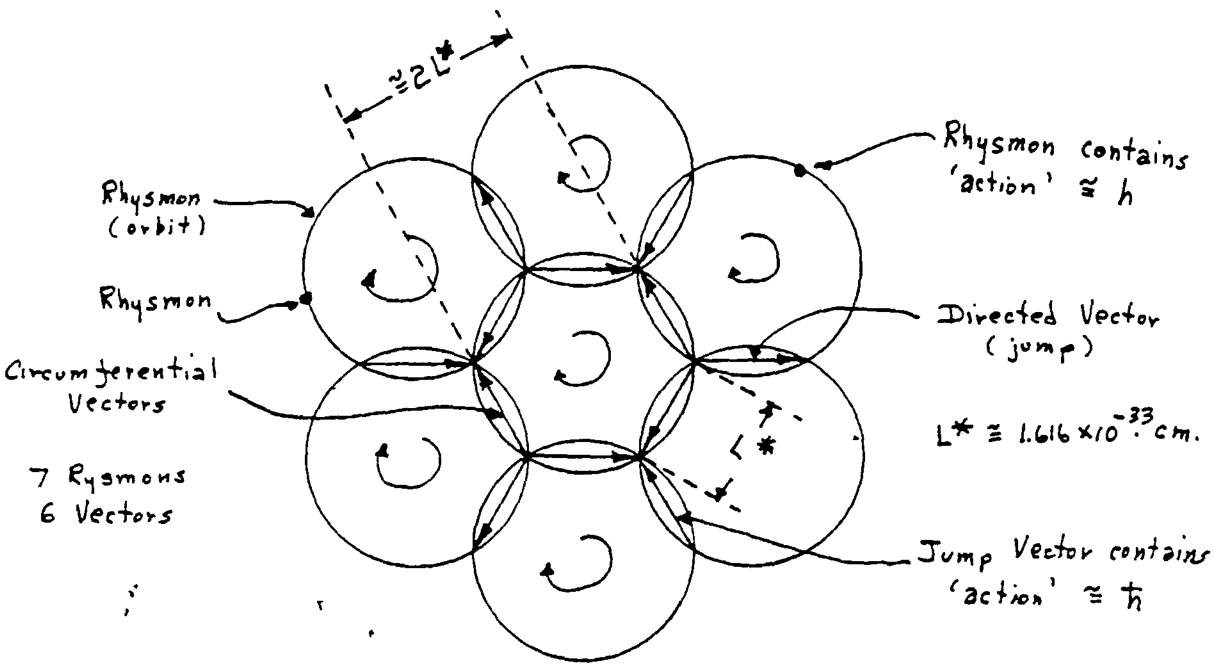

Figure (1) - Planar view of circumferential vectors in basic cell of matrix structure.

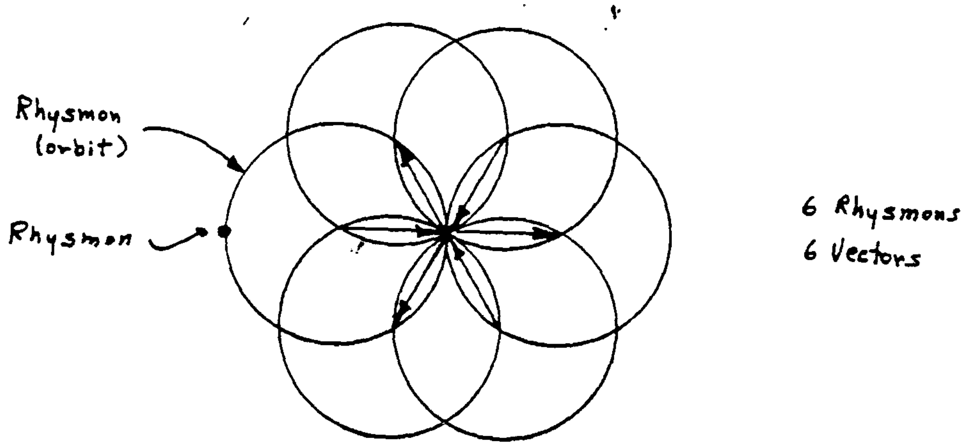

Figure (2) - Planar view of radial vectors in basic cell of matrix structure.

(5)

Chapter 2

Basics of Rhysmonic Cosmology

Fundamentals

In a sense, rhysmonic cosmology restores the substratum aether of the classical era in that an underlying structure is hypothesized but this structure is somewhat different than what was imagined by the classicists. Rhysmons are the 'particles' of this substratum and as with the original atoms of Democritus, rhysmons have only "size, shape, position, and velocity". Nothing else is needed to describe them except for the definitions of these attributes. For the purposes of this monograph, rhysmons will be assumed to be extremely small spherical 'objects'. The reality of the universe is therefore nothing but rhysmons and the void. Rhysmons provide the elementary quantum of action and rhysmons intertwine or interweave in a matrix structure to form the vacumn which is the very fabric of the universe. It will be shown later that modifications to this structure result in the myriad manifestations or phenomena in nature. From this basis can be constructed the so-called forces or fields of nature, the nature of particles or mass, the nature of charge, and other phenomena, as well as definitions for these entities. These constructions or models can therefore also explain, in simple terms, the more subtle phenomena in nature, such as the nature of inertia, electromagnetic wave propagation, redshift, the constant velocity of light, and astronomical paradoxes such as quasars, superluminal motions, and galaxy formation, to name just a few of the phenomena.

Matrix Structure

The term rhysmon stems from another Greek designation for the early atom, "rhysmos", which meant 'onrush' or evermoving since the Greeks considered this entity to never be at rest. Rhysmons also may be considered to be evermoving in contained 'orbits' as well. In rhysmonic cosmology, the rhysmons intertwine or interweave with other rhysmons in a close-packed hexagonal structure which is very much reminiscent of the vector equilibrium of R. Buckminster Fuller's energetic-synergetic geometry.(1) It will be shown that such a structure results in a system of short directed energy vectors which, in free space, ie., the vacumn, cancel their energies and thus display no effects or phenomena which can be 'observable'. Thus the basic premise: the pure rhysmoid or the vacumn is not directly observable, but the structure of this vacumn can be constructed from a logical basis as is shown in this cosmology.

Shown in Figure (1) is a planar view of a portion of the vector equilibrium basic cell of the matrix structure in free space, ie., the vacumn, from which one can define some basic constants in this structure. Only circumferential vectors are emphasized in this figure. This basic view directly defines the quantum unit of action for the rhysmon (which is the Planck Constant) and other fundamental units of length, time, and velocity (which are also the Planck Natural Units of measurement).(2)

These units are designated in the figure but are expressed in words below:

L* = Planck Length	=	basic quantum 'jump' length of rhysmons in free space (vacumn).
T* = Planck Time	=	basic quantum 'jump' time of rhysmons in free space.
C* = Planck Velocity	=	basic quantum 'jump' velocity of rhysmons in free space (equal to velocity of light in free space).
h = Planck Constant	=	basic quantum of action available in each 'orbiting' rhysmon.
$\hbar$ = Reduced Planck Constant	=	basic quantum of action available in a quantum 'jump' length of L*. (equals $h/2\pi$ units of action.)

The actual calculated values for the above units and some other derived units are given in Appendix I. To aid the reader in following the development of rhysmonic cosmology, some terms used in describing this cosmology are defined in Appendix II. Additional terms will be defined as needed in the course of the text development.

Shown in Figure (2) is a <u>planar</u> view of a portion of the vector equilibrium basic cell of the matrix structure in which radial vectors are emphasized. In this construction six radial vectors exist and these vectors cancel the six circumferential vectors of Figure (1) as shown in the more complete construction of Figure (3). It should also be noted that the directions of the rhysmonic rotational 'orbits' shown are for illustrative purposes only and may not be correct since the complete matrix cell involves many vectors as seen in the three-dimensional view of the system as shown in Figure (4). The structure of Figure (4) contains three intersecting planar structures of the type shown in Figure (3) and these interlock with additional cells as shown for the planar case again in the extended plane of Figure (5). These interlocking structures build-up in a three-dimensional geometry out to the very edge of the universe, but the individual rhysmons are contained within their 'orbits' only. The maximum use of available energy content, however, would require that the three-dimensional build-up of the universe be in spherical form, ie., the universe must be a perfect sphere. It would be interesting to demonstrate this dynamic, perfect mechanically interlocking model in a three-dimensional computer simulation.

From the construction of Figure (5), one can define some additional rhysmonic (Planck) terms which are expressed in words below:

M* = Planck Mass	=	mass of single rhysmon in free space.
V* = Planck Volume	=	Euclidian cube in free space having Planck Length per side; contains one rhysmon.
D* = Planck Density	=	mass of rhysmons contained in one unit volume (cm^3) of free space.
E* = Planck Energy	=	energy of one rhysmon in free space.

From the definitions established so far, one may also determine the properties of the rhysmons. These flow directly from the basic cell structure which forms the very foundations of this cosmology. The determined properties of the rhysmons as derived from these definitions are also given in Appendix I.

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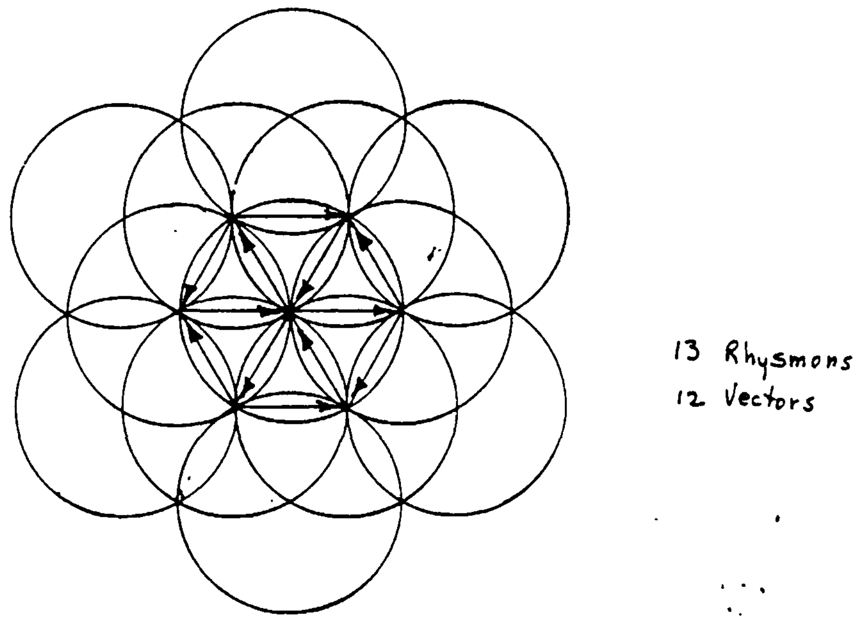

Figure (3) - Complete planar view of balanced forces of vectors in basic cell of matrix structure.

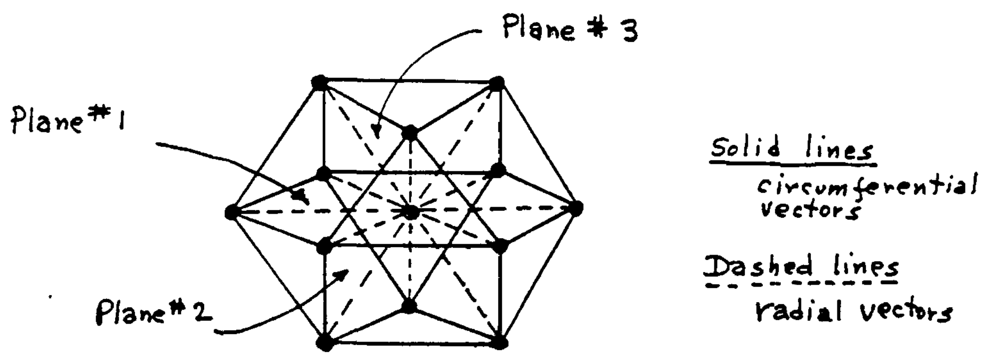

Figure (4) - Three dimensional view of vector equilibrium of basic cell of matrix structure.

Matrix Geometry

The simplified constructions of Figures (1) through (5) are based on Cartesian co-ordinates and thus Euclidian geometry. Another basic premise in rhysmonic cosmology is that the pure rhysmonic structure, ie., the vacumn, is Euclidian in geometry throughout the entire universe. This means that Euclidian type 'straight' lines exist in this universe. The vectors as depicted in these figures, especially those shown in Figure (5), are seen to form Euclidian type straight lines with directed rhysmonic vectors joining head-to-tail. For any one particular straight line this is an 'instantaneous vector' which spans the universe from edge to edge (the universe was shown to be a finite sphere). A particular configuration exists for Planck Time, T* , or about 5.4 x 10^{-44} seconds, when rhysmonic 'orbiting' causes other rhysmons which have reversed orbital orientation to appear in any chosen reference 'line' , and thus the vectors also reverse direction. In time, T* , later again, the vectors are restored to the original directions, but the original rhysmon does not return to this original position until a time period of 6T* has passed. Since this directional reversal occurs for each straight line instantaneous vector in the entire universe every 5.4 x 10^{-44} seconds, the universe is like a movie or cinema, where each single frame or picture in the cinema of existance lasts for only 5.4 x 10^{-44} seconds. This representation of the structure of the universe has two significant conclusions: (1) Individual rhysmons are limited in movement to an 'orbit' having a radius of Planck Length, L* , or about 1.6 x 10^{-33} centimeters, and (2) rhysmonic effects in each 'straight line' are instantaneous vectors which span the universe and reverse in Planck Time, T* , or about 5.4 x 10^{-44} seconds. Thus it is possible in rhysmonic cosmology to ascertain that two events in different parts of the universe do occur at the same time, within a measurement error of Planck Length, L* , or Planck Time, T* . Thus rhysmonic cosmology restores, in essence, the absolute space and time of Newton. The concepts disclosed in this paragraph are very important for the later discussion of forces and fields as well as particles and charge. It will be shown to be especially significant in the discussion of gravitation.

Conclusions

The simple concepts of the basics of rhysmonic cosmology as given in this chapter are used to establish the whole of rhysmonic cosmology. No other ad hoc or other assumptions are needed in the further development of this cosmology. Thus it could well be the simple cosmology sought by most cosmologists today. This will become clearer as the development of this cosmology continues.

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Chapter 3

The Rhysmonic Universe

Introduction

Currently popular cosmological models for the universe generally fall within three broad categories: the Big Bang version, the Oscillatory version, and the Steady-State versions. There are many individual interpretations within each broad category, depending upon the proponent's general viewpoints. However, each general class has some common features as follows: In the Big-Bang version, the universe is supposed to have begun as a 'primeval' atom which contained all the mass of the universe. This 'atom' exploded about 15 billion years or so ago, resulting in the apparent expansion seen today. In the Oscillatory version, the universe does not expand forever, but because of self-gravitation, stops, and then collapses to the 'primeval' atom state again to repeat the cycle. In Steady-State versions, constant mass and mean density is postulated. Since the 'observed' expansion of the universe is also recognized, these theories call for the continous creation of matter in some manner to maintain the mean density constant.

As noted above, the current theories all postulate expansion of the universe as evidenced by the Hubble relation of velocity-distance for the galaxies. In addition, various geometries are also postulated, for example, Einstein's four-dimensional space. This all results in the necessity for many ad hoc explanations for these various effects. However, rhysmonic cosmology, since it starts with very basic premises as briefly outlined in the previous chapter, effectively eliminated the need for such ad hoc explanations and thus is a general theory for all effects and phenomena without invoking any additional assumptions.

Rhysmonic Postulates

The universe in terms of rhysmonics requires but few postulates, all of which stem directly from the basic premises of the previous chapter. They are listed here and briefly developed in this chapter. The development will be made more complete as rhysmonic cosmology unfolds:

(1) The universe is a finite, spherical, matrix structure which has finite energy content which is a function of its size.
(2) The universe is Euclidian in geometry.
(3) The edge of the universe is a perfect reflector of radiant energy; therefore the universe is a perfect black body.
(4) Matter particles (mass) form only in the central region of the spherical universe.

Finite Universe

The size of the universe depends only on the total number of rhysmons involved and the size of the matrix cell. The present size of the matrix cell is established by Planck's Natural Units as applied to the vector equilibrium structure of the basic cell

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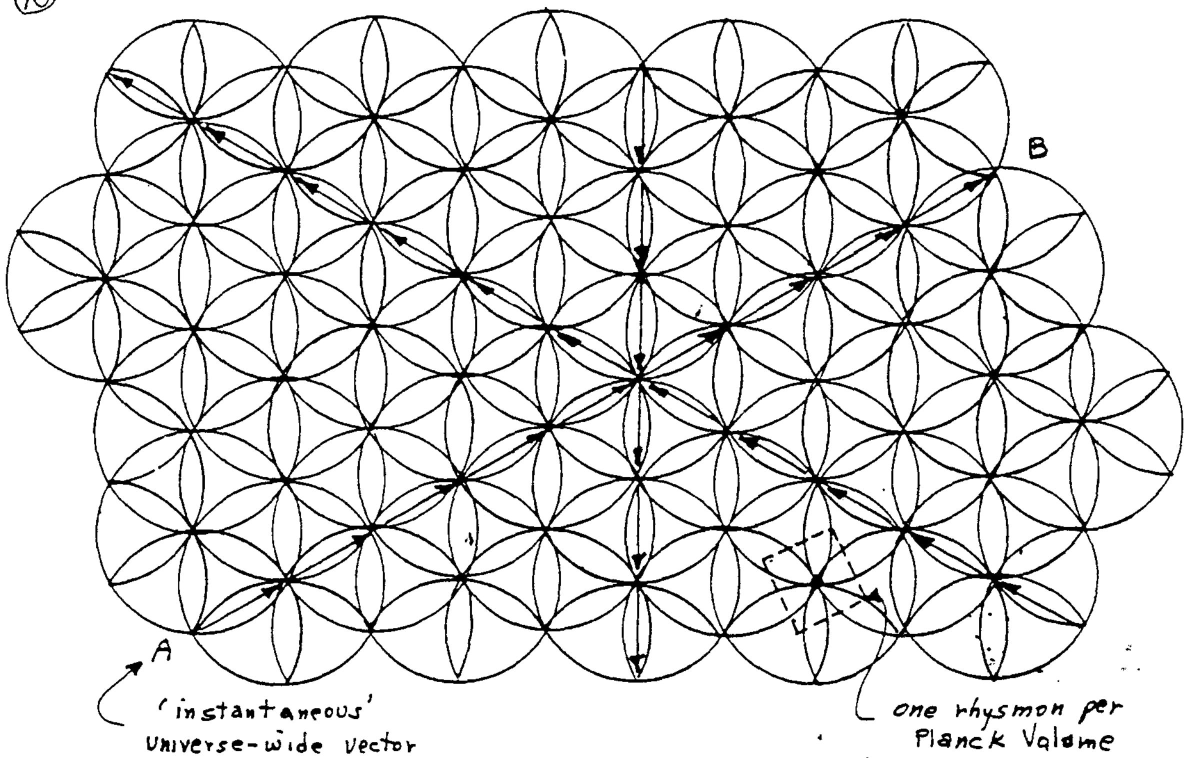

Figure (5) - Extended planar view of basic cell of matrix structure.

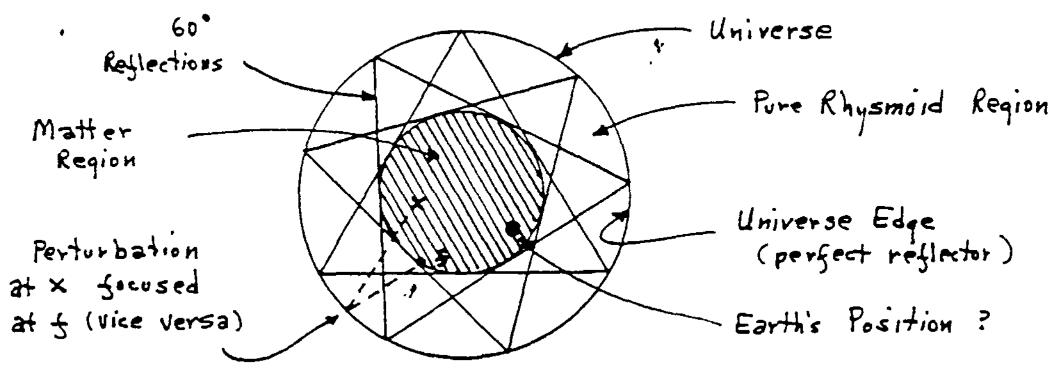

Figure (6) - Planar view of rhysmonic universe.

described previously. Perhaps the size of the universe can eventually be determinable from the size of the basic cell structure. While the basic cell structures could be combined to yield almost any shape for the universe, it can be shown that optimum use of the available energy content would require that the universe be spherical in shape. The present energy of a single rhysmon is determinable from the Planck Constant and his Natural Units. Therefore, since the rhysmonic universe builds-up from very basic fundamental structures, there is no need for expensive atom-smashing experiments to finally arrive at this same basic structure. Instead of working down from complexity to basics, as in present day high-energy physics, rhysmonic cosmology works up from basics to the more complex structures and phenomena. The complexities of nature are but modifications or perturbations in the pure rhysmoid (vacumn) universe. Rhysmonic cosmology does not preclude the existence of other universes in the void, or the possibility of collisions between universes, nor the possibility that universes might gain or lose rhysmons which may be out there 'floating' in the void.

Euclidian Universe

A Cartesian co-ordinate Euclidian type universe has already been postulated. This is directly the result of the close-packed hexagonal structure of the vector equilibrium basic matrix cell. This applies primarily to the pure rhysmoid or low-density matter regions of the universe. Rhysmonics does not preclude that under highly localized conditions other geometries could and probably do exist. However, on a large-scale, eg., astronomical dimensions, use of Euclidian geometry would still be valid, which is contrary to the opinions of many present day cosmologists.

Reflections at Rhysmoid Edge

As has been shown in the previous chapter, the close-packed hexagonal structure of the basic matrix cell leads to universe-wide 'instantaneous vectors' which reverse in Planck Time, T*. Consider the planar cell structure of Figure (3) to be located at the edge of the universe. Note the directions of the vectors depicted. At Planck Time, T* , later, all these vectors will reverse direction, no matter what was the direction of their arrival, ie., the vector field is returned or reflected. Since the overall surface of the universe is a sphere, the inside edge of the universe is in essence a concave spherical mirror. As such it has all the properties of any concave spherical mirror in terms of geometric optics based upon Euclidian geometry. This concept is significant and crucial to the development of matter (particles, atoms, molecules, galaxies, etc.,) in the universe as well as such effects as gravitation, quasars, superluminal motions, and other strange effects or paradoxes found in nature, especially in the large-scale aspects of the universe.

Matter in the Universe

Shown in Figure (6) is a planar view of the universe as constructed in rhysmonic cosmology. It has already been postulated in concept that the universe is a perfect sphere with the edge acting as a perfect spherical mirror for rhysmonic vectors. It will be shown later that electromagnetic and gravitational signals

(12) are but special manifestations of rhysmonic vectors, thus these signals or effects are also perfectly 'reflected' from the edge of the universe. Thus, as has been stated already, the universe is a closed system and a black body.

It is indicated in Figure (6) that matter (mass) particles form out to only about the half radius point in the rhysmoid universe. This is primarily due to two factors as depicted in Figure (6). First, due to the rhysmoid's hexagonal geometry, ideal 60° reflections from the edge of the universe will be limited to the outer one half radius, thus helping to maintain this outer region a pure rhysmoid. Second, any perturbations within the center half of the rhysmoid sphere will reflect off the spherical edge of the universe to the focal plane which is also the edge of the center sphere, thus also tending to maintain the outer half radius as pure rhysmoid. By the same token, perturbations at the focal plane can be reflected off the edge of the universe and could possibly be statistically combined at different points in the matter region, creating additional excesses and deficiencies of rhysmons which will be shown to be the 'matter' of the universe. The matter created at the focal plane would diffuse under gravitational effects toward the center of the universe. Gravitational effects would also develop large-scale structure in matter 'created' in the central regions of the universe. Some additional matter could perhaps be created in shock action with possible 'collisions' between universes. It is believed that the earth is located well off-center in the matter portion of this universe model.

Conclusions

A simple rhysmonic model of the universe has been postulated. This model is the direct result of the rhysmonic premises of the previous chapter. Therefore, the basic foundations of rhysmonic cosmology have already been laid. The further development of this cosmology, including all known phenomena (and many previouly unknown phenomena) will not require further assumptions or premises. This is the desired simple universe; complexity will be shown to be the result of the many manifestations and interactions possible in this postulated basic structure.

Chapter 4

Mass and Energy

Introduction

Definitions for mass (matter) and energy (work) have appeared in many forms. For the most part, mass has been defined as that quality in a particle or body which has the property of resisting a change in motion, ie., it has inertia. Matter, in turn, has been defined as that which occupies space and has weight, ie., it is affected by the earth's gravity. In even more simpler terms, matter has been defined merely as a collection of atoms, since atoms contain many of the more 'fundamental' particles of nature which have the above characteristics. Energy, on the other hand, has been defined as a property that is a measure of the capacity to do work. More precisely, it is the capacity to do work by overcoming resistance, eg., inertia. Energy may appear in many forms, but always in conjunction with 'mass". Thus mass (matter) and energy (work) are very closely related as has been shown in the relation: $E=mc^2$.

The generalities mentioned above may be more simply expressed in terms of simple mathematics provided the terms that are used are also simply defined. Since we are dealing with matter and motion, these will be general terms from mechanics:

Force- An action capable of changing the state of rest or motion in matter.
Velocity- The rate of motion measured as length moved per unit time.
Acceleration- Rate of change in velocity per unit time.
Momemtum- An inertial force measured as a function of mass and velocity.
Work- Energy expended in the motion of matter against a resisting force, eg., inertia.
Action- Work (energy) expended in a given time; also expressible as momentum expended in a given distance.

Classical Mechanics

Classical mechanics also expresses rhysmonic mechanics and thus some of these classical relations are developed here. Development will be in the CGS system of units:

Force- The quantity of force applied to a mass or particle is measured by the amount of acceleration induced as a function of the mass of the particle.

$$F = ma = gm \times cm/sec^2 = dynes$$

Work- The amount of work is a function of the resisting force (inertia) and the distance moved against this force.

$$W = Fd = gm \times cm/sec^2 \times cm = dyne\text{-}cm = ergs$$

Action- The amount of action is a function of inertial force (momentum) and the distance over which this force is applied.

$$A = pd = mvd = gm \times cm/sec \times cm = gm\text{-}cm^2/ sec$$

Energy- The time rate of action expended.

$$E = A/t = gm\text{-}cm^2/sec \times 1/sec = W = ergs$$

The mechanical concepts considered in the previous paragraphs are applicable to the so-called 'particles' of physics at both the macroscopic and microscopic levels. It will be shown that these concepts have their basis from the nature of the substratum, ie., the vacumn or the matrix cell structure. As was described in the previous development of rhysmonic basics, the universe consists of only rhysmons and the void. Therefore, rhysmonic mechanics must stem from the rhysmons in this matrix structure. While some innate properties can be derived from the basic matrix structure, the development of most mechanical concepts require a 'perturbation' or disturbance in the normal free space configuration of the matrix cell in order to manifest itself in the macroscopic or microscopic levels as an effect which is 'observable'. A prime concept involved is that of inertia which has already been mentioned. Inertia must now be considered in more detail.

Inertia

Inertia has been loosely defined in most mechanics as an observed resisting force to a change in matter's initial state of rest or motion, but once changed, the inertial force tends to keep the altered motion uniform in a straight line. This behaviour is simply explained at the rhysmonic level of the basic cell structure in free space. In Figure (5) a planar view of rhysmonic structure in a repeating hexagonal construction over an extended plane was shown. As depicted there, at any 'instant' of Planck Time, rhysmonic vectors are all oriented in a particular 'direction' in space, but then the vector directions are reversed in the next instant of Planck Time. Since all vectors are in equilibrium in an undisturbed vacumn, no effect is observable. However, if available energy is used in some manner to enable a rhysmon to gain some additional finite energy, say in the direction AB shown in Figure (5), the directed vector will be changed by this incremental amount of energy in the direction of the 'instantaneous' or straight line vector which contained the affected vector. Since the vacumn is a perfect 'machine', balance of forces in this matrix system will require an apparent movement of this 'disturbance' along this line at the rate of the initial energy increase, forever, unless perturbated or disturbed again. By the same token, to stop this progression would require the equivalent amount of energy to be expended in the reverse direction in order to restore the previous status quo. This simple depiction of inertia, involving but a single rhysmon, is an oversimplification, but it does illustrate the basic mechanism involved and also forms the basis for space and time 'dilation' as postulated in relativity theories. It is apparent, even from this simple picture, that rhysmons cannot receive more energy than that of the 'jump' energy, ie., that involved in a single rhysmonic directed vector (the Reduced Planck Constant energy), or dilation effects would result in a solid mass of rhysmons whose energies could no longer be overcome. With the multitudes of rhysmons involved with mass or particles, some with possible charge, other effects such as electromagnetic fields and

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other field effects would make the situation much more complex, but it would not change the basic conception of inertia as given here. Inertia exists because the vacumn exists.

Rhysmonic Mechanics

As was shown in the simplified planar view of the matrix cell structure depicted in Figure (1), the total rhysmonic quantum of action may be considered to reside in one complete rhysmonic orbit. Therefore, from Planck's Constant, we have:

$$A = h \cong 6.624 \times 10^{-27} \text{ gm} \times \text{cm}^2/\text{sec}^2 \times \text{sec or(erg-sec)}.$$

From Euclidian geometry, we find the action of a single directed rhysmonic vector to be:

$$A^* = h/2\pi = \hbar \cong 6.624 \times 10^{-27} / 6.2832$$

$$\cong 1.054 \times 10^{-27} \text{ erg-sec.}$$

Therefore, the energy available in a rhysmonic directed vector in free space is:

$$E^* = A^*/T^* \cong 1.054 \times 10^{-27} / 5.391 \times 10^{-44}$$

$$\cong 1.96 \times 10^{16} \text{ ergs.}$$

The energy available in a rhysmonic directed vector is also determinable from the Einstein relation:

$$E^* = M^* \times C^{*2}$$

$$\cong 2.177 \times 10^{-5}\text{gm} \times (2.977 \times 10^{10}\text{cm/sec})^2$$

$$\cong 1.96 \times 10^{16} \text{ ergs.}$$

The momentum available in a rhysmonic directed vector is also determinable from Planck (rhysmonic) units:

$$P^* = M^* \times C^*$$

$$\cong 2.177 \times 10^{-5}\text{gm} \times 2.977 \times 10^{10} \text{ cm/sec}$$

$$\cong 6.524 \times 10^{5} \text{ gm cm/sec.}$$

The force of a rhysmonic directed vector may be determined as:

$$F^* = E^*/L^* \cong 1.96 \times 10^{16} / 1.616 \times 10^{-33}$$

$$\cong 1.21 \times 10^{49} \text{ dynes.}$$

Conclusions

The physical nature of the rhysmonic universe has been determined from the basic cell of the matrix structure and the Planck Constant and Natural Units. From these parameters, an estimate of the size and mass of the visible universe as well as its energy content is given in Appendix I.

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Chapter 5

Particles, Fields, and Charge

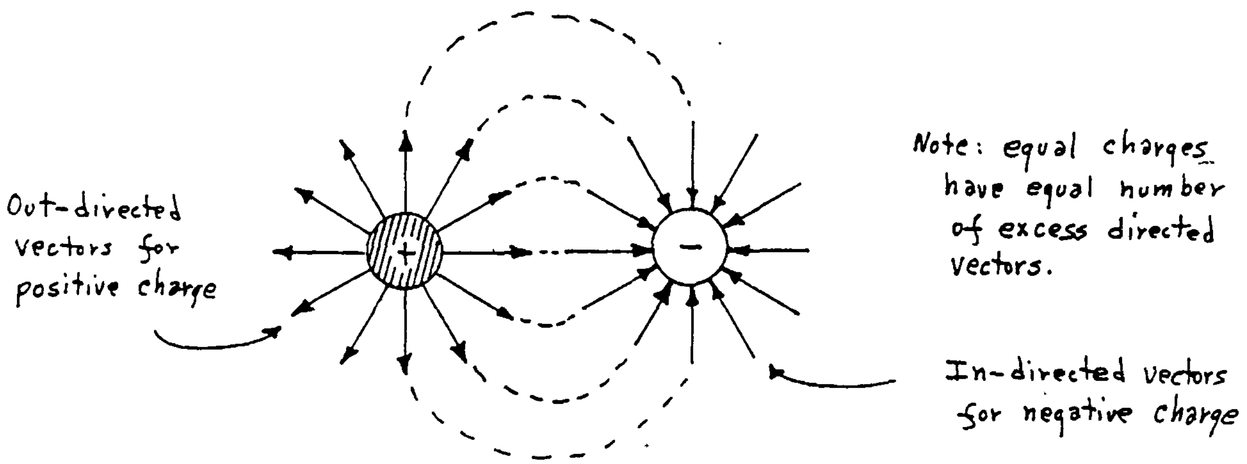
Introduction

The concept of particles has existed from the earliest of times since it is a natural conclusion derived by man from general observations of his surroundings, eg., the presence of sand and dust. Using logical considerations, this was extended down to the concept of atoms by the early Greek philosophers. However, the concepts of fields and charge were more recent considerations by man, receiving serious contemplations mainly during the nineteenth century years. This work by a great number of theorists and experimenters in this 'classical' period had resulted in a physics and cosmology which was so complete to some workers as to suggest that little more could be learned. However, the advance of science led to a 'modern' physics with newer concepts and ideas such as nuclear physics and the theory of relativity, and classical physics was relegated to the "back burner", so to speak. It will be shown, however, that while classical physics and cosmology were incomplete, the foundations for a true and realistic cosmology were still there. Rhysmonic cosmology proposes to re-build this foundation and thus re-establish an up-dated classical-type physics as the more correct approach to our knowledge of the universe.

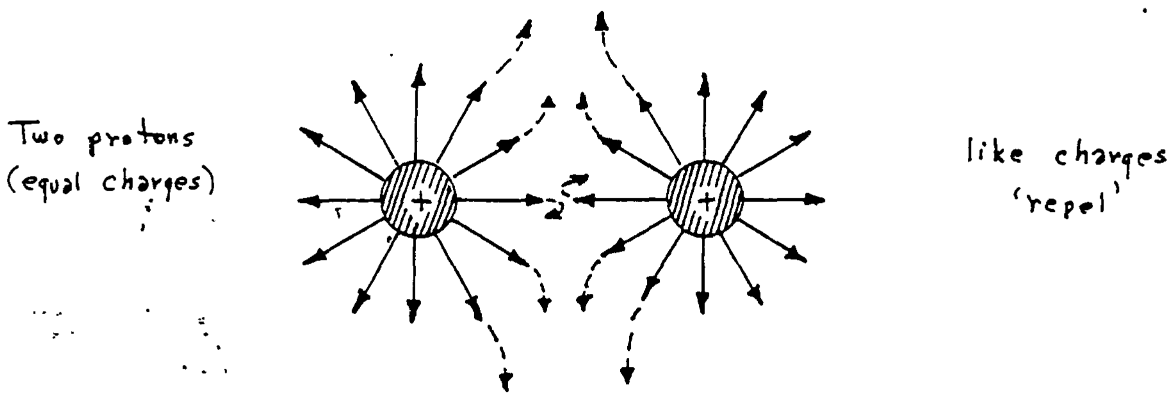
Rhysmonic Concepts

Particles may be defined in many ways, but in general, they may be considered an entity in the vacumn which is 'observable' by man or his instruments. Additional requirements are that this entity have locality, or position, and also the attribute called inertia. Developments in rhysmonic cosmology thus far have shown that these considerations require perturbations in the structure of the pure rhysmoid or vacumn. In essence, particles in rhysmonic cosmology must be the result of changes in the 'density' of this rhysmonic structure, since the universe is nothing more than rhysmons and the void. This may be achieved essentially by a 'tightening' or a 'loosening' of the hexagonal matrix structure, most likely as a spherical perturbation. This is depicted in the planar views of Figure (7), where simple illustrations can explain many of the properties of particles such as the proton, neutron, and electron as well as their anti-particles.

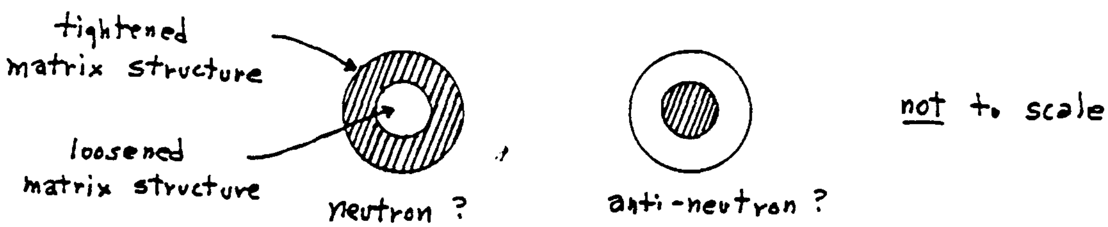
A tightened matrix structure is depicted by the cross-hatched circles in these illustrations and the loosened matrix structure by the open circles. The tightened structure has many more rhysmons than the normal background (vacumn), while the loosened structure has much fewer. The extra rhysmons which make up the tightened structure must, of necessity, have come from the loosened structure. Thus particles, in essence, are created in pairs, one high density and an equivalent low density one. Since rhysmons have energy, work is required to be expended to restructure the vacumn and thus create these particles. An excess of rhysmons, as in the shaded circles, becomes a source of excess directed rhysmonic vectors which influence the vacumn structure as a stress field, or as is observed in classical physics, an electric field. The excess region is said to contain positive charge since it is



(a) - Rhysmonic vector 'attraction'.



(b) - Rhysmonic vector 'repulsion'.



(c) - Neutral particles.

Figure (7) - Planar depictions of rhysmonic particles.

(18) a source of excess out-directed rhysmonic vectors. The open circle areas, which have a deficiency of rhysmons compared to the vacumn background, also causes a stress field. The deficient region is said to contain negative charge as it is a sink for in-directed rhysmonic vectors. Figure (7a) also shows in a simple way the nature of the 'attractive force' between particles of opposite charge. As depicted here, the excess rhysmonic vectors between the two particles are in the same direction and thus the balance of forces required by the vacumn causes these two entities to progress or move toward each other, in an apparent attractive force. The method of progression will be considered in electromagnetics in conjunction with a depiction of magnetic fields. Shown in Figure (7b) is a simple illustration of the 'repulsive force' between two like charges, say two protons. The excess rhysmonic directed vectors between these particles are in opposition and thus the balance of forces of the vacumn will require the particles to progress or move away from each other, in an apparent repulsive force. To cause these particles to approach each other will require additional work to overcome the energy of these opposing vectors. Thus, in essence, the nature of charge is pretty much as was imagined by the classicists.

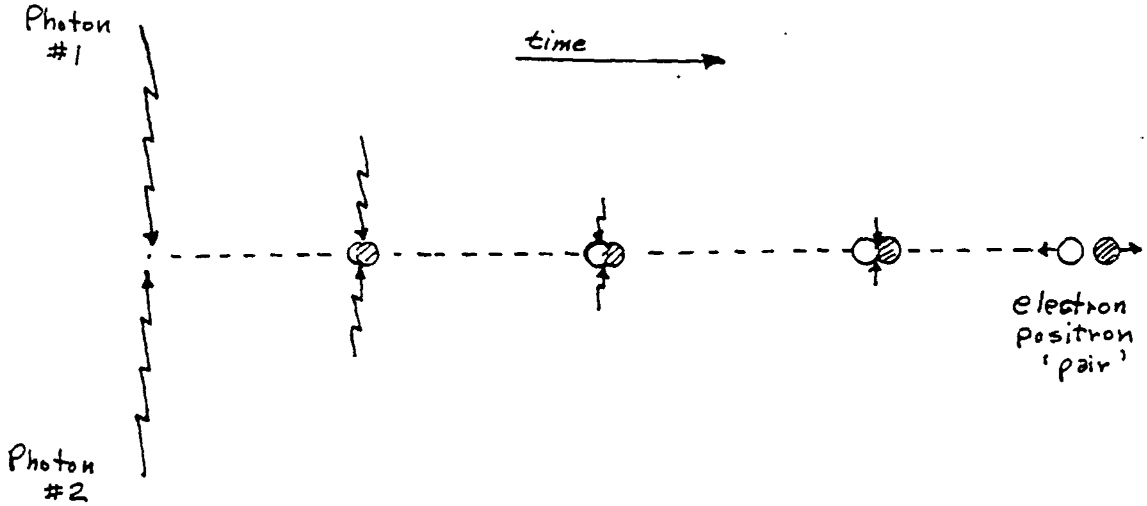
Shown in Figure (7c) is the possible configurations in rhysmonics for the neutron and anti-neutron and other possible neutral particles. The neutron may be considered to be basically a proton but to contain a reduced density center region roughly equivalent to the electron in structure. Therefore, excess directed vectors cancel within this configuration, and since no external excess-directed vectors are 'seen', no charge effects are apparent. The anti-neutron has the inverse structure of the neutron and also shows no charge due to a similar cancellation of excess directed vectors. Other more complex structures may be built-up from these basic concepts as well as some other concepts, to create the myriad particles of physics. For example, nuclear structure, eg., the liquid drop model, could be considered to have the above neutron-type structure in which the positive excess directed vectors are not completely cancelled. The remaining out-directed vectors terminate on surrounding electrons and thus serve to 'attract' and hold these electrons in various atomic structures.

Particle Creation

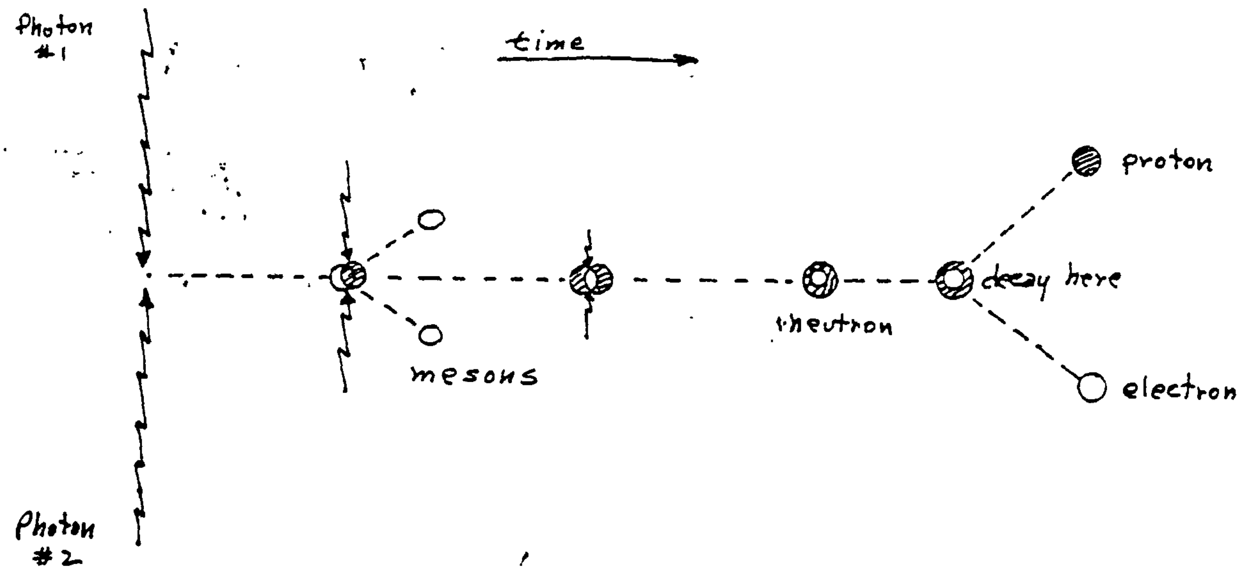
The universe is assumed to have been a pure rhysmoid, ie., a pure vacumn, in the beginning. It was built-up into the spherical matrix structure of today with the continual collection of rhysmons from the void. With this conjecture as a starting point, a simple scenario for particle (or matter) creation is now presented.

Consider the early universe without the presence of any matter. The energy content is that which was brought into this spherical system by the 'incoming' rhysmons. These rhysmons 'locked' their energies into the 'equalized' matrix structure which forms this universe. The only initial energy 'force', to use this term loosely, was the 'instantaneous' vector field, which was also the equalizing mechanism in the rhysmoid. This process resulted in the 'perfect mechanical' universe mentioned previously.

The only possible form of radiant energy in this early universe other than the instantaneous vectors would be 'disturbances' introduced into this rhysmoid by the impacts of unusually energetic incoming rhysmons, possible collision with another universe (which will result in essentially a big-bang type of energy increase), or



(a) - Rhysmonic 'pair production'.



(b) - Rhysmonic 'proton-electron production'.

Figure (8) - Particle production in rhysmonics.

(20)

just the normal fluctuations which could be attributed to such a system. In any event, the only 'observable' phenomena in this early universe would be electromagnetic fields and possibly some gravitational effects. Therefore, any particle creation must have stemmed from this radiant energy.

A mechanism for particle production from radiant energy is still observable today in the so-called pair production and annihilation phenomena. This mechanism in rhysmonics is slightly modified but would still largely apply to electron-positron production because of energy considerations. This mechanism is depicted in Figure (8a). It is postulated here that if two electromagnetic impulses (photons of the proper energy and phase) meet from opposite directions at a point in space, this energy, in principle, could restructure the vacumn into two entities, where one now has an increased rhysmonic density and the other has an equivalent reduced density, ie., a positron and an electron are created. These two entities would then move off in opposite directions (orthogonal to the photons) with an energy (kinetic) as left over in this process. It should be remembered that this process is a function of two photons and thus does not require the presence of another mass for momentum reasons.

While the above could account for positron-electron production, the universe is known to be largely composed of protons and electrons. Some positrons (under certain conditions) could possibly combine to form protons. However, rhysmonics offers other mechanisms for proton creation. One would be similar to that given for positron-electron production, where the interacting photons would have sufficient energy to produce proton-antiproton particles. If annihilation does not take place, then the proton (which is quite stable) would continue to exist, while the antiproton may perhaps decay eventually into electrons. Another more energy efficient mechanism may be that depicted in Figure (8b). Instead of forming a proton-antiproton pair, a rhysmonic neutron is formed as indicated here. The neutron, being somewhat unstable, also eventually decays to a stable proton and a stable electron. Therefore, the early universe may have been largely protons, electrons, and the 'captured' form of the pair, the hydrogen atom. Moreover, since protons contain much more 'frozen or locked' rhysmons than electrons, there should be more free or trapped electrons in the universe. While hydrogen atoms are in very much abundance in the universe, the build-up of atomic structures of greater complexity was, of necessity, required to further balance the charge nature of the universe which developed under these conditions. Therefore, the excess electrons, or some form of negative charge, either as free or captured entities, must be accounted for. The nature and mechanisms for these processes should make an interesting branch in the study of rhysmonic cosmology.

Conclusions

The simple depictions of particles, fields, and charge given here should lead to a further analysis of the complexity of nature. The illustrations are incomplete, but they should provide a starting point for development of these concepts into structures which can represent reality as perceived by man and his various instruments. The simple depictions of Figures (7) and (8) can lead to many deductions which are observed in physics today. Just a few of them will be listed here:

(1) Particles are essentially excess concentrations of rhysmons or deficient concentrations of rhysmons compared to the normal concentration of rhysmons in the rhysmoid or vacumn.
(2) Particle production, of necessity, must occur in pairs and requires energy proportional to the number of rhysmons involved in this process.
(3) Particles may be considered to have tied up or 'frozen' energy in stabilized geometries of vector equilibrium form.
(4) The energy required to form particles initially from the vacumn must be of the radiant form, generally electric, magnetic, electromagnetic or gravitational fields.
(5) Particle and anti-particle recombination must, of necessity, release this 'frozen' energy back to the vacumn in radiative form.
(6) Charge is a function of the excess directed vectors arising from the perturbations of certain particles. Charges of equal value have equal excess vectors. Charge sign is a function of the directivity of the excess vectors. Positive charge has out-directed vectors while negative charge has in-directed excess vectors.
(7) Stable configurations of rhysmons having the same charge but different concentrations of rhysmons are possible, for example the proton and the positron, as well as the antiproton and the electron. The proton and electron are believed to be more stable configurations than their anti-particle configurations.

There has been no consideration of the magnetic, electromagnetic, and gravitational fields as these dynamic concepts will be treated in separate chapters.

Chapter 6

Electromagnetics

Introduction

Many aspects of electric and magnetic fields had been fairly well established by the classical physicists of the nineteenth century. Electromagnetic radiation 'effects' were probably noticed by the nineteenth century physicists and experimenters, notably Michael Faraday, but do not appear to have been persued further. Therefore, it wasn't until about the end of that century before electromagnetic radiation, theoretically predicted by James Clerk Maxwell, was finally conclusively generated and detected in the experiments of Heinrich Rudolph Hertz. Not much was done with these signals, however, until Gugliemo Marconi demonstrated in 1901 that long range communication using these signals was feasible. At this time the inquisitive and knowledgeable experimenter became involved and amateur radio as a hobby and avocation was born. These dedicated experimenters probably did more for the development of radio than any other group until the accelerated development programs of World War II.

The work of 'modern' physicists has elucidated on these developments, but has added very little to the basics or in fundamentally new concepts. Much effort has been expended to mathematically define particles and fields from their observed effects only, since relativity physicists have effectively 'squelched' any real attempts to model electromagnetics on a material or mechanical basis. Since rhysmonic cosmology starts with a simple basic matrix structure for the substratum, or vacumn, a material and 'perfect mechanical' universe is once more feasible. Some concepts, which have already been applied to particles and electric fields, will now be considered with respect to magnetic fields, and of necessity, to the concept of the electromagnetic field.

Rhysmonic Magnetics

In the discussion on mass and energy, the concept of inertia at the rhysmonic level was considered on the basis of a single rhysmon. When this is extended to the multitude of rhysmons of a particle (but without charge), it can be shown that the process of inertia now also involves a concept called 'spin' for the movement of a mass or particle within the 'sea of rhysmons' formed by the matrix structure of the vacumn. In essence, the particle must perform sort of a 'cork screw' motion where the circumferential vectors now 'rotate' at the velocity of light, but the translational or inertial velocity of the system proceeds at the macroscopic speed of the added energy increment given this system. To a large measure, these concepts are in agreement with those which were established by the classical physicists many years ago. However, in the case of a particle which has charge, say an electron, in addition to this property called spin, there is a new action called the magnetic moment, due to the excess directed rhysmonic vectors associated with the charged particle. Thus, it has long been recognized that a moving charge will generate a new effect known as the magnetic field, eg., a flow of electrons in a wire will create a stress condition in the vacumn around this wire which has the properties known as a magnetic field in classical physics.

Rhysmonics, therefore, shows that the magnetic field is due to the interaction of the excess directed rhysmonic vectors of a rotating charge region with the circumferential vectors surrounding this charge region, as depicted for the electron in Figure (9). Here the electron is depicted to be 'spinning' counterclockwise as it moves up and out of the paper. The excess directed vectors can affect the circumferentials shown, adding their energies to these vectors, and thus causing the magnetic moment to be created. Therefore, the magnetic field is a closed loop of excessively rotating rhysmonic vectors, giving reality to the flux lines as imagined by Faraday and the classicists, as well as that seen in the well-known image formed by iron filings surrounding a current carrying wire. Since the rhysmons are directed vectors, the flux line 'flow' is also as that which was imagined by the classicists, ie., that given by the right hand rule. From Figure (9), it can be shown (from Euclidian geometry) that the strength of the circumferential vectors, ie., the magnetic field, will fall off inversely with the radius. The radial vectors, which form the electric field flux lines, can be shown to fall off inversely with the square of the radius. Thus rhysmonics provides a logical explanation for the fall off of these field strengths which have been determined from experiment.

<u>Electromagnetic Fields</u>

The translation of charge has been shown to cause an interaction with the surrounding circumferential rhysmonic vectors. The added energy in this case will also appear as an incremental increase in the rhysmonic circumferential vectors. Since the vacumn is a 'perfect machine', balance of forces will require an apparent rotational movement of these vectors, and the rotational energy (or curl) will be sustained as long as the lateral movement of charge is sustained. This simple picture indicates that a moving charge, ie., a dynamic electric field, must, of necessity, also bring into existence at the same time, a dynamic magnetic field. By the same token, a changing or dynamic magnetic field will bring into existence a movement of rhysmons which leads to a charge and thus a resultant electric field. As a consequence, energy may be stored alternately in these two aspects of rhysmonic fields. A sustained movement of charge will result in a sustained magnetic field, ie., the magnetic field will be a sustained stress in the vacumn and thus a storehouse of energy. Sudden release of this stress would result in a rapid movement of radial rhysmons and thus an intense electric field. Energy can also be stored in this electric field. The rapid interchange of stressed rhysmonic energy between the magnetic mode and the electric mode of storage is known as an oscillatory discharge in electronics. Therefore, under dynamic conditions, we cannot speak of just an electric field or just a magnetic field, but only of an interacting electromagnetic field.

<u>Wave Propagation</u>

A dynamic electromagnetic field has an additional interesting property in that the interacting fields result in a propagation effect in free space (the vacumn) which is known as an electromagnetic wave or EM radiation. A seldom used illustration of this process is shown in Figure (10a). This is the 'link chain' interpretation of EM wave propagation. Here the fields are depicted as closed loop vectors for not only the magnetic component, but also the electric component. The H-field loops are shown lying in the plane of the paper, while the E-field loops are shown directed into the paper at (+) and coming out of the paper at (-), thus completing the loop. The direction of propagation is seen to be at right angles to both these components. This closed loop interpretation of EM wave propagation indicates a quarter wavelength or 90° phase shift between the electric and magnetic components, which is not depicted in most EM wave illustrations. This appears to be a necessary requirement of the directed vector construction of the vacumn of the universe. The loops are shown as circular in this depiction for illustrative purposes only. It should be noted that the depiction is symmetrical, ie., the E-components can be interchanged with the H-components, and vice versa, without affecting the nature of this propagation. This symmetry is also apparent in the form of Maxwell's equations for EM waves.

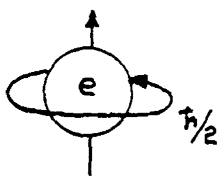
When viewed under the substratum conditions of the rhysmonic matrix structure, this propagation process has some interesting consequences. As was seen in the planar view of circumferential vectors in the basic matrix structure of Figure (1), the closest approach of any two adjacent, parallel directed rhysmonic vectors is approximately two times the Planck Length, or 2L*, which is equal to about 3.2×10^{-33} centimeters. Since the magnetic component in electromagnetic propagation is at right angles to the direction of propagation, and since curl or a rotational vector geometry is also involved, magnetic field reversal as seen in the depiction of Figure (10a) cannot take place closer than this closest approach of parallel directed rhysmonic vectors, or 2L*. This concept is clarified in the simplified sketch of Figure (10b). Here the magnetic closed loop vectors (which are really circumferential vectors) are shown, but the closed loop electric field vectors (which are really radial vectors) are shown only by (+) where they enter the paper and (-) where they return out of the paper. Again, the magnetic rotational vectors cannot approach closer than the basic cell structure shown here. It should be noted that this basic cell could, in a broad sense, be considered as the 'idler wheel' imagined by Maxwell in his mechanical model of EM fields. Therefore, for each magnetic field reversal, ie., each half wavelength of EM propagation, the wavelength must <u>increase</u> by this increment, 2L*, or by 4L* per full wavelength. Since this increment is independant of wavelength, it is a linear factor and is also the observed 'Hubble' Factor, but it should not be considered as a velocity factor. It should be remembered that E- and H-components may also be interchanged in this depiction. However, from symmetry, it is seen that the electric field component reversal also requires an increment of 4L* per wavelength. However, since both components are increased equally, the overall wave has a uniform expansion with wavelength of this same fixed amount of 4L*. Thus the longer EM waves travel in space, the more the wavelength increases. This process accounts for the so-called redshift in the spectra of distant galaxies.

<u>Verification of L* from Astronomy</u>

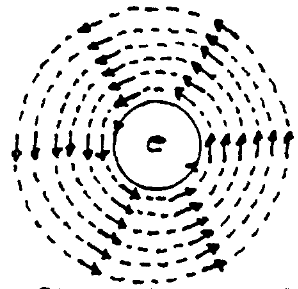
The incremental factor of 4L* can also be determined from astronomical data, confirming in part this explanation for the redshifts in distant optical spectra. The relation of the rhysmonic model to astronomical data can be made as follows: The best overall estimate of the radius of the <u>visible</u> universe, R_o, from various determinations, is about:

(25)

(26)

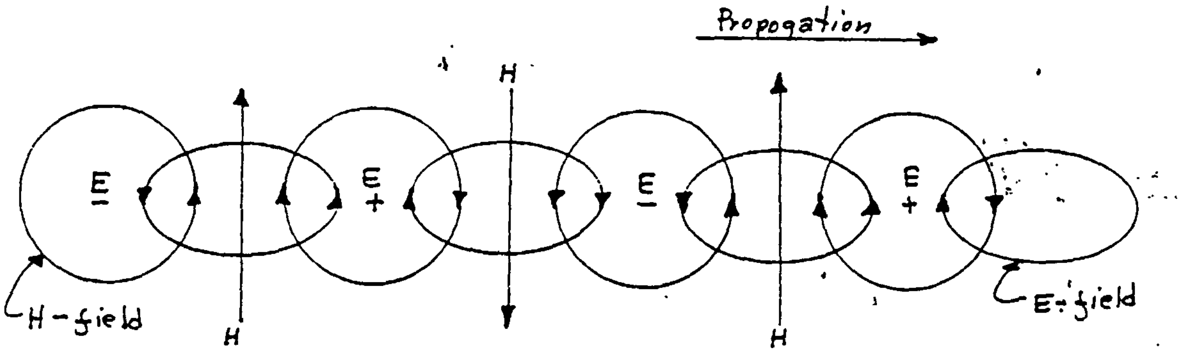


(a) - Classical electron

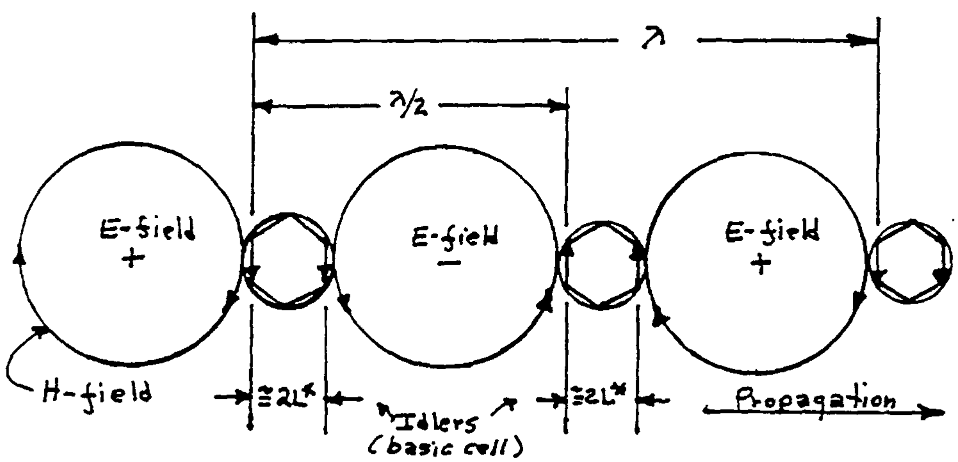


(b) - Circumferential vectors

Figure (9) - Depiction of rhysmonic electron.



(a)- Link chain depiction of EM wave.



(b) - Simplified rhysmonic 'idler' concept.

Figure (10) - Vector depictions of EM wave propagation.

26 $R_o \cong 1.2 \times 10^{10}$ L.Y. or 1.14×10^{28} cm.

Redshift of EM wavelengths from the far gamma ray regions ($\cong 10^{-14}$ cm) to the deep red region ($\cong 7.5 \times 10^{-5}$ cm) would be an incremental change ($\Delta\lambda$) in wavelength in the order of this 7.5×10^{-5} cm. Therefore, the number of incremental steps needed for light in the universe to go 'dark' in R_o , the radius of the visible universe, is:

$$\frac{1.14 \times 10^{28} \text{ cm } (R_o)}{7.5 \times 10^{-5} \text{ cm } (\Delta\lambda)} \cong 1.52 \times 10^{32} \text{ increments.}$$

From this , we have a new 'Hubble' factor of:

$$H^* \cong (1.52 \times 10^{32})^{-1} \text{ or } 6.58 \times 10^{-33}$$

per wavelength of light travel time. Compare this with the present Hubble factor of:

$$H_o \cong (1.7 \times 10^{28})^{-1} \text{ or } 5.9 \times 10^{-29}$$

per centimeter of light travel time.

As was shown in Figure (1), 2L* was about 3.23×10^{-33} cm, and thus L* is about 1.61×10^{-33} centimeters. From the above astronomical determination, 4L* is about 6.58×10^{-33} cm and thus L* is about 1.64×10^{-33} centimeters, in close agreement with the Planck and rhysmonic values.

Velocity of Propagation

The vector depictions of Figure (10) are for EM wave propagation in the pure rhysmoid, ie., the vacumn. Since the universe is like a cinema, with each frame in the cinema of existence lasting for Planck Time, T* , a rhysmonic field reversal, eg., the magnetic field reversal, must occur only after a new frame has begun, ie., after this time interval of T* has passed. But also in this time interval a rhysmonic vector has moved or 'jumped' a distance of Planck Length, L*. Therefore, the translation of these rhysmonic 'effects' is Planck Length, L* , in Planck Time, T* , which gives a Planck Velocity, C* , or as is calculated out, C , the known velocity of light (or EM waves) in the vacumn! Since, repeated rhysmonic field reversals occur during electric and magnetic field generations, as well as in this propagation process, the velocity of propagation must be this constant L*/T*, and is thus independant of wavelength (frequency) or other factors such as initial velocity or energy. The only way the velocity of propagation would change is if L* or T* change. This is possible in matter where the matrix structure is tightened or loosened, or under conditions where space and time are 'dilated' as per relativity theory.

Conclusions

Rhysmonic cosmology restores a mechanical basis to the phenomena of electromagnetics and predicts that redshifts are but a function of the EM wave propagation process and not due to the so-called expansion of the universe. The universe is not expanding.

(27)

Chapter 7

Gravitation

Introduction

The force of gravity was probably the earliest 'force' to be recognized by man. Early man realized that objects had weight and when a supported object was released he noticed that it would always fall to the ground. This force was very mysterious to him and it has remained more or less mysterious even to this very day. While gravitation was the first of the fundamental laws of physics to be discovered, it was also found to be the weakest of the three major forces noted thus far in our universe. The other two forces, the electromagnetic and nuclear forces, are many, many orders of magnitude stronger. However, the gravitational force, in a sense, may be considered more fundamental since it requires only the presence of mass in order to exist, while the other forces also require the presence of charge in order to exist.

While gravitation was recognized as a force very early, the development of a quantitative expression for this force was a long time in coming. It was finally summed up in the laws of universal gravitation by Isaac Newton early in the eighteenth century. During the eighteenth and nineteenth centuries, Newtonian gravitation was further developed and applied to many problems in physics and astronomy. It remained unchallenged until the advent of the theory of relativity by Albert Einstein early in the twentieth century. At this time a geometric interpretation for the 'force' of gravity was proposed.

Newtonian Gravitation

While Newton never arrived at a mechanism for gravitation, he was a staunch believer in the aether theory and had strong convictions that the mechanism somehow lay in the aether. A hypothesis was proposed somewhat later by G. L. Le Sage, a French Swiss, that 'ultra-mundane corpuscles' in the aether were responsible for the effect of gravitation. While Newton did not express it directly so, both he and Le Sage really proposed a 'mechanical particle' view of gravitation. However, these concepts were not pursued seriously then, since the success of the mathematical interpretation of gravitation appeared to outweigh any need for a mechanical explanation of gravitational effects.

Newton's law of universal gravitation suggests that every bit of matter, ie., mass, in the universe 'attracts' every other bit of matter in the universe, with a 'force' which was proportional to their mass and inversely proportional to the square of the distance between them. In the CGS system of units, this statement can be expressed as an equation, by introducing a proportionality constant, G. Therefore, the law is generally presented as:

$$F = \frac{Gm_1m_2}{d^2} ,$$

where G is now approximately equal to 6.672×10^{-8} dyne-cm^2/gm^2.

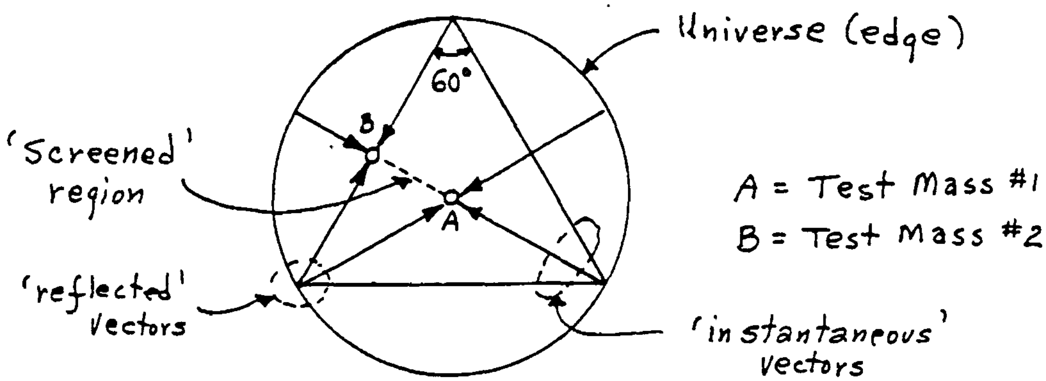
28 This would mean that if m_1 and m_2 were two spherical masses of 1 gm each, and were placed exactly 1 cm apart (between centers), the so-called force of attraction between them would be the factor of 6.672×10^{-8} dynes seen in the value of G.

This relation and the three Newton laws of motion form the basis of Newtonian mechanics. In addition, such concepts as work and energy, potential and kinetic energy, as well as the conservation of energy, can be developed from these premises. Another concept arising in Newtonian gravitation is that of 'action at a distance', which implies an 'instantaneous' action. Newton had no explanation for this other than the effect existed. Since Newtonian gravitation is essentially a mathematical theory (as is relativity), it provides largely a macroscopic view, integrating many microscopic effects and possibly some substratum effects, in its overview. Therefore, both are somewhat incomplete, and thus may lead to some erroneous conclusions under certain conditions. However, the author's 'new' theory of cosmology has very basic premises which provide for a firm foundation on which can be constructed a universe in which both classical gravitation and relativistic gravitation can be shown to be but broad overviews of rhysmonic theory. Rhysmonic cosmology will demonstrate that all known (and many unknown) gravitational effects can be derived from the basic matrix structure of the rhysmoid as developed in the basic premises of this theory.

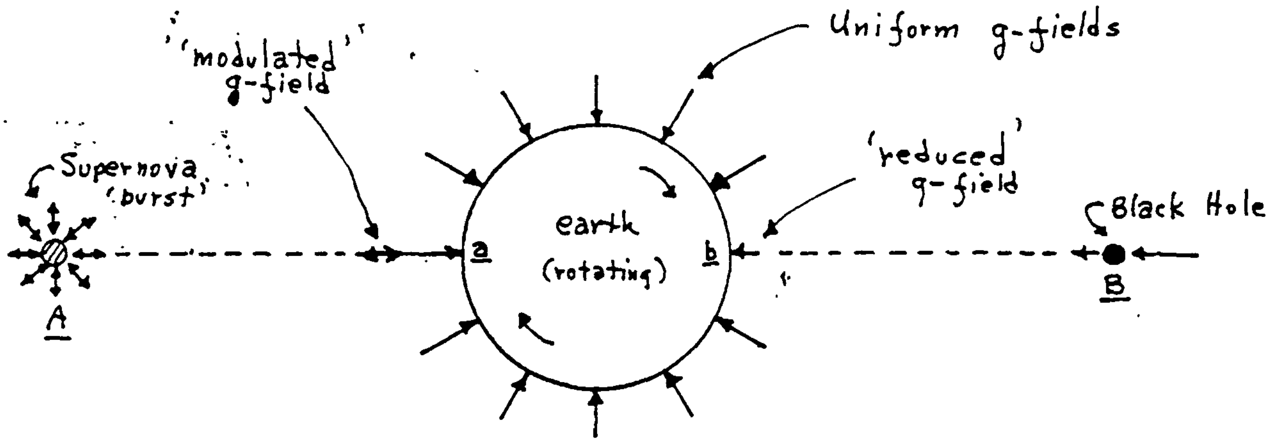
Rhysmonic Gravitation

It had been shown (in terms of rhysmonics) that the universe is a finite, spherical, and perfect black body in that all forms of radiant energy are reflected from the edge of the universe. This is a direct result of the matrix structure of the vacumn and the rhysmonic energy vector concept. For example, the 'instantaneous' energy vectors as depicted in Figure (5), are returned or reflected at the universe edge by the same process of vector reversal as was discussed in Chapter 2. These instantaneous vectors are fundamental to a discussion of rhysmonic gravitation effects.

The determination of the laws of gravitation and the mechanism for gravitation in terms of rhysmonics is depicted in Figure (11). Consider a lone mass, A , located at the exact center of a pure rhysmoid universe, ie., an undisturbed vacumn universe, as is shown in Figure (11). No other masses are assumed to be present in this universe. From Euclidian geometrical symmetry it is seen that the instantaneous rhysmonic vector impulses on this test particle are exactly equal for all possible angles of arrival. Therefore, since all impulses are equal, the particle remains at 'rest' and no net force is present. Now consider the lone test particle to be located off-center in the rhysmoid universe at position B. Again, it can be shown by Euclidian geometry that all instantaneous rhysmonic impulses arriving at this test particle would also be equal, and thus again no net force would be present. In a similar manner, it can be shown that a lone mass, located anywhere in the rhysmoid universe will have no net force on it and thus will be at rest. Therefore, there will be no external gravitational effect in the universe if it contains only one mass, even though the region of this mass is a perturbated section of the rhysmoid or vacumn. Of course, the particle itself will be partially held together by the internal gravitational effects between the individual rhysmons which go to make up this particular particle.



(a) - Simplified planar view of the mechanism of gravitation in the rhysmonic universe.



(b) - Simplified depictions of some cosmological actions which affect gravitation on earth.

Figure (11) - Gravitational mechanism and some effects in terms of rhysmonic cosmology.

However, now consider the case where two masses, A and B, are present in the universe. Again, the instantaneous rhysmonic impulse vectors will be generally equalized, except for the impulses which are in a direct line with the two test particles. Here, due to the 'screening' action of the masses, there will be more impulses on the sides away from each other than on the sides facing each other. The two masses will thus be 'impelled' towards each other, which, from the outside would appear to be a force of 'attraction'. This is due to the fact that a massive particle implies a tightened matrix structure which delays the transmission of rhysmonic impulses through such a structure. It can be shown that this force would be proportional to the number of rhysmons in these particles, ie., the masses, and inversely proportional to the distance between the masses. The proportionality constant, G , is both a function of the size of the universe, and the amount and location of other masses in the universe. In general, the constant, G , remains very much a constant, except when other masses are located relatively close and in line with the test masses. Since gravitational effects are a function of Euclidian geometry, and the rhysmonic universe is Euclidian in geometry, eg., Euclidian 'straight lines' do exist in this universe, shielding effects must be considered in any determination of the gravitational constant, G . In most past determinations of G , neglect of this factor has resulted in errors in the determination of the value of G.

Two interesting observations can now be made. First, gravitation is basic to the matrix construction of the vacumn and thus is very fundamental as it does not depend upon any other effect other than the 'screening' action of masses in the universe. Thus, gravitation is really an 'impelling' force rather than an 'attractive' force between the masses. If the vacumn did not exist, neither would the phenomenon of gravitation, even if matter 'existed' in a void. Second, since these gravitational effects take place in Planck Time, T* , with instantaneous rhysmonic vectors existing in this time period, 'action at a distance' is in effect restored in this universe. Electromagnetic effects, which procede at the speed of light, C , do not play a part in this action. However, since gravitational fields are rhysmonic flux fields, the same as electric fields are also rhysmonic flux fields, both can transfer energy between distant objects in the process called induction, which really involves monopole 'waves' between them. It must be remembered, however, that in the case of the electric field, the rhysmonic flux is due to the presence of charge in the universe, while with gravitation, the rhysmonic flux is due to the presence of shielding masses and charge is not a requirement. A commonly observed flux due to this shielding action is the earth's gravity.

Gravity on Earth

The gravitation due to the earth's mass appears in the common concept of weight. The shielding action of the earth's mass results in a net flux of rhysmonic impulses at the earth's surface which becomes the accelerating force of gravity or the accelerating force of free fall, g . Newton's law may be applied to this special case of gravitation using the best estimate of the earth's radius and mass. The constant of proportionality is now g . The relation for the weight, W , is given by:

$$W = mg \quad ,$$

where m is the mass of the test particle. The expression for W assumes that g is a constant, which it normally is. However, rhysmonic cosmology has shown that 'fluctuations' in this constant could exist due to certain cosmological effects. Therefore, the apparent weight, W , would also fluctuate, sometimes quite appreciably, in the order of several per cent! Shown in Figure (11) are simplified depictions of two cosmological factors which were found to affect the value of g on earth. The shielding action of the mass of the earth results in a fairly uniform g-field flux at the surface of the earth (assuming locations selected for constant flux values). This is indicated by the uniform length vectors directed toward the center of the earth. Consider now a supernova explosion located far off in space at location, A . The oscillatory 'implosion' of the mass of the core of this nova will 'modulate' the instantaneous rhysmonic vectors and this will appear as a modulation superimposed on the g-field flux appearing to an observer at location a on earth. In a similar manner, a dense object, such as the core of a galaxy or a black hole, located in deep space at position B , will reduce the g-field flux level to an observer located on earth at position b. The mechanisms and experimental data for these observations will be given in separate articles as listed in Appendix III and thus will not be considered here.

Gravitational 'Waves'

Quadrature-type gravitational-waves which propagate at the speed of light were predicted by Einstein many years ago. While rhysmonics does not deny such waves, the low levels and extremely long wavelengths of these waves make their detection very difficult. Unequivocal detection of such waves has not been made to date (perhaps some micropulsations may be such waves). However, monopole-type induction field gravitational 'waves', generated by oscillatory mass movements such as would appear in a supernova have been unequivocally detected electronically (3) with the very basic circuit shown in Figure (12). This circuit operates essentially in that these oscillatory gravitational impulse signals appear equivalent to the action of an alternating electric field with respect to the loosely bound electrons in the detecting capacitor. The current impulses generated in this capacitor are highly amplified to a voltage pulse which is then displayed on a recording meter and/or oscilloscope as well as listened to on audio equipment. This circuit will actually display the Gaussian amplitude variations of nova and supernova 'bursts' as well as other gravitational disturbances in the universe. This circuit is further discussed in reference articles in Appendix III and thus will not be further considered here. Therefore, under certain conditions, the monopole gravitational 'waves', or more correctly, rhysmonic impulse flux variations, cannot be differentiated from electric field flux variations since they are essentially the same entities. The detector is also useful in detecting massive bodies in the universe as a 'shadow' affecting the average background levels of the general gravitational radiation. This technique has been used to detect galaxy structure, black holes, and more important, supernova development in real time! These concepts and experiments are also further discussed in the references of Appendix III.

Microwave Background Radiation

The so-called microwave background radiation (MBR) has been

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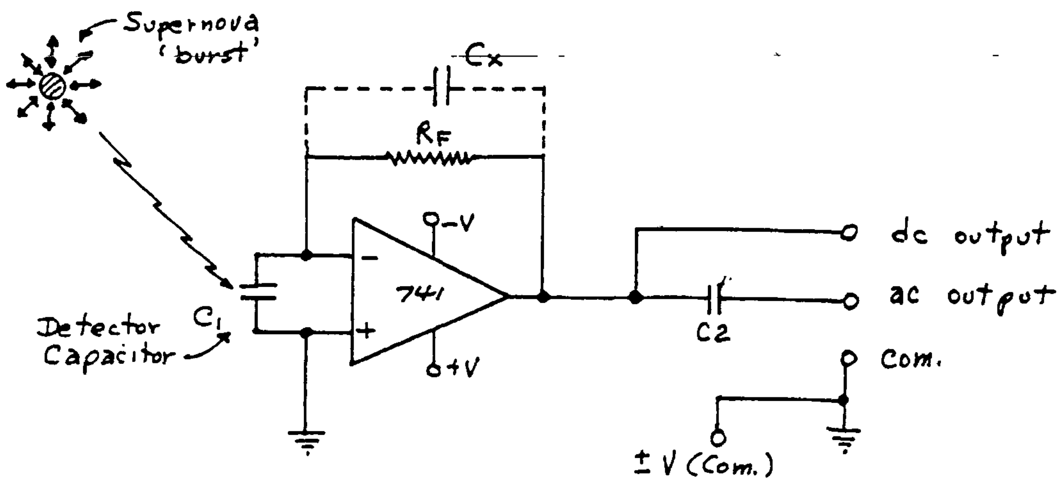

C_1 : .22 uF, P.C. type
C_2 : .05 uF
C_x : .0004 uF (See text)
R_F : 1-2 MΩ

Figure (12) - Simplest electronic gravitational 'wave' signal detector.

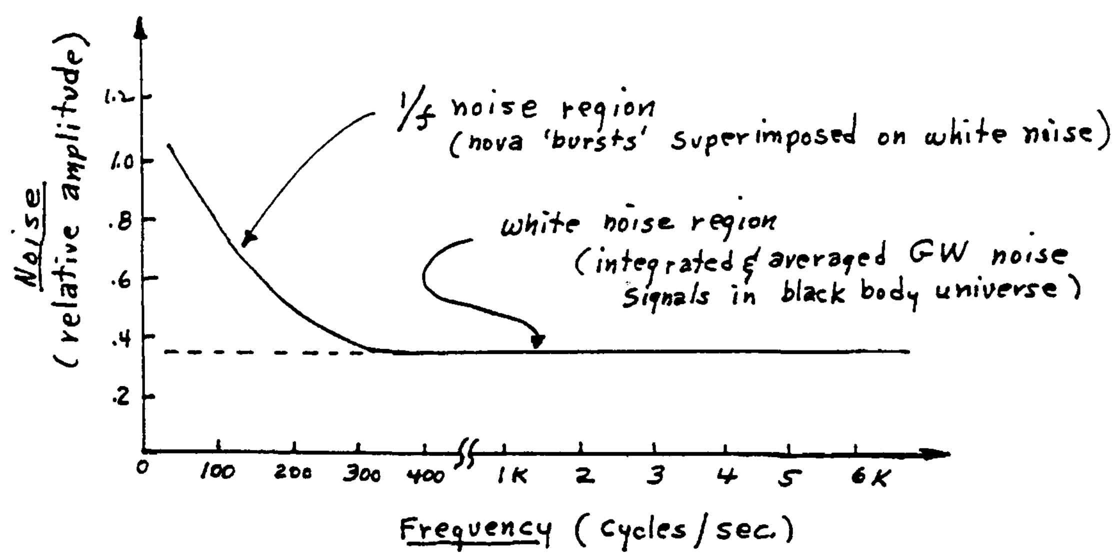

Figure (13) - Simplified curve of overall noise as generated by gravitational processes in the universe.

attributed to being a relic radiation left over from the original 'explosion' in the Big-Bang version of the origin of the universe. However, it can be shown by rhysmonics to actually be due to a summation of all the above gravitational 'waves' present in the universe. This radiation was discovered serendipitously in 1965 by Penzias and Wilson (4) in the course of making radio-astronomical measurements using a microwave horn antenna at about a 7cm wavelength. During the course of these tests, a residual radiation which was isotropic in nature, remained unaccounted for. That this radiation is of a black body nature and highly isotropic has been determined in many tests since that time. Today the radiation has been shown to pretty much follow the curve for a black body at a temperature of about 2.7° K. However, some questions still remain concerning the isotropy of this radiation.

The simple detection circuit of Figure (12), when operated with stabilizing capacitor, C_x, in the circuit, will respond to overall noises generated by these gravitational impulse processes. This is depicted in the curve of Figure (13). Audio amplification of the output of the detector will evidence the many sounds of space, both noisy and somewhat musical sounds. An interesting experiment can be performed under these audio conditions. The output of the detector can be modulated in amplitude by a local movement of mass near the detector. This is indicated as Experiment I in the simplified sketch of Figure (14). Here, the output level of the noise can be peaked or nulled with a mass movement of about .25cm between the peaks or nulls, for an apparent 'space' wavelength of this .25cm. It is as if the gravitational noise in space has a natural intense wavelength of .25cm, and local perturbations cause these signals to interfere, typical of standing waves in wave theories. This effect is found to be present at all laboratory distances, up to the maximum of 75 feet available. The effect is not due to electromagnetic effects since when the circuit, amplifier, and power supplies are shielded electrically <u>thoroughly</u>, the modulation still comes through unabated. In fact, the detector is found to be also modulated by the beating heart! It is also significant that the measured wavelength of .25cm is also the peak wavelength of the so-called black body microwave radiation! However, as is shown here, this noise <u>is</u> a gravitational effect and a summation or integration of all rhysmonic impulses generated in the universe, and thus averaged out as a general noise background level. While this noise level, or if you wish, this microwave background level (-what Penzias and Wilson measured was the microwave energy generated by the thermal heating of their horn antenna by these gravitational impulse signals) is quite isotropic, since it exists in a black body universe, measureable anisotropies will also exist due to our off-center location in this spherical universe, and the random nature of the supernova 'bursts' as well as random concentrations of mass, ie., galaxies, in the central portion of the universe. As a final note, while the gravitational flux field is equivalent to the electric flux field under certain conditions, it is not an electric flux field since it is not sourced or sunk by an electric charge. Therefore, the so-called microwave background radiation is really a gravitational effect as discussed here.

<u>Modulation of the Rhysmoid</u>

Consider now another effect which is also gravitational in nature. Suppose that a mass is set into physical 'oscillation' by

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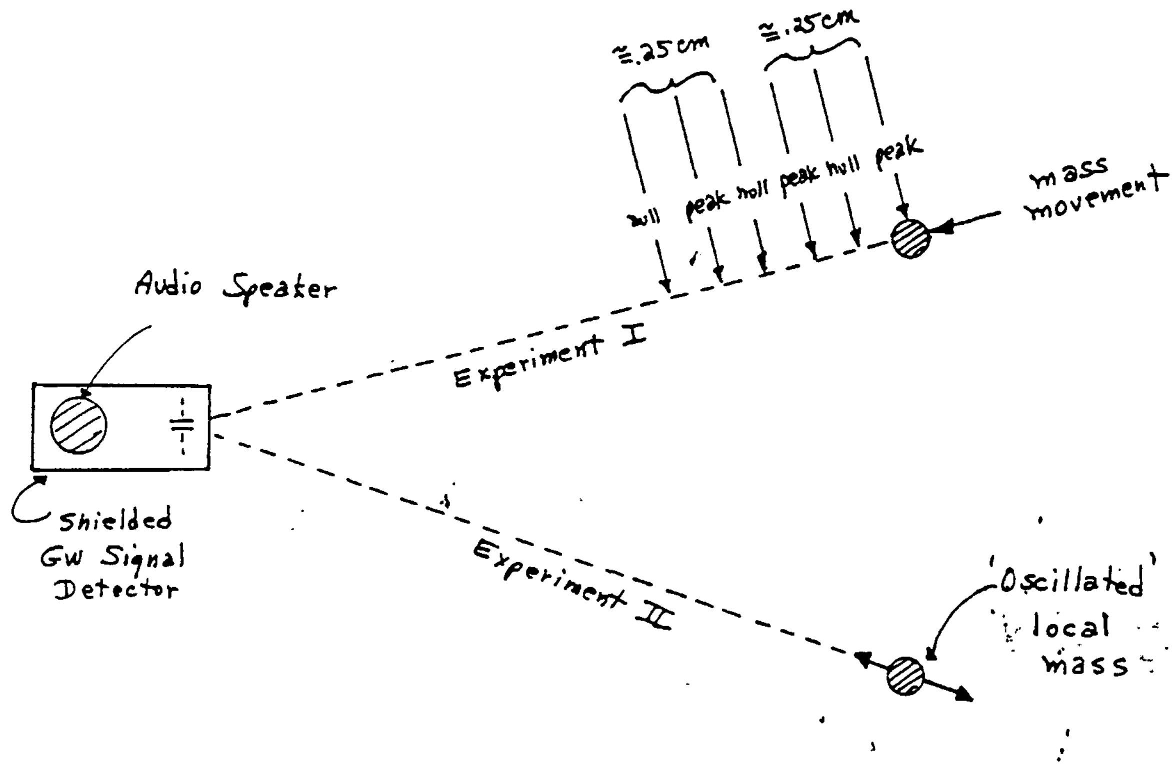

Experiment I :

Demonstrates the existence of a .25 centimeter long 'standing wave' in the overall gravitational signals which are summed up or integrated in our black body universe.

Experiment II :

Demonstrates the initiation of a universe-wide gravitational 'disturbance' by a mass movement at the local level.

Figure (14) - Local 'modulations' of the gravitational signal background levels.

(35)

an external force in some direction, it does not matter which direction is chosen. The movement of the mass will affect the energy of the instantaneous rhysmonic vectors in the direction of this mass translation. If this energy increase is just unidirectional, the mass affected will continue to translate in this direction in the process of inertia as was discussed in Chapter 4. In essence, the component of increased energy is superimposed on the instantaneous rhysmonic vectors contained in this 'straight line Euclidian' universe. When the motion is made 'oscillatory', this requires that the mass be accelerated and then decelerated to a halt, re-accelerated in the opposite direction and again decelerated to a halt again. While external energy is required to initiate this process, once initiated, the energy of the vacumn, ie., the rhysmonic matrix structure, will maintain this 'oscillation' until dissipated in some fashion. This is because a movement of mass interacts with rhysmonic vectors, and affected rhysmonic vectors, in turn, interact with mass. Thus, an oscillating mass, in principle, should initiate a gravitational disturbance in the vacumn which could be perpetuated forever by the intrinsic energy of the vacumn as was seen in the case of inertia and the propagation of electromagnetic fields.

That this is so is confirmed in the simple test indicated as Experiment II in the simplified sketch of Figure (14). Using the same totally shielded gravitational signal detector as before, slowly 'oscillate' a mass, this could be your own arm, for example, at a slow rate around 1 cycle per second. Note that the audio output of the detector responds with a 'rushing' sound which reflects the disturbance your arm is creating in the .25cm standing waves in the universe. Repeat this motion (adjusting the rate if necessary) until a well defined 'modulation of noise' is established. Then cease this perturbation by your arm at some peak swing and maintain your arm at rest in this position, ie., do not disturb the vacumn any further. You will now note that the modulations will continue on at this same rate for many minutes (even hours if there are no other local disturbances), or until other perturbations in the universe destroy this coherent effect. A local effect which usually takes over is the beating of the observer's own heart!

Conclusions

The basic premises of rhysmonic cosmology have been used to develop a theory of gravitation which correlates very well with known gravitational effects and also discloses some previously unknown gravitational effects. Gravitation is thus seen to be but another aspect of rhysmonic cosmology and rhysmonic impulse forces. In essence, gravitational fields, electric fields, and magnetic fields can be shown to be but specific aspects of the general rhysmonic directed vector flux fields. Rhysmonics provides many more concepts and answers to gravitational enigmas than can be developed in this short monograph. The technological potentials which stem from these concepts are enormous and are being further developed by the author.

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Chapter 8

Unification of Fields

Background

As was stated in the introduction to this brief monograph, it was the hope of cosmologists to ascertain a basic simplicity to nature and thus to unify the forces of nature, especially the electromagnetic and gravitational fields. This was achieved to some extent in the case of electric and magnetic fields, but the recent emphasis on a geometric explanation for gravitation had just about precluded the inclusion of the gravitational field in this unity. Einstein had spent many years in this quest without success.

To a large measure, rhysmonic cosmology, thus far, has shown that electric and magnetic fields are but different manifestations of directed excess rhysmonic vectors. In the discussion of electromagnetism, it was shown that some dynamic translations of rhysmons would create an electric field due to the creation of regions of rhysmonic excesses and deficiences. The resulting rhysmónic stress in the vacumn is the electric field. As a function of this rhysmonic movement, rhysmonics required an accompanying rotational movement of directed excess vectors, which manifested itself as the magnetic field. Thus, the two fields, which of necessity must be interrelated in the dynamic case, are but different aspects of directed rhysmonic vectors. This is only natural, as the universe only consists of rhysmons and the void. Similarly, gravitational fields were shown to be but yet another aspect of these vectors as was discussed in the last chapter. The unification of these three aspects is simply demonstrable using the simple circuit for gravitational 'wave' signal detection which was shown in Figure (12).

Electric Fields and Gravitation

Electric fields have been shown to be a net flux of directed rhysmonic vectors, the result of the presence of charge in the universe. Positive charge is the result of a localized excess of rhysmons, while negative charge is a localized region having a deficiency of rhysmons. Directed excess rhysmonic vectors 'procede' from the excess region to the deficient region, creating the 'flux' of rhysmons which has been termed the electric field.

In the discussion on gravitation, it was shown that a similar flux of directed rhysmonic vectors is achievable with the 'shielding' action introduced by mass particles, with or without charge. The earth's mass creates a relatively strong flux known more generally as the earth's gravity. However, since all these fluxes are excess directed rhysmonic vectors, they are all the same entity, only the method of their creation makes them appear to be different. The equivalence of electric and gravity fields can be shown in the experiments of Figure (15).

Figure (15) depicts the equivalence of electric and gravitational fields through their effects on loosely bound electrons in a capacitor. The electrons are 'moved' by gravitational impulses (rhysmons) created by the sharp probe movement in very much the same fashion that the electric field (rhysmons) created by the battery can 'move' these electrons. It had been shown by the author (see references of Appendix III) that supernovae should create relatively strong mono-

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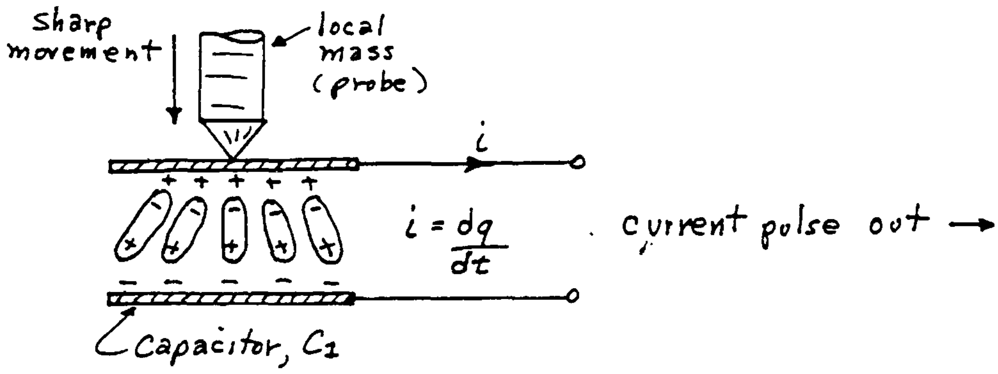
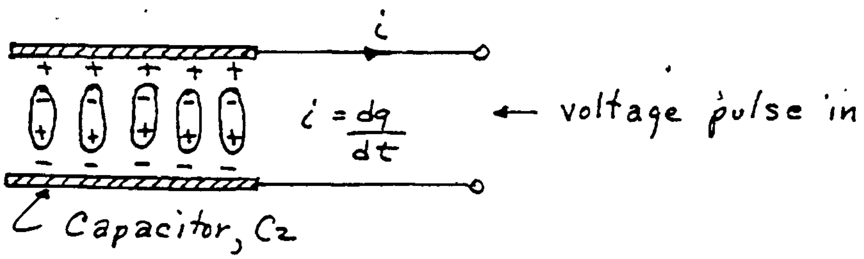


(a) - Gravitationally induced polarization in capacitor, C_1 .



(b) - Electrically induced polarization in capacitor, C_2 .

(c) - Conclusion:

Polarization in capacitor, C_1 , due to a gravitational impulse from the probe, is roughly equal to the polarization in capacitor, C_2 , due to an electric field impulse.

Figure (15) - Experimental evidence for the equivalence of gravitational and electrical fields.

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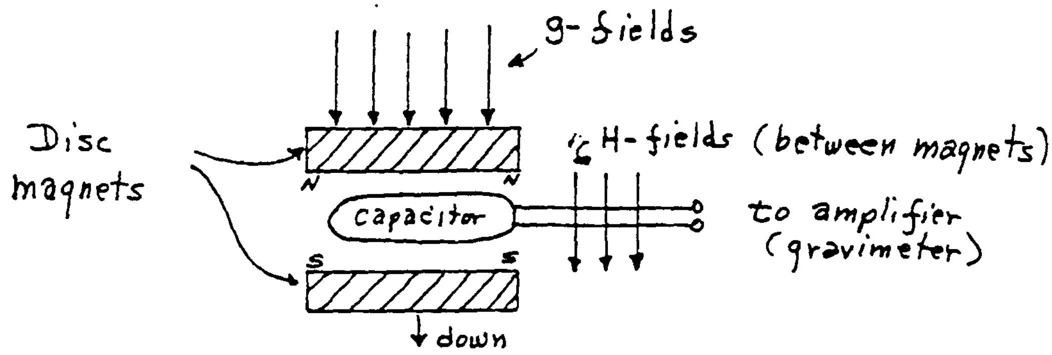
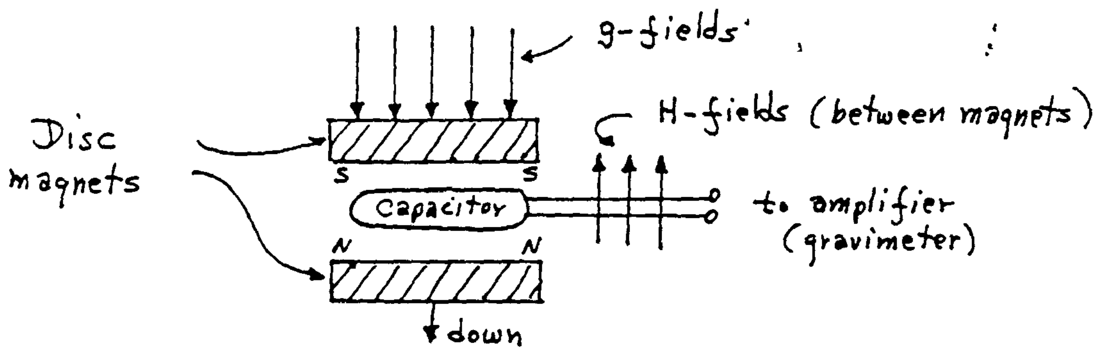


(a) - H-fields add to g-fields and thus increase the apparent gravity reading for the earth.



(b) - H-fields oppose the g-fields and thus decrease the apparent gravity reading for the earth.

Figure (16) - Experimental evidence for the equivalence of gravitational and magnetic fields.

polar gravitational impulses, ie., rhysmonic vector impulses, which are oscillatory in nature, and thus should appear to this capacitor as equivalent to an alternating electric field. The resulting perturbations on the loosely bound electrons creates small impulse currents which can be amplified tremendously and converted to voltage fluctuations in the circuit of Figure (12) as described in the last chapter and as further discussed in some references of Appendix III. Therefore, electric fields and gravitational fields, under certain conditions, are indistinguishable from each other (as demonstrated in this test) since they are really the same entities.

Magnetic Fields and Gravitation

The simple circuit of Figure (12) may also serve as a gravimeter since the relatively constant rhysmonic flux generated by the earth's 'gravity' develops a small fixed charge in the detecting capacitor which appears as a dc level in the output of the circuit. While the gravitational impulses due to other factors, eg., supernovae, are also superimposed on this dc level, the dc output can be filtered (or dampened) and thus provide an indication of the strength of the earth's gravity on a relative basis. The equivalence of gravitational fields and magnetic fields (static) can be demonstrated in the simple tests of Figure (16).

In Figure (16a), a relatively uniform magnetic field, eg., a small segment of a closed magnetic loop as supplied by two disc-type ceramic magnets 'sandwiching' the detecting capacitor, are oriented so that the directed rhysmonic vectors of the magnetic field are in the same direction as the directed rhysmonic vectors of the earth's gravity field, or g-field. The fields, being the same entities and in the same direction, sum up. Thus the magnetic flux increases the apparent strength of the gravity field, ie., the earth appears to be more massive. When the magnetic field is reversed, as in Figure (16b), the rhysmonic vectors are in opposition and thus reduced, making the earth now appear to be less massive. The fields are the same entities, and thus a uniform magnetic field (parallel field) is indistinguishable from the gravitational field in this case.

Unification

The simple circuit of Figure (12) actually demonstrates the indistinguishability of all three aspects of rhysmonic directed vector flux fields: the electric aspect, the magnetic aspect, and the gravitational aspect. All are directed rhysmonic vector fields, but each is generated by a different process and thus only appear to be a different entity. Electric fields are rhysmonic fluxes generated by vectors moving from excess rhysmonic regions to deficient rhysmonic regions. Magnetic fields are closed loops of rhysmonic flux, but in a short parallel segment of this loop, the flux is indistinguishable from the electric field. Gravitational fields are rhysmonic fluxes generated by 'screening' action of masses. As was indicated in these and other experiments, all three aspects can be made to appear simultaneously , with similar responses, in this one simple circuit, since they are really all the same basic entity.

Since it has been shown that electric fields, magnetic fields, and gravitational fields cannot be distinguished from each other where the involved excess directed rhysmonic vectors are parallel to each other, a unification of these fields is thus achieved.

Chapter 9

Applications to Astronomy

Introduction

The concepts of rhysmonic cosmology have been applied to many aspects of astronomy, from the experimental viewpoint as well as the theoretical viewpoint. Some of these applications have already been considered in this monograph and many more are the subject material for a series of specialized articles (see Appendix III). Only a very few applications will be briefly mentioned here to indicate to the reader the scope of these applications.

Gravitational 'Wave' Detection

Gravitational 'wave' (GW) detection had been briefly considered in this monograph and somewhat more thoroughly in some rhysmonic reference articles. This detection appears in two general forms: active, as in the detection of novae and supernovae, as well as some other 'disturbances' in the universe; and passive, as in the 'shadow' detection of massive structures in the universe, such as galaxies and black holes.

Detection of monopole gravitational signals provides a new 'window' to the universe and should be fruitful in the further development of both astronomy and rhysmonic cosmology. The detection of many gravitational effects has already been verified in a highly repeatable and consistent manner. Since this detection is a low-cost process, requiring very little (non-special) equipment, this field of gravitational 'wave' astronomy should have many independant investigators.

Quasars

Quasars are shown by rhysmonics to be but a special viewing of essentially ordinary type galaxies; perhaps the more distant quasars are of the Seyfert type. As was depicted in Figure (6), the universe is a perfect sphere, with matter formed only in the central portion. The outer half-sphere is generally pure rhysmoid (pure vacumn) in construction. A fairly active galaxy could be viewed directly through the matter universe with a great loss of EM wave energy in this matter region, or also over a much longer path reflecting off the edge of the universe, with little or no loss of EM energy in the rhysmoid region. Therefore, this second path would introduce large 'redshifts' but little energy loss, the two more prominent characteristics of quasars. A more detailed description of this process is given in appropiate reference articles.

Superluminal Motions

Rhysmonics relates this effect largely to quasar images of galaxies in which the viewing angle (off the edge of the universe) for certain luminous or radio emissions (jets) emitted from galaxy centers are such that the virtual image as seen in the spherical mirror of the universe edge makes this image to appear to move much faster than in reality. This is a property of spherical mirrors and is simply demonstrable by looking at the image of an object, say a pencil point, viewed from outside the focal plane of a local spherical mirror. Again, this phenomenon is considered more fully in a reference article.

Galaxy Formation

As had been pointed out many times now, matter in the rhysmonic universe forms only in the central region of the universe. Coupled with rhysmonic gravitational effects, it can be shown that spiral formation in matter concentrations are a natural development in this universe. With the further development of matter from the intrinsic energy of the vacumn, other effects appear which tend to destroy this symmetry. For example, supernovae tend to form black holes with surrounding shock-ring-formed star systems. On a larger scale, the shock-ring star formations become new galaxy formations. Over a long period of time, the universe may tend to collect black holes in the center region, perhaps creating a super black hole, and a 'chicken wire' structure of galaxies in the remainder of the matter portion of the universe. The original basic spiral structure may yet leave trace areas where galaxy count is low, ie., the so-called holes in space. Gravitational wave astronomy should be able to 'map' this structure more completely. More details on these processes are given in the applicable reference articles.

Conclusions

The applications of rhysmonic cosmology to astronomy are much more numerous than can be listed here. Some of these will be further developed in future articles by the author. Much more could be developed when the professional astronomical community becomes involved with this cosmology also.

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Chapter 10

Applications to Technology

Introduction

Since rhysmonic cosmology is a fundamental science, dealing with a most basic approach to matter and motion, the application of these concepts to technology is extremely fertile and useful. Therefore, only the briefest of mentions are given here, again to give the reader an idea of the scope of these applications. However, even these few will demonstrate the tremendous scope and power of this theory.

Cancellation of 1/f Noise

It has been shown in several reference articles that 1/f noise is generated by massive gravitational effects, such as those created by nova and supernova 'bursts', the energy of which affect relatively free matter, such as molecules, atoms, and electrons. This noise is 'heard' in such varied phenomena as running water; winds and fan-forced air; ionized flames, such as gas- and oil-fired burners; and even in the so-called 'sounds of the sea' in sea shells. Electrons in electronic components such as resistors, capacitors, and electron devices, are especially sensitive to these fluctuations in the rhysmonic flux which 'bathes' matter throughout the universe. Since the sources of these fluctuations are generally large volume, eg., supernovae, the fluctuations in a particular locality are largely correlated. While other effects, such as signal delays in circuits, would tend to destroy some of this correlation, it is possible, in principle, to cancel noise generated by these processes at the input of an electronic system, where the noise factor is largely established. Cancellation would require the proper adjustment of both phase and amplitude if reduction is to be more complete. Such cancellation would enable the design of more sensitive receivers, for example, since at low audio frequencies, 1/f noise, at present, is the limiting factor in receiver sensitivity.

Correction of Weight Scale Errors

Gravitational fluctuations of various types affect the gravity field as it appears at the surface of the earth. Such variations could appear as weight errors in scale systems. Balance-type scale systems would not be subject to these fluctuations due to the balanced nature of the scales. However, scale systems which balance weight against some restoring force (Hooke's Law type scales) would be subject to fluctuation errors which could, at times, be as high as 5-10 per cent! Hooke's Law type scales with electrical readout rather than a mechanical readout, can be corrected for these fluctuations electronically. Further information on this subject is planned for a future reference article.

Vacumn Energy

Rhysmonic cosmology has shown the vacumn to be a storehouse of a vast amount of potential energy. In fact, this is the only real energy source in the universe. This energy is made apparent to man

43 through the perturbations and disturbances in this storehouse, which will now appear as particles and fields, as well as other attending phenomena. Most energy sources used by man are secondary sources, in which this fundamental energy had been converted to other forms by other processes. Rhysmonics does not preclude the 'tapping' of the vacumn energy more directly, eg., through an intermediate process which can be controlled by man. Nuclear energy is a point in fact, as is the gravitational impulse energy which can be tapped with the use of capacitors, for example. There are other ways to tap this vacumn energy; these become more and more apparent as the understand- of rhysmonic cosmology develops. Most promising is the extraction of energy from the curl of a magnetic field, which can be directly replaced by the intrinsic energy of the vacumn. Preliminary tests have shown that such a system could probably be the energy source of the future because of its extreme efficiency. 43

Gravitational Communications

Very limited work on this aspect has demonstrated feasibility. This is a most important consideration for, say space communication, since communication would be 'instantaneous'. If there are other intelligent life out there in space, monopole gravitational waves would probably be used for space signaling. Some of the sounds heard on GW detectors, especially the 'musical' ones might be such communications, especially as they appear to come from the same direction in space on a daily basis. Most are from the plane of the Milky Way. This development is the direct result of the discovery of monopole gravity signals, and the author is confident that future developments will make this a viable and reliable communications system.

Conclusions

The technological applications of rhysmonic cosmology are extremely numerous since this is quite virgin territory yet. The author has prepared many patent applications covering the basic and specific technology of this cosmology. The author, at present, has over 100 potential applications for this technology. However, other than that already disclosed here, the remainder will be disclosed in future articles after patent protection has been sought.

Epilogue

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The prime objective of this brief monograph was to introduce the principles of rhysmonic cosmology to potential fellow investigators in a simple and straightforward manner. To do this properly would have required much more time and many more pages than the author could do at this time.

The author, however, hopes that he has provided enough glimpses of this theory to encourage others to enter into this development. Some additional considerations are provided in the specialized articles listed in the rhysmonic references of Appendix III. Technological aspects, however, are first disclosed in patent applications, and then in limited form here and also in technical articles in the future.

Rhysmonic cosmology, which has strong experimental and theoretical support, has every indication of being the viable cosmology of the future. Rhysmonics is here to stay.

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(4) R. Wilson, SCIENCE, Vol.205, 31 August 1979.

Appendix I

Planck Units (also rhysmonic units)

h = Planck's Constant $\cong 6.624 \times 10^{-27}$ erg-sec.

$\hbar$ = Planck's Reduced Constant $\cong 1.054 \times 10^{-27}$ erg-sec.

L^* = Planck Length $\cong 1.616 \times 10^{-33}$ cm.

T^* = Planck Time $\cong 5.391 \times 10^{-44}$ sec.

C^* = Planck Velocity = L^*/T^* = $C \cong 2.997 \times 10^{10}$ cm/sec.

M^* = Planck Mass $\cong 2.177 \times 10^{-5}$ gm.

L^{*3} = Planck Volume $\cong 4.22 \times 10^{-99}$ cm^3.

D^* = Planck Density $\cong 5.157 \times 10^{93}$ gm/cm^3.

Rhysmon Parameters

Rhysmon radius $\cong 1.62 \times 10^{-66}$ cm.

Rhysmon volume $\cong 1.78 \times 10^{-197}$ cm^3.

Rhysmon number $\cong 2.37 \times 10^{98}$ $rhysmons/cm^3$.

Derived Rhysmonic Units

A^* = action of rhysmon = $h/2\pi = \hbar = E^* \times T^* = E^*/f^*$.

E^* = energy of rhysmon = $M^* \times C^{*2} = F^* \times L^* = \hbar/T^*$.

F^* = force of rhysmon = $M^* \times a^* = E^*/L^*$.

f^* = rhysmonic frequency = $1/T^* = E^*/A^*$.

a^* = rhysmonic acceleration = $F^*/M^* = L^*/T^{*2}$.

Visible Universe Parameters

R_o = radius $\cong 1.14 \times 10^{28}$ cm.

V_o = volume $\cong 6.2 \times 10^{84}$ cm^3.

M_o = mass $\cong 3.2 \times 10^{178}$ gm.

N_o = number of rhysmons $\cong 1.47 \times 10^{183}$.

E_o = energy $\cong 2.9 \times 10^{199}$ ergs.

Note: Some of the above determinations are only preliminary and thus may be changed in the future.

Appendix II

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Rhysmonic Terminology

To aid the reader in following the development of rhysmonic cosmology, some terms used in describing this cosmology are defined below. Additional terms will be introduced as needed in the course of the development of this text.

Rhysmon: The fundamental 'particle' in the substratum of our universe. In a matrix structure it makes up the very fabric of our universe. It moves in a closed 'circular' path and has one quantum unit of action, the Planck Constant, h .

Rhysmoid: The sum total of rhysmons in the matrix structure of the perfectly spherical structure which is our universe. Undisturbed, this is a perfectly interlocking mechanical structure which forms our so-called vacumn.

Rhysmos: A general term applying to the rhysmoid in terms of the phenomena observed in this structure. Similar to cosmos.

Rhysmonic: Of or pertaining to rhysmons or to devices, circuits, or systems developed through rhysmons.

Rhysmonic Cosmology: A study of the origin and structure of the universe based upon the rhysmonic particle matrix system.

Rhysmonic Impulse: A short directed vector of rhysmonic energy resulting from the matrix structure of the universe. This vector is approximately 10^{-33} cm long and contains $\hbar$ quantum of action. In a pure rhysmoid, these energy vectors cancel and no phenomena exists. Any modification or disturbance in this structure results in phenomena known as particles or fields.

Rhysmonic Particle: These are localized structures in the rhysmos where there are excesses or deficiences of rhysmons in the matrix structure as compared to that of the pure rhysmoid. The geometry of these structures could be very stable, forming the known masses of the universe, or transitory, forming the many short-lived splinter particles of physics.

Rhysmonic Forces or Fields: A perturbated rhysmonic matrix structure results in excess directed rhysmonic impulse vectors which are not cancelled and thus manifests itself as a force or a field of force. The known force fields are but different aspects of these excess directed rhysmonic energy vectors.

Rhysmonic Charge: Same as the electrical charge. These are the result of excesses or deficiencies of rhysmons in the universe which are not cancelled and thus act as sources or sinks for excess directed rhysmonic impulse vectors. The flow of excess directed vectors from a source to a sink forms the entity known as an electric field.

Appendix III

47 (Rhysmonic Cosmology References) 47

Completed Articles

(1) "Background on the Possible Development of a Simple Gravitational Wave Detector", Unpublished Note, June 1980.

(2) "Are Cosmological Effects the Source of 1/f Noise in Electron Devices?", Unpublished, June 1981.

(3) "Op-Amp Circuit Detects Gravity/Signals", To be Published,1985.

(4) "Is the Universe Really Expanding?", Unpublished, March 1985.

(5) "The Nature of Electromagnetic Wave Propagation", Unpublished, April, 1985.

(6) "The Nature of Gravitation", Unpublished, May 1985.

(7) "The Nature of the Microwave Background Radiation", Unpublished, May 1985.

(8) "A Simple Low Cost Radar Signal Detector", Unpublished, June 1985.

Articles in Initial Draft Form

(1) Rhysmonic Cosmology: A Brief Introduction

(2) The Universe: A Closed and Finite System

(3) The Nature of Quasars and Superluminal Motions

(4) The Nature of Particles, Fields, and Charge

Articles in Preparation

(1) Galaxy Formation

(2) Supernovae and Black Holes

(3) Gravitational Wave Astronomy

(4) Gravitational Effects on Hooke's Law Scales

(5) Energy Sources

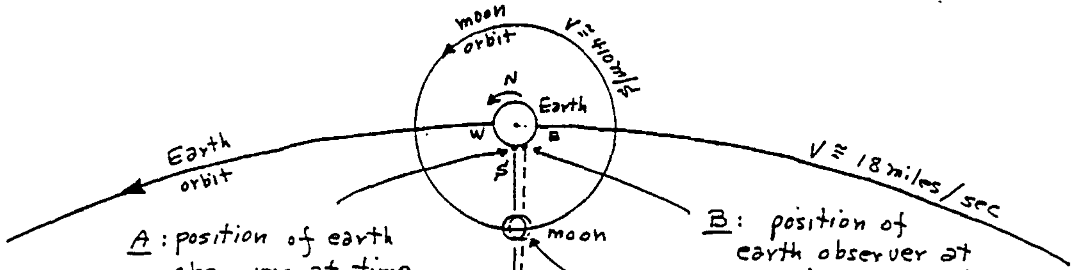
Note: Many other theoretical and technical articles are in the planning stages.

 (47B)

Cosmology

GH Labs
Newark, N.J.
3/15/86
(GH)

I. Gravitational vs. Optical Eclipse of Sun by Moon (per Rhysmonic Cosmology).



A: position of earth observer at time of gravitational eclipse.

B: position of earth observer at time of optical eclipse.

moon shown (solid) at time of gravitational eclipse. moon shown (dotted) at time of optical eclipse.

Notes:

(1) Observer on earth has a relative movement as shown due to the earth's rotational velocity (≅ 16 miles/minute).

(2) Relative to earth, moon has a velocity eastward due to the moon's orbital velocity (≅ 410 m/min).

(3) The stellar aberration (the sun is our nearest star) due to the finite velocity of light and the earth's orbital velocity (≅ 18 miles/sec) places the optical image of the sun to the observer at position B, along the direction shown by the dotted line.

(4) The 'instantaneous' gravitational eclipse occurs in the direction shown by the solid line.

Light travel times:
moon to earth ≅ 1.3 sec.
sun to earth ≅ 8.3 min.

gravitational signal path (≅ instantaneous)

optical signal path (as aberrated ≅ 8.3 min. later)

angle of arc ≅ 22 seconds of arc (shown not to scale). ma

'apparent' position of sun for optical eclipse. (due to stellar aberration) & finite velocity of light

actual position of sun for both gravitational and optical eclipses.

(GH) Conclusion: Optical eclipses of the sun by the moon will follow the gravitational eclipse by about 8.3 min due to stellar aberration and the relative movements of the earth and moon. This has been confirmed in the experiment of May 30, 1984. Gravity signals are essentially 'instantaneous' signals!

FURTHER CONFIRMATIONS BY THE AUTHOR AND OTHERS DURING SEVERAL ECLIPSES SINCE. SEEMS LIKELY THERE ARE MANY MORE 'EMBEDDED' IN EM ECLIPSE RECORDS (?)

THREE-PART ARTICLE (STAMPED COFIDENTIAL) WHICH GOES INTO GREATER DETAIL, THEORETICAL AND TECHNICAL, THAN MONOGRAPH FOLLOWED BY OTHER EXPLORATORY ARTICLES

(48)

(48)

GRAVITRONICS: A Developing New Technology???

G. Hodowanec

CONFIDENTIAL

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(49)

(49)

ABSTRACT

Electricity, magnetism, and their interaction as electromagnetic effects, have been the foundation of much of 20th century science and technology. Much progress and development in these areas still continues. However, it is believed that perhaps much of the 21st century science and technology will also include presently little known or understood aspects of the interaction of electricity and magnetism with gravitation. Such interactions will be known as electrogravitation and magnetogravitation and will lead to newer technologies and possibly new energy sources. Some simple experiments which appear to confirm the validity of some of these concepts are presented. It is hoped that the open-minded amateur experimenters (and possibly some professional researchers) will explore these concepts and thus help develop the new technologies. The territory is largely unexplored, thus the potential is great and the possibilities enormous. It is there for the asking at present.

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The material is presented in three parts. Part I, "Experimenting with Gravity" develops some of the basic concepts in this new technology. Part II, "Communicating with Gravity Signals" applies some of the concepts to practical demonstrations of the possibility of gravitational communications. Part III, "Gravity Signal Astronomy" has proven highly significant as a 'new window' to the Universe and has also detected what may prove to be profound effects in the Universe. All material is presented in simple fashion and is aimed at primarily the inquisitive and knowledgeable electronic experimenter.

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Part I

Experimenting With Gravity

G. Hodowanec

CONFIDENTIAL

PART I

(51) (57)

INTRODUCTION

The knowledgeable and inquisitive experimenter has always been in the forefront of the development of new sciences and technologies. For example, when radio communications was in its infancy, it was the amateur radio experimenters who entered this new field and eventually became an important factor in its rapid development. When government and commercial services expanded operations, they relegated the so-called 'useless' frequencies below 200 meters to the amateur radio experimenters. However, the resourceful amateurs soon realized the true value of these frequencies, and thus blazed the way for the future development of the higher radio frequencies. The reason for their rapid progress was that the amateurs were not restricted by 'conventional' tenets and practices, but had open-minds and thus were willing to experiment with new ideas and methodologies.

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The fields of electricity and magnetism, as well as their vector interactions as electromagnetic radiation fields, have since become the basis for much of our 20th century science and technology. The readers of technical publications are well aware of these various aspects, from power generation and distribution to the multitude of uses of this power in innumerable applications of electromagnetic technology. Not only are the applications of this technology of value to the military and industrial establishments, but also of vast importance in the many consumer-type of applications, which are now far too numerous to be be simply listed here. The readers of this magazine are well aware of many of them.

However, in recent years, there has also been a growing interest in a newer science and technology which involves the field of gravitation and its possible interactions with electricity and magnetism.

The present day science and technology which involves electricity and magnetism (as well as the vector interaction of the two) is generally lumped into one category called ELECTRONICS. In a similar manner, the new science and technology of gravitation, as well as its possible interactions with electricity and magnetism, could also be lumped into a category called GRAVITRONICS. This new field of gravitronics is yet largely unexplored although some classical period researchers, notably Nikola Tesla, have pioneered much effort in the past, but some modern researchers, at present, are also exploring this virgin territory. The present explorers are some open-minded professional researchers, but the main body (as it was in the past with early electronic research) is made up of mainly the inquisitive and knowledgeable amateur experimenters who are intrigued by the potential and possibilities of this new science and technology. Thus the material in this article will be directed toward such experimenters and it is hoped that the material will encourage them to join in the further development of this material. The more conventional (orthodox) scientists and technologists will enter this field once the amateurs have blazed the path.

GRAVITRONICS

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There are but three long-range field effects in the universe and these are generally known as the electrical, magnetic, and gravitational 'forces' of physics. The relation between these forces can be depicted as shown in Figure (1). Here, electricity and magnetism are shown as the base of a triangle formed by these forces since these fields are fairly well understood, including their vector-type interactions which are more commonly referred to as electromagnetic field effects. Gravitation, however, is a more fundamental aspect and is thus shown as the apex of this triangle of forces. It is not well

(53) understood by most present-day scientists; and its possible interaction with electricity in electrogravitic effects, and its interaction with magnetism in magnetogravitic effects, is even less understood and is not even recognized by most present-day conventional scientists.

In its most simple form, the long-range fields are fields of scalar potential which are conservative in nature and thus describable in terms of magnitude alone, even though the gradients in such fields will be vectorial. Scalar fields have some interesting properties; they are long-range, they are essentially 'instantaneous' fields, and they readily penetrate ordinary matter. The interaction of electricity and magnetism, (generally through the actions of a moving electron), gives rise to a vector-type field which consists of interlocking closed loops of flux, sometimes termed whirlpool fields, which have been recognized since the days of Maxwell, Hertz, and Marconi. However, the scalar interaction of gravitation with the scalar aspects of electricity and magnetism, while recognized by a few pioneers in the past, are not generally recognized by today's science, since these interactions are more subtle, not predicted by present theory, and thus require more specialized test methods to detect such interactions. Fortunately, the necessary methodology is quite simple and easily duplicated by the average electronic experimenter. Therefore, it will be the objective of this article to present simple concepts and experiments which appear to confirm these types of interactions, and thus provide a basis for this new science of gravitronics.

SCALAR FIELDS SIMPLIFIED **CONFIDENTIAL**

The basis for scalar field flux has been developed by the author in a brief monograph[1] but will be described here in simple fashion only. They are similar to the 'lines of force' imagined by Faraday and Maxwell, and are much the same as depicted in present-day electric and magnetic theory, eg., the electrostatic and magnetostatic flux lines. Therefore, the interaction of say, earth gravity flux fields, with the 'local' scalar flux fields as shown in Figure (2), is very similar to the interaction between electric flux lines and magnetic flux lines as shown in Figure (3), since they are really the same entities, but are in different aspects.

Pure scalar fields in the universe are not directly observable, but their gradients as shown in Figures (2) and (3), are observable as scalar field interactions, either directly, or as interactions with matter, when observed with the proper instrumentation. For example, the scalar flux due to the earth's g-field is simply observed as the presence of 'weight' in a given mass which is accelerated by this scalar flux. The instrumentation required here is but a simple scale system. However, other interactions may be more subtle and thus require special tests or instrumentation, as will be briefly considered in this article. To aid the reader in the visualization of scalar flux, they will be depicted as 'flowing' from + to - , ie., from regions of high density to regions of lower density in scalar potential. While there are many types of scalar signals developed in the universe (and by man), only a few of these effects will be considered in this article.

SCALAR FIELD GENERATION

Scalar fields can be shown to be just aspects of the electric, magnetic, and gravitational fields. Thus their basic generation involves but these three aspects and all scalar field generating systems can be reduced to one of the basic methods shown in Figure (4).

Scalar E-fields are related in some way to the presence of charge as was shown in Figure (3). A somewhat uniform 'local' scalar E-field can be generated by charging the plates of a simple parallel plate capacitor as shown in Figure 4(a). The intensity of the field can be made variable, either by varying the voltage across the plates, the spacing between the plates, or the permittivity of the dielectric material between the plates. In essence, the gradient in the scalar potential is due to the difference in potential between the plates.

Scalar H-fields (curl-free fields) are related to moving charges (mainly electrons) and may be generated by certain permanent magnet configurations, as well as certain current-carrying coil configurations. A simple way of generating scalar H-fields is with the solenoidal coil configuration as shown in Figure 4(b). The intensity of the flux will be a function of the current (electron flow) and the number of turns in the coil as well as the coil geometry. An interesting aspect here is that the flux will remain constant if the driving emf (voltage) is kept constant, but the number of coil turns is increased. This results in an apparent paradox in that the input power needed to produce a certain flux <u>decreases</u> as the number of turns increases, ie., the wire length increases. This is due to the little realized aspect that the flux generated is a function of the <u>drift velocity</u> of the electrons which are generating this flux. While the number of electrons 'flowing' under such conditions decreases due to the increased resistance as per Ohm's Law, the drift velocity of the remaining electrons will actually increase in direct proportion and thus maintain a constant flux field.

The generation of scalar g-fields are due to the 'shielding' action of masses in the universe as was postulated in the author's cosmology.[1] The shielding action creates a net flux in the scalar potential which is depicted in Figure 4(c). This flux, of course, has been determined by Newton and found to be a function of the masses, the spacing between the masses, as well as another universal function which is expressed by the gravitational constant, G. The net gravity flux (or gradient) can also

56 be made variable with any change in any of the parameters. 56

SCALAR FIELD DETECTION

Scalar flux field detection essentially involves the inverse of the generation processes shown in Figure (4). The polarization effects in a capacitor as shown in Figure 4(a) is a very effective detector of scalar fields of all types, E-, H-, and g-fields, and is briefly discussed in the simple system shown below, and in more detail in a previously published article.[2]

CONFIDENTIAL

The solenoidal scalar H-field generator shown in Figure 4(b) may also be used in a detection process in that an incoming scalar flux in this coil may drive a small electron flow (current) in that coil which can be amplified for a useful signal response. While the interactions of scalar flux between coils have been used ever since the days of Faraday, and especially by Tesla, and of course, in most present-day electronic circuits, the interaction of coils with the gravitational flux is not well known and will be further considered in the section on magnetogravitic effects.

The detection of gravitational flux, of course, has always been noted in scale systems of various types. Sensitive Hookes's Law scale systems have been used as gravimeters for some time now. Here, as is depicted in Figure 4(c), the action of a gravitational flux on a small mass, m_1 , due to the shielding action of a much larger mass, m_2 , which could be the mass of the earth, may be determined if the small mass is supported by some restoring force, usually a spring. If the restoring force 'spring' is made of a compressible conductive foam material, variations in the resistance of the foam will follow the variations in the 'weight' of the test mass, m_1 , which reflects the earth's g-field and any other variations which may be superimposed on these.[3]

Such a detector is highly responsive to g-field variations since these can interact with the material scalar fields at the nuclear levels, but response to normal scalar E-fields and H-fields may be poor or even non-existent in the case of E-fields.

The capacitor element of Figure 4(a), or any other device which can develop polarization 'currents' with scalar field interaction, may be used with the simple electronic detection system shown in Figure (5). The unit operates primarily as an electrogravitic device (which is discussed more fully later). Here, the scalar g-fields of the earth may 'charge' the capacitor to some average dc level, which may also have ac variations superimposed due to various fluctuations in the scalar flux which may be due to certain cosmic-generated scalar signals or even man-made scalar signals. Thus this detector responds to all three aspects of scalar flux fields, as will be further discussed in this article, but it has also been extremely useful in simple gravitational signal astronomy systems.[4,5,6]

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SIMPLE ELECTROGRAVITIC EXPERIMENTS

The earth has a relatively constant gravitational flux near its surface which will accelerate a test mass at about 980 cm/sec^2 , or 32 ft/sec^2. This is the so-called free-fall constant of the earth's gravity field, g , and the field is commonly referred to as the earth's g-field. This field is directed towards the center of the earth, but may be considered as a vertical component in a small region near the surface of the earth. (Note: The earth also has an electric field component, an E-field, which is similarly oriented, and thus it may at times be difficult to differentiate between the two since they are the same basic entities. However, for reasons which will become apparent in the course of this article, it will be assumed that the interactions discussed here will be with the earth's g-field.)

Experiment I : Interaction of charge with the earth's g-field.

Balance an uncharged plastic soda straw on some fulcrum as is shown in Figure (6). A pin pushed through the straw slightly above the centerline axis and supported on a U-shaped bracket is suitable. Perform the experiment in a draft-free region. Then,

(1) Charge one end of the plastic soda straw by rubbing it with dry fingers or a dry cloth. The end will thus charge negatively. An electric field, E-field, formed between the negative charge on the end of the straw and its positive 'image' charge will interact with the earth's g-field (in opposition) and thus the negative end of the straw will be repulsed toward the ground.

(2) Repeat the experiment now with a paper straw. The end will now charge positively, and the 'image' field will be reversed, and thus 'attracted' by the g-field and therefore it will rise or levitate.

Experiment II : Interaction of a parallel plate capacitor with the earth's g-field.

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Fabricate a small capacitor made of about a five inch square of light guage aluminum sheet metal and separate the plates about one half inch apart with a good insulating support as shown in Figure (7). Provide for flexible electrical lead connections to the capacitor. Now support the capacitor on a very sensitive Hookes's Law type scale, preferably one of non-magnetic construction. (The author used a readily available small postal scale unit which originally measured up to 16 ounces full scale. The original spring in the unit was replaced with one of lower tension so that the scale now measured only about 4 ounces full scale.) Then,

(1) Measure the capacitor 'weight' without any voltage applied to the capacitor plates. This will be the nominal weight of the capacitor as shown in Figure 7(b).

(59) (2) Now apply about 500-1000 volts dc to the capacitor plates as shown in Figure 7(a). Here, the scalar E-field developed between the plates will be in opposition to the scalar g-fields, and thus will be 'repulsed'. Thus the capacitor will appear to have an increase in its weight and thus be 'heavier' than before. (59)

(3) Reverse the voltages to the capacitor as shown in Figure 7(c). Here the scalar E-fields will be in the same direction as the earth's g-field, resulting in an 'attraction' and thus the capacitor will appear to be 'lighter' in weight or levitated!

These interactions had been demonstrated as the Biefeld-Brown[7] effect many years ago, but unfortunately it has largely been ignored by the conventional scientists.

Experiment III : 'Local' scalar field interactions with the detector of Figure (5).

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The simple electronic scalar field detector unit shown in Figure (5) will detect the averaged g-fields of the earth as a dc level component (on which is superimposed the gravity fluctuations due to some other effects) as shown in Figure 8(a). If the detecting unit capacitor element, C_1 , is sandwiched between a 'locally' generated scalar E-field, such as that provided by the air capacitor shown in Figure (7) of Experiment II, the unit will also detect apparent variations in the g-fields due to an interaction between the locally generated scalar E-field and the earth's g-field as depicted in Figure 8(b). For example, when the experiment is conducted as shown in Figure 8(c), then,

(1) When the switch, SW , is open (no voltage applied to the parallel plate air capacitor sandwiching the detector element capacitor, (C_1), the conditions shown in Figure 8(a) will prevail.

(2) When switch SW is closed, a scalar E-field is created as shown. This field will sum with the vertical component of the earth's

(60) g-field (and possibly also with the earth's E-field which is in a similar direction) and thus the detector will measure an increase in fields, or an apparent increase in the earth's gravity as is indicated by an increase in the dc component. (60)

(3) When the parallel plate capacitor voltage is reversed, the opposite conditions will prevail, and the field is reduced, for an apparent reduction in the earth's gravity, as indicated by a reduction in the dc component.

There are many possible electrogravitic interactions. For example, energy may be extracted from the earth's gravity (or E-field) simply by having this field 'charge' a bank of high capacity electrolytic or other capacitors. The above few examples are only to illustrate to the knowledgeable experimenter the many possibilities.

SIMPLE MAGNETOGRAVITIC EXPERIMENTS **CONFIDENTIAL**

The relatively constant gravitational flux of the earth's gravity as expressed by the acceleration factor, g , will also interact with 'locally' generated vertical scalar magnetic field components, or the H-fields. Scalar H-fields (curl-free fields) may be generated by certain permanent magnet configurations and certain current-carrying coil configurations. An example of each type is briefly presented here as simple experiments.

Experiment IV : Interaction of magnets with the earth's g-field.

For this experiment the author used the same sensitive, non-magnetic postal scale unit described in Experiment II. The permanent magnet used was made up of a stack of three ceramic ring magnets which ha about a 3/4 " OD, 1/4 " ID, and a 1/4 " thickness, and were strongly magnetized in the direction of the axis of the rings. The experiment was performed as follows:

(1) When the magnets are 'weighed' on edge, as shown in Figure 9

(61) there is little interaction between the horizontal scalar H-field components and the g-fields, so that the magnets will hve normal 'weight'. (61)

(2) When the ceramic magnets are placed on the scale as shown in Figure 9(a), the 'local' scalar H-fields (and B-fields) in the magnet are in the opposite direction to the earth's g-field, and thus there is a repulsive force between them, and the magnet will appear to have an increase in 'weight'.

(3) When the magnets are reversed as shown in Figure 9(c), the H-fields are now in the same direction as the g-fields, and thus there is an attractive force between them, and the magnet will appear to have a reduction in 'weight', ie., there is levitation!

Experiment V : 'Local' scalar H-field interaction with the detector of Figure (5).

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This experiment is the counterpart of that shown in Figure (8), but the 'local' scalar field in this case is the scalar H-field provided by a solenoidal coil configuration. The author used as a solenoid a commercially available telephone pick-up coil which consisted of many turns of fine wire in a 1/4 " slot on a form having about a 2 1/2 " mean diameter. The basic circuitry is as shown in Figure 10(a). The detector unit sensing capacitor is positioned in the center of this coil configuration, with the coil axis in the vertical position. The following observations were noted:

(1) For the conditions where the scalar H-field flux is constant, and thus in essence a static flux field,

a. When the H-fields are in the same direction as the earth g-fields, a slight increase in the apparent measured earth gravity field is seen. TP b. When the H-field direction was reversed, very little effect on the measured g-field was noticed.

(2) For the conditions where the scalar H-fields are dynamic or

transient, such as with the turn-on or turn-off of the coil current,
such that the flux is either building up or collapsing, other effects are noticed, especially with regard to collapsing fields. For example, when the collapsing H-fields are in the reversed direction from the g-fields, very little effect is seen on the measured g-fields. However, when the collapsing H-fields are in the <u>same</u> direction as the earth's g-field, a <u>tremendous increase</u> in the measured earth g-field is seen! This effect will be shown to be of possibly great importance as a potential new energy source.

<u>Experiment VI</u> : Interaction of a coil with the earth's g-field.

This experiment is of great importance and thus it will be described in more detail:

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(1) When a voltage is applied to a <u>very long wire</u> solenoid, which is constructed with roughly the geometry shown in Figure (11), only a a small current flows due to the high resistance of this coil, as per Ohm's Law. However, the magnetic flux (scalar H-field) developed inside such a solenoid can be quite substantial due to the increased 'drift velocity' of the conducting electrons under such conditions. The magnetic flux generated is a function of the electron drift velocity as was pointed out previously. When the driving emf (voltage) which sustains this drift velocity of the electrons, and thus the magnetic stress energy in the vacuum, is suddenly cut-off, the energy stored in the 'magnetic stress' is returned to the coil as a scalar field in the coil. This transient scalar flux energy will thus re-induce a driving emf in the coil and this will appear as a high voltage across the coil. In addition, some earth g-field energy (that which may have been displaced from the solenoid in the initial 'charging' of the magnetic stress field by the current flow in the solenoid) is also returned to the solenoid. The collapsing H-fields and the g-fields must be in the

same direction for this effect to occur. Thus, at least two times the initial energy supplied to the solenoid is returned: the original energy that was supplied, plus the energy which is essentially 'extracted' from the gravitational field of the earth! According to the Russian physicist Landau, the potential gravitational energy near the earth's surface is in the order of 400 kw-hours per cubic foot!

(2) In actual tests, proper control of the experiment (such as proper timing of the charge/discharge cycles) has shown that the energy 'extractable' by this process can be many times the original energy expenditures needed to set up this process!

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(3) Such interactions have been demonstrated by many classical physicists in the past. Faraday and others have demonstrated the effects of self-inductance having indications of such properties. Notable among the classical experimenters was Nikola Tesla, who was a pioneer in demonstrating such effects with his 'magnifying transformer' and also in his various 'Tesla Coils'. Some modern researchers, including the author, have demonstrated many such type reactions. Highly publicized demonstrations have been made by J. Newman due to his patent problems. However, while Newman's demonstrations are valid, they are not the result of 'extraction' of energy from mass as he claims at least in this author's opinion. That the gravitational energy 'extraction mechanism' is more correct appears to be validated in the tests of Experiment V.

Experiment VII - Simple electro-magneto-gravitic experiment.

The simple experiment shown in Figure (12) demonstrates the interaction of all three long-range forces in this universe. These aspects have been noted by many classical period researchers in the past as well as some more recent researchers, eg., J. Searl[7] of England,

(64) but their efforts have largely been ignored by conventional science. (64)

This experiment utilizes a low-loss plastic disc element of about 3" in diameter which is rotated by a small dc motor (shielded) which is mounted on the same sensitive, non-magnetic postal scale unit described previously. The experiment is performed as follows:

(1) Charge the rim of the plastic element negatively by rubbing with a dry cloth while it is spinning. The electrons are then carried around by the rim at high velocity and thus is, in effect, a strong circulating current which creates a very intense magnetic field, an H-field, in the central regions of the plastic disc.

(2) With a clockwise (CW) rotation of the plastic element, the H-field flux is directed down, in the same direction as the g-fields, and thus they are 'attracted' by the g-fields. Therefore, the rotating element's 'weight' is reduced for an apparent levitation of the disc!

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(3) With counterclockwise (CCW) rotation of the disc, the rim 'current' is reversed and thus the direction of the H-fields flux in the center regions of the disc is now up, and thus opposes the g-fields. Therefore, the element's 'weight' is now apparently increased.

Such aspects have been noted by many earlier classical period researchers, especially in experiments with electrostatic field generating devices. More recent applications, such as in the work of J. Searl[7], have resulted in strong levitation and high energy extraction effects, and thus they have been used to explain 'flying saucers' in a way. However, these experiments and explanations were 'outside' of present theory and thus were never accepted by most conventional scientists. The author believes that many of these tests are technically possible in terms of gravitronics and thus effort in these techniques should continue, especially by the experimenters.

CONCLUSIONS (Part I)

65 The brief introduction to gravitronics and the simple experiments described in Part I should provide the rationale for the more exciting experiments of Part II and Part III of this series of articles. The experimenter should be able to develop other simple experiments and also verify the reality of these effects in simple correlation tests. For example, it is possible to show a direct one-to-one relation between changes in electronic gravimeter measurements, the apparent 'weight' of a magnet, and a person's own weight, since all these measurements will reflect the variations in the earth's g-field which are detectable in these various detection methods. Many people complain that the newer digital weight scales do not give a person's weight correctly since they see much variations in their weight over a short time period. However, what they are seeing is an actual variation in their weight due to various cosmic effects, for example, the position of the Galaxy Arms with respect to earth. Fortunately, such scale variations may be cancelled with a simple electronic technique which will be released by the author in a future article.

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Part I

(66)

(66)

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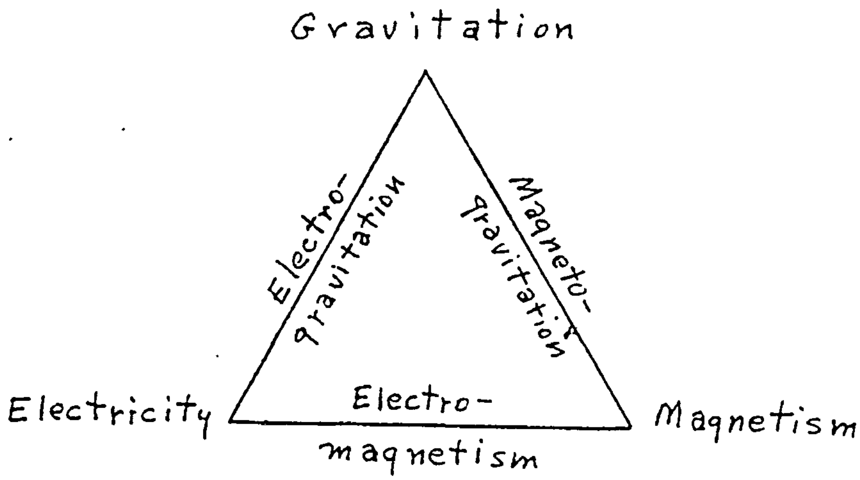

Figure (1) - Depiction of the relationship between the long-range forces of the universe.

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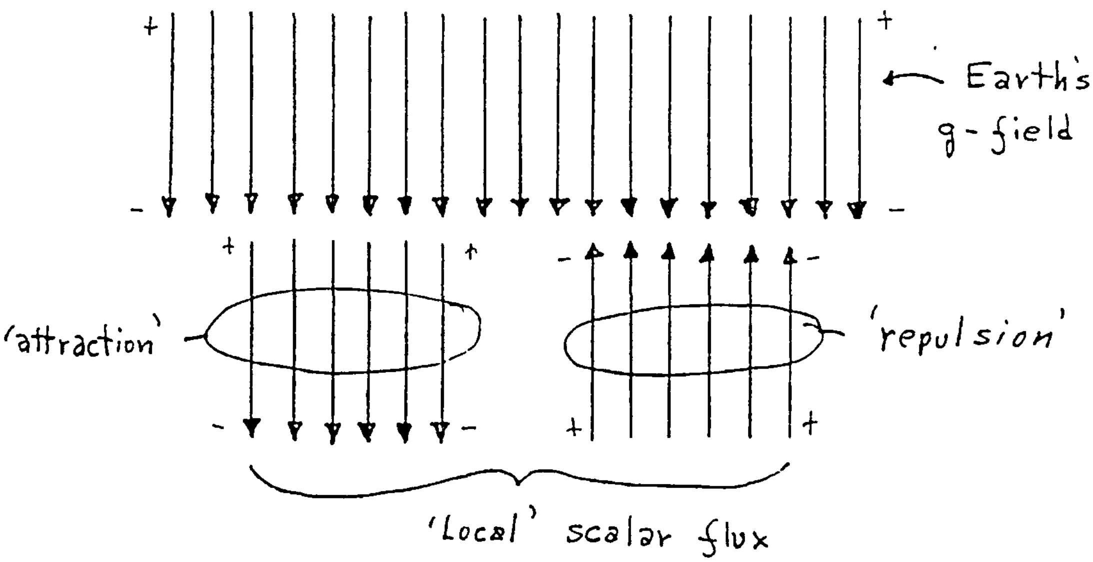

Figure (2) - Interaction of 'local' scalar flux with the earth's scalar g-field.

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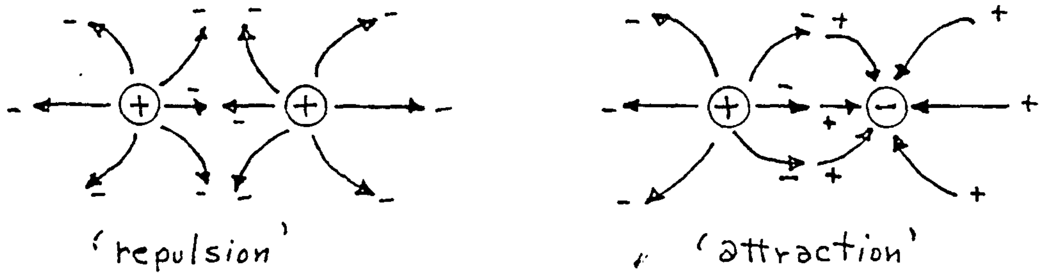

(a) - Scalar flux due to electric charge.

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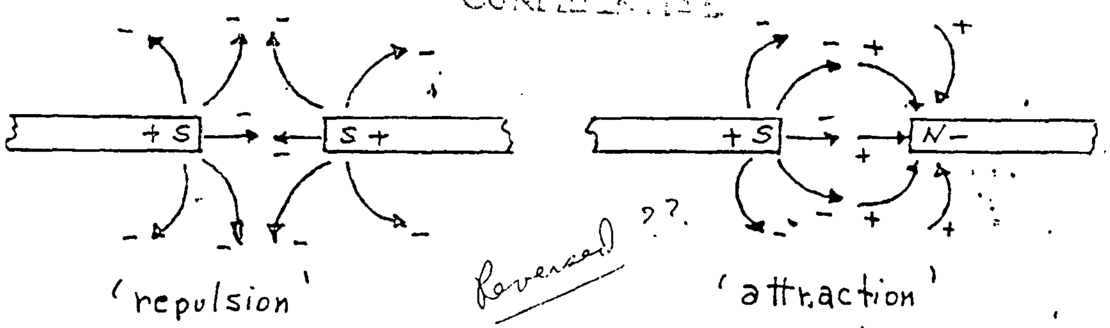
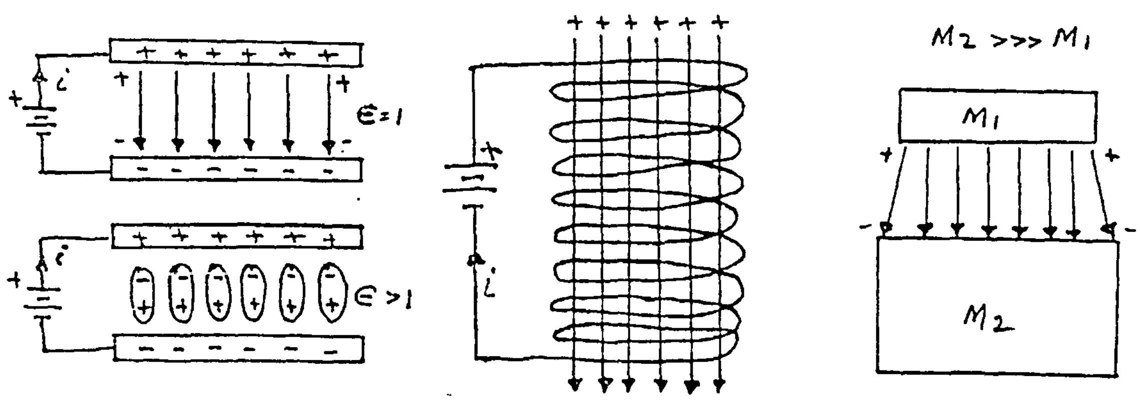


(b) - Scalar flux due to magnetic 'poles'.

Figure (3) - Interaction of scalar flux as developed by electric fields and magnetic fields.



(a) Scalar E-fields (b) Scalar H-fields (c) Scalar g-fields

Figure (4) - Basic generation of scalar flux fields.

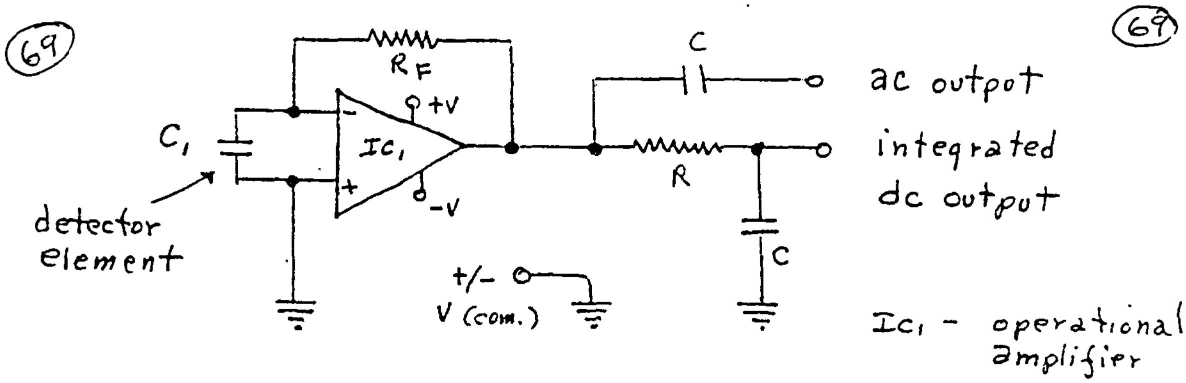


Figure (5) - Simple electronic scalar flux detector.

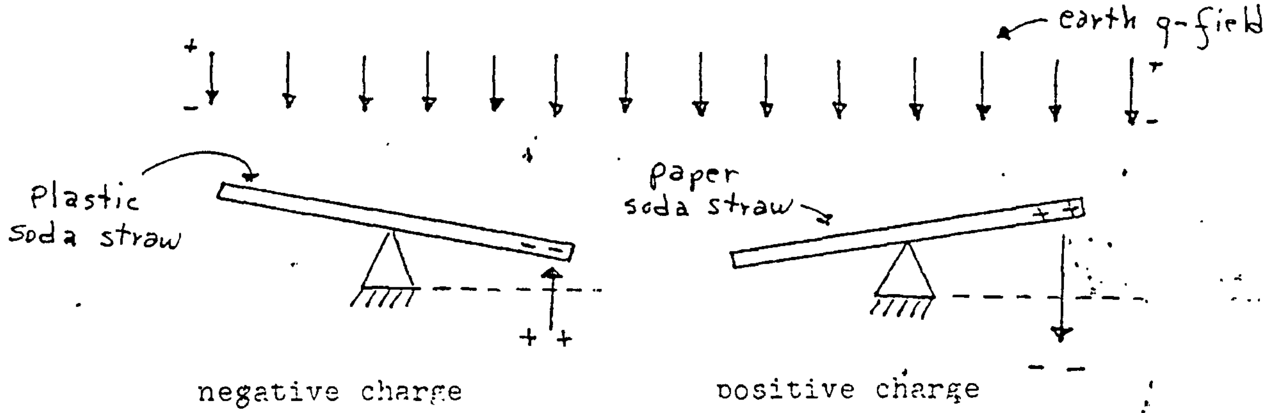


Figure (6) - Interaction of charge with earth's g-field.

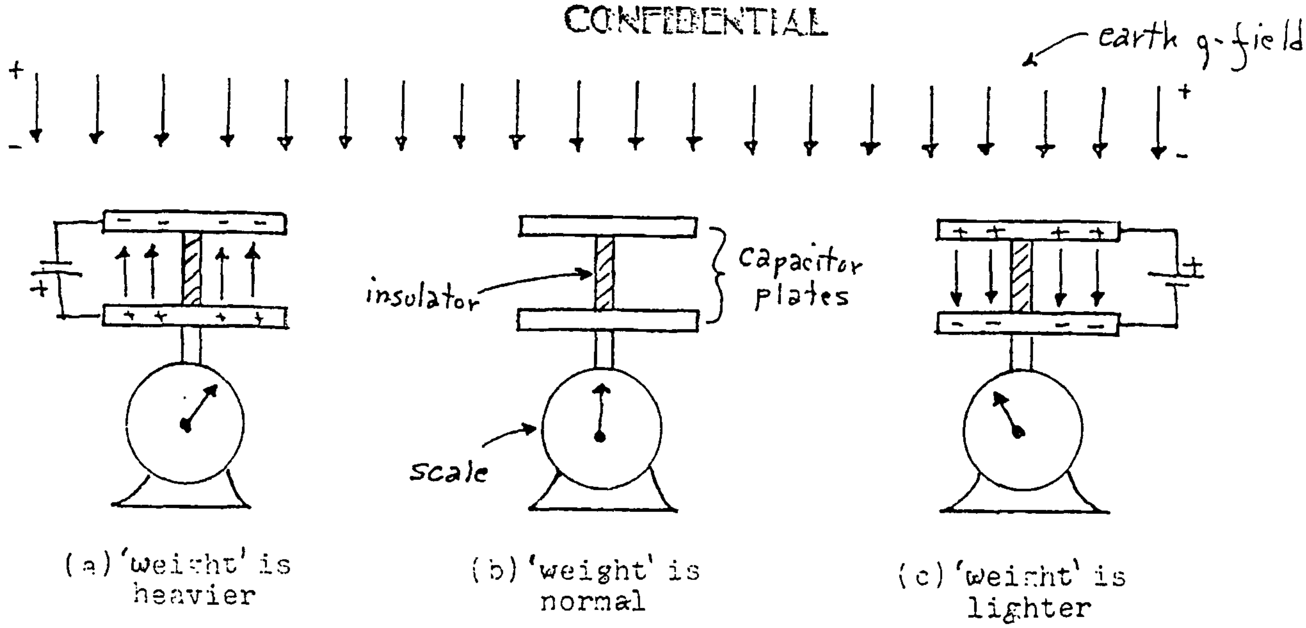


Figure (7) - Interaction of parallel plate capacitor with the earth's g-field.

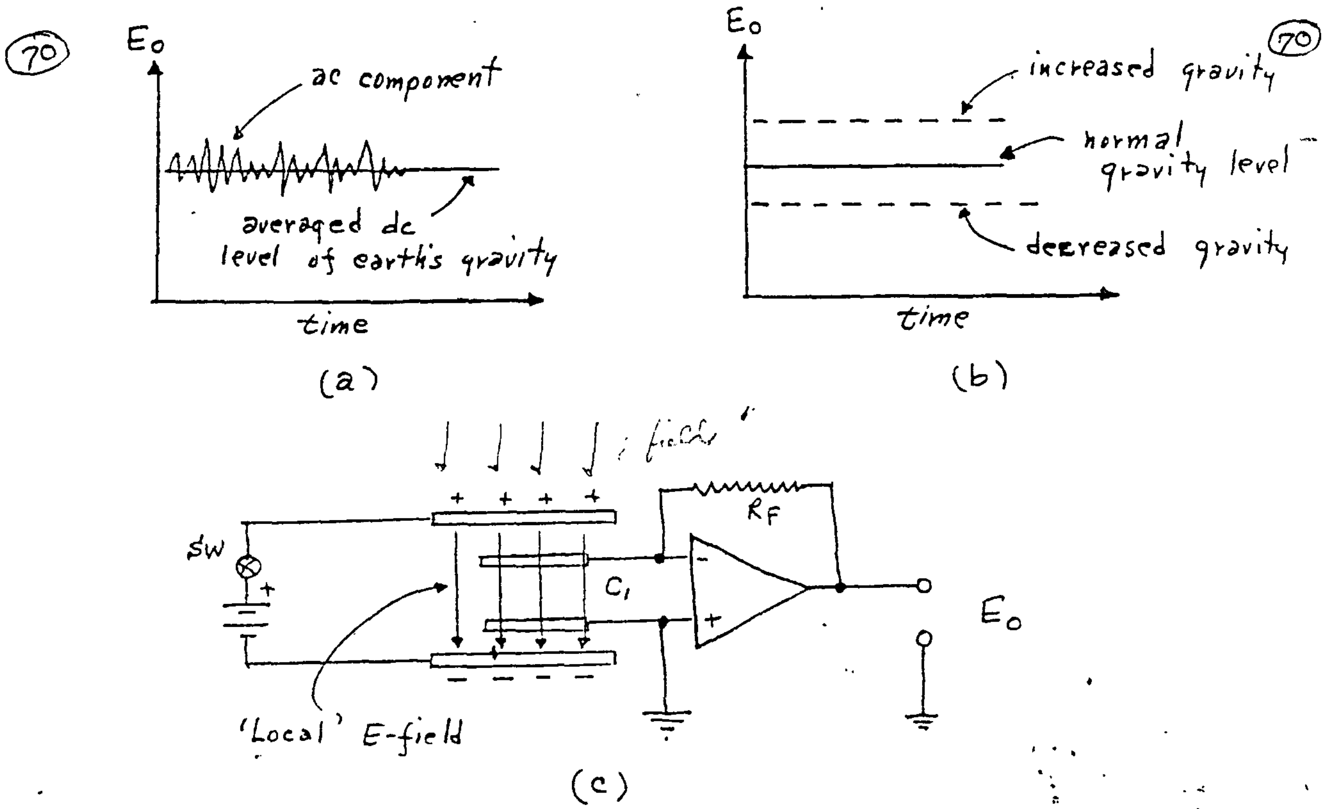


Figure (8) - 'Local' scalar E-field interaction with the detector of Figure (5).

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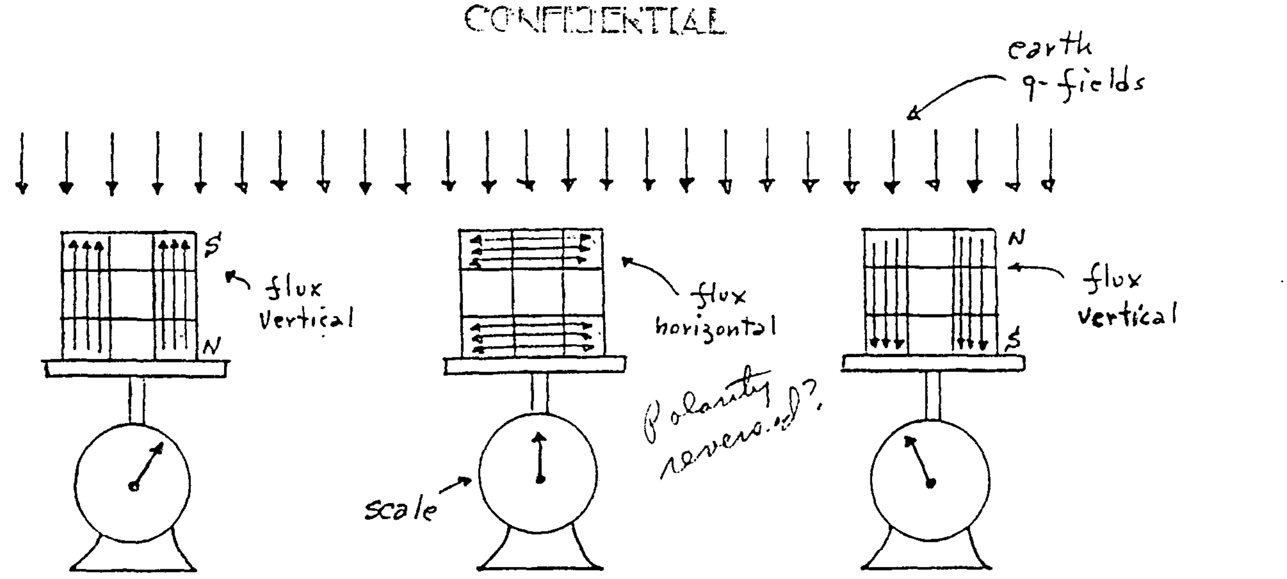

(a) 'weight' increased

(b) 'weight' normal

(c) 'weight' decreased

Figure (9) - Interaction of magnet with earth's g-field.

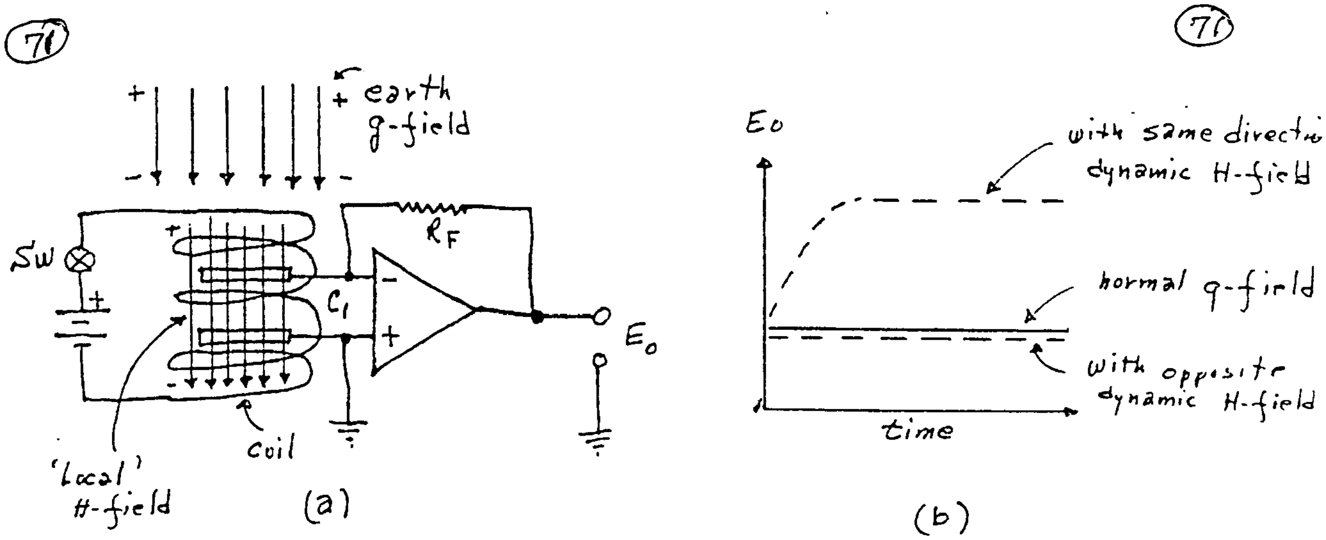

Figure (10)- 'Local' scalar H-field flux interaction the detector of Figure (5).

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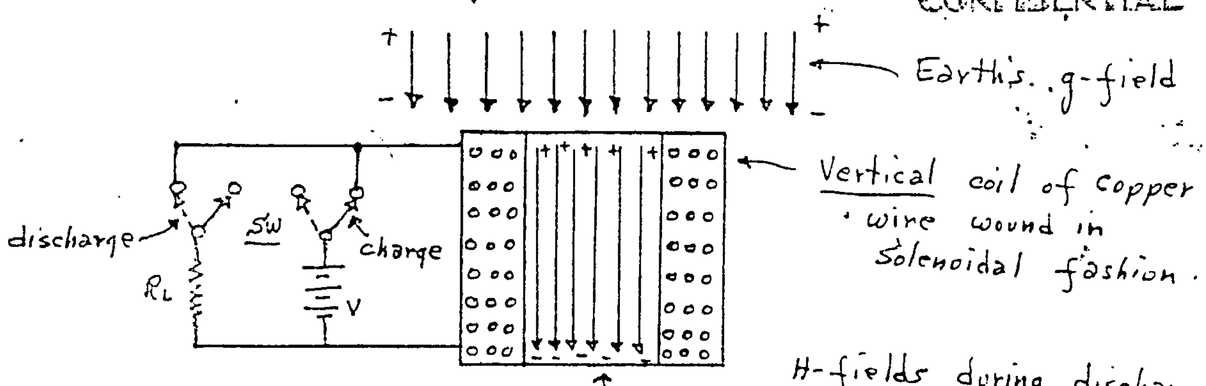

Figure (11) - Interaction of a coil with the earth's g-field.

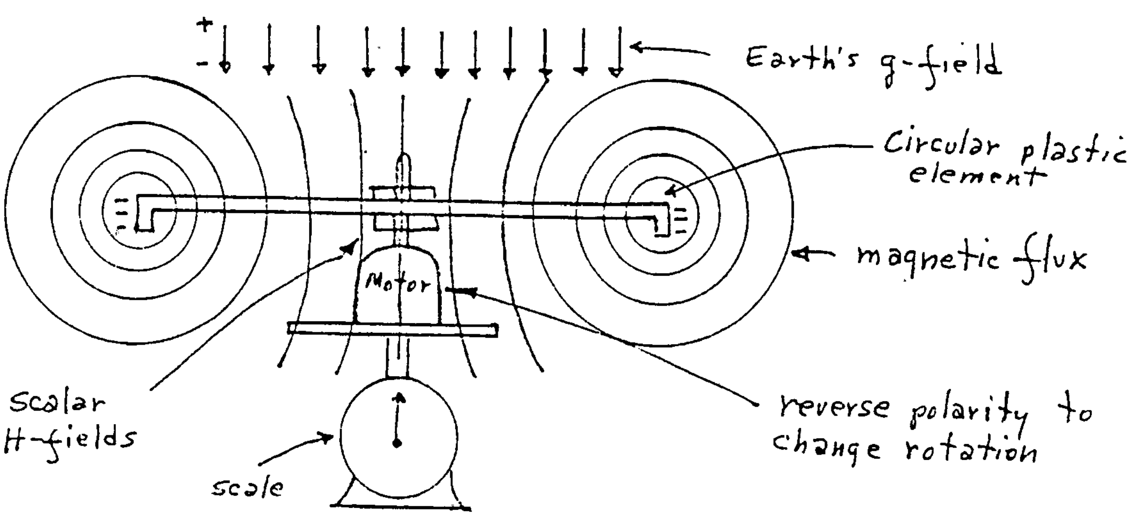

Figure (12) - Simple electro-magneto-gravitic experiment.

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Part II

Communicating With Gravity Signals

G. Hodowanec

(73) (73)

INTRODUCTION

Present-day communication systems largely make use of the interaction of electric flux fields and magnetic flux fields in a vector type of radiation field, ie., electromagnetic waves, to convey information between distant points at the speed of light. Such systems range over the entire electromagnetic spectrum, from the very low frequencies (VLF) to the super high frequencies (SHF) reaching past the microwave frequencies and well into the optical range frequencies. Such vector-type radiation fields have been extensively developed over the years and are in extensive use today. Scalar-type radiation fields, such as the gravitational field, however, might eventually be useful to convey information 'instantly' according to the authors's theories. With the development of scalar flux-field detectors, it is now possible to demonstrate some effects which appear to be attributable to such scalar field effects. Some simple experiments, based upon the concepts discussed in Part I, are used to illustrate the potential of such gravity signal communications. These should provide a starting point for further experiments and investigations into these effects by the inquisitive and open-minded electronic experimenters, amateur astronomers, as well as the professional researchers.

BACKGROUND

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Scalar flux fields, especially the gravitational flux field, have the interesting property of easily penetrating ordinary matter, in addition to their long-range and 'instantaneous' response characteristics. Thus such systems may operate from any location, even deep in the ocean or deep underground. While proper methodology will have to be developed for these systems to become operational, they are also well within the capability of most electronic experimenters.

(74) A major step forward in the possibility of affecting scalar signal communications has been made with the development of some very sensitive scalar flux field detectors by the author.[1] These detectors are but the application of the concepts given in Part I, but they may appear in several forms. The detectors are presently being used in a wide range of applications by the author, including such facets as gravitational signal astronomy, gravity field measurements, 1/f noise detection and cancellation, Hooke's Law type scale 'gravity fluctuation error' corrections, esoteric energy detection, as well as many others. However, discussed here briefly will be only the potential of using scalar flux fields, eg., gravitational fields, in possible methods for communicating or signaling purposes.

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SCALAR FIELD DETECTORS

The scalar flux field detector used by the author in the experiments of Part II is very simple and is shown in Figure (1). It is basically a typical electronic-type gravity signal detector which uses a capacitor element, C_1 , for the detection of polarization effects caused by any incident scalar flux which may transit this capacitor. It is largely a 1/f noise detector in that it will detect various gravitational signal impulses which are generated in the universe or by mankind. It is termed 1/f noise since the stronger impulses are generated less frequently than the more moderate impulses and the moderate impulses are seen less frequently than the weaker impulses. The capacitance, C_1 , and the feedback resistance, R_1 , are chosen sufficiently high in value such that input circuit 'resonances' are very much less than 1 Hz and thus the unit will not respond to certain earth or universe resonance effects[2] , but only to the individual gravity signal impulses. The use of a C-mos op-amp unit, the ICL 7611, enables efficient operation with but a +/- 1.5 volt battery supply.

The unit is assembled in a small aluminum box with the batteries enclosed within the box, and the output is brought out with a filter-type feedthru unit in order to eliminate any possible response to ambient RF-type signals.

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Shown in Figure (2) is a simple audio amplifier which may be used with the detector. The readily available 386 device has a gain of about 200 times and provisions are made for headphone listening also. Small telephone amplifiers or mini-amplifiers are commercially available which make suitable ready-built audio amplifiers. The author also used a mini-amplifier available from Radio Shack (#277-1008) for these tests with good results. The headphone jack is desireable for headphone listening to the many scalar signal sounds generated naturally in the universe or by mankind. Headphone listening also facilitates the detection of some of the weaker scalar flux signals to be noted in these experiments. Other simple scalar flux field detectors may make interesting experiments for the amateur. Shown in Figure (3) is a detection unit which uses the low-cost 741 op-amp. Here, the 1/f noise is generated in a carbon composition input resistive element rather than a capacitive element. The current impulses developed in the resistor by gravity signals are also highly amplified and converted to voltage impulses by the op-amp circuit. To facilitate the more critical adjustment of this circuit, both the input resistance and the feedback resistance were made variable. The input resistance, R_1, is generally in the order of 100 to 200 ohms for most of the ICs tested, while the feedback resistance is generally in the order of 1000 to 10,000 times the input value for optimum results. The experimenter should first adjust the input resistance to about 150 ohms and then adjust the feedback resistance for maximum 1/f noise response. A final re-adjustment of the input resistance should then be undertaken.

The resistive 1/f noise detector of Figure (3) is an effective detector of scalar flux signals and thus it may be used in place of the capacitive 1/f noise detector shown in Figure (1) in the detection of gravity impulses or the scalar flux signals which are developed by the simple flux generators to be described here.

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However, other electronic devices may also operate as scalar flux detectors. For example, a transistor operated in its 'avalanche breakdown' mode will detect scalar flux modulations which are superimposed on the 'white noise' created by the avalanching electrons and holes in the semiconductor junction. Shown in Figure (4) is a simple test circuit to evaluate this detection process. The author used a 2N3866 RF transistor device which contains many parallel-connected small units with a breakdown voltage in the order of 55 volts and thus it can develop appreciable noise output. A voltage divider network, with a variable resistance, R_1, was used to establish the correct dc operating point for the device in this mode of operation. Other transistor devices may also be operated in this mode with similar interesting output noise characteristics. An interesting aspect of this noise generator is the 'random telegraph signal' response which is obtained by shifting the device operating point just beyond avalanche breakdown. A series of irregular output pulses are obtained which are believed to be due to supernova 'burst' signals being intercepted by the device.

Another interesting gravity noise detection circuit may be constructed with some gaseous voltage regulator tubes which contain a radio active 'keep alive' element. These tubes were commonly used in WWII military electronic gear and some may still be available occasionally on the surplus market. The author used a small 300 volt device in the simple circuit shown in Figure (5a). With the proper adjustment of the dc supply voltage, the device will generate a 'random telegraph signal' type of response as shown in Figure (5b). However, the unit also 'oscillates' at about the 400 Hz frequency rate which is independent of the dc supply voltage! However, the pulse train characteristics could be increased or decreased by varying the supply voltage. Thus while the audio output appears very much like 400 Hz Morse Code signals, they are believed to be but excitations induced by the interception of supernova 'burst' signals.

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SCALAR FLUX GENERATION

Scalar flux fields of the gravitational type are generated profusely in the universe and are detectable with the simple circuits of Figures (1) and (3). The units will respond to the individual impulses of gravity gradients as a 'noise spectrum' which can be heard on an audio amplifier or displayed as 'grass' on an oscilloscope. Careful listening to the audio signal response will also reveal, not only 'noise' but also some coherent responses and 'musical' tones as well. These will be considered later.

Man-made scalar flux signals are largely due to oscillating or rotating asymmetric masses. Some are also generated in processes similar to that shown in Figure (6), for example, turning on a bank of flourescent lights could create a fairly strong momentary scalar flux field. A translation of mass will also generate 'signals' which are due to perturbations of an apparent standing-wave pattern in the universe's background radiation. This background radiation is believe to be the result of countless violent processes in the universe over the eons, but is at present considered as the so-called microwave background radiation left over in the 'big bang' theory of the creation of our universe.

'Local' weak scalar flux signals of the pure electric field type (E-fields), the curl-free magnetic field type (H-fields), or the

gravitational field type (g-fields) may be generated with the simple
78 circuits shown in Figure (6). These signals have been detected at 78
about 75 feet away, the maximum lab distance available to the author. However, they are at about the same level or just above the normal universe background gravitational levels, and thus are sometimes difficult to ascertain within the general background response. Thus the use of different pulse rates for these generators helps to properly identify the correct scalar flux signal. In general, it was found that low pulse rates must be used, less than 100 Hz, and preferably less than 10 Hz.

Scalar flux signals of the pure electric field type (E-fields) are generated mainly by charge impulses which are divorced from any accompanying magnetic components. In these circuits, this is accomplished by charge 'flow' across semiconductor junctions, or by charge fluctuations in ionized gases. Scalar flux signals of the curl-free magnetic type (H-fields) are generated by magnetic source fields near the poles of a long magnet or electromagnet, ie., in loose terms, a magnetic monopole. Scalar flux fields of the electric type may also be generated by special coil configurations in which the magnetic component (but not the electric component) is cancelled. Other coil configurations may also generate scalar H-fields as was discussed in Part I. However, these are usually on the local level only.

The circuits of Figure (6) develop weak <u>active</u> scalar flux signals which are detectable with the simple detectors of Figures (1) and (3). However, the experimenter may be more impressed with the potential communication possibilities which involves 'modulations' of the existing strong gravitational background radiation. Some experiments along these lines are now considered.

(79) Listening to the sounds of the universe's scalar flux signals with the detector of Figure (1) and the audio amplifier of Figure (2) on headphones can be quite impressive. Adjust the amplifier sound level for best response to the particular sound under study. Of particular interest may be some of the coherent 'musical' sounds which appear to come from the same direction of space on a daily basis. At the author's location of 42° N. Latitude, these sounds appear to originate in the Perseus and Auriga regions of our Galaxy when these regions appear in the author's zenith. Perhaps some of these signals might be extraterrestrial intelligence signals, and those experimentters interested in SETI (Search for ExtraTerrestrial Intelligence) may want to investigate this aspect of the detection process.[3]

The detector is also extremely sensitive to 'modulations' of the ambient gravitational background levels (also known as the microwave background radiation or MBR). This background appears to have a standing wave pattern structure in the universe which has a 'wavelength' of about .25 centimeter, corresponding to the 3° K black-body temperature for this radiation. The local translation of mass affects this structure as a rather intense perturbation which appears as a strong 'rushing' sound in the detector audio output. The experimenter may best observe this effect by slowly waving his arm back and forth at about a 1-2 Hz rate so as to establish a strong 'resonance effect' and then stops this movement at some peak swing. He will then note that this resonance effect will continue for many minutes, even hours, or until the coherent effect is destroyed by some other local process such as your own beating heart or breathing actions, which are local gravitational signals. It is best destroyed by oscillating your arm, initially rapidly, then tapering down to a standstill. That these modulations are truly due to mass in motion, can be seen by oscillating a pendulum, or rolling a mass. These devices will disturb the vacuum, ie., the gravitational background, independently of any human action. The effect appears to drop off directly with distance, which may be typical of scalar flux signals. The author has detected the oscillation of a pendulum 150 feet away which appeared to have the same response in intensity (detected) as when the pendulum was only 5 feet away.

An interesting experiment can be performed with this pendulum, which is a two pound weight suspended from a six foot height with a light weight string. Set the pendulum in motion with about a five foot arc length. Adjust the detector volume for a good response to this swinging disturbance of the vacuum, ie., the universe. Now take the detector along in your car. Note that the response remains about the same in intensity even when the detector is inside the car. Now drive slowly to a distance of about one mile from the site of the pendulum. You will note that the pendulum response will fall off with distance (probably at the 1/r rate) but will be still quite noticeable at the one mile distance. Now slowly return to the original site of the pendulum. As you return, you will notice that the response will continually increase in level and will have the original magnitude when you have returned to the site. However, most likely, the pendulum has stopped its oscillations by this time, but the disturbance in the universe remained! This effect appears to be typical of scalar or gravitational perturbations in this universe. This also has an interesting connotation in that it further explains the failure to detect the 'ether' in the Michelson-Morely type experiments. It appears that if an experiment is conducted in a moving frame of reference such as the earth, the experiment will also move through the ether with this frame of reference and thus no translational effects will be detectable from within this frame of reference. That is why the pendulum disturbance remained at the site region even though the experiment moved with the earth about 500 miles with respect to the ether (or rhysmoid).

Therefore, such perturbation disturbances could have very extended range. There is that one drawback, however. Scalar signals, once generated tend to propagate continually until dissipated or over-ridden in some way. However, the perturbations can be encoded, eg., if a scalar flux signal is pulsed at some rate, the pulsed rate will be maintained. For example, if the 5 Hz LED scalar source shown in Figure (6) is pulsed on every five seconds, the gravitational background (universe) will be excited with 5 Hz pulses every five seconds even after the original excitation has ceased! It appears that this type of gravitational communications will probably require some sort of pulse-code modulation which can defeat the continuing propagation characteristics of the vacuum. The buzzer scalar flux source of the type shown in Figure 6(c) can apparently do this to some extent. The strong desired scalar signals from the diode, CR_1 , appear to be followed by 'cancellation' pulses , either from the scalar H-field shown, the g-fields generated by the armarture, or possibly some remaining E-fields at the breaker points. These fields may act in such a way that desired 'buzzing' scalar signals are strongly transmitted, but they are not strongly repeated, ie., the repeating pulses appear to be way, way down in level. Therefore, it was possible to transmit low speed Morse Code signals by these means. While some brief tests were made at about a distance of 200 feet, the range is probably very much greater than that, even when a very low level (1.5 volt) buzzer source was used. Perhaps the early radio experimenters with their 'spark gap' induction coil transmitter operating at extremely long wavelengths were actually also using scalar 'waves' in their systems in addition to the normal vector EM waves?

It is also interesting to note that the maximum energy excitation of this background radiation appears to take place at about the 1-2 Hz rate. This may be a natural resonance frequency, either as an earth resonance or as a universe resonance. Lightning stroke induced scalar flux signals also appear to be a good source for these very low frequency excitations.[2] There is room for much research here.

PSYCHIC EFFECTS ???

There are many sources for gravitational perturbations at the local level. For example, a good 1-2 Hz resonance effect can be established by simply pressing the thumb and first finger together at this rate. When a good rate is established, cease the excitation process using the fingers. However, the modulations will continue at this same rate. Now think hard to slow down this rate: the rate will slow down!! Then think hard to increase the rate: the rate will increase!! Relax and the rate will return to the original excitation!! Are these psychic effects or are they a control of time? Or are they related to unconcious heart beats, lung expansions, and muscle tensions which are capable of generating gravitational modulations? Even the nerve impulses controlling these actions could possibly be in terms of scalar signals? I will leave it to the reader to perform the experiments and thus decide for himself the nature of these effects. That the effects are apparently real is seen in that the experiment can be recorded on tape and stored.

CONCLUSIONS

A new area of scalar field research has been opened up due to the development of very sensitive scalar flux field detection units.

The brief note on some experiments given here are but the tip of the iceberg. There is room for much research and development here. At present only a few dedicated experimenters and open-minded researchers have entered this new field and are contributing to the development of this new technology. The author hopes that many more inquisitive and knowledgeable experimenters will enter the fray. But just a few words in warning: Scalar field technology is just now awaken ing. Therefore, there is not much gravity signal 'pollution' at present, such as what exists today in terms of electromagnetic radiations. The strongest gravity signals at present are due to the various mechanisms due to natural processes in the universe. There is some evidence that the Russians may be experimenting with very strong scalar flux signals (a colleague may have detected some very strong possibly Russian scalar signals in Sweden) but none have been detected in the author's locality. Therefore, it behooves one to make the most of the 'quiet ~~universe~~ earth' at present to explore the gravitational window to the universe using the scalar signal detection methods. This will be considered in the final Part III of this article series.

Part II

(84) (84)

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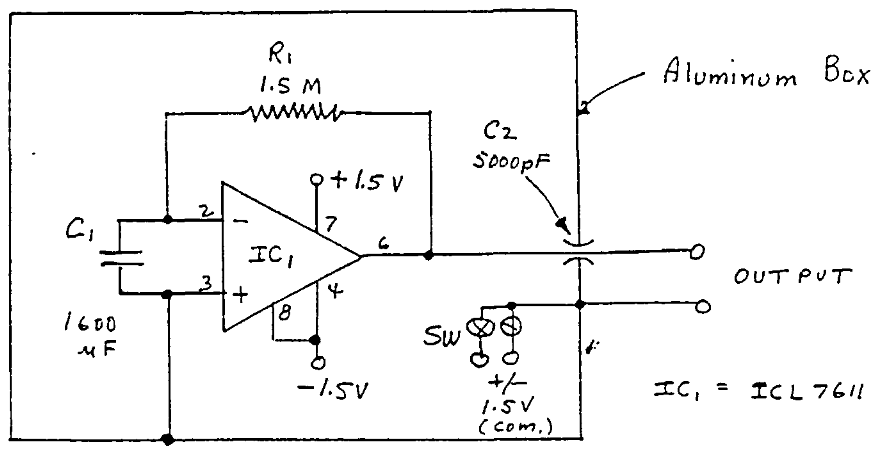

Figure (1) - Scalar Field Detector Used in the Author's Experiments.

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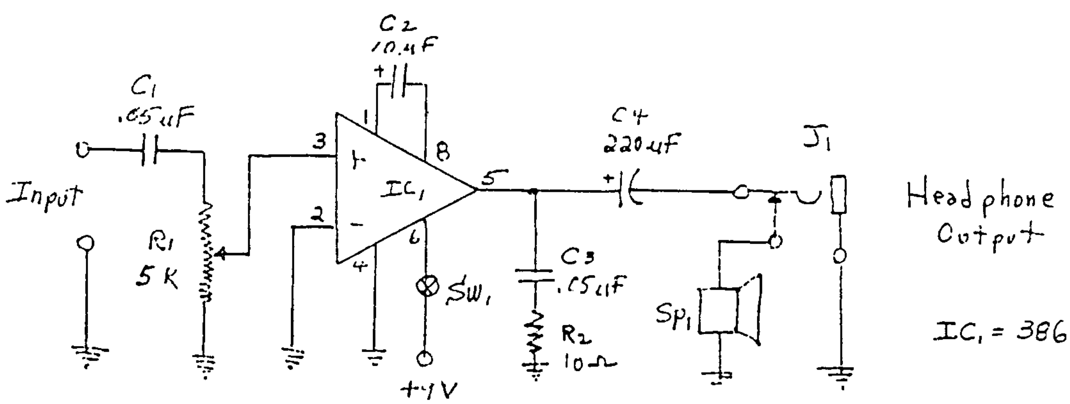

Figure (2) - Simple Audio Amplifier Useful With the Scalar Field Detector.

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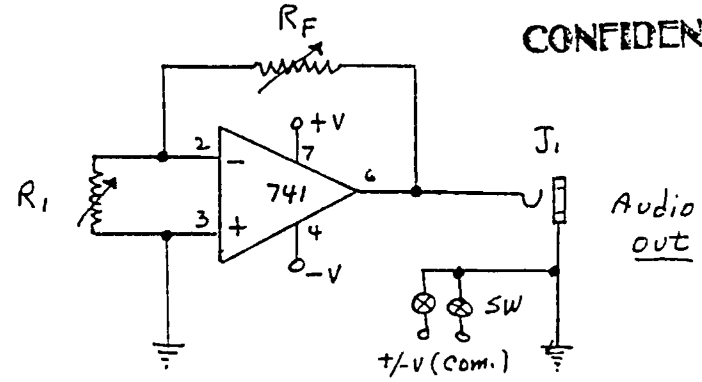
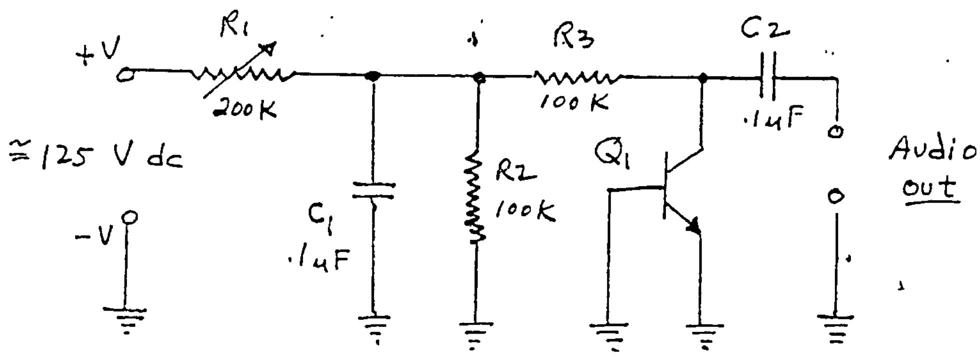
Note: Shield entire detector for best results.



V = 9 volts

Figure (3) - Resistive 1/f noise detector.



See Note

Q1 : 2N3866

Figure (4) - Avalanche transistor 1/f noise detector.

See Note

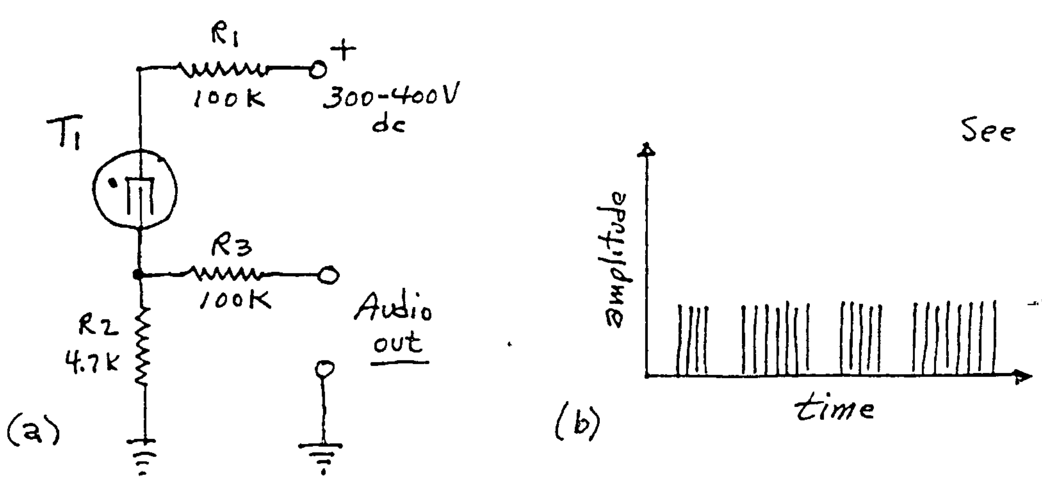
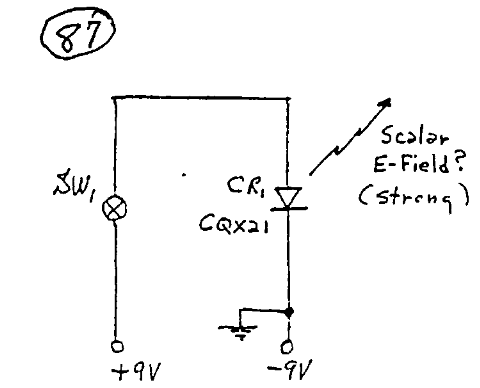
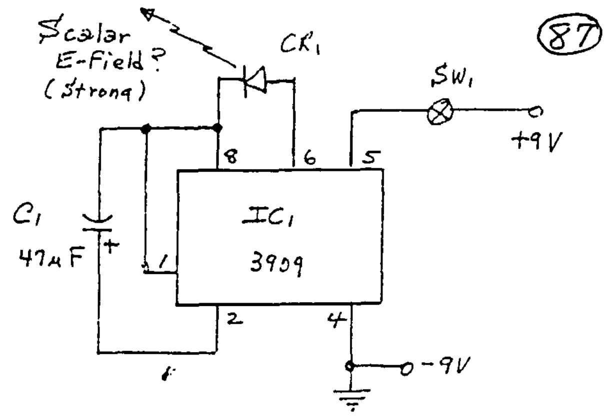


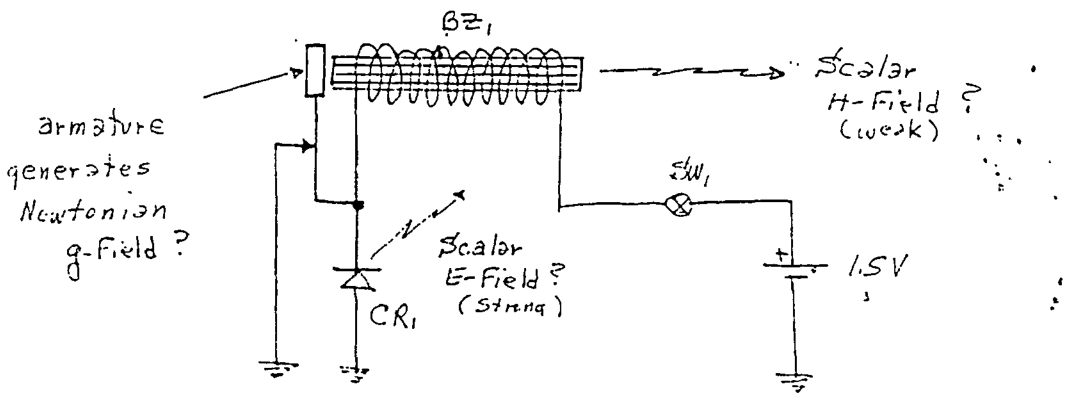
Figure (5) - Gaseous regulator tube 1/f noise detector.



(a) 1-2 Hz 'Blinking' LED
Scalar Source



(b) 5 Hz Pulsing LED
Scalar Source



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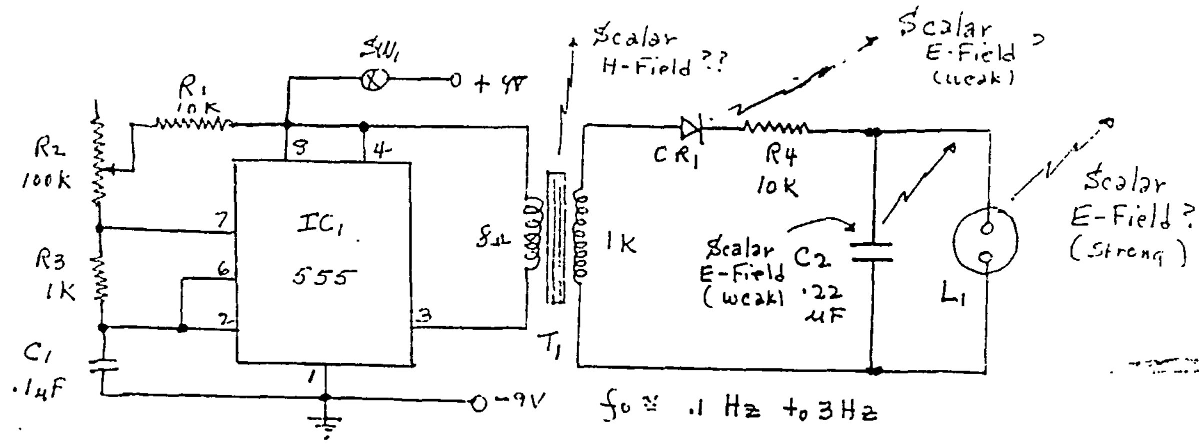
(c) Buzzer Scalar Source



(d) Neon Bulb Scalar Source

Figure (6) - Some Simple Circuits Which Give Indication of Being Scalar Sources. Note- all circuits are constructed in shielded boxes.

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PARTS LIST

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Figure (1)

R_1	-	1.5 megohm, 1/4 w, resistor
C_1	-	1600 uF, 4V, electrolytic capacitor
C_2	-	5000 pF, feedthru, filter type preferred
IC_1	-	C-mos, ICL7611
SW_1	-	DPST miniature switch

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Figure (2)

R_1	-	5k potentiometer
R_2	-	10 ohm, 1/4 w, resistor
C_1, C_3	-	.05 uF ceramic capacitor
C_2	-	10 uF, 10v, electrolytic capacitor
C_4	-	220 uF, 15v, electrolytic capacitor
SW_1	-	SPST miniature switch
J_1	-	miniature closed circuit jack
IC_1	-	386
SP_1	-	8-16 ohm miniature speaker

Figure (3)

R_1	-	500 ohm carbon potentiometer
R_f	-	1.5M potentiometer
SW	-	DPST miniature switch
J_1	-	miniature output jack
IC_1	-	741

Figure (4)

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R_1	-	200k potentiometer
R_2, R_3	-	100k, 1/4w, resistor
C_1, C_2	-	.1 uF, mylar capacitor
Q_1	-	2N3866

Figure (5)

R_1, R_3	-	100k, 1/4 w, resistor
R2	-	4.7k, 1/4 w, resistor
T_1	-	300v gas regulator tube (radioactive)

Parts List (Cont.)

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Figure (6)

Circuit (a)

CR_1 - CQX21 blinking LED
SW_1 - SPST miniature switch

Circuit (b)

C_1 - 47 uF, 15v, electrolytic capacitor
CR_1 - high output LED
SW_1 - SPST miniature switch
IC_1 - 3909

Circuit (c)

BZ_1 - small 1-3v buzzer unit
CR_1 - 1000v diode
SW_1 - SPST miniature switch

CONFIDENTIAL

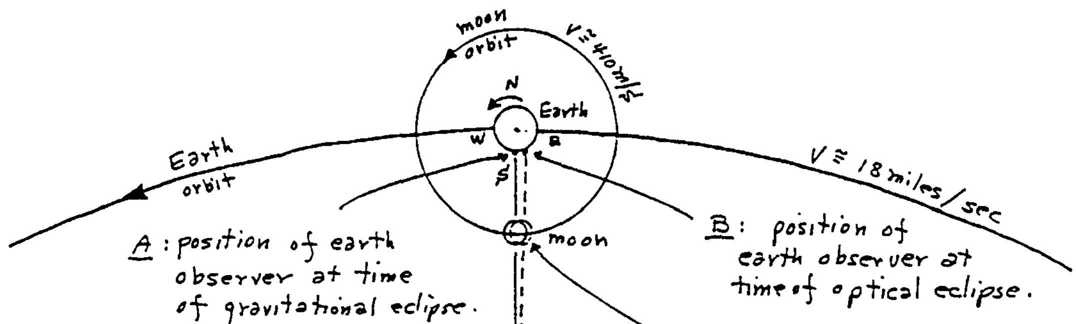
Circuit (d)

R_1,R_4 - 10k, 1/4 w, resistor
R_2 - 100k potentiometer
R_3 - 1k, 1/4 w, resistor
C_1 - .1 uF, 50v, capacitor
C_2 - .22 uF, 200v, capacitor
SW_1 - SPST miniature switch
CR_1 - 1N914 type diode
T_1 - 1k to 8 ohm miniature transformer
L_1 - NE-2 neon bulb

Cosmology

GH Labs
Newark, N.J.
3/15/86
GH

I. Gravitational vs. Optical Eclipse of Sun by Moon (per Rhysmonic Cosmology).



moon shown (solid) at time of gravitational eclipse.
moon shown (dotted) at time of optical eclipse.

Notes:

(1) Observer on earth has a relative movement as shown due to the earth's rotational velocity (≅ 16 miles/minute).

(2) Relative to earth, moon has a velocity eastward due to the moon's orbital velocity (≅ 410 m/min).

(3) The stellar aberration (the sun is our nearest star) due to the finite velocity of light and the earth's orbital velocity (≅ 18 miles/sec) places the optical image of the sun to the observer at position B, along the direction shown by the dotted line.

(4) The 'instantaneous' gravitational eclipse occurs in the direction shown by the solid line.

Light travel times:
moon to earth ≅ 1.3 sec.
sun to earth ≅ 8.3 min.

gravitational signal path (≅ instantaneous)

optical signal path (as aberrated ≅ 8.3 min. later)

angle of arc ≅ 22 seconds of arc (shown not to scale). ma

'apparent' position of sun for optical eclipse. (due to stellar aberration) & finite velocity of light

actual position of sun for both gravitational and optical eclipses.

BR

Conclusion: Optical eclipses of the sun by the moon will follow the gravitational eclipse by about 8.3 min. due to stellar aberration and the relative movements of the earth and moon. This has been confirmed in the experiment of May 30, 1984. Gravity signals are essentially 'instantaneous' signals!

FURTHER CONFIRMATIONS BY THE AUTHOR AND OTHERS DURING SEVERAL ECLIPSES SINCE. SEEMS LIKELY THERE ARE MANY MORE 'EMBEDDED' IN EM ECLIPSE RECORDS(?)

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Part III

Gravity Signal Astronomy

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Part III

INTRODUCTION

Astronomy in recent years has undergone a revolution in both theoretical considerations and observational methods. These are the result of new advances in scientific technology, which not only opene new observational techniques, such as observations at electromagneti frequencies other than visible light, but also gave evidence that ou universe, in its furthest reaches, also obeys the same scientific principles as is observed here in our own environment. Among the ne observational attempts ~~was~~ were those made ~~with~~ for the detection of possible gravitational signals. Such signals would be a new 'window' to the universe and thus would disclose many aspects not observable with th present electromagnetic techniques. However, the present attempts are being made in terms of the ~~quadrature~~ quadrupole-type gravity 'waves' which were predicted by Einstein. Those signals are really, in essence, but a form of electromagnetic radiation, and, due to the relatively slow movements of large astronomical masses, would be expected to have very long wavelengths and thus very low energy content. Therefore, they would be a very elusive type of radiation signal to be detected with the presently developed techniques. Nevertheless, the author believes that perhaps some of the so-called micropulsations being observed with some very sensitive magnetometers might be just such gravity signals.

The main problem today in the attempts to observe any gravitational radiation signals has been the insistence by the conventiona (orthodox) astrophysicist that only the ~~quadrature~~ quadrupole-type of signals of Einstein are permissible in the universe. Rhysmonic cosmology[1], however, has shown the existence of longitudinal, monopolar or scalar type gravity signals also. These signals exist profusely in the un verse and are easily detected with the rather simple detection techniques that have already been described in Part I and Part II of this series of articles.

Such detection techniques are very low in cost and well within the capabilities of the electronic experimenter, amateur astronomer, and interested private researcher. They do not require expensive installations or special location sites. In fact, the author does his 'observing' in a corner of his basement laboratory! The amateur will thus be in the forefront of this new technology and will be in a position to contribute much to our knowledge of our universe. While the basis for these techniques have already been described, the author will now elaborate somewhat on the techniques of electrogravitation as it applies to this gravity signal astronomy methodology.

ELECTROGRAVITIC DETECTION METHODS

While magnetogravitic techniques could also be used in gravity signal observations, emphasis here will be on the electrogravitic effects in a capacitor element as it is used in the simple electronic detection circuit shown in Figure (5) of Part I. As pointed out previously, scalar g-fields will 'polarize' the dielectric of the capacitor and thus create an internal scalar E-field which can be coupled out as a current level (or impulse) to drive the current-to-voltage mode of operation of an operational amplifier. Moreover, as shown in the depiction of Figure (1), this current output, and thus the voltage output of the op-amp circuit, will be proportional to the g-field fluctuations transiting this capacitor detector element. The amount of dipole interaction (the ions are 'repelled' by the gravity field while the electrons are 'attracted') will also be a function of the nature of the dielectric as well as the geometry and orientation of the capacitor. For example, a flat, planar type of capacitor, such as a printed circuit type of capacitor oriented such that a flat side is up, is more effective as a detecting element than a tubular-type of capacitor. In both cases, the effective detecting area is but a small region in the central regions of the capacitor. Thus the detection unit will have a very fine resolution or a 'beam' size of generally less than one inch in cross section. The experimenter may want to evaluate other capacitor geometries and orientations later on in his investigations.

The reason for the effectiveness of the capacitor detector element in gravity signal astronomy is due to several factors, some of which are simply depicted in Figure (2). Here, the observer's capacitive detection element is shown located on the observer's meridian, the line of longitude which lies along the celestial sphere and passes through the observer's zenith, or the position, o , shown. The earth's gravity field, the g-field shown as x , is in essence a parallel field in the vertical direction and thus interacts directly with the planar capacitor dielectric in developing the polarization effects which are a direct function of the strength of the scalar g-fields, as was depicted in Figure (1). However, it can be shown that any possible gravity components arriving from other directions such as that shown as vectors a and b in Figure (2), will be largely cancelled by the gravity components which are generated by the ~~mass~~ motion of the rotating earth, ~~such as~~ leading to the reduced vectors a' and b'. Thus only the the gravity components arriving along a line through the observer's meridian and the center of the earth will be most effective in exciting this capacitor element. However, gravity signals which arrive anywhere along the meridian line, even through the earth, will be detectable, but the strongest response will be from the signals from directly in the zenith or directly through the center of the earth, since such signals will then have more vector components parallel with the earth g-field at the observer's position, and thus will interact more strongly within the capacitor element. However, strong signals on the observer's meridian, which are not on the direct zenith-to-earth-center line, may at times 'swamp' the direct signals and thus also be 'observable'. It is in this fashion that the author is able to 'observe' the Galaxy Center structure, even though it is located about 70° from the vertical when it is in the author's celestial dome. However, when it is located on the author's meridian through the earth, it is only about 15° from the vertical and thus the Galaxy Center signals are more pronounced under these conditions. However, signals which lie off the meridian may yet be detectable with special high gain detection systems. The author will describe in a future article the detection of such signals with what could be described as a gravity signal 'telescope'. In this mode of operation, a series of detectors along a line could have their outputs 'summed' electronically for increased sensitivity and output. While such a unit will be most useful with observations along the meridian, it will also detect strong signals off the meridian since the weak components can be 'summed' to useful levels. That such techniques are valid is demonstrated experimently in that two such detectors connected to a summing amplifier will have their outputs essentially doubled, while if they are connected to a difference amplifier their outputs are effectively 'cancelled' except for some low level 'burst' signals coming ~~for~~ from supernova effects. This is due to the extreme resolution of the detector elements and thus each detector could respond to some separate 'events' under these conditions. The detection process is depicted for two common universe gravity signals in Figure (3). A supernova 'implosion' will generate an oscillatory 'modulation' of the g-fields to an observer located at position A and a reduced g-field

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due to the presence of a 'black hole' to the observer located at position B. These effects and many others will be considered in more detail later.

SIMPLE DETECTION UNITS

The astronomical gravity signal detection units are but special modifications of the basic scalar flux field detector shown in Figure (5) of Part I. The modifications are in general: (1), the input resonance frequency is normally kept much less than one hertz per second, (2), amplification stages are added, and (3), low pass filter sections (signal integrating) is used in the output.

The input resonance is kept low to insure response only to individual low frequency scalar signal impulses, while still retaining a high current-to-voltage gain in this input circuitry. Also, the circuit response to 'natural' earth or universe resonances[2] which are in the order of 1-2 hertz are especially to be avoided since such responses could 'swamp' desired astronomical signals! The detector stage signal output is amplified to desired levels with an amplifier stage. In some cases an off-set control may be included in the amplifier stage to set correct dc levels for the strip chart recorder unit which may be used. However, none was required with these detector units. An internal 100 kHz low pass filter unit was built into the detector unit shown for internal stability. However, most detection operation will require additional output filtering provided externally to the unit. The lower cut-off frequencies of the filter would limit response to certain frequency ranges. This is useful since, in effect, it limits the detector response to certain astronomical distance ranges. For example, when the output shunt capacitance is about 2200 uF, response appears to be largely limited to our own immediate group of galaxies.

(96) With lower values of output shunt capacitance, ie., higher filter frequency cut-off, response will include gravitational effects from deeper and deeper in space, the depth being apparently a function of the cut-off frequency response. (96)

Detector Unit #1 The basic astronomical gravity signal detection system is shown in Figure (4). The detection unit circuitry is shown in Figure 4(a). It is built around a single 1458 dual operational amplifier device and is self-contained within an aluminum enclosure, including the +/- 9volt battery supply. The aluminum box is also contained within another heavy steel box in order to ensure that only scalar-type flux signals will be receivable within this doubly-shielded Faraday-type enclosure. The output signal is brought out through filtercon type feedthrus to avoid possible RF type leakage through them. Since this particular unit (Unit #1) was originally also used to detect the 'universe' and 'earth' resonances (at high gain levels), there was some additional by-passing of the power supply as well as the feedback resistance of the amplifier stage, to ensure stability with the possibly sharp and strong input impulses to be seen in that mode of operation. Thus the input resonance of this particular unit was made in the order of one hertz, but it could be further reduced by making the input feedback resistance much higher, say up to five megohms.

The low pass filter unit shown in Figure 4 (b) is contained within its own aluminum box and is connected to the detector unit with shielded cabling. The general system set-up is shown in Figure 4(c). The author had used the system shown in Figure (4) in obtaining much of the astronomical data of the past, including the earth or universe resonance effects. The output impedance is low (order of 5k ohms) and it can drive a low impedance D'Arsonval type x-y chart recorder unit directly. However, a high impedance x-y recorder unit may be used by loading the output with a 1 to 2 kohm resistor and using the output voltage developed across this load resistance to drive the high impedance chart recorder. Since the detector output is a varying amplitude dc level which is a function of time, it is ideally displayed on an x-y recorder unit operating with a paper speed rate of about three inches per minute. However, the experimenter who lacks such a unit (which probably includes the vast majority) may make reasonable 'scans' of certain astronomical events by hand-plotting data recorded also by hand, by using a very long time constant filter in the output. It will be possible to follow the rather slow responses with respect to the more prominent 'local' events, for example the Galaxy Center.

Detector Unit #2 This unit is, in general, similar to unit #1, but uses a low-cost C-mos op-amp device which is quite effective with but a +/- 1.5 volt battery supply. The output, again, can drive either a low- or high-impedance x-y chart recorder. For those experimenters lacking a chart recorder, it works well with a +/- 500 uA galvanometer operated as a +/- .5 volt to +/- 2.5 volt dc meter (using the correct range resistances). The long time constant provided by the 2200 uF output shunt capacitance should enable the accumulation of data from some interesting 'local' astronomical events which can then be plotted.

Detector Unit #3 This unit uses the same sensitive C-mos device as was used in unit #2, but now contains its own miniature output meter, and was intended as a pocket portable unit which could be used anywhere The unit sensitivity is controlled only by the input feedback resistanc which was made variable. The very low drain of the unit ensures very long operating times, and was used by the author to 'observe' away from the lab area, as well as demonstrate the unit to interested friends. Probably the experimenter, amateur astronomer, and interested private researcher may want to start out with this simple unit. The 'scan' of the new Galaxy Center (through the earth) was hand-plotted with data obtained with this unit! See Figure (11).

GRAVITY SIGNAL 'OBSERVING'

98 The gravity signal detector 'sees' the zenith of the observer's celestial sphere through but a very small aperture as was discussed previously. This small aperture 'beam' sweeps across the celestial sphere (at the observer's latitude) with the rate of the earth's rotation with respect to the 'fixed' stars. In this respect the earth's rotation has a period of 23 hours, 56 minutes, and 4.1 seconds of civil (ordinary) time, and this period is called a siderial day. Thus a particular object being observed on the meridian will return to that meridian about 4 minutes earlier each day with respect to standard (civil) times. An object is located on the celestial sphere by the optical and radio astronomers in terms of a celestial longitude expressed in terms of siderial time with respect to a reference longitude, and also in terms of a celestial latitude. These are known as the right ascension and declination of the astronomical object.

However, the electronic experimenter may want to locate astronomical objects in a more simpler fashion. There are available circular-type-chart star finders, or planispheres, as they are more generally known. These devices are calibrated for different earth latitudes and in ordinary standard (civil) times for each day of the year. Thus by adjusting the day and time parameters, the electronic experimenter will be able to determine the position of his meridian on the celestial sphere and its relation to the star constellations there. Therefore, he will be able to determine the apparent location of an interesting object 'seen' with gravity signals, or actually determine when a particular object of known location will appear on his meridian. These sky charts, or planispheres, are also calibrated in terms of right ascension and declination, so that objects may be located in terms of these parameters if they are known. For example, the Galaxy Center is known to be located in the Sagittarius constellation region in the southern hemisphere at about 17.7 hours right ascension and about -29° declination. Locating this spot on the meridian of the observer's celestial sphere will enable the experimenter to use the planisphere to determine the day and time of day when the Galaxy Center will appear there. Again, if the meridian is relocated through the center of the earth, the time of the appearance of the Center there can also be ascertained. Using such a chart, the author was able to ascertain that the Galaxy Center structure (through the earth) would transit the author's meridian at about 2:33 PM (DST) on May 23, 1987. That region was 'scanned' from about 2:28 PM to 2:38 PM on that day using the portable Detector Unit #3, and the data was recorded by hand. The data which was obtained (with fine structure averaged out) is shown plotted in Figure (11) , and it shows that the present new Galaxy Center structure transited the detector at about 2:33:15 PM on that day. The Galaxy Center is thus 'observable' on a twice daily basis, once in the celestial sphere, and again through the earth!

The electronic experimenter is warned that the accuracy of these determinations depends upon the accuracy of his charts and local times. The author's lab is located in about the mid-point of his standard time zone and thus his charts are relatively accurate if his timing is also accurate. Generally, the experimenter should 'observe' over a sufficiently long time period to ensure that any possible timing errors will be covered by this observing period. Other 'local' objects may also be observed as they transit the observer's meridian. For example, the sun transits the meridian at noon and midnite each day. The different planets and the moon may also be observed when they 'transit'.

EXPERIMENTAL RESULTS

(100) The gravity signals which are observable with these detection systems are very numerous and includes many astronomical 'events'. However, only a few of the more prominent events will be briefly described here, primarily to aid the electronic experimenter in recognizing the 'signatures' of these events.

Nova: Novae are believed to be stars which eject their outer layers in a violent 'explosion', probably due to some nuclear reaction The large transient movement of mass is detectable with these units. There are two prominent features or signatures for this event: the 'blast' itself and the 'tailing' of the blasted material as the detector pulls away from the blasted material (due to the rotation of the earth). This is depicted in Figure (7). Novae generally don't leave lasting gravitational traces (although new explosions are quite commonly observed) since the amount and density of the expelled material is not that great.

Supernova: Supernova are believed to be stars which exceed a certain 'critical mass' and thus 'collapse' to a small dense neutron star or a black hole structure, and in this process, expels much of its gaseous material. This entire process, which occurs only in the order of a few hundred milliseconds, is very much observable with these systems. They also have certain prominent features or signatures as is depicted in Figure (8). First, there is the actual collapse of the core of the star, which generally appears as a sharp dip in the response of the detectors considered here, but is more prominent as an oscillatory event when detected with the standard QND type detectors described in a previous reference.[3] The expulsion of the gaseous mass layers is now much more pronounced, which again gives rise to the tailing effect like that seen with ordinary novae. Supernova, however, also show a mass build-up due to 'shock-wave' action, and this may appear as a 'bump' in the tailing responses of supernovae.

Black Holes: Black hole type structures are generally developed by very massive supernova events. They appear following the event and are usually quite developed 24 to 48 hours after the event. The typical gravity signal response for such structures is depicted in Figure (9). The black hole itself appears as a rather deep gravity 'shadow' of very narrow width (time of response) since it is rather small in size, in the order of just miles, typically. Also generally prominent is the newly formed 'accretion ring', which may be formed of material which did not escape away from the black hole and thus remains 'trapped' in its vicinity. The development of such a system can usually be followed for a few days (four minutes earlier each day) and makes a most interesting observation, especially when it is recorded on strip chart paper. The close-in 'accretion ring' may remain for some time, but it is suspected that over a very long period of time, only the black hole itself will be gravitationally visible as is depicted in Figure (10).

Galaxy Center: The Galaxy Center structure as it appears with gravity signals is depicted in Figure (11). However, prior to about Dec. 5, 1986, this structure appeared to be much less pronounced and was probably quite stable for at least the past 32,000 years or so, since the gravity signal response appeared to agree quite well with the radio and infra-red detections of the Center structure. (The electronic experimenter will recall that electromagnetic waves travel at the speed of light, while monopolar-type gravity signals are essentially instantaneous signals.) However, on Dec. 1 and 2, 1986, the author noticed what appeared to be a movement of mass towards the original central obje present then in the Center. That mass was apparently 'captured' by the central mass around Dec. 5, 1986, for on Dec. 6, 1986 gravity signal detection disclosed a new very deep black hole structure with a well-defined 'accretion ring' there in place of the older weaker type structure! (See Fig. (11)). The development of the new Galaxy Center structure was accompanied by 'strong and turbulent' gravity 'winds' due to the expansion of much mass with the shock-wave front from this blast. This event was reported on December 8, 1986 to our National Science Foundation with the comments the 'winds' might affect the jet streams in the northern hemisphere and thus result in 'disturbed' weather patterns here, while in the southern hemisphere, the direction of the winds could result in stagnant weather patterns, or the doldrums there. The predicted weather disturbances in both the northern and southern hemispheres appear to have been confirmed in the weather reports from about the middle of Dec. 1986 to the present!

It was also surmized that for the same reasons earthquakes in the southern hemisphere might be more pronounced while there may be reduced activity in the northern hemisphere. Another interesting prediction was that the twinkling of starlight could also be affected. The star Sirius appeared to twinkle often and strongly this past winter!

CONCLUSIONS

While only a few aspects of gravity signal astronomy were considered here, it should illustrate to the serious experimenter, both amateur and professional, the potential in the exploratation of this new window to the universe. The field is yet wide open, and the cost of entering into these investigations is very low. The author hopes that many will join with him in these undertakings to develop a more complete knowledge of our universe.

Part III

REFERENCES

(1) G. Hodowanec, Rhysmonic Cosmology, August, 1985. (First edition out of print)

(2) G. Hodowanec, "Simple Detection of Tesla Earth Resonances??", Unpublished, July, 1986.

(3) G. Hodowanec, "Gravitational Waves???", RADIO-ELECTRONICS, April, 1986.

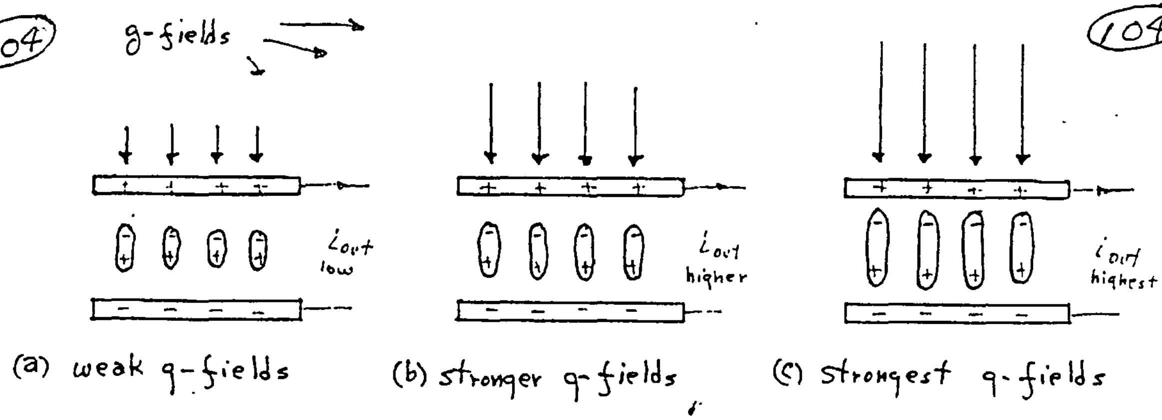


Figure (1) - Polarization effects in a capacitor due to the actions of the earth's g-fields.

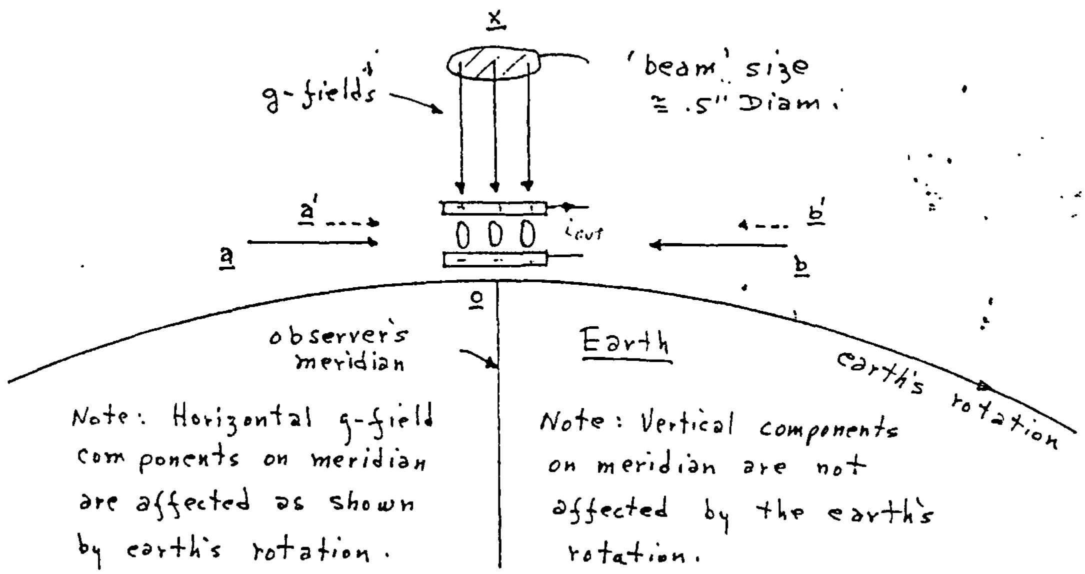


Figure (2) - Polarization effects in an observer's capacitor when located on the meridian position.

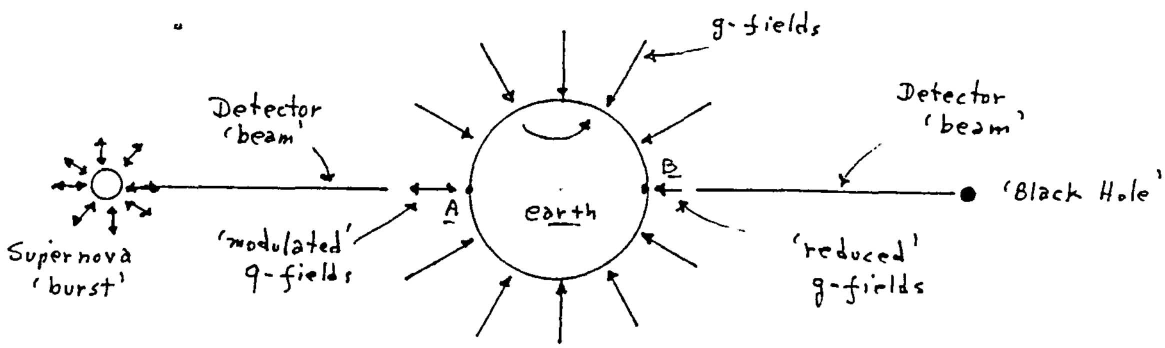
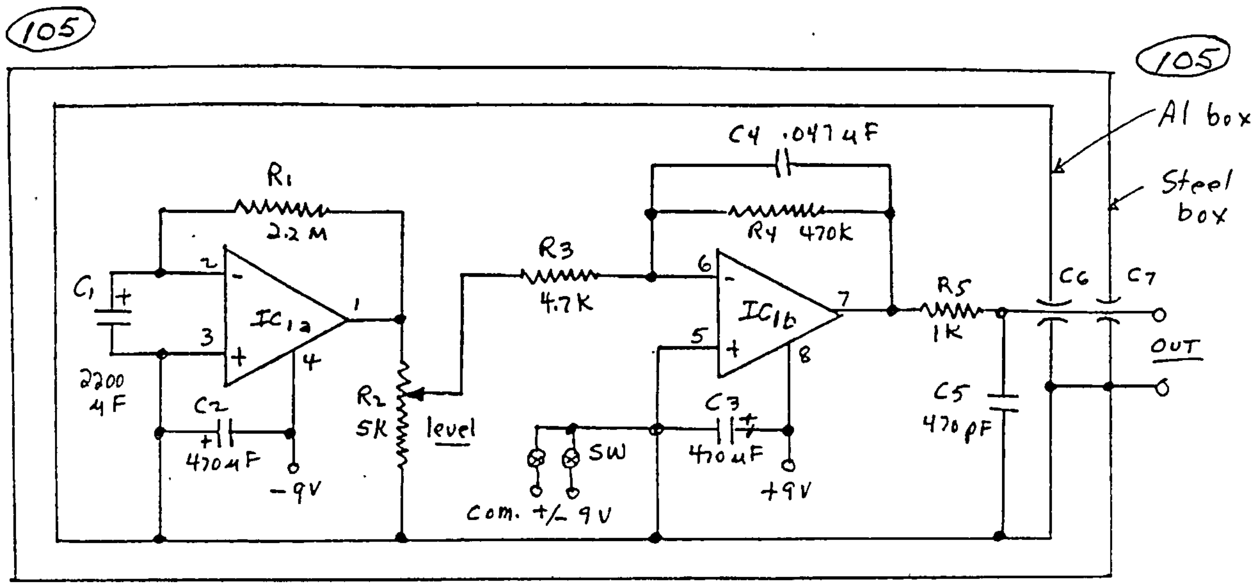
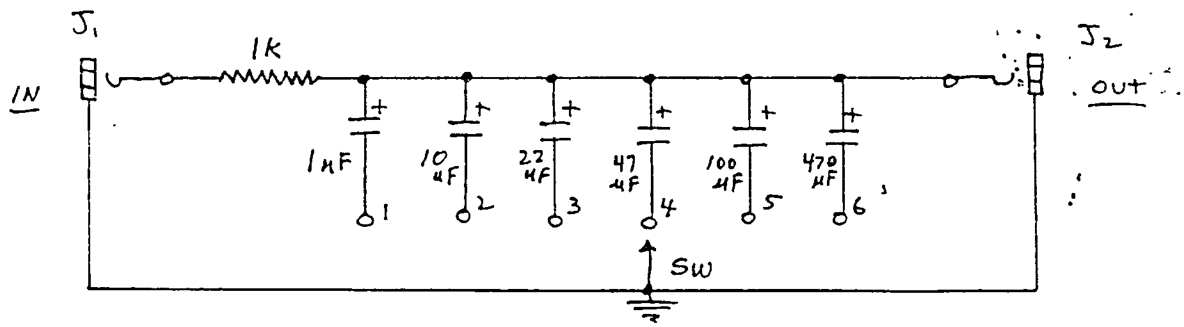


Figure (3) - Simple depiction of two common astronomical gravity effects.



IC1 : 1458

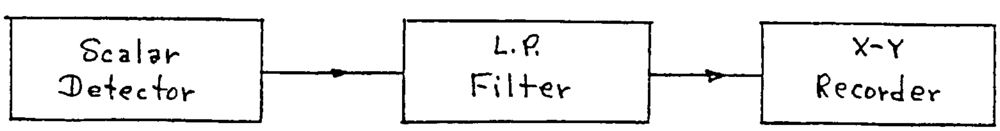
(a) Basic Gravity Signal Detection Unit #1 (or TL082, LF353 & others BR)



SW Position	Filter Cut-off
1	≅ 1 KHz
2	100 Hz
3	45 Hz

SW Position	Filter Cut-off
4	≅ 21 Hz
5	10 Hz
6	1 Hz

(b) Low Pass Filter Design



(c) System Set-up

Figure (4) - Experimental arrangements for astronomical gravity signal detection.

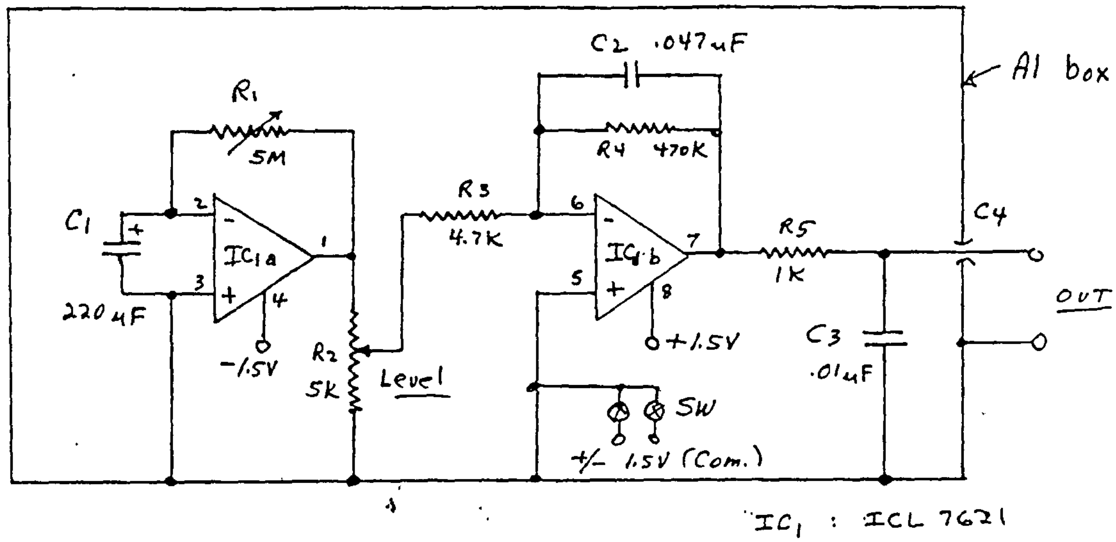


Figure (5) - Gravity Detector Unit #2.

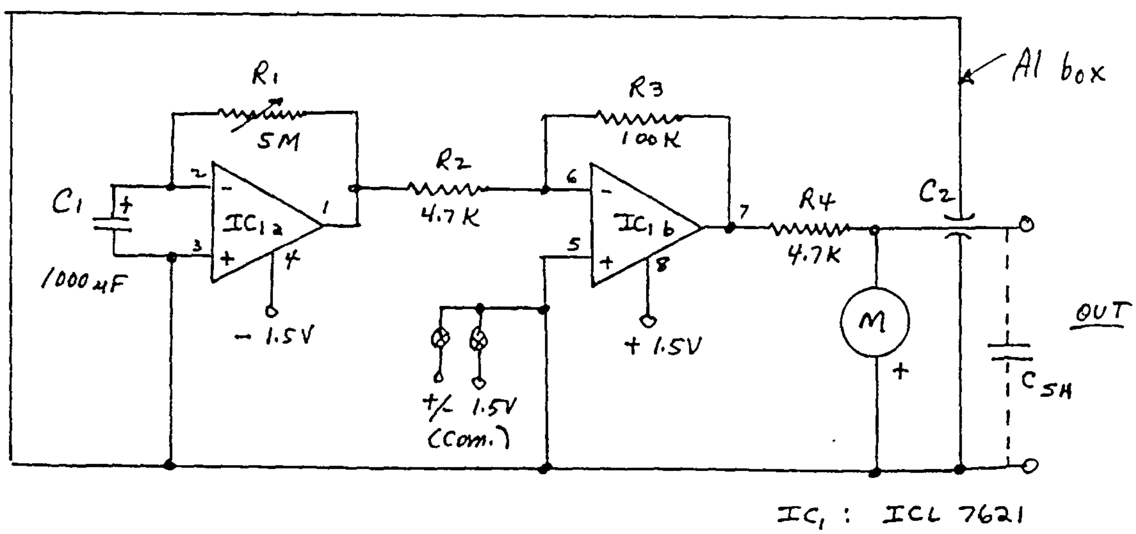


Figure (6) - Gravity Detector Unit #3.

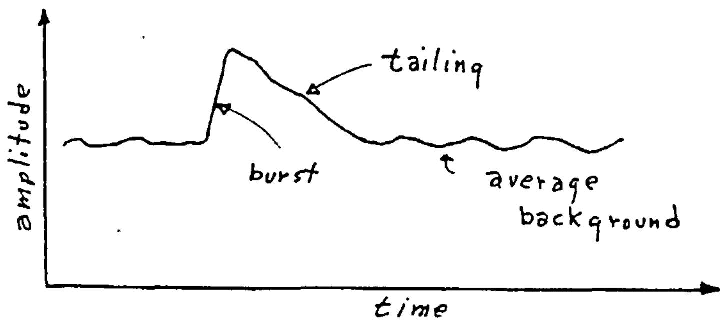


Figure (7)

Typical Nova Response

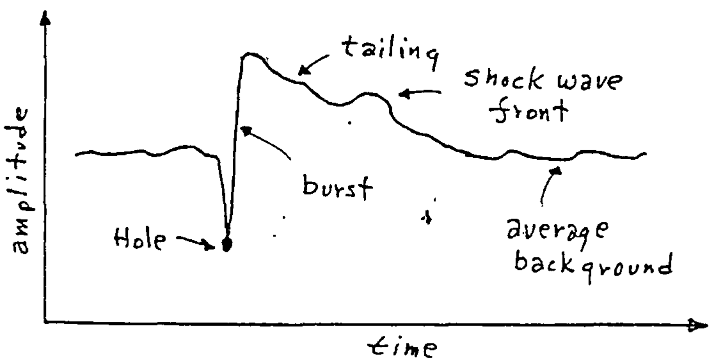


Figure (8)

Typical Supernova Response

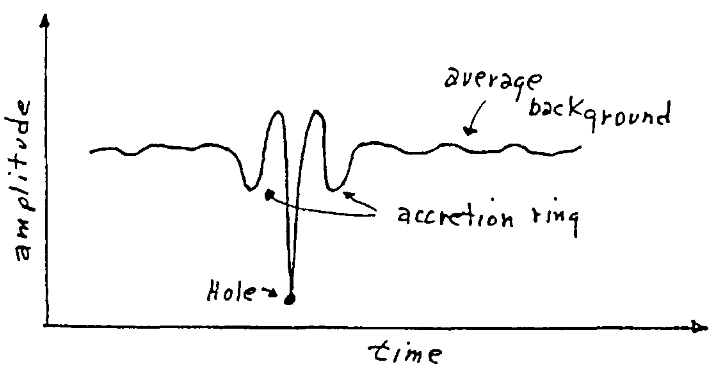


Figure (9)

Typical New Black-Hole Response

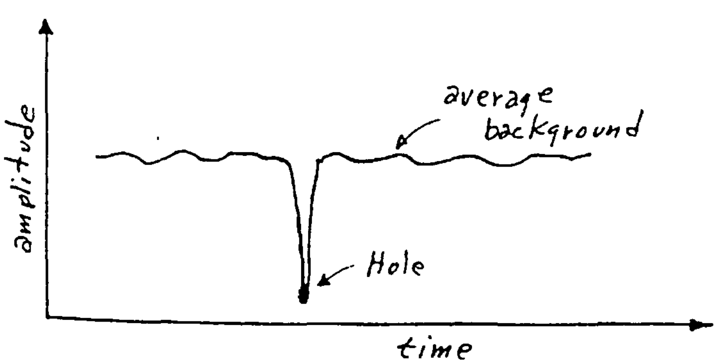


Figure (10)

Ancient Black-Hole Response

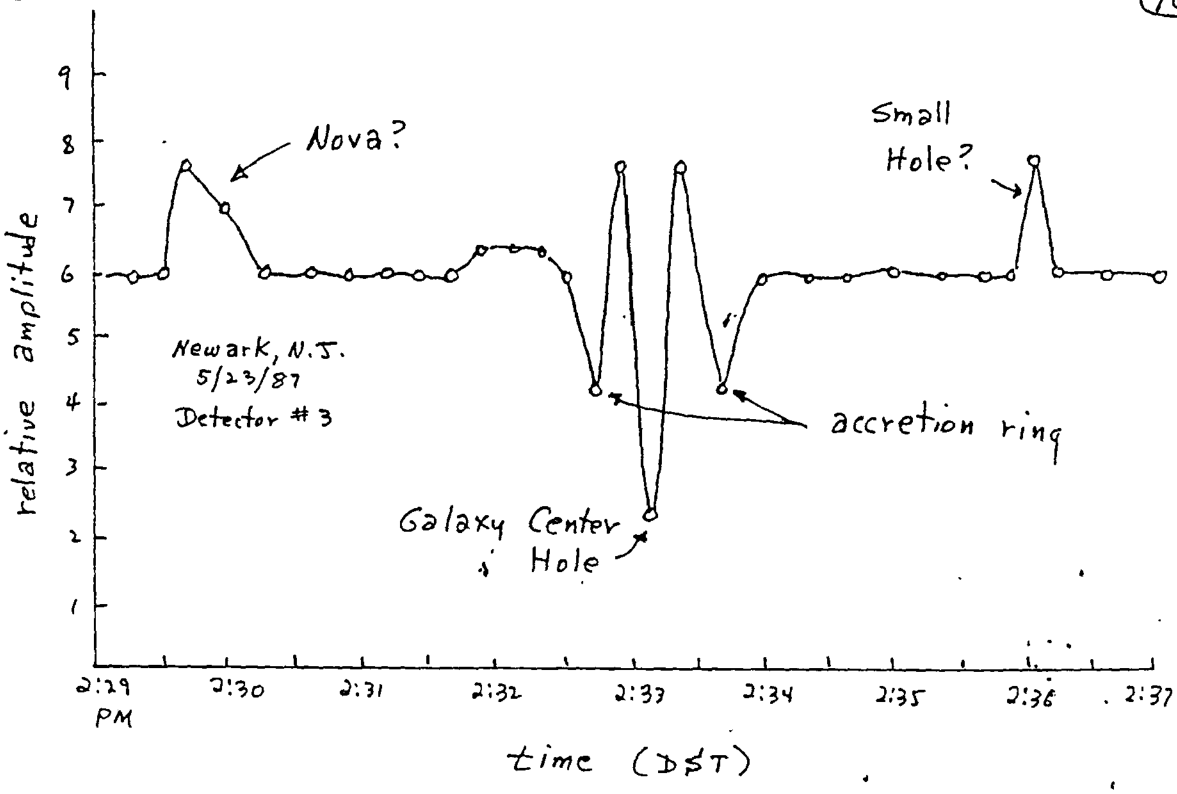


Figure (11) The New Galaxy Center Structure
(PRIOR TO JUNE, 1991. BR)

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Part III
PARTS LIST

Detector #1

R1	2.2M, 1/4 w, resistor
R2	5k potentiometer
R3	4.7k, 1/4 w, resistor
R4	470k, 1/4 w, resistor
R5	1k, 1/4 w, resistor
C1	2200 uF, 10 v, electrolytic capacitor
C2,C3	470 uF, 10 v, electrolytic capacitor
C4	.047 uF ceramic capacitor
C5	470 pF ceramic capacitor
C6,C7	5000 pF feedthru capacitor
SW	DPST miniature switch
IC1	1458

Detector #2

R1	5M miniature potentiometer
R2	5k potentiometer
R3	4.7k, 1/4 w, resistor
R4	470k, 1/4 w, resistor
R5	1k, 1/4 w, resistor
C1	220 uF, 35 v, electrolytic capacitor
C2	.047 uF ceramic capacitor
C3	.01 uF mylar capacitor
C4	5000 pF feedthru capacitor
IC1	ICL7621 IC
SW	DPST miniature switch

Detector #3

R1	5M miniature potentiometer
R2,R4	4.7k, 1/4 w, resistor
R3	100k, 1/4 w, resistor
C1	1000 uF, 10 v, electrolytic capacitor
C2	5000 pF feedthru capacitor
IC1	ICL7621
SW	DPST miniature switch
M	+/- 100 uA (1k ohm) miniature tuning meter
Csh	2200 uF for local signal responses

(110)

(110)

THE NATURE OF GRAVITATION
((110)-(124))

by G. Hodowanec

ABSTRACT

A new theory of gravitation is developed by the author using the concepts of rhysmonic cosmology. Correlation with known gravitational effects is shown to be good and some new and previously unknown effects are disclosed. In essence, this development restores an up-dated version of the aether theory as the basis for gravitational effects in the universe.

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Introduction

The force of gravity was probably the earliest 'force' to be recognized by man. Early man realized that objects had 'weight' and when a supported object was released he noticed that it would always fall to the ground. This force was very mysterious to him and it has remained more or less mysterious even to this very day. While gravitation was the first of the fundamental laws of physics to be discovered, it was also found to be the weakest of the three major forces noted thus far in our universe. The other two forces, the electromagnetic and nuclear forces, are many, many orders of magnitude stronger. However, the gravitational force, in a sense, may be the more fundamental of these three forces. The other two can be shown to require the presence of mass <u>with</u> charge in order to exist, while gravitation requires only the presence of mass, <u>with</u> or <u>without</u> charge, in order to exist.

While gravitation was recognized as a force very early, the development of a quantitative expression for this force was a long time in coming. It was finally summed up in the laws of universal gravitation by Isaac Newton early in the eighteenth century. During the eighteenth and nineteenth centuries, Newtonian gravitation was further developed and applied to many problems in physics and astronomy. It remained unchallenged until the advent of the theory of relativity by Albert Einstein early in the twentieth century. At this time a geometric interpretation for the 'force' of gravity was proposed.

Newtonian Gravitation

While Newton never arrived at a mechanism for gravitation, he was a staunch believer in the aether theory and had strong convictions that the mechanism somehow lay in the aether. A hypothesis was proposed somewhat later by G. L. Le Sage, a French Swiss, that

(112) 'ultra-mundane corpuscles' in the aether were responsible for the effect of gravitation. While Newton did not express it directly so, both he and Le Sage really proposed a mechanical 'particle' view of gravitation. However, these concepts were not pursued seriously then, since the success of the mathematical interpretation of gravitation appeared to outweigh any need for a mechanical explanation of gravitational effects.

Newton's law of universal gravitation suggests that every bit of matter, ie., mass, in the universe 'attracts' every other bit of matter in the universe, with a 'force' which was proportional to their mass and inversely proportional to the square of the distance between them. In the CGS system of units, this statement can be expressed as an equation, by introducing a proportionality constant, G. Therefore, the law is generally presented as:

$$F = \frac{Gm_1m_2}{d^2},$$

where G is presently approximately equal to 6.672×10^{-8} dyne-cm^2/gm^2. This would mean that if m_1 and m_2 were two spherical masses of 1 gm each, and were placed exactly 1 cm apart (between centers), the so-called force of 'attraction' between them would be the factor of 6.672×10^{-8} dynes seen in the value of G.

This relation and the three Newton laws of motion form the basis of Newtonian mechanics. In addition, such concepts as work and energy, potential and kinetic energy, as well as the conservation of energy, can be developed from these premises. Another concept arising in Newtonian gravitation is that of 'action at a distance', which implies an 'instantaneous' action. Since Newtonian gravitation is essentially a mathematical theory (as is relativity theory), it provides largely a macroscopic view, integrating many microscopic effects and possibly some sub-microscopic effects, in this overview.

Therefore, both are somewhat incomplete, and thus may lead to some erroneous conclusions under certain conditions. However, the author has developed a 'new' theory of cosmology which has very basic premises which provide for a firm foundation on which can be constructed a universe in which both classical gravitation and relativistic gravitation can be shown to be but broad overviews of this theory. Some concepts, essential to any discussion of gravitation, will be briefly presented here. Further details will be found in the author's monograph, Reference 1.

Rhysmonic Theory

The new cosmology developed by the author is based upon what amounts to as an up-dated version of the aether theory. A substratum particle which is termed a rhysmon, after another early Greek term for the atom, forms a matrix structure which can be recognized as the 'vacumn'. Thus this vacumn is the very fabric of the universe. The substratum, or the new aether of the vacumn, is also a storehouse of potential energy provided by the extremely small objects called the rhysmons. The rhysmons are contained within independant 'orbits' and have energies equal to one Planck Constant quantum of action, h . Individual rhysmons intertwine with other rhysmons in this matrix structure as is shown in planar form in Figure (1). In this planar view, it is seen that interweaving results in short directed rhysmonic vectors which now have energies of $h/2\pi$, or $\hbar$, quantum of action. From this construction, one can define some additional parameters based upon Planck's Constant and his system of Natural Units.[2] These are given in Appendix I for reference. The complete matrix structure is shown in Figure (2) in three-dimensional form. This basic cell is reminiscent of R. Buckminster Fuller's vector equilibrium[3] in that all directed energy vectors in the pure rhysmoid, ie., the undisturbed vacumn, cancel

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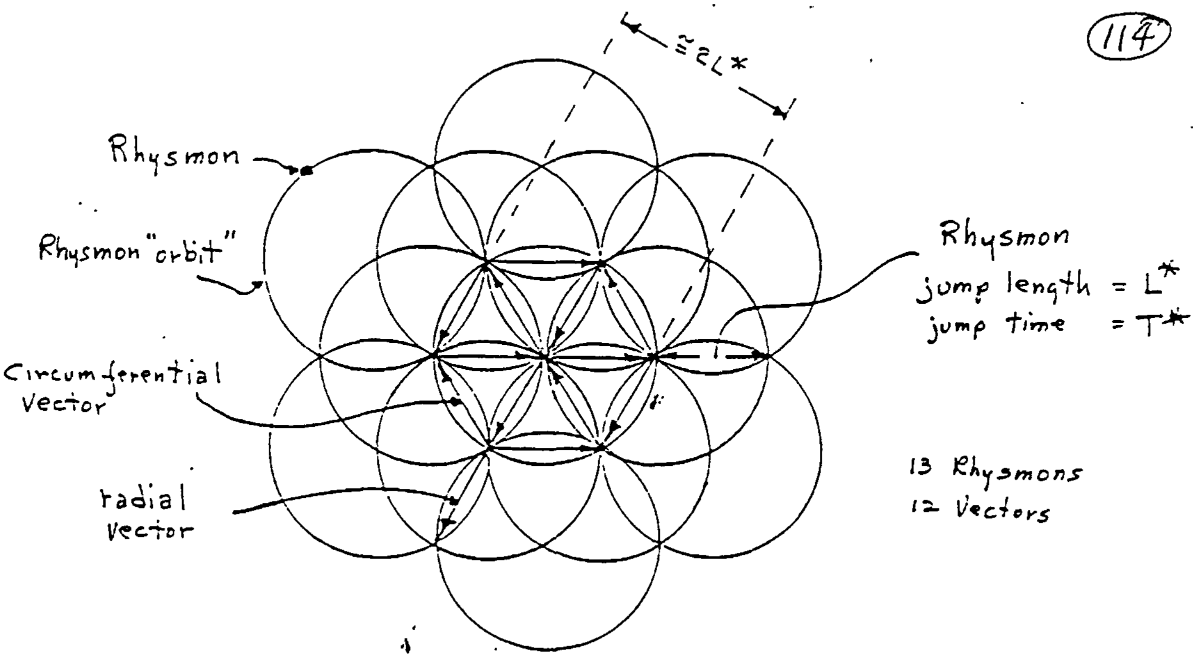

Figure (1) - Complete planar view of balanced forces of vectors in basic cell of matrix structure.

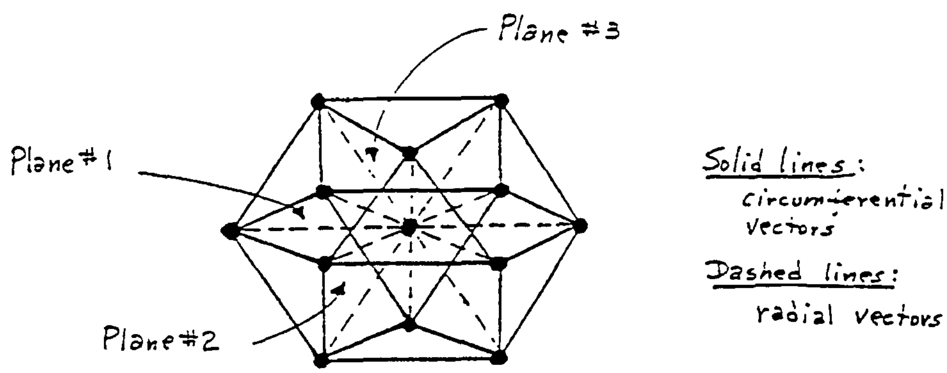

Figure (2) - Three dimensional view of vector equilibrium of basic cell of matrix structure.

their energies and thus display no effects or phenomena which can be observed. Observable effects, such as particles or fields, require perturbations or disturbances in this 'perfect mechanical' matrix structure. The basic cell structures interlock with other cell structures in forming the vacumn of the universe. This interlocking is depicted for an extended planar view in Figure (3). The maximum use of available energy content, however, would require that the three-dimensional build-up of the universe be in spherical form, ie., the universe must be a sphere.

Depicted in Figure (3) are the directed rhysmonic vectors as given in some single instant of time, having a duration of Planck Time, T* , or about 5.4×10^{-44} sec. In the next instant of time, T* later, all vectors reverse direction, as new rhysmons 'orbit' into these same positions. In time T* later again, the vectors are restored to the original directions, but the original rhysmon does not return to this original position until a time period of 6T* has passed. Thus the universe is like a movie, in which each frame of the cinema of existence lasts for only Planck Time, T*. As seen in Figure (3), directed rhysmonic vectors join head-to-tail to form an 'instantaneous' vector which can span the universe. These instantaneous vectors are fundamental to the rhysmonic explanation of the nature of gravitation and will be further developed in the next section.

Rhysmonic Gravitation

It has been shown (in terms of rhysmonics) that the universe is a finite, spherical, and perfect black body in that all forms of radiant energy are reflected from the edge of the universe. (see Ref.1) This is a direct result of the matrix structure of the vacumn and the rhysmonic energy vector concept. For example, the instantaneous energy vectors as depicted in Figure (3), are returned or reflected

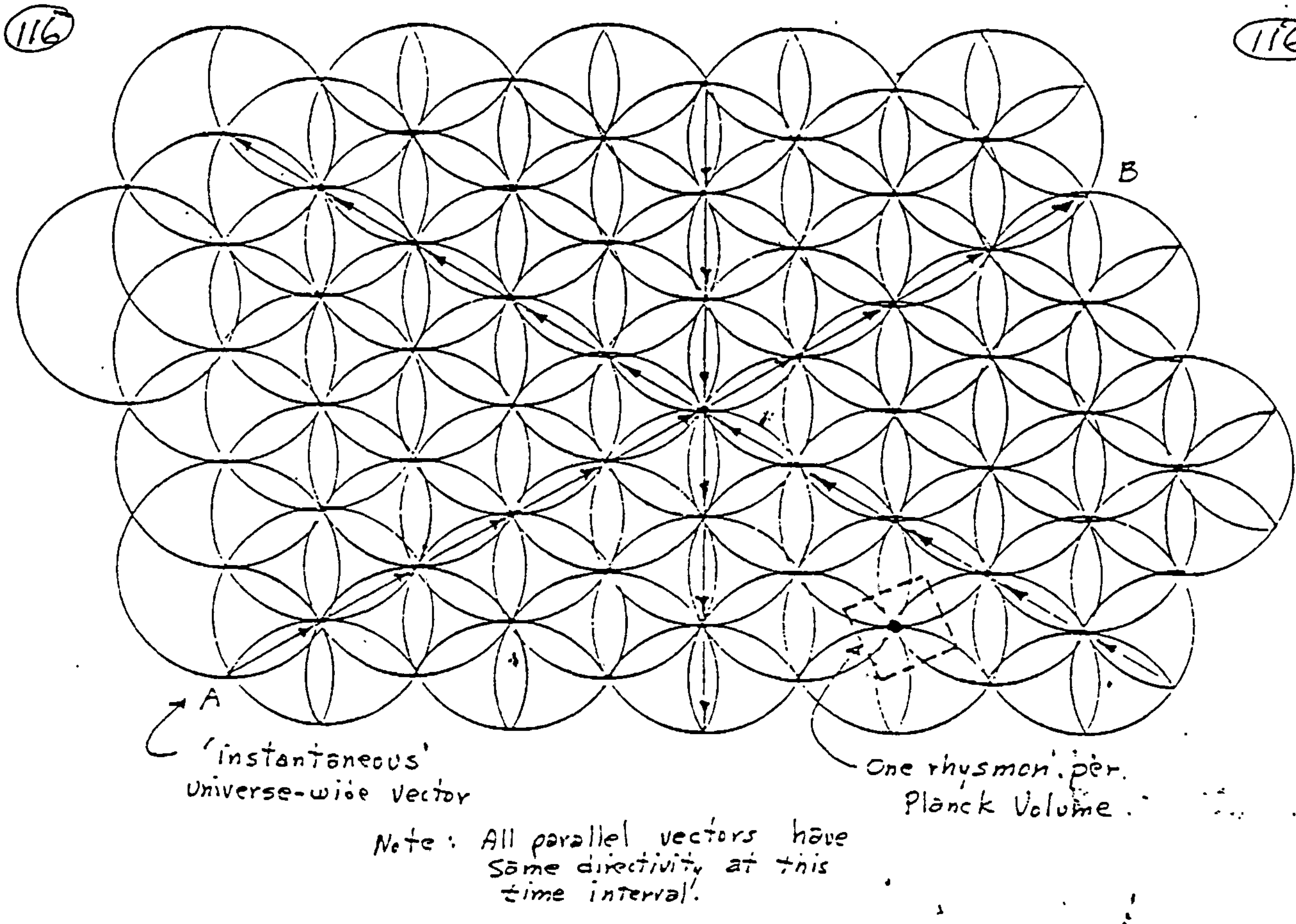

Figure (3) - Extended planar view of basic cell of matrix structure.

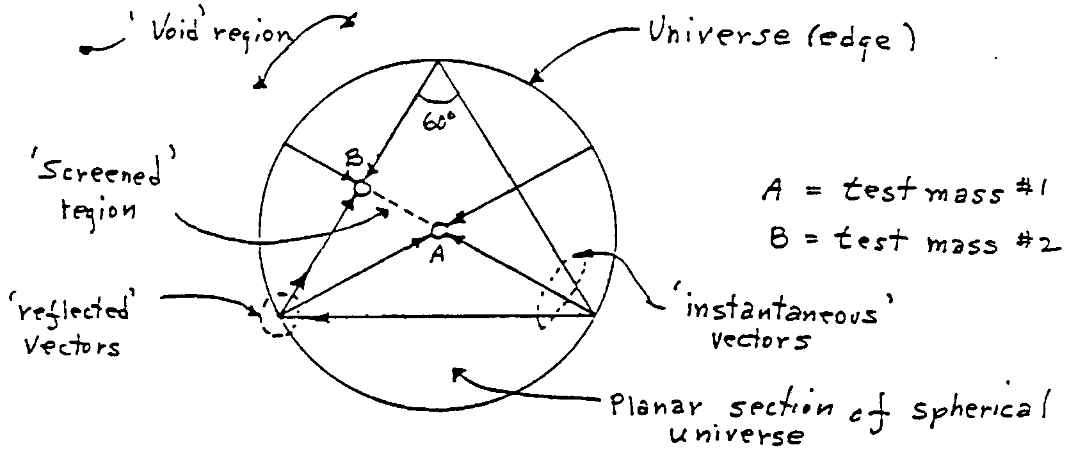

Figure (4) - Gravitation in terms of rhysmonics.

at the universe edge by the same process of vector reversal as was shown above.

The determination of the laws of gravitation and the mechanism for gravitation in terms of rhysmonics is illustrated in Figure (4). Consider a lone mass, A , located at the exact center of the pure rhysmoid universe, ie., an undisturbed vacumn universe, as depicted in Figure (4). No other masses are assumed to be present in this universe. From Euclidian geometrical symmetry it is seen that the instantaneous rhysmonic vector impulses on this test particle are exactly equal for all possible angles of arrival. Therefore, since all impulses are equal, the particle remains at 'rest' and no net force is present. Now consider the lone test particle to be located off-center in the rhysmoid universe at position B. Again, it can be shown by Euclidian geometry that all instantaneous rhysmonic impulses arriving at this test particle would also be equal, and thus again no net force would be present. In a similar manner, it can be shown that a lone mass, located <u>anywhere</u> in the rhysmoid universe will have no net force on it and thus will be at rest. Therefore, there will be no gravitational effect in the universe if it contains only <u>one</u> mass, even though the region of the mass is a perturbated section of the rhysmoid or vacumn.

However, now consider the case where <u>two</u> masses , A and B, are present in the universe. Again, the instantaneous rhysmonic impulse vectors will be generally equalized, <u>except</u> for the impulses which are in a direct line with the two test particles. Here, due to the 'screening' action of the masses, there will be more impulses on the sides away from each other than on the sides facing each other. The two masses will thus be 'impelled' towards each other, which, from the outside would appear to be a force of 'attraction'. This is due to the fact that a massive particle implies a 'tightened' matrix

(118) structure which delays the transmission of rhysmonic impulses through such a structure. It can be shown be shown that this force would be proportional to the number of rhysmons in these particles, ie., the masses, and inversely proportional to the distance between the masses. The proportionality constant, G , is both a function of the size of the universe, and the amount and location of other masses in the universe. In general, the constant, G , remains very much a constant, except when other masses are located relatively close and in line with the test masses. Since gravitational effects are a function of Euclidian geometry, and the rhysmonic universe is Euclidian in geometry, eg., Euclidian 'straight lines' do exist in this universe, shielding effects must be considered in any determination of the gravitational constant, G . In most past determinations of G , neglect of this factor has resulted in errors in the determination of value of G.

Two interesting observations can now be made. First, gravitation is basic to the matrix construction of the vacumn and thus is very fundamental as it does not depend upon any other effect other than the 'screening' action of masses in the universe. Thus, gravitation is really a force of 'impelment' rather than an 'attractive' force between masses. If the vacumn did not exist, neither would the phenomenon of gravitation, even if matter 'existed' in a void. Second, since these gravitational effects take place in Planck Time, T* , with instantaneous rhysmonic vectors existing in this time period, 'action at a distance' is in effect restored in the universe. Electromagnetic effects, which procede at the speed of light, C , do not play a part in this action. However, since gravitational fields are rhysmonic flux fields, the same as electric fields are also rhysmonic flux fields, both can transfer energy between distant objects in the process called 'induction'. It must be remembered, however, that

119 in the case of the electric field, the rhysmonic flux is due to the presence of charge in the universe, while with gravitation, the rhymonic flux is due to the presence of shielding masses and charge is not a requirement. A commonly observed flux due to this shielding action is the earth's gravity.

Gravity on Earth

The gravitation due to the earth's mass appears in the common conception of weight. The shielding action results in a net flux of rhysmonic impulses which becomes the accelerating force of gravity or the accelerating force of free fall, g . Newton's law may be applied to this special case of gravitation using the best estimate of the earth's radius and mass. The constant of proportionality is g. The relation for the weight, W, is given by:

$$W = mg ,$$

where m is the mass of the test particle. The expression for W assumes g is a constant, which it normally is. However, rhysmonic cosmology has shown that 'fluctuations' in this constant could exist due to certain other cosmological effects. Therefore, the apparent weight, W , would also fluctuate, sometimes quite appreciably, in the order of several per cent! Shown in Figure (5) are simplified depictions of two cosmological factors which were found to affect the value of g on earth. The shielding action of the mass of the earth results in a fairly uniform g-field flux at the surface of the earth (assuming locations selected for constant flux values). This is indicated by the uniform length vectors directed toward the center of the earth. Consider now a supernova explosion located far off in space at location, A . The oscillatory 'implosion' of the mass of the core of this nova will 'modulate' the instantaneous rhysmonic vectors and this will appear as a modulation superimposed on the g-field flux appearing to an observer at location a on earth.

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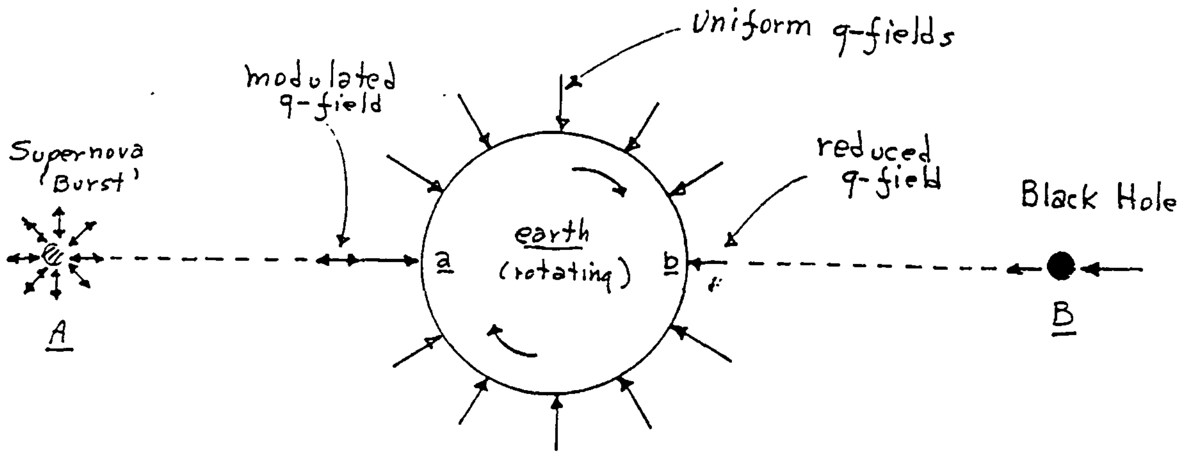

Figure (5) - Some cosmological factors which affect g-fields on earth.

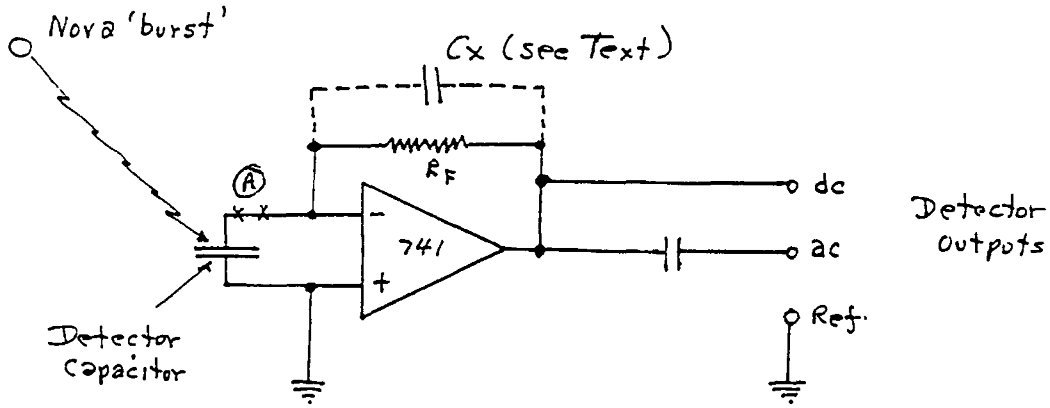

Figure (6) - Simple gravitational signal detector.

(A) WITH HIGHER GAIN POST ≈ 1970 DEVICES; A SERIES 'DAMPING' RESISTANCE OF Ω ≈ 20-100 OR MORE MAY BE REQUIRED TO OBTAIN STABILITY. A 500-1,000 Ω VARIABLE (NON-INDUCTIVE) RESISTOR WILL ALLOW PRECISE OPTIMIZING. (BR)

In a similar manner, a dense object, such as the core of a galaxy or a black hole, can also affect the apparent g-fields. For example, a black hole, located in deep space at position B, will reduce the g-field flux level to an observer located on earth at position b. The mechanisms and experimental data for these observations are given in References 4, 5, and 6, and thus will not be considered here.

Gravitational 'Waves'

Quadrature-type gravitational-waves which propagate at the speed of light were predicted by Einstein many years ago. While rhysmonics also predicts such waves, the low levels and extremely long wavelengths of these waves make their detection very difficult. Unequivocal detection of such waves has not been made to date (perhaps some micropulsations may be such waves). However, monopole-type induction field gravitational 'waves', generated by oscillatory mass movements such as would appear in a supernova have been unequivocally detected electronically with the detector circuit of Figure (6). This circuit operates essentially in that these oscillatory gravitational impulse signals appear equivalent to the action of an alternating electric field with respect to the loosely bound electrons in the detecting capacitor. The current impulses generated in this capacitor are highly amplified and then displayed on a recording meter and/or oscilloscope as well as listened to on audio equipment. This circuit will actually display the Gaussian amplitude variations of nova and supernova 'bursts' as well as other gravitational disturbances in the universe. This circuit is further discussed in Reference 4. Therefore, under certain conditions, the monopole gravitational 'waves', or more correctly, rhysmonic impulse flux variations, cannot be differentiated from electric field flux variations since they are essentially the same entities. The detector is also useful in detecting massive bodies in the universe as a 'shadow' affecting the average background levels of the general gravitational radiation. These concepts and experiments are further discussed in References 4, 5, and 6.

Microwave Background Radiation

The so-called microwave background radiation (MBR) has been attributed to being a relic radiation left over from the original 'explosion' in the Big-Bang version of the origin of the universe. However, it has been shown by rhysmonics to actually be due to a summation of all the above gravitational 'waves' present in the universe. The simple detection circuit of Figure (6) , when operated with stabilizing capacitor, C_X , in the circuit, will respond to overall 1/f type noises generated by these gravitational impulse processes. Audio amplification of the output of the detector will evidence the many sounds of space, both noisy and somewhat musical sounds. An interesting experiment can be performed under these audio conditions. The output of the detector can be modulated in amplitude by a local movement of mass near the detector. This is indicated in the simplified sketch of Figure (7). Here, the output level of the noise can be peaked or nulled with a mass movement of about .25 cm. between peaks or nulls, for an apparent 'space' wavelength of this .25 cm. This effect is present at say 2 inches away, 10 feet away, or 75 feet away, the maximum lab distance available. The effect is not due to electromagnetic effects since when the circuit and amplifier is shielded electrically thoroughly, the modulation still comes through unabated. In fact, the detector is found to be also modulated by the beating heart! It is also significant that the measured wavelength of .25 cm is also the peak wavelength of the black body microwave background radiation! However, as it was shown here, this is a gravitational wavelength. While this is equivalent to the electric flux field, it is not an electic

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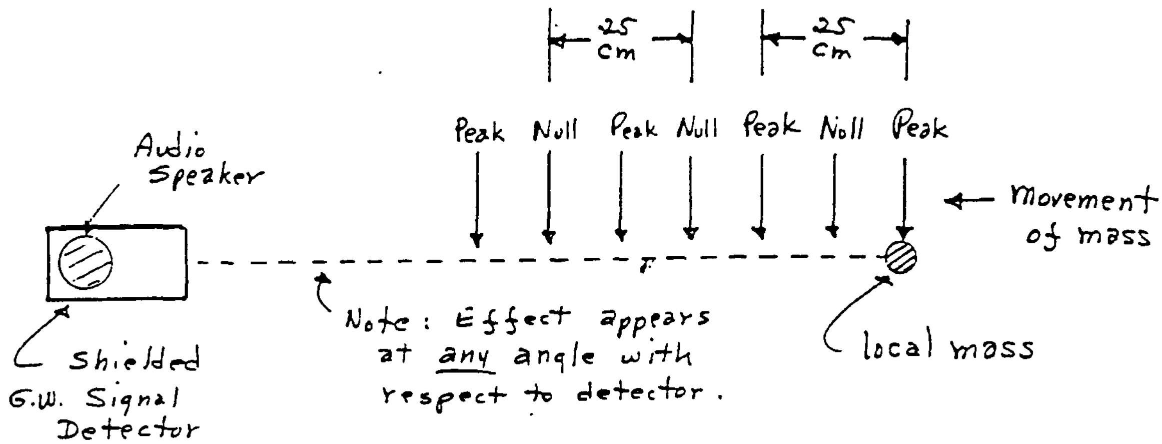

Figure (7) - Local 'modulation' of gravitational

flux field since it is not sourced or sunk by an electric charge. Therefore, the so-called microwave background radiation is really a gravitational effect which is further discussed in Reference 7.

Conclusions

The basic premises of rhysmonic cosmology have been used to develop a theory of gravitation which correlates very well with known gravitational effects and also discloses some previously unknown gravitational effects. Gravitation is thus seen to be but another aspect of rhysmonic cosmology and rhysmonic impulse forces. In essence, gravitational fields, electric fields, and even magnetic fields can be shown to be but specific aspects of the general rhysmonic flux fields. Rhysmonics provides many more concepts and answers to gravitational enigmas than can be developed in this short and simple article. The technological potentials which stem from these concepts is enormous and is being further pursued by the author.

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(124)

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APPENDIX I

Planck Units (also rhysmonic units)

h = Planck's Constant = 6.624×10^{-27} erg-sec.

$\hbar$ = Planck's Reduced Constant = 1.054×10^{-27} erg-sec.

L* = Planck Length = 1.616×10^{-33} cm.

T* = Planck Time = 5.391×10^{-44} sec.

C* = Planck Velocity =L*/T* = C = 2.977×10^{10} cm/sec.

M* = Planck Mass = 2.177×10^{-5} gm.

E* = Rhysmonic Energy = 1.96×10^{16} ergs.

A* = Rhysmon Action = $\hbar$ above.

F* = Rhysmon Force = 1.21×10^{49} dynes.

Rhysmon radius = 1.62×10^{-66} cm.

Rhysmon volume = 1.78×10^{-197} cm^3.

Rhysmon number = 2.37×10^{98} rhysmons/cm^3.

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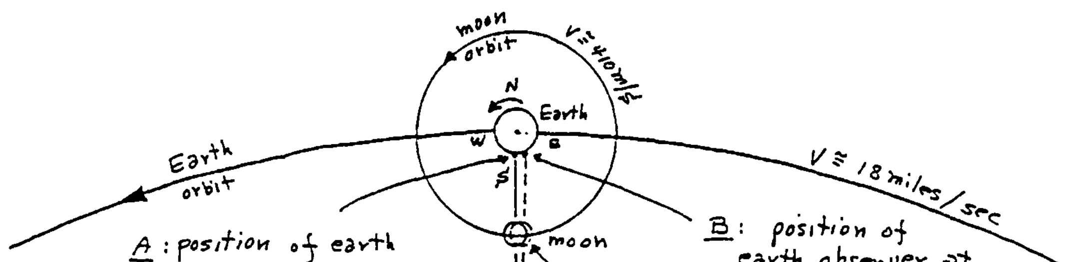
Cosmology

GH Labs
Newark, N.J.
3/15/86
(gh)

I. Gravitational vs. Optical Eclipse of Sun by Moon (per Rhysmonic Cosmology).



A: position of earth observer at time of gravitational eclipse.

B: position of earth observer at time of optical eclipse.

moon shown (solid) at time of gravitational eclipse.
moon shown (dotted) at time of optical eclipse.

Notes:

(1) Observer on earth has a relative movement as shown due to the earth's rotational velocity (≅ 16 miles/minute).

(2) Relative to earth, moon has a velocity eastward due to the moon's orbital velocity (≅ 410 m/min).

(3) The stellar aberration (the sun is our nearest star) due to the finite velocity of light and the earth's orbital velocity (≅ 18 miles/sec) places the optical image of the sun to the observer at position B, along the direction shown by the dotted line.

(4) The 'instantaneous' gravitational eclipse occurs in the direction shown by the solid line.

Light travel times:
moon to earth ≅ 1.3 sec.
sun to earth ≅ 8.3 min.

gravitational signal path (≅ instantaneous)

optical signal path (as aberrated ≅ 8.3 min. later)

angle of arc ≅ 22 seconds of arc (shown not to scale). ma

'apparent' position of sun for optical eclipse. (due to stellar aberration) & finite velocity of light

actual position of sun for both gravitational and optical eclipses.

(gh) **Conclusion**: Optical eclipses of the sun by the moon will follow the gravitational eclipse by about 8.3 min. due to stellar aberration and the relative movements of the earth and moon. This has been confirmed in the experiment of May 30, 1984. Gravity signals are essentially 'instantaneous' signals!

FURTHER CONFIRMATIONS BY THE AUTHOR AND OTHERS DURING SEVERAL ECLIPSES SINCE. SEEMS LIKELY THERE ARE MANY MORE 'EMBEDDED' IN EM ECLIPSE RECORDS (?)

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THE NATURE OF ELECTROMAGNETIC SIGNAL PROPAGATION

((125)-(141))

by Gregory Hodowanec

Abstract

A simple mechanism for the propagation of electromagnetic waves, based upon the author's 'new' cosmology, is briefly described. In essence, an up-dated version of the 'aether' theory is involved in this mechanism. Correlation between theory and experiment is shown to be good. Other potentials of the theory are also briefly mentioned.

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Introduction

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The use of electromagnetic radiation to transmit or receive impulses or signals without the use of connecting wires or wave-guides is so common today that we now have many terms which were 'coined' to describe a particular aspect of these communication systems. For example, the term <u>radio</u> incorporates systems which involve <u>sound</u> broadcasting, be it in commercial, military, amateur, or citizen band applications. The term <u>television</u> incorporates <u>vision</u> broadcasting, which today, while still using electromagnetic radiation signals, is also using guided signals, primarily cables. Another common term is <u>radar</u> where the systems employ electromagnetic radiation for the purpose of locating, identifying, or guiding fixed or moving objects. The reader is also aware of the many specialized applications such as garage door openers, intrusion alarms, wireless telephones, etc., as well as such sophisticated systems as those used in radio astronomy, for example. Therefore, with electromagnetic radiation signals so commonplace in our lives, perhaps the inquisitive reader or electronic experimenter has often wondered how <u>exactly</u> do these signals travel in space to reach us. It will be the purpose of this article to go beyond the usual mathematical approach to this subject and look at the process (in simple fashion) of the actual basic mechanisms underlying electromagnetic signal propagations.

History

Electromagnetic radiation 'effects' were probably noticed by many nineteenth century physicists and experimenters, notably Michael Faraday. However, it was toward the end of that century before electromagnetic radiation, theoretically predicted by James Clerk Maxwell, was finally conclusively generated and detected in

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the experiments of Heinrich Rudolf Hertz. Not much was done with these signals until Gugliemo Marconi demonstrated in 1901 that long range communication using these signals was feasible. At this time the inquisitive and knowledgeable experimenter became involved and amateur radio as a hobby and avocation was born. These dedicated experimenters probably did more for the state-of-the-art of radio than any other group until the advent of World War II in 1939, when government and industry, out of necessity, teamed up to rapidly advance the state-of-the-art on all fronts. This effort was summarized in the well known MIT Radiation Laboratory Series of publications which were produced at the war's end. While development work has continued since then, emphasis has been on the more practical aspects of communications rather than on studies of the basic mechanisms of electromagnetic wave propagation. This was the result of the theory of relativity and the new physics which did away with the classical view of an 'aether' which was hypothesized to be the 'medium' in which wave propagation took place. Failure to detect this medium in a number of tests was cause enough to drop this medium as an unnecessary assumption and reliance put on the mathematical descriptions of the propagation process. However, the author in some original work in physics and cosmology[1], has come up with a new approach to the basics of electromagnetic radiation which, in essence, restores an up-dated version of the aether as the fundamental constituent of the 'vacumn'. A substratum particle which he calls a 'rhysmon' forms the very fabric of the universe in a structure in which particles, fields, and forces are but different manifestations of this structure. Some of these concepts, which are essential to any discussion of the propagation process, will be briefly presented here. Further details will be found in the reference cited above.

Basic Rhysmonics

The substratum, or the new aether of the vacumn, is a storehouse of energy provided by the extremely small spherical 'objects' called the rhysmons. The rhysmons are contained within individual "orbits" and have energy equal to one Planck Constant quantum of action, h. Individual rhysmons intertwine with other rhysmons in a matrix structure as shown in planar form in Figure (1). In this planar view it is seen that interweaving results in short directed rhysmonic vectors which now have energies of $h/2\pi$ or $\hbar$ quantum of action. From this construction, one can define some additional parameters based upon Planck's Constant and his system of Natural Units.[2] These are further developed in Appendix I for reference. The complete matrix structure is shown in three-dimensional form in Figure[3] (2). This basic cell is reminiscent of R. Buckminster Fuller's vector equilibrium in that all directed energy vectors in the pure rhysmoid, ie., the undisturbed vacumn, cancel their energies and thus display no effects or phenomena which can be observable. The basic cell structures interlock with other cells to form the vacumn structure of the universe. This interlocking is depicted for an extended <u>planar</u> view in Figure (3). Shown are the directed vectors as given in the single instant of time given by the Planck Time, T*. In the next instant of time, T* , <u>all</u> the vectors reverse direction and then restore to the original direction in time, T* , later. Thus the universe is like the movies, in which each frame in the cinema of existence lasts for only Planck Time, T*. As seen in Figure (3), directed vectors join head-to-tail to form an 'instantaneous' vector which can span the universe. The instantaneous vectors are especially significant in the nature of gravitation. This simple interpretation of the structure of the universe forms the basis of rhysmonic cosmology (See Reference 1).

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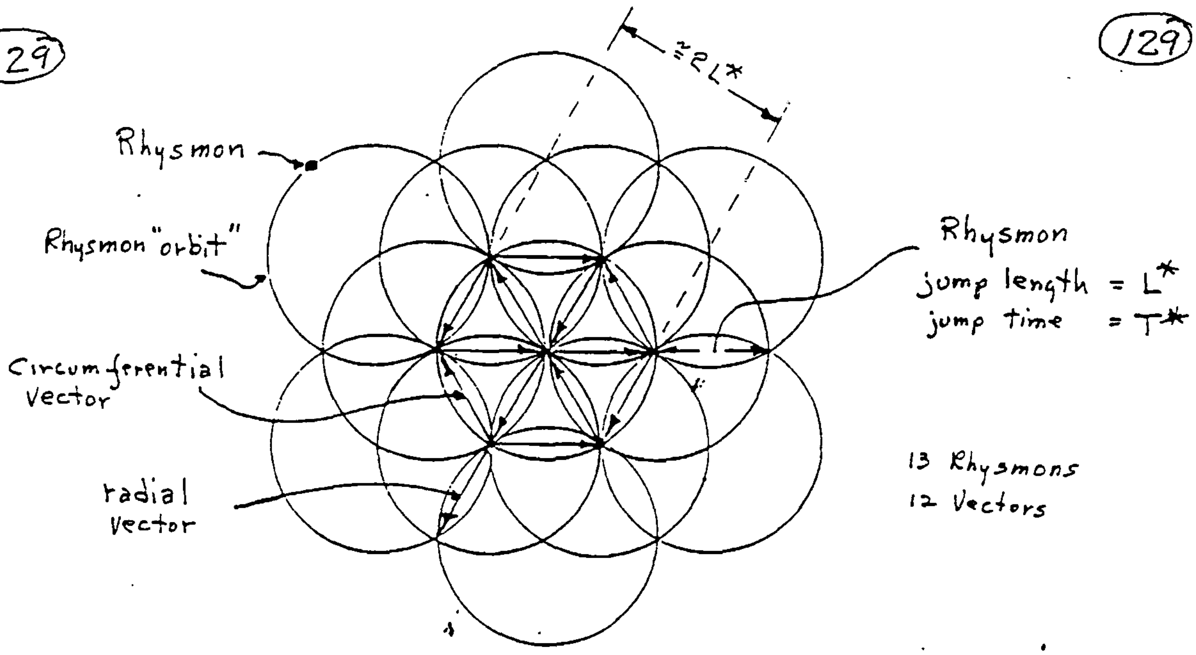

Figure (1) - Complete planar view of balanced forces of vectors in basic cell of matrix structure.

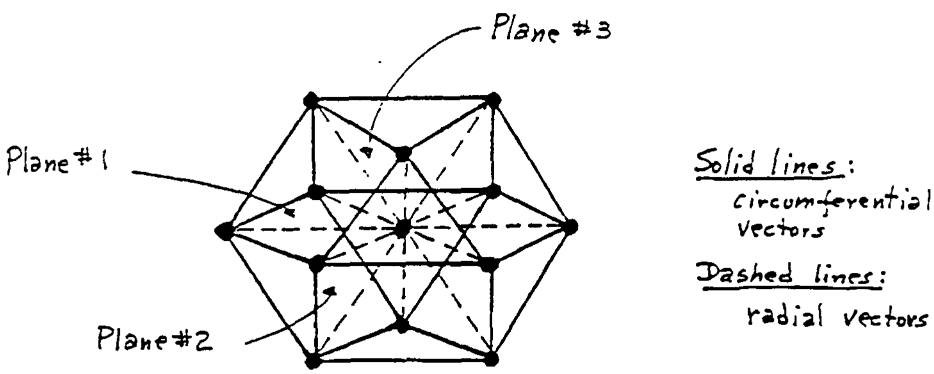

Figure (2) - Three dimensional view of vector equilibrium of basic cell of matrix structure.

Electric and Magnetic Fields

(130) The cell structures depicted in Figures (1) to (3) are for the vacumn state. Balance of forces in the vector equilibrium of the vacumn result in no phenomena, or effects, ie., the vacumn is 'un-observable'. For a 'particle' to be observed in the vacumn, the vacumn would have to be perturbated primarily as a change in density of the vacumn. This can be accomplished by a 'tightened' or a 'loosened' matrix structure of the form shown in Figure (2). A tightened matrix structure would result in an increased density of rhysmons compared to the vacumn, and as a result there would be an <u>excess</u> of directed rhysmonic vectors <u>leaving</u> such a region. The dense region would be said to have 'positive charge' and the excess out-directed vectors would form the flux field known as the positive electric field of this entity. A 'loosened' matrix structure would result in a reduced density compared to the vacumn, and as a result, there would be a deficiency of rhysmons, requiring excess directed vectors to <u>enter</u> such a region. This rarefied region would now be said to have 'negative charge' and the excess in-directed vectors would also form a flux field known as the negative electric field of this entity. Therefore, rhysmonics gives reality to the flux lines of charged particles as imagined by Faraday, Maxwell, and the other classicists of the nineteenth century. The depiction of charge and electric fields in rhysmonics, shown in Figure (4), is therefore pretty much as imagined by the classical physicists.

It has been known since classical times that a moving charge will generate a magnetic field. This is because a particle which has charge, say an electron, in addition to a property called spin, has a new action called a magnetic moment. In rhysmonics, the electron is a 'loosened' spherical matrix structure in the vacumn, having

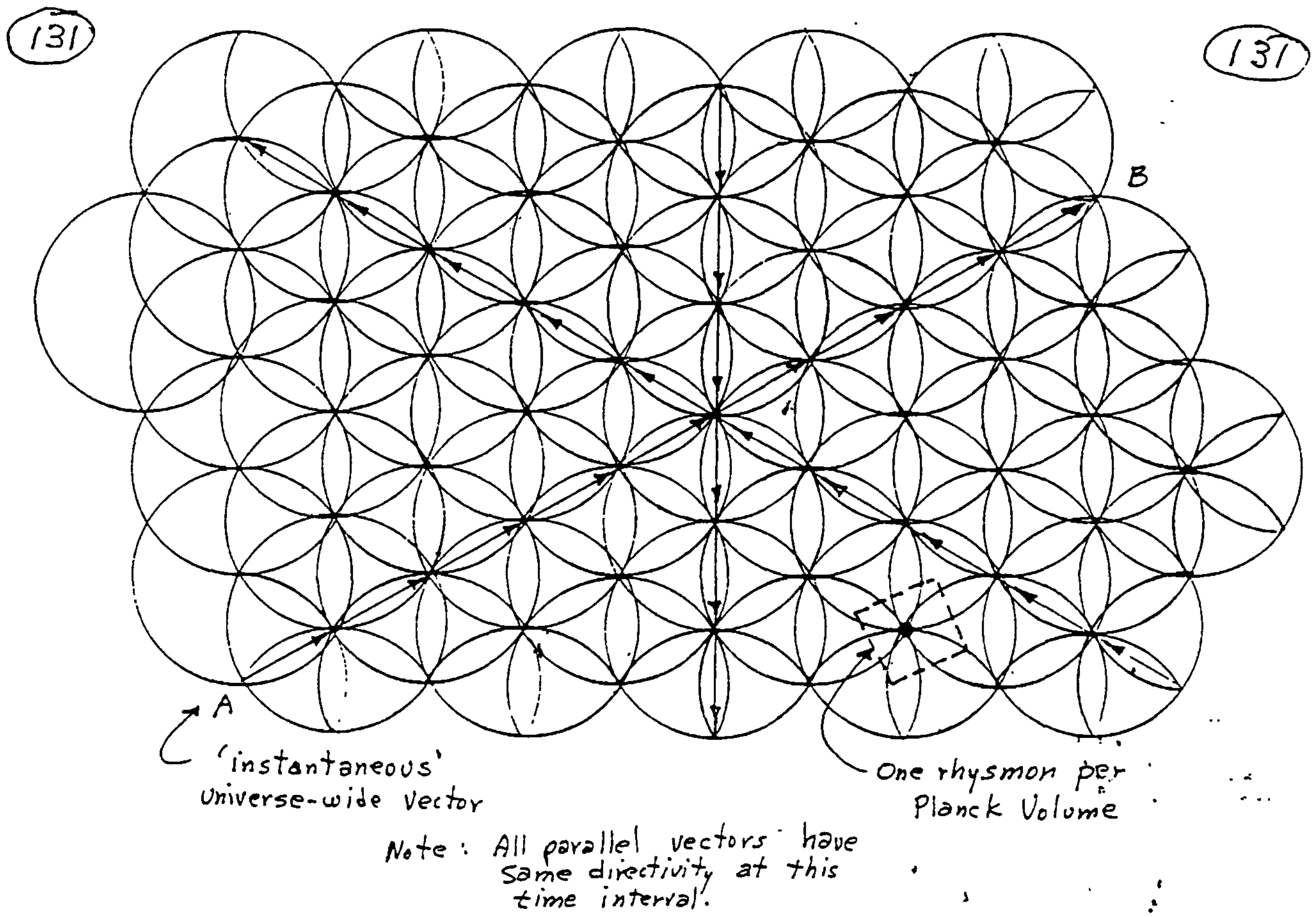

Figure (3) - Extended planar view of basic cell of matrix structure.

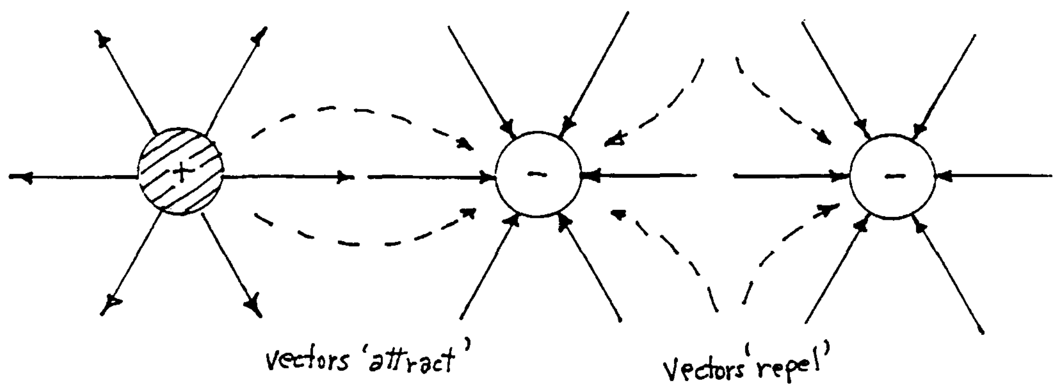

Figure (4) - Rhysmonic charge and fields are the same as in classical physics.

a radius in the order of 10^{-13} cm and an angular momentum of $\hbar/2$, as determined by the classicists. Rhysmonics has also shown the electric field between unlike charges to be the result of the flux of directed rhysmonic vectors moving between a region of excess (positive charge or a source) to a region of deficiency (negative charge or a sink) as was shown in Figure (4). Rhysmonics also shows that the magnetic field is due to an interaction of the excess vectors of the rotating charge region with the circumferential directed rhysmonic vectors surrounding the charge region as depicted in Figure (5). Here the electron is shown to be 'spinning' counterclockwise as it moves up and out of the paper. The excess directed vectors affect the circumferential vectors shown and thus cause a magnetic moment to be created. Thus the magnetic field is a closed loop of 'rotating' rhysmonic directed vectors, giving reality to the flux lines as imagined by Faraday and the classicists, as well as that seen in the well known image formed by iron filings surrounding a current carrying wire. Since the rhysmons are directed vectors, the flux line 'flow' is as was imagined by the classicists, ie., that given by the right hand rule. From Figure (5) it can be shown (by Euclidian geometry) that the strength of the circumferential vectors, ie., the magnetic field, will fall off inversely with the radius. The radial vectors, which formed the electric field flux lines, were shown to fall off inversely with the square of the radius. Thus rhysmonics provides a logical explanation for the fall-off of field strengths which have been determined from experiment.

Electromagnetic Fields

Rhysmonics has also shown that a translation of a 'particle' in the vacumn required a 'spin' for this process (See Reference 1). However, if the particle has charge, ie., excess directed vectors, the translation must be accompanied with an additional interaction with the circumferential vectors surrounding this charged particle, as was discussed above. This rotational energy forms the entity known as the magnetic field. Therefore, a dynamic translation of 'charge', ie., an electric field, must of necessity, also create a dynamic movement of circumferential vectors, ie., a magnetic field. Thus, under dynamic conditions, we cannot speak of only an electric field or a magnetic field, but of a dynamic electromagnetic field. It can be shown that this process is reversible, ie., a dynamic magnetic field, however created, must of necessity, also cause a translation of rhysmonic vectors, ie., a movement of charge or an electric field. This is because the vacumn is a 'perfect machine' and the balance of forces requires these interactions (See Reference 1).

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Wave Propagation

A dynamic electromagnetic field has an additional interesting property in that the interacting fields result in a propagation effect in free space (the vacumn) which is known as an electromagnetic wave or EM radiation. A seldom used illustration of this process is shown in Figure (6a). This is the 'chain link' interpretation of EM wave propagation. Here the fields are depicted as closed loop vectors for not only the magnetic component, but also the electric component. The H-field loops are shown lying in the plane of the paper, while the E-field loops are shown directed into the paper at (+) and coming out of the paper at (-), thus completing this loop. The direction of propagation is seen to be at right angles to both these components. This closed loop interpretation of wave propagation indicates a quarter wavelength or 90° phase shift between the electric and magnetic components, which is not indicated in most depictions of EM wave propagation. This may be a necessary requirement of the directed vector construction of the vacumn of the universe. The loops are shown as circular in this depiction for illustrative purposes only. It should be noted that the depiction is symmetrical,

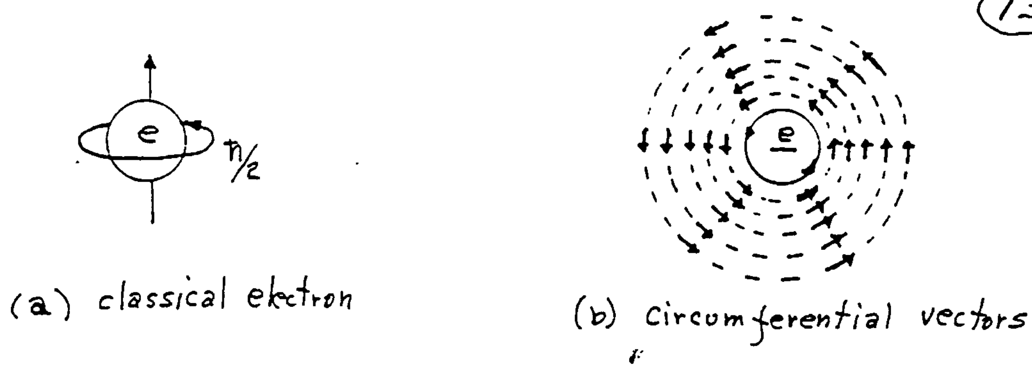
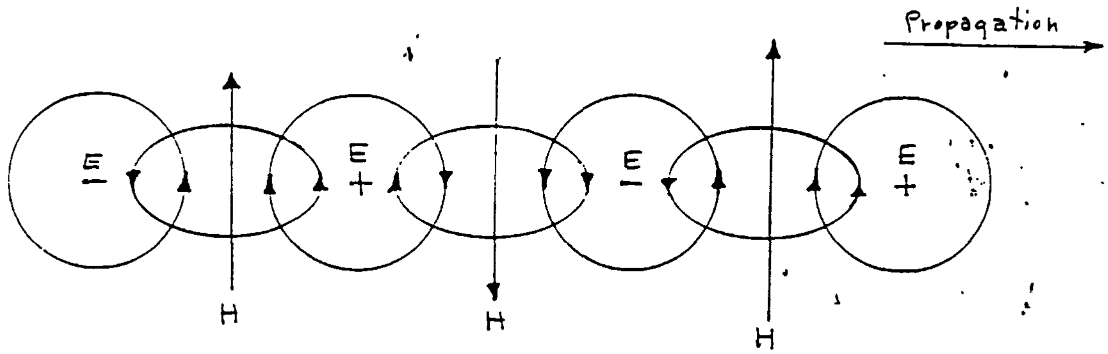
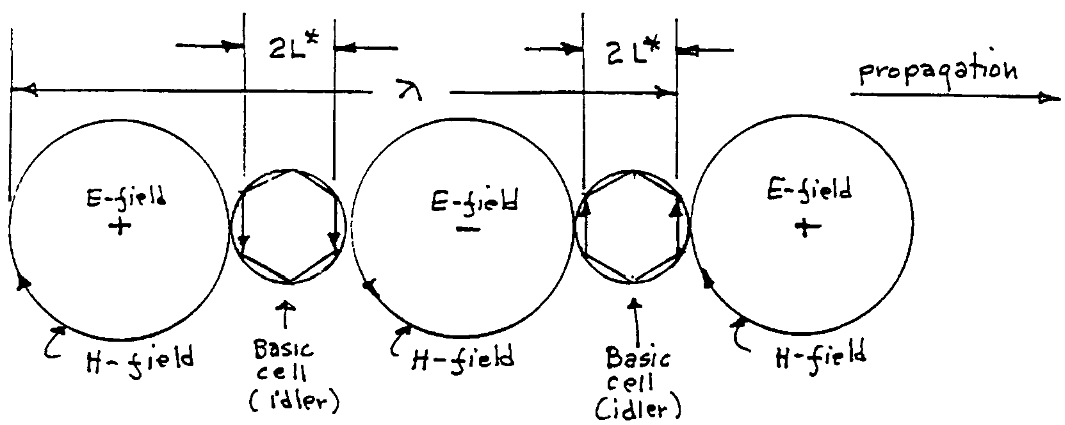


Figure (5) - Depiction of the rhysmonic electron.



(a) Chain link depiction of EM wave propagation.



(b) Clarification of rhysmonic 'idler' concept.

Figure (6) - Vector depictions for EM wave propagation.

ie., the E-components can be interchanged with the H-components, and vice versa, without affecting the nature of this propagation. This symmetry is also apparent in Maxwell's equations.

When viewed under the substratum conditions of the rhysmonic matrix structure, this propagation process has some interesting consequences. As was seen in the planar view of circumferential vectors in the basic matrix structure of Figure (1), the closest approach of any two adjacent parallel directed rhysmonic vectors is approximately two times the Planck Length, 2L*, which is equal to about 3.2×10^{-33} centimeters. Since the magnetic component in electromagnetic propagation is at right angles to the direction of propagation, and since curl or a rotational vector geometry is also involved, magnetic field reversal as seen in the depiction of Figure (6a) cannot take place closer than this closest approach of parallel rhysmonic vectors, or 2L*. This concept is clarified in the simplified sketch of Figure (6b). Here the magnetic closed loop vectors (which are really the circumferential rhysmonic vectors) are shown, but the electric field vectors (which are really the radial rhysmonic vectors) are shown only by (+) where they enter the paper and (-) where they return out of the paper. Again, the magnetic rotational vectors cannot approach closer than the basic cell structure shown here. It should be noted that this basic cell could, in a broad sense, be considered as the 'idler wheel' imagined by Maxwell in his mechanical model of EM fields. Therefore, for each magnetic field reversal, ie., each half wavelength of EM propagation, the wavelength must increase by this increment, 2L*, or 4L* per full wavelength. Since this increment is independant of wavelength, it is a linear factor and is also the observed Hubble Factor, but it should not be considered as a velocity factor. It should be remembered that E- and H-components may also be interchanged in this depiction. However, from symmetry, it is seen that the electric field component reversal also requires an increment of 4L* per wavelength. However, since both components are increased equally, the overall wave has a uniform expansion with wavelength of this same fixed amount of 4L*. Thus the longer EM waves travel in space, the more the wavelength increases. This process accounts for the so-called redshift in the spectra of distant galaxies.

Velocity of Propagation

The vector depictions of Figure (6) are for EM wave propagation in the pure rhysmoid, ie., the vacumn. Since the universe is like a cinema, with each frame in the cinema of existence lasting for Planck Time, T*, a rhysmonic field reversal, eg., the magnetic field reversal, must occur only after a new frame has begun, ie., after this time interval of T* has passed. But also in this time interval a rhysmonic vector has moved or 'jumped' a distance of Planck Length, L*. Therefore, the translation of these rhysmonic 'effects' is Planck Length, L*, in Planck Time, T*, which gives a Planck Velocity, C*, or as is calculated out, C, the known velocity of light (or EM waves) in the vacumn! Since repeated rhysmonic field reversals occur during the electric and magnetic field generations, as well as in this propagation process, the velocity of propagation must be be this constant L*/T*, and is thus independant of wavelength (frequency) or other factors such as initial velocity or energy. The only way the velocity of propagation would change is if L* and T* change. This is possible in 'matter' where the matrix structure is tightened or loosened, or under conditions where space and time are 'dilated' as per relativity theory.

Waves and Particles

The depiction of electromagnetic waves, thus far, has been on a fundamental mechanism basis. In practice, radio waves, in general, are initiated by antenna systems which are considerably larger than

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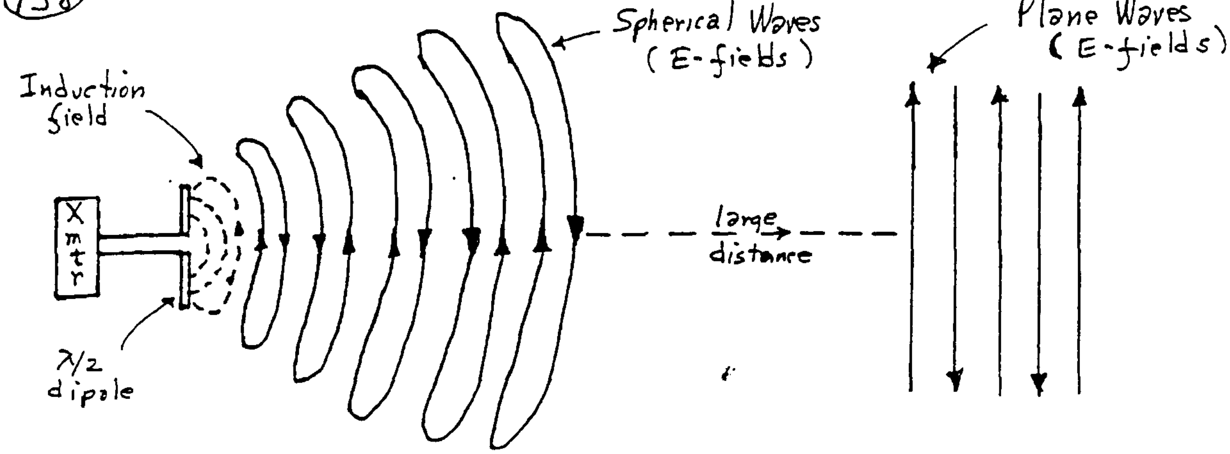
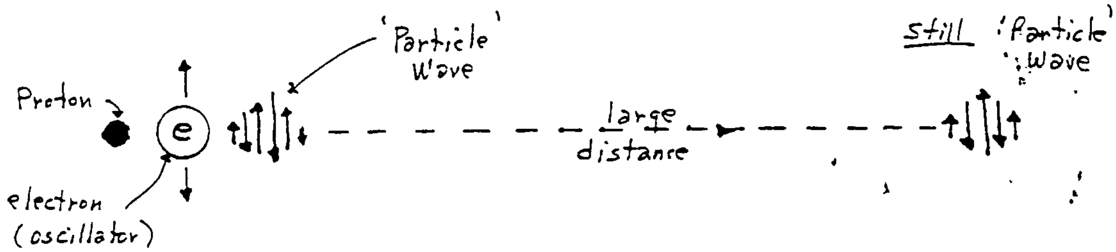
rhysmonic or atomic dimensions. Therefore, the overall radiative effects are definitely macrascopic in nature. For example, consider the simple dipole antenna system of Figure (7a). The linear dimensions of such an antenna are in the order of one half the wavelength of the generated EM wave. The radiation is initiated by an 'induction' field in the immediate region of the antenna, and is generally termed the 'near field'. The radiated field is generated beyond about one wavelength in a delayed process due to the finite generation times for electric and magnetic fields. This mechanism may be found explained in most elementary texts on electromagnetic waves and will not be considered here. The important fact here is that the macroscopic nature of this wave generation results in an expanding spherical wave as depicted in Figure (7a). The electric component , in planar form, is shown as arcs of increasing length with distance from the antenna. At great distances, the radiation may be considered to be a plane wave, for all practical purposes. To be useful for information purposes, the wave is 'modulated' in some fashion, generally as pulse (code), amplitude (or intensity), or as a frequency variation. In any event, these waves have all the characteristics of 'waves' as defined in classical physics.

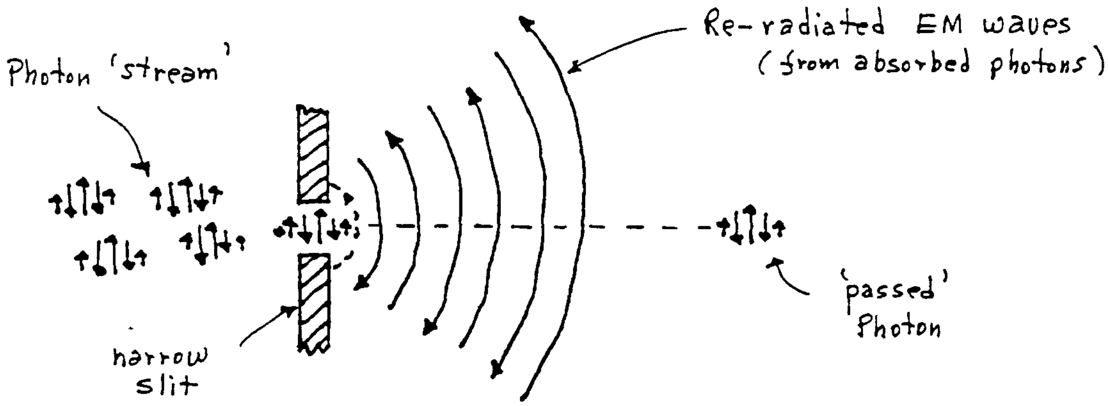
When the source of the radiation is from dipoles, say of atomic dimensions, the radiation will have a different 'characteristic'. Depicted in Figure (7b) is a simplified model of a hydrogen atom, which contains a single proton in the nucleous, and a single electron in 'orbit'. When an energy change is made by the trapped electron, the sub-microscopic radiation released in this process is highly contained and may appear as depicted in Figure (7b). The highly localized fields now have the 'characteristics' of a localized 'particle', having both trapped energy and spin. This particle has been termed a photon and



(a) - Radiation from dipole antenna.



(b) - Radiation from atomic dipole.



(c) - Conversion of 'particle' waves to wavefronts.

Figure (7) - Wave aspects of EM radiation.

139 will exist as a short pulse of EM waves, perpetuated by the energy of the vacumn until dissipated in some fashion.

However, if a stream of such 'particles' is allowed to pass through a narrow slit, as shown in Figure (7c), the coherent nature of this radiation (it is all generated in the same manner) can introduce other effects due to absorption and re-radiation from the slit edges, to create an apparent wavefront, ie., spherical and plane waves as depicted in Figure (7c). Therefore, EM waves generated at the atomic dimensions are generally 'particle' in nature, or photons, while macroscopic effects, generated by many photons, or large radiating structures, are generally recognized as waves. Thus particles and waves are but different aspects of rhysmonic effects in the vacumn. The smaller the wavelength, the more particle-like the effects.

Conclusions

A brief introduction on the nature of electromagnetic wave propagation from the viewpoint of the author's rhysmonic cosmology has been presented. Even this brief glimpse has developed a number of concepts which will be just mentioned here:

(1) The vacumn is a storehouse of potential energy and a perfect mechanical structure which under undisturbed conditions is unobservable. However, the energy of the vacumn can be found useful under certain conditions. Three simple examples are given here.

a. Electromagnetic wave propagation: This has been the main subject of this article. In essence, EM waves, once initiated, would be perpetuated forever by the intrinsic energy of the vacumn. In practice, matter in the universe would affect and dissipate this process. Even in pure vacumn, the energy would eventually 'dissipate' due to the increase in wavelength with time of propagation.

b. Inertial effects: Although not emphasized here, inertial effects are also the result of the perfect mechanical nature of the structure of the vacumn. Again, once inertial effects are initiated, they would also be perpetuated forever by the intrinsic energy of the vacumn. Examples are astronomical objects, space satellites, and closer to home, the simple flywheel. Dissipation in the latter case is primarily due to resisting forces such as gas molecules and friction.

c. Magnetic fields: Since the magnetic field is a closed loop of rhysmonic energy, it should be possible, in principle, to 'tap' this energy and have it continually replaced by the vacumn. Possibility of this approach has been partly confirmed by the author.

(2) Nature of particles and fields: These are essentially perturbations of the pure vacumn. The important factor here is that the concepts of charges and fields, which were assumed by the classicists as aids in evaluating phenomena, are shown to have reality, ie., these entities actually exist!

(3) Velocity of light: The constant velocity of light (or EM waves) in the vacumn, which is only a postulate in relativity theory, is shown to be a necessary consequence in rhysmonics.

(4) Redshift of Spectra: The so-called expansion of the universe has been called upon to explain this phenomenon. Rhysmonics shows redshift to be but a function of the propagation process and universe expansion is not required.

(5) Phase shift: Rhysmonic models appear to require a phase shift between the electric and magnetic components in EM wave propagation. This is not generally considered in most models of wave propagation.

Summary

The author hopes that the curiosity of the inquisitive and knowledgeable electronic experimenter as to the actual physical nature of 'radio' propagation has been answered, at least in part, by this article. However, the author believes that there is much more to intrigue the serious experimenter. As mentioned in the introduction, experimenters have contributed much to the development of early radio. The present day experimenter should find this 'new' cosmology very fertile ground for new concepts and innovations. These would have both practical and technical value, and the experimenter would have the satisfaction of exploring new and virgin territory. The author hopes that many would opt to do so.

References

(1) G. Hodowanec, Rhysmonic Cosmology, To Be Published, 1985.

(2) Max Planck, The Theory of Heat Radiation, Dover, 1959.

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Appendix I

Planck Units (also rhysmonic units)

h = Planck's Constant = 6.624×10^{-27} erg-sec.

$\hbar$ = Planck's Reduced Constant = 1.054×10^{-27} erg-sec.

L* = Planck Length = 1.616×10^{-33} cm.

T* = Planck Time = 5.391×10^{-44} sec.

C* = Planck Velocity =L*/T* = C = 2.997×10^{10} cm/sec.

M* = Planck Mass = 2.177×10^{-5} gm.

Rhysmonic Units

E* = Rhysmon Energy = 1.96×10^{16} ergs.

A* = Rhysmon Action = $\hbar$ above.

F* = Rhysmon Force = 1.21×10^{49} dynes.

Rhysmon radius = 1.62×10^{-66} cm.

Rhysmon volume = 1.78×10^{-197} cm^3.

Rhysmon number = 2.37×10^{98} rhysmons/cm^3.

(142) (142)

SIMPLE ELECTRONIC GRAVITY METERS DISPLAY INTERESTING GRAVITY EFFECTS

((142) - (153))

G. Hodowanec

ABSTRACT

Astrophysicists have been attempting to detect the elusive quadrupole-type gravity signals predicted by Einstein without unequivocal success thus far. However, Newtonian-type gravitational force field gradients have actually been detected for many years now as noise in electronic devices. The simple electronic-type of gravimeter described here greatly amplifies electronic noise and resolves it into meaningful displays on an analog meter or a strip chart recorder unit. The inquisitive and interested electronic experimenter can thus enter at low-cost into an exciting exploration of our universe in terms of these gravity signals, especially if a strip chart recorder unit or a computer unit is used to store and display the tremendous amount of information present in these data. The author hopes that many will opt to do so.

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Background

Gravimeters (or gravity meters) are used to measure the relative strength of a gravitational force field at some particular location for a number of reasons. One very common reason is to determine the possible presence of large underground mass anomalies which, in turn, could signify the presence of potential mineral, oil, or gas deposits. The commercial gravimeters used in many of these evaluations are generally both very expensive and also very delicate apparatuses. However, the electronic experimenter may construct a very simple low-cost electronic-type gravimeter* which is highly portable, rugged, and yet extremely sensitive to even minor variations in the earth's gravitational field. Therefore, it will not only indicate variations in gravity due to local mass variations, but it will also respond to the many fluctuations in the earth's gravity field which are due to cosmic-generated gradients and even the presence of astronomically-distant very dense masses which may happen to lie on the instantaneous astronomical meridian position of the gravimeter. The meridian position as defined here is essentially the same as the geographical longitude of the location of the gravimeter unit.

Newtonian gravitational force field gradients, ie., scalar field type gradients, have been noted by the author for many years now.[1] Simple detectors of the electronic type[2] and the spring scale type[3] have been used in these detections. The electronic version to be considered here is extremely simple requiring but a few readily available electronic components which may be easily assembled by the average electronic experimenter or amateur scientist. It should be of special interest to amateur astronomers engaged in either optical

* Patent Pending

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or radio astronomy as well as to many professional astrophysicists.

How It Works

The circuit for these particular demonstration units is given in Figure (1). One version uses a single low-cost C-mos type operational amplifier device (a dual section unit) which can work well with but a low level +/- 1.5 volt battery supply. The low current drain of these op-amps should enable long life from the small alkaline AAA cells used to internally power this unit. The second version is similar in design but uses the more generally available low-cost bipolar-type of operational amplifier devices. The operation of the C-mos unit will be described in detail here. However, the bipolar unit, while quite similar, requires some component value changes as well as a higher power supply voltage. These changes are noted in the Parts Lists for these units.

In the C-mos version, Newtonian gravitational force field gradients interact with the electron-ion structure of the dielectric in the 1000 uF input capacitor, C_1, to generate small current fluctuations from that capacitor and these fluctuations will reflect the gravity gradients being intercepted by that capacitor. Section IC_1 of the op-amp is operated in the current-to-voltage conversion mode and the small input current fluctuations from capacitor C_1 are converted to much higher voltage fluctuations. The sensitivity of this stage is controllable by the high resistance feedback resistor, R_1. Output from the detector section, IC_1, is then coupled out through a gain control potentiometer, R_2, to drive a conventional inverting amplifier, IC_2, which has about a x20 voltage gain. An off-set control, R_6, in the non-inverting input of IC_2 is used to establish the operating position of the averaged gravity-induced output levels on the analog display meter, M_1 . The display meter is a 100 uA meter operated as a 0-1 volt voltmeter in conjunction with the series resistor, R_5 . Capacitors C_3 and C_4 form part of a low-pass filter network (utilizing R_5 also) to establish a time constant for integration of the meter response to the gravity fluctuation signals. A very long time constant, ie., a very low cut-off frequency for the LP filter, is used to largely measure the averaged gravity levels, while the shorter time constants are used to monitor the more rapidly varying responses of the more distant astronomical events. The switch SW_2 provides for three levels of integration. A DPST switch, SW_1 , is used to interrupt the common return leads of the dual power supply used separately while in the off position. This is necessary to avoid the small battery drain that would occur if a SPST switch were used here. The output jack, J_1 , provides for an output to any external device such as an external meter, an audio amplifier, a strip chart recorder, or a computer unit, if desired. To avoid possible RFI problems, the unit should be fabricated in a Faraday type shielded enclosure. A simple aluminum box enclosure containing the entire circuitry, including the battery supply, should be adequate for most observing locations.

Testing The Unit

After the electronic experimenter has checked out his circuit components and the circuit wiring, the 1.5 volt batteries may be inserted into their holders. Keep the power switch, SW_1 , off at this time. Turn the sensitivity (feedback) control, R_1 , to its mid-position , the gain control, R_2 , to its minimum position, the offset control, R_6 , to its mid-position, and the integration switch, SW_2 , to the off position. Now turn on the power switch and if the unit is operating properly a meter deflection near center scale

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should be noted. Center the pointer with the off-set control, R_6. The off-set control is very sensitive and should be adjusted carefully. Now slowly increase the gain control about one quarter turn. If no indications are seen on the display meter, or if the meter goes off scale, the input capacitor may have an excessive residual charge on it. This charge should leak off in a minute or so but may be discharged more rapidly by turning down the sensitivity control down to its shorted position momentarily, and then returning it to the mid-position again. Since the integration switch, SW_2, had been set to its fastest response time, rapid fluctuations should now be seen on the analog meter output, that is if good components were used and the circuit wiring was correct. The fluctuations may now be better centered on the display meter with the off-set control and their amplitudes adjusted to suitable levels with the gain control. Do not increase the gain to the point of overdrive or to the point where there will be a tendency to low frequency 'oscillations' which will be sustained by occasional high level fluctuations from the cosmos. Notice the varied and wide amplitude ranges of the display!

With the integration switch in its off position, the unit largely responds to the rapid fluctuations due to distant cosmic events. With the switch in the Lo position, it will respond mainly to closer-by cosmic events and this position may also be used to determine the averaged gravity field levels, especially if even a longer integration time is used, eg., the output shunt capacitance is increased more. When the integration switch is in the Hi position, the unit will respond to the many interesting cosmic events in our own Galaxy region as well as the Local Group of galaxies. The reason for this type of response is that the resolution of the detector 'beam' is extremely fine, since the aperture for this detection system is essentially the active area of capacitor, C_1 , and that may be only in the order of 1/4 to 1/2 inch in diameter. Thus this fine beam sweeps the meridian position of the detector as a function of the rotation of the earth. Simple geometry shows that such a fine beam would sweep across some distant object more rapidly than it would do so for some similar but but much nearer object. Thus the difference in response times.

Typical Responses

Since these fluctuations are a function of time, they are best displayed on a strip chart recorder unit running at about a chart speed in the order of 2 to 4 inches per minute. A high input impedance strip chart recorder unit must be used with the C-mos device detector unit, but a low impedance strip chart recorder unit could be used with the bipolar detector unit, eg., a D'Arsonval meter type unit. In both cases, the output voltage could range between 0 volts and about 1.5 volts. Some typical responses as seen on a strip chart recorder are shown in Figure (2). Experimenters who lack a strip chart recorder or a computer unit may try to follow some of the slower responses by hand recording the output data being received when the unit is operated with very long output integration times. Even here, the experimenter can expect to 'observe' some local cosmic events of the type shown in Figure (2). However, recording the data by hand can be quite tedious and very difficult at best.

Briefly stated, some of the cosmic events detectable with these units are cosmic events which were predicted by the astrophysicists but not yet detected by them, primarily because most of these astrophysicists are still looking for the elusive quadrupole-type gravity signals which were predicted by Einstein. However, these units detect the longitudinal gravitational force field gradients of the Newtonian-type (which were not supposed to exist, incorrectly so, in terms of the presently prevailing relativity theories!). Therefore, the interested electronic experimenters, amateur scientists, as well as the professional researchers, now have a golden opportunity to enter into a low-cost exploration of our universe using the proven techniques briefly disclosed here.

Many of the active astronomical events detectable with these units appear to be novae and supernovae. Novae are believed to be stars which lose much of their outer layers in a nuclear-type explosion. These events are detectable (and quite often) since the rapid expansion of the star's outer mass causes a Newtonian force field gradient, which, if it happens to lie on the detector's meridian position, causes a superposition of fields on the earth's gravity field, and thus results in a measureable change in the earth's gravity field. Supernovae are believed to be large stars which 'implode' to a neutron star or black-hole type of structure, and then 'blasts' off much of their volume and atmosphere. The response as detected by these units shows both the implosion and the explosion of the event. After a massive supernova event, the neutron star or black hole type of structure, ie., a very small very dense mass, is generally seen at that location, often accompanied by what the astrophysicists have termed an accretion ring. The units also detect what appear to be very dense masses but without an accretion ring. These may be very old black holes which have since lost their accretion rings.

The Bipolar Detection Unit

The bipolar device detection unit is very similar to the C-mos device unit described above, but requires some component value changes as well as the power supply change as shown in the Parts Lists. These changes were made in order to essentially duplicate the responses as seen with the C-mos device unit. The bipolar device unit works well with an internal +/- 9 volt battery supply. Most experimenters may prefer to use the bipolar device op-amps since they are more generally available. The author uses the bipolar device design to drive his D'Arsonval meter type strip chart recorder unit.

The experimenter is cautioned here that while the basic design of these detectors is very simple, components and devices do vary. The experimenter may wish to try several electrolytic capacitors or op-amp devices if difficulty is seen in achieving the effect given here. Especially the bipolar op-amp devices, even if they are labelled the same, may be quite different in structure and performance; some might even have different pin-outs. The author has constructed many detector units (and many colleagues have also done so) so that he has confidence that the careful and patient researcher, amateur and professional, will be able to duplicate these results.

Conclusions

The simple low-cost electronic type gravity meters described here should enable the electronic experimenter not only to determine the averaged gravity forces at various locations, but also enter into the fascinating and quite unexplored area of gravitational field astronomy. Outside of possibly obtaining a strip chart recorder as a highly desireable component for use in these studies, the experimenter is not otherwise limited by extensive or expensive facilities or preferred locations in persuing these objectives. Many experimenters, mainly amateur radio operators (hams) have entered the area of radio astronomy successfully. However, compared to the above disclosed gravity field astronomy, radio astronomy is rather expensive, tricky, and involves fairly massive antennas as well as requiring fairly radio-quiet, ie., EMI free locations. Gravity signal astronomy can be done at any location, even electrically noisy locations, provided the units are adequately Faraday shielded. Simple aluminum box enclosures are adequate for most locations. The author does his 'observing' in a corner of his basement lab area. The author hopes that many experimenters, both amateur and professional, will opt to enter into these investigations. Good luck with your experiments!

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(2) "Gravitational Waves???", Radio-Electronics, April 1986.

(3) "Simple Gravimeter Detects Gravity 'Shadow' Signals", Tesla '86, March-April 1986.

Added Notes

(1) Place a .OluF ceramic capacitor across output jack, J_1 , terminals A and C for improved RFI isolation, if necessary.

(2) The low impedance output of the op-amp should normally be loaded with a low impedance meter or strip chart recorder unit. However, if a high impedance meter or a potentiometric-type strip chart recorder unit is used, it may be necessary to load the output with a 1-2K ohm resistance and use the voltage drop across this resistance as the output signal. All loads should be resistive. Reactive loads could present scalar-type signal feedback to the detector and result in instabilities.

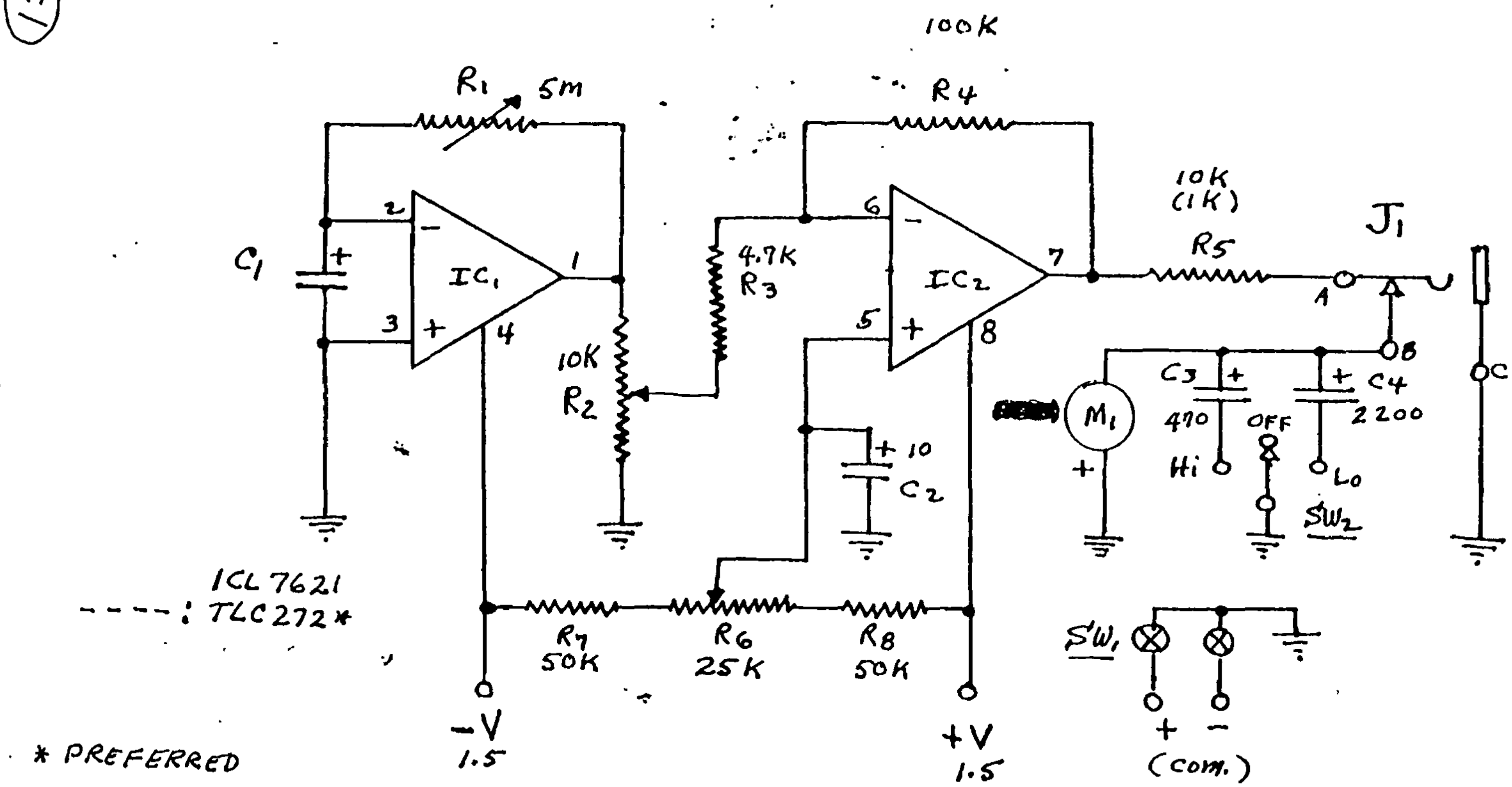

Figure (1) - Schematic diagram of the gravimeter unit.

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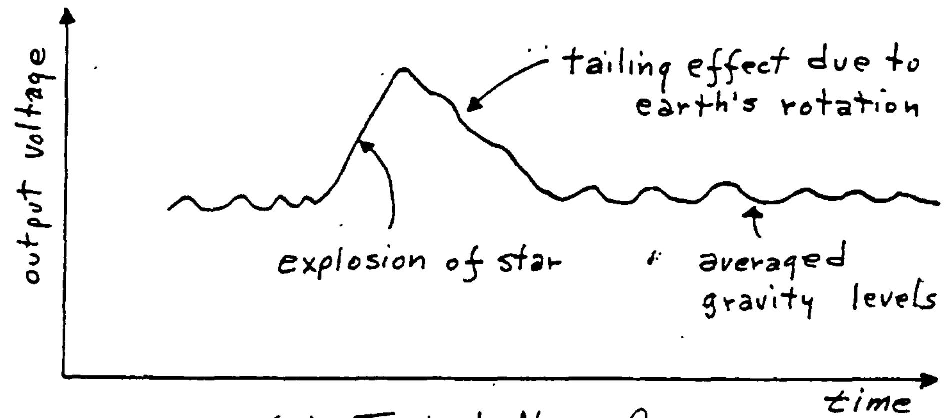
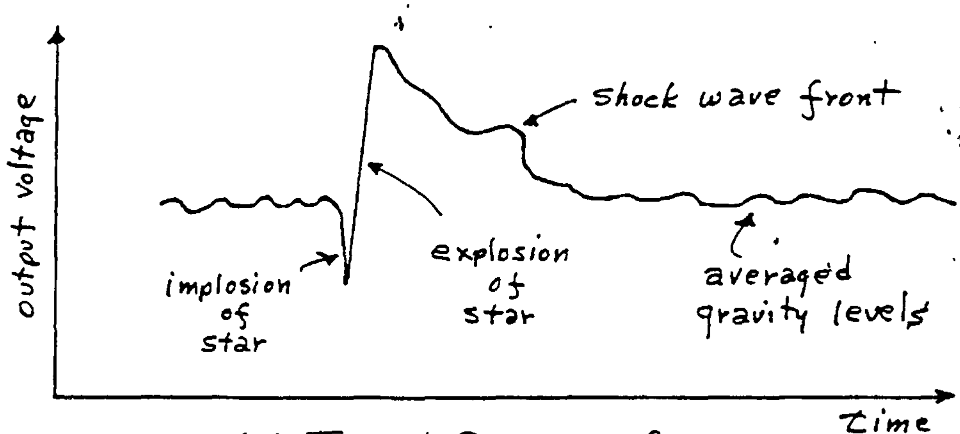
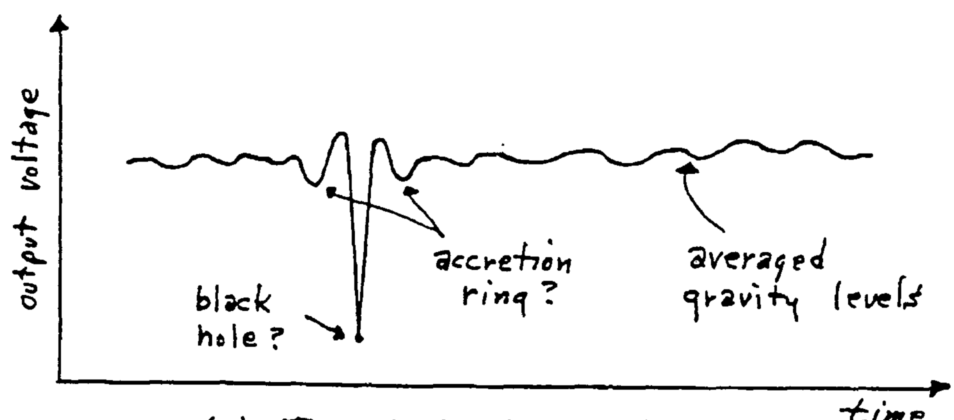


(a) Typical Nova Response



(b) Typical Supernova Response



(c) Typical Black Hole Response

Figure (2) - Some recorded gravity signals

PARTS LISTS

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For the C-mos device unit:

R_1	5 megohm, miniature potentiometer
R_2	10,000 ohms, miniature potentiometer
R_3	4,700 ohms, 1/4w, 5%, resistor
R_4	100,000 ohms, 1/4w, 5%, resistor
R_5	10,000 ohms, 1/4w, 5%, resistor
R_6	25,000 ohms, miniature potentiometer
R_7,R_8	50,000 ohms, 1/4w, 5%, resistor
C_1	1000 uF, 10v, electrolytic capacitor
C_2	10 uF, 10v, electrolytic capacitor
C_3	470 uF, 10v, electrolytic capacitor
C_4	2,200 uF, 10v, electrolytic capacitor
SW_1	DPST, miniature switch
SW_2	SPDT (center off), miniature switch
J_1	miniature closed-circuit jack
IC_1,IC_2	Dual operational amplifier (C-mos) ICL7621 (ok) TLC272 (used)
M_1	100 uA meter (0 to 1 scale)
V	1.5 volt battery

For the bipolar device unit:

R_4	470,000 ohms, 1/4w, 5%, resistor
R_5	1,000 ohms, 1/4w, 5%, resistor
R_7,R_8	100,000 ohms, 1/4w, 5%, resistor
C_1	2,200 uF, 10v, electrolytic capacitor
IC_1,IC_2	Dual operational amplifier (bipolar) 1458 (used)
M_1	1 mA meter (0 to 1 scale)
V	9 volt battery

Note: The other components are the same as above.

SUPERNOVAE AND BLACK HOLES

(154) - (164)

(154)

G. Hodowanec

(154)

Abstract

The existence and development of supernovae and black holes, which are postulated in conventional astrophysical theory, are examined from the viewpoint of the author's rhysmonic cosmology. The actual existence of these effects are confirmed with the gravitational signal astronomy techniques which were developed by the author. The theoretical and experimental data are compared and some conclusions are drawn.

Introduction

Astronomy in recent years has undergone a revolution in both theoretical considerations and observational methods. These are the result of new advances in scientific technology, which not only opened up new observational techniques such as observations at electromagnetic frequencies other than visible light, but also gave some evidence that our universe, in its furthest observable reaches, obeys the same scientific principles as is observed here in our own environment. These principles have been used by the astrophysicists to theorize on the basis for some of the effects noticed in these astronomical observations. There are many effects but this short article will consider only the observation of supernova effects and the possibility of the existence of black holes.

Supernovae, of course, are observed effects and thus are not just purely theoretical objects. The possible existence of black holes, however, is still theorized and has not yet been unequivocally confirmed in either theory or in present observational methods. However, while the theoretical aspects appear to be somewhat valid, the observational attempts made by the conventional astrophysicist to confirm these effects has been mainly in terms of quadrature-type gravity wave signals, which are really, in essence, but a form of electromagnetic radiation. Such signals would be expected to have very long wavelengths and very low

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energy content, and thus would be a very elusive type of radiation signal to be detected with presently developed techniques. The author believes that perhaps some of the so-called micropulsations being observed with some magnetometers might be such signals.

The main problem today in the attempts to observe any gravitational radiation signals has been the insistence of the conventional (orthodox) astrophysicist that only the quadrature-type of signals of Einstein are permissable. Rhysmonic cosmology, however, has shown that longitudinal, monopolar, or scalar-type gravity signals exist profusely in this universe and are easily detectable with rather simple detection techniques. (See Ref. 1,2,3,4 and 5). Such techniques and experimental results, as they apply to supernovae and black holes, will be discussed in the remainder of this short article.

Rhysmonic Viewpoints

Rhysmonic cosmology[1] is a very basic theory which applies to all of existence and scientific technology. In a way, it also confirms much of the theoretical speculations of present day astrophysicists. While rhysmonic cosmology is a very fundamental theory, which deals largely with the substratum of the universe (the aether, if you wish), it also relates very well to the macroscopic aspects of the universe. Therefore, the gravitational aspects considered in this cosmology[6], lead to predictable effects in the substratum or aether of this universe which can also be observable in the macroscopic world of man or his instrumentation. Of prime importance is the prediction that the scalar gravitational signals can interact with scalar-type electric fields and scalar-type magnetic fields. Of particular importance is the interaction of gravity with scalar electric fields, since this forms the basis for many of the author's gravitational signal detection systems. While Some of these techniques may have been observed in the past by lone and unappreciated researchers, they had not been really recognized for their true value, since many of the conceptions required are not yet generally recognized or accepted by the orthodox scientific community. While a philosophy behind many of these concepts is given in various works by the author, no attempt will be made here to justify the theories other than in the experimentally observed results, which will be shown to correlate very well with the otherwise noted astronomical effects.

Experimental Detectors

Scalar type (longitudinal or monopolar) gravitational signals from the universe are observable as perturbations superimposed on the earth's 'static' gravity field. The earth's static field (g-field) can be measured with simple gravimeters of the electronic type[1,2,3,4] or of the spring scale type[5]. The electronic versions are more suitable for the detection of supernova effects and black holes and thus only those types will be considered here. While some actual detection systems are considered in more detail in the references, a very simple description of the basic detection process is given here using the simplest circuitry shown in Figure (1).

The detection element is a rather large-value capacitor (order of 2000 uF), C_D, in which the scalar fields developed by the electron-ion pairs in the dielectric material can be 'modulated' by interaction with the monopolar or scalar gravity fields which 'proceed' instantly from the distant supernova, S.N., (See Ref. 1). These perturbations of the earth's gravity field can be active, as those which appear when there are large and rapid 'movements' of mass, eg., when a star mass collapses to a neutron star or black hole in the supernova event, or passive, where the black hole which is created in the supernova event causes a 'shadow effect' which can also modulate the GW signal levels which may be inline with this highly concentrated mass and the observer's

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meridian position on earth. Modulations of the electron-ion structure in the detector capacitance, C_D , lead to some small current fluctuations in the external input circuitry and these are amplified to higher-level voltage fluctuations by IC_1 , which is operated in the current-to-voltage mode. The combination of the detector element, C_D , and the IC's mode of operation results in a harmonic type oscillation where the 'polarization' effects in the capacitor, C_D , are restored by the reverse electric fields developed from the IC. This enables a rather pure sine-wave mode of oscillation, with the frequency of the oscillation established by the amount of charge in the detection capacitor, ie., the capacitance of C_D , and the feedback voltage, which is largely a function of the feedback resistance, R_F . Since the variation in g-field levels is also equivalent to a variation in scalar E-fields, the gravitational output signals generally have two components; a dynamic variation or an ac signal output, and a slowly varying off-set voltage variation, or a dc signal output. Both signals are useful in evaluating the gravitational signal effects. The ac component can actually display on an oscilloscope the gaussian nature of the collapse of a supernova star to a black hole, and this process can also be heard aurally. Meanwhile, the dc component, when processed through a low pass filter element, can also display and record on a strip chart recorder the variations or 'shadow effects' caused by the presence of dense masses which happen to be inline with with the observer's meridian position on earth. The detection 'window' is essentially the cross-sectional area of the active portion of the detecting element, capacitor C_D in this case, and thus has extreme resolution, ie., the 'beam size' is in the order of but a square inch or so.

The actual detection circuits used in the observation of supernovae and black holes are somewhat more complete and are doubly Faraday-shielded in practice to avoid any possible RFI problems, but in essence they operate essentially as briefly described above. Some experimental results are now given, using a well- proven GW detection circuit.[7]

Experimental Results

The experimental detection systems respond to the many gravitational signals which are very profusely generated in this universe. The response and analysis here will be limited to novae, supernovae, and black holes only. Some typical responses will be shown and the data analyzed in terms of conventional astrophysics as well as rhysmonic theory.

Novae

Nova in conventional astrophysical terms are stars which eject their outer layers of gas in a violent 'explosion', probably due to some nuclear reaction. Such events are detectable with this system due to the large transient movement of mass and the response is usually as depicted in Figure (2). There are two prominent features or 'signatures' for this event; the 'blast' itself and the observed 'tailing' of the blasted material as the detector 'sweep' pulls away from the blasted material due to the movement of the detector with the earth's rotation. In some cases, a build-up of material due to the shock-wave from the blast may be seen. Novae rarely leave lasting gravitational traces since the amount and density of material removed from the star is not great. Optically, ionization effects can leave traces of expelled material, eg., planetary nebulae, but these are generally gravitationally transparent, and thus are not seen with this system.

Supernovae

Supernovae in conventional astrophysical terms are believed to be stars which exceed a certain 'critical mass' and thus 'collapse' to a small very dense neutron star or a black hole structure, and in this

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process also expels much of its gaseous material. This process, which occurs only in the order of milliseconds (per conventional theory) also leaves certain prominent features or 'signatures' as depicted in Figure (3). First, there is the actual 'collapse' of the star to the black hole structure which is noted briefly with the dc component of this detector, but is more prominent in the ac component which can actually display the gaussian nature of the 'implosion' of this collapse on an oscilloscope. Also prominent is the actual expulsion of much of the star's mass in the 'explosion' which again gives rise to a 'tailing' effect due to the detector's sweeping action caused by the earth's rotation. However, supernovae generally show a mass build-up now due to the shock-wave from this blast. Also, supernovae generally show lasting gravitational effects which can be followed for days (and sometimes years), especially with regard to the black holes which can be developed.

<u>Black Holes</u>

Black hole structure developed by <u>massive</u> supernovae usually appear following the event, and are quite developed 24-48 hours after the event. The typical depiction of the new structure is given in Figure (4) and this also has some typical features or 'signatures'. The black hole itself appears as a rather deep 'shadow' of very narrow width (time) since it is of rather small size, in the order of just miles in diameter, typically. Also prominent is the newly formed 'accretion' ring, which may apparently be formed of material which remained 'trapped' by the dense hole and thus did not escape as did the material which is now forming the expanding shock-wave ring systems. The development of this system can usually be followed for a few days, where the hole 'deepens' and the rings expand and vary in structure. The close-in 'accretion' ring may remain for sometime, but it is suspected that over a long period of time, only the black hole itself will be gravitationally visible as depicted in Figure (5).

Galaxy Center

(160) The Galaxy Center is considered by many conventional astrophysicists to harbor a very dense mass or even a black hole. Infra red and radio astronomy observations of the Center (necessary since dense clouds of gas and debris there prevent direct visible light observations) have supported such conjectures. Gravitational signal observations of the Center by the author for the past five years have also confirmed to some extent the EM wave observations. This meant that the Galaxy Center had been relatively stable for the past 32,000 years or so. This is because GW signals are essentially 'instantaneous' and thus depict the conditions there now, while the EM wave signals which travel at the speed of light depict the conditions which were there about 32,000 years ago. A rough comparison of the GW and EM scans of the Galaxy Center are given in Figure (6). The GW scan would seem to indicate that the central object in the Center is a very massive object and could be a small black hole.

However, on Dec. 1 and 2, 1986, some slight changes were noticed in the GW scans of the Galaxy Center structure. It appeared as if there was a movement of a near-by mass in this structure toward the central dense object in this structure. This might have been 'precipitated' by a rather large supernova event noted near (?) the Galaxy Center on Dec. 1st. Unfortunately, the Center was not scanned again until Dec. 6th and at this time it was observed that the original long-standing structures had 'disappeared' and in its stead was a 'new' very deep black hole structure with a well-defined 'accretion ring' as shown in the depiction of Figure (7). The Center was followed daily for a month and the development of the new structure was observed. The Center had largely stabilized in this time period and thus appears to harbor a new deep black hole with the well-defined accretion ring structure.

However, the original shock-wave created 'debris ring' of about 7 minutes of arc in diameter had expanded to about 15 minutes of arc! The gravitational or 'rhysmonic winds' being created by this expanding material were recorded on 1/f type noise detectors by the author as very noisy and turbulent initially, but have since settled down to a more or less steady 'wind' (1/10/87). These winds could possibly affect the normal weather patterns here on earth, especially at the latitudes between about 50° N. Latitude and the north pole, where these gravitational winds are essentially parallel to the earth's surface and thus could strongly affect the atmospheric conditions in this region. The reported anamolous weather conditions in Europe and Siberia during the month of January 1987 could well have been due to these winds. Time will tell if there is a correlation between the two.

Conclusions

Simple gravitational signal detection systems appear to confirm much of the processes of novae, supernovae, and black holes as was expounded by some astrophysicists. Much of their theories also appears to be in agreement with tenets of rhysmonic cosmology. Therefore, these gravitational signal detection systems offer a new 'window' to the universe which has already proven its usefulness as discussed in this brief article but has also detected many, many other objects and events in this universe. The catastrophic event in the Galaxy Center of about December 4th or 5th, 1986, will be followed closely, especially with respect to the effects of the gravitational winds on the weather of earth. The observational systems are quite simple and the author invites interested open-minded researchers to join him in this effort.

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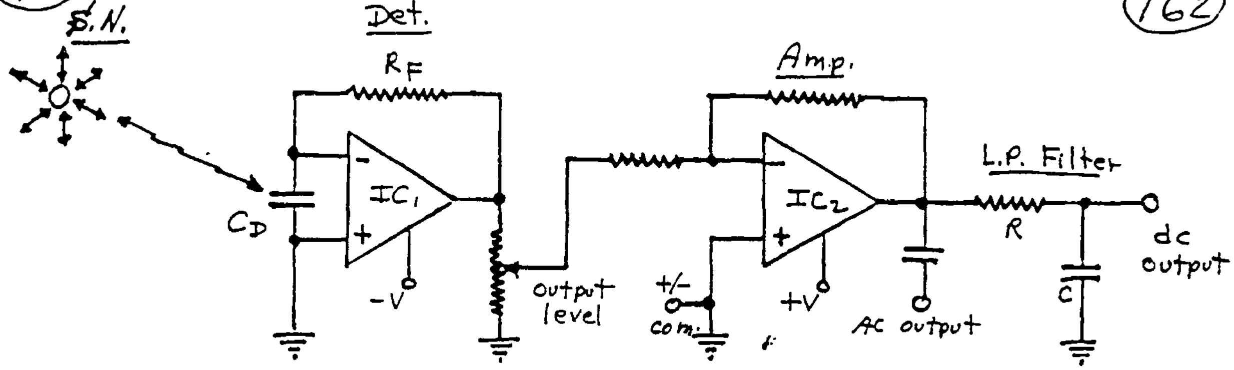

Figure (1)-- Simplest GW Detection System

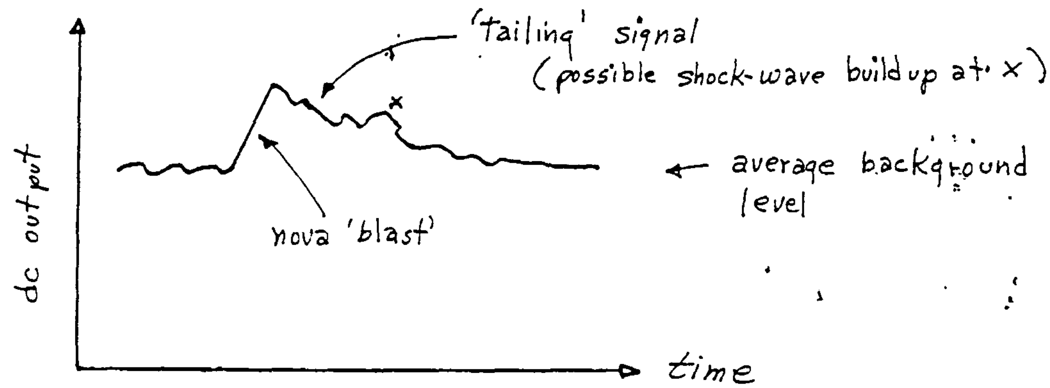

Figure (2)-- Typical Nova GW Response

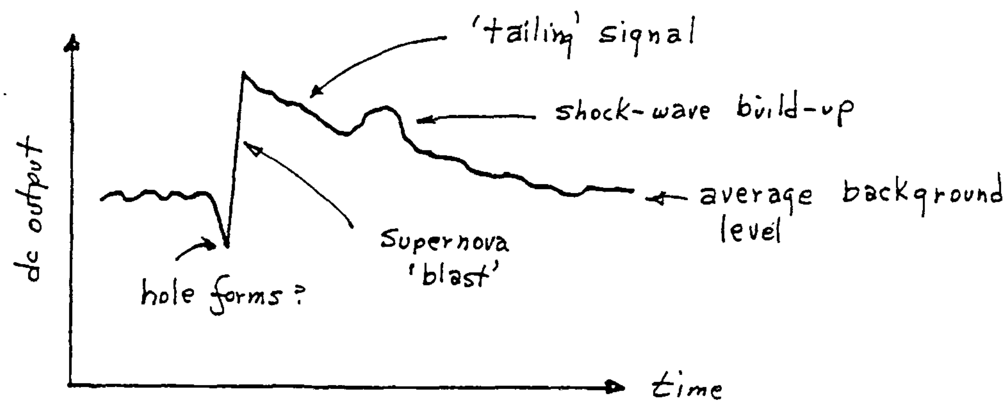

Figure (3)-- Typical Supernova GW Response

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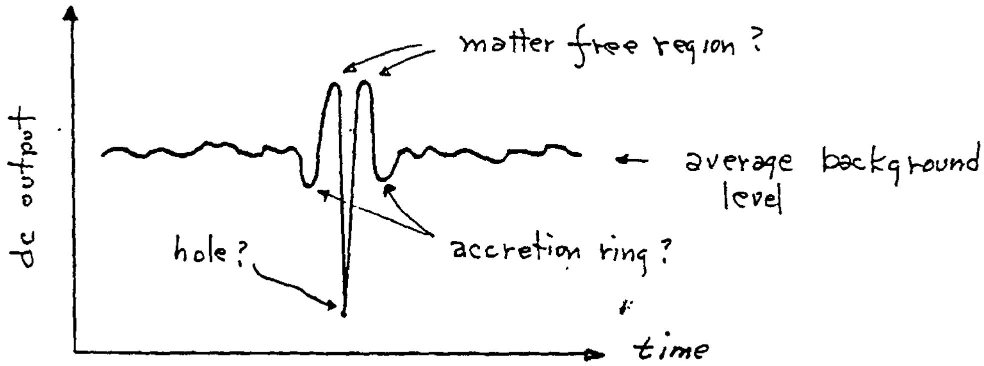

Figure (4)-- Typical 'New' Black Hole Structure

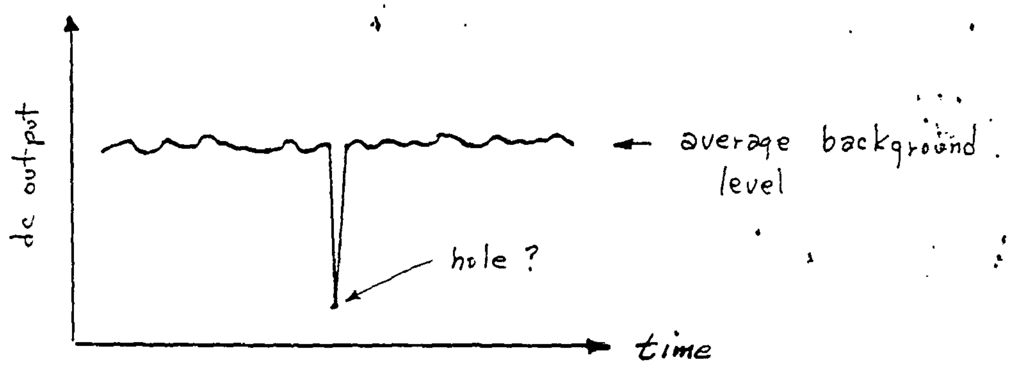

Figure (5)-- Typical 'Old' Black Hole Structure

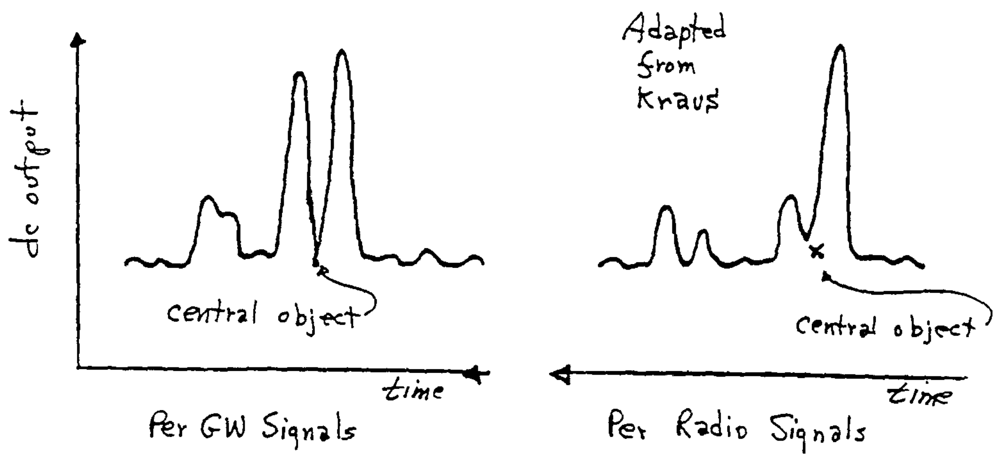

Figure (6)-- GW and EM Scans of the Galaxy Center
Compared Prior To December 5, 1986

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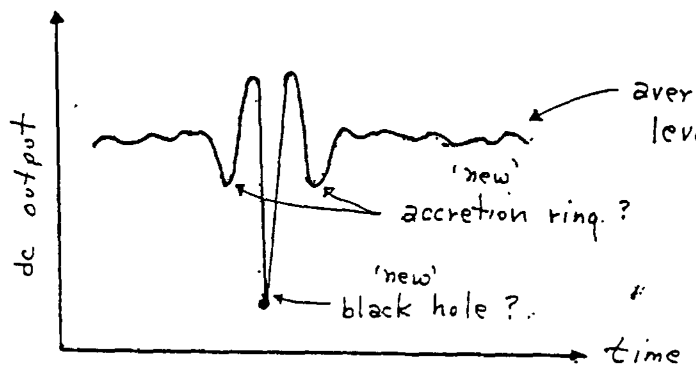

Figure (7)-- The 'New' Galaxy Center Structure (1/10/87)
(UNTIL JUNE 1991 ONLY)
BR

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Note: All are by the Author

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(5) "Simple Gravimeter Detects Gravity 'Shadow' Signals", Tesla '86, March-April, 1986.

(6) "The Nature of Gravitation", Unpublished, May, 1985.

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(165) (165)

THE NATURE OF QUASARS

G. HODOWANEC

Introduction

Quasars have been an enigma ever since they were first discovered in the late 1950s. It is difficult to explain the enormous energy output, small size, rapid fluctuations in output, and apparent remoteness within the present concepts of astronomy. However, rhysmonic cosmology offers a simple and elegant solution to this enigma and requires no ad hoc explanations. Simply stated, quasars are ordinary galaxies (more likely Seyfert types) which are viewed under special conditions in this rhysmoid universe.

Seyfert Galaxies

Seyfert galaxies are a class of galaxies which have unusually active nucleouses. They are, therefore, the prime candidate for quasar type responses. As shown in Figure (5), the nucleous will be prominent in whatever the general class or orientation of the galaxy. However, many ordinary galaxies, which have black hole energy engines in the nucleous, should also have quasar type responses at shorter viewing distances.

Quasar Response

The nature of quasar response can be depicted with the rhysmoid model of the universe as shown in Figure (6). The earth's position in the matter portion of the universe is shown at point E, while a Seyfert galaxy is shown at point S_1. The Seyfert galaxy can be viewed directly, in a shorter distance $E-S_1$, but viewing is through the matter universe with its dust clouds and galaxies as well as interstellar gases and molecules, all of which lead to absorption of EM wave energy; thus, at best, galaxy S_1 is very dimly seen, if at all. However, galaxy S_1 can also be viewed over a much longer path, $E-2-S_1$, reflected off the edge of the universe at point 2, but with differences. Absorption bands are present only in the matter regions near earth and the Seyfert galaxy regions. However, most of the EM wave pro-

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(1) Only apparent high output energy due to very low losses.
(2) Only apparent large cosmological distances due to the very long viewing path. The galaxy is much closer in reality.
(3) An actual small size since it is mainly the nucleous part being viewed. Some of the rest of the galaxy could be viewed if bright enough.
(4) Emission bands are near S_1 while most absorption bands are near E.
(5) Absorption due to interstellar hydrogen will be minimal.
(6) Redshift values will range over a range of Z-values which will be determined by the actual path of reflection off the universe edge and will be determined by the relative locations of earth and the galaxy.
(7) It should be possible, in principle, to view our own Galaxy or a nearby Seyfert galaxy using optical path E-1-S_2.

Summary and Conclusions

Rhysmonic cosmology provides a simple solution to the mystery of quasars, requiring no ad hoc explanations but only the basic premises as established in the beginning of these cosmological studies. The predictions flowing from this theory appear to be confirmed with the many observations of quasars to date.

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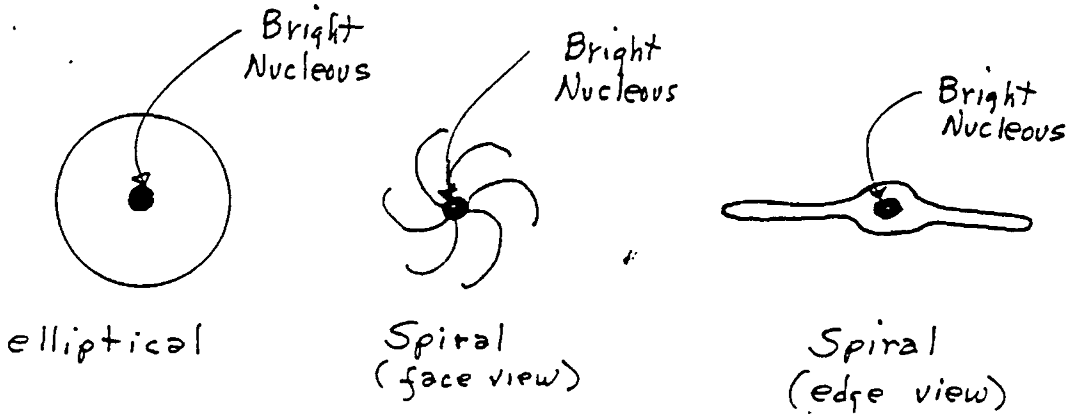

Figure (5): Seyfert Galaxies

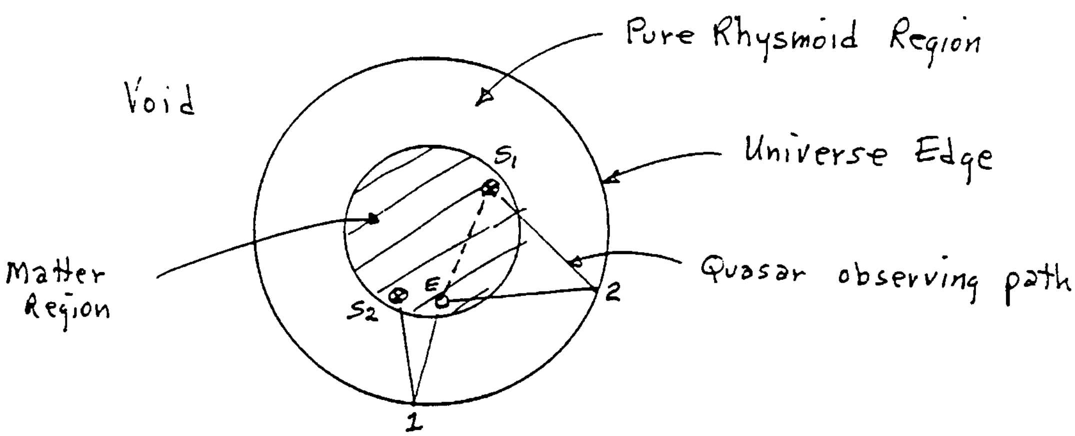

Figure (6) - Quasars as Special Views
of Seyfert Galaxies.

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A Brief Background on the Possible Development of a Simple Gravitational Wave Detector

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During the past ten years I have been endeavoring to develop a simplified (unified) approach to cosmology. This work has been limited and sporadic in nature as I am employed full-time as a research and development engineer in electronics. Effort has largely been directed towards the evaluation of some original concepts with respect to those previously proposed or commonly accepted, utilizing the limited theoretical and experimental data available to me.

Briefly, my concepts are based upon the premise that a subphenomena gravitating particle (rhysmon) is the only true elementary particle of physics and the source of all energy and the basis of structure (geometry) in the universe. Much of the properties of this particle and thus the structure of the universe are related to many physical constants already determined, especially the various Planck Constants, including his fundamental units of length, time, and mass. According to these concepts, the rhysmon provides the fundamental force; the gravitational field, the electric field, and the magnetic field are but different manifestations or modes of this basic force.

About five years ago, a consideration of these concepts, coupled with a background in physics and electronics, led me to an idea for a simple detector for the above three modes of the rhysmon particles. The basic design of the detector has since proven to be extremely sensitive to these modes. For example, the basic circuit has been used to detect low-level and extremely short transients of electromagnetic radiation in the range of 50Mhz to 500Ghz. The circuit has also been used as a sensitive Doppler-type motion detector or intrusion alarm. Primarily, the circuit was found to be extremely sensitive to minute changes in the gravitational field at the detector element. This last item had been the original reason for the development of this circuit, one objective having been the possible detection of "hammer-type" gravitational wave-fronts. The random pulse counts being detected by this circuit are now believed to be caused by just such gravitational wave-fronts.

However, I am aware that other explanations for these results are possible. Therefore I have tried to eliminate the other possibilities as much as possible within the limited time and facilities at my disposal. For example, the detection of what I believe to be gravitational wave-fronts persists even when the detector is completely shielded against electric and magnetic field effects. Electromagnetic radiation is completely cut-off under these conditions. Components in the circuit were changed many times to eliminate possible internal circuit effects. Several circuits were fabricated and operated individually , simultaneously, at close range and up to fifteen feet apart. Similar random pulse counts were obtained in all cases, and the counts in the multiple circuit tests were found to be coincident. Detectors were operated in moving vehicles and at locations five to fifty miles away from the home lab location where most of the tests were performed. In every case, similar random pulse counts were obtained. Pulse counts appear to vary only slightly at different times of the day except for a noticeable increase in counts seen around the hour of true midnight. This is tentatively related to the detector position with respect to the earth-sun-moon alignment and thus may note a possible shielding or deflection effect, or perhaps a preferred orientation in space. More refined experiments and data analysis is required here than is possible for me to undertake alone.

(continued on page 2)

(169) (169)

In summary, a detector for "hammer-blow" type gravitational waves such as may be generated with gravitational collapse on a grand scale (ie., supernovae) is believed to have been constructed. Based upon my concepts, gravitational effects anywhere in the universe are "felt" in any other region of the universe in Planck Time ($\simeq 10^{-44}$ sec) and thus would be essentially instantaneous effects. The detectors as presently constructed appear to be detecting in the order of ten to thirty "events" per second. Considering the billions upon billions of stars in the universe, these results could be well within the statistical possibilities for such events. Most important, if my basic concepts are correct, these events are taking place now, in real time, and not in the remote past as would be the case with an electromagnetic field type of detection system.

G. Hodowanec 6/10/80

G. Hodowanec

GRAVITATIONAL SIGNAL ASTRONOMY

170 170

G. Hodowanec

Abstract

A version of the author's gravity detection system is described. This unit detects modulations of the earth's gravity field which appear to be due to various cosmic processes and structures which happen to be in line with the observer's position on earth. The events can be recorded on a strip chart and thus studied at leisure. The author describes some typical 'events' and proposes some of the possible causes of these events. The simplicity of the units should enable SARA members to partake in these investigations at very low cost.

Introduction

The author has developed a new cosmology (1) which predicted the existence of monopolar type gravitational signals which were detectable with simple scalar field detector systems. Some of these have been previously reported in the literature. (2,3,4) Others are now scheduled for future publication. This article describes another simple version of the electronic scalar signal detector which also serves as a very sensitive gravimeter. Of interest to SARA members is that the averaged value of the earth's gravity field at the observer's location will also include variations or 'structure' in this averaged field which are believed to be due to various active cosmic effects such as novae and supernovae, starquakes, coupled rotating large masses, etc., as well as such passive effects as 'gravitational shadows' which are created by the presence of very dense masses, eg., galaxies, black holes, etc., which may lie in line with the observers' position. Some detected signals will be described in brief detail later.

Circuitry

The circuit used by the author in these tests described here is shown in Figure 1(a). It is essentially a standard GW detector but has been optimized to some extent for these observations. The detector proper is of the quantum-non-demolition type (QND) in that it will respond to aperiodic events in the cosmos with faithful response to the amplitudes of such events. However, since the natural resonant frequency of the input section is only in the order of a few Hertz, (depending on the values of C and R_F), response of the unit will largely be as 1/f noise signals, except for possible response to some naturally occuring earth or universe 'resonances' which may be in the order of a few Hertz. Therefore, to develop a 'waveshape' of the cosmic event, filtering in the output is normally used. The higher the cut-off frequency of the LP filter in the output, the more distant is the detected cosmic event and the more detail to be seen in the event. To begin with, the experimenter should use a LP filter of 1 or 10 Hz cut-off frequency in order to 'observe' the nearer cosmic events which will now have longer periods and greater amplitudes; and the reduced gain levels will tend to avoid the detection of natural 'resonances' which can obscure the desired detection events. The unit has a second stage gain of about 100X and does not use off-set. Off-set as shown in Figure 1(c) can be introduced later if desired. A simple low-pass filter arrangement is shown in Figure 1(b).

Experimental Results

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(171) With proper adjustment of the circuitry and the filter section, structure will be seen superimposed on the general gravity levels. With a D'Arsonval type strip chart recorder having a typical input level of 1 mA (or 1.4 volts), the detector output can be coupled directly to such a unit. For the higher impedance digital or potentiometric dc type recorders, the output should be fed to a 1k to 2k load resistance, and the dc developed across this load is the output signal. Chart speed should be in the order of 3 inches per minute initially and could be changed once proper circuit operation is obtained.

Shown in Figure 2 are just a few of the many signals which appear on the output of this detection system. The events are quite numerous at higher filter frequencies and contain much detail. However, while the events are fewer at the 1 Hz or 10 Hz filter frequencies, the longer periods and increased amplitudes of these 'local' events enable a more clearer 'imprint' of these events.

Shown in Figure 2(a) is what may be a typical nova event. Such novae occur quite often, even locally, so that the experimenter should have little trouble 'catching' such an event.

Shown in Figure 2(b) is the more rare supernova event. Such events appear to have three characteristics: the actual collapse of the star at (a), the 'blast' of the outer envelope at (b), and the formation of a shock ring at (c). While such events are rare, the experimenter should be able to 'catch' an event occasionally even with a low Hz filter. If a major supernova event is followed for a few days (4 minutes earlier each day), the experimenter may be lucky to note the development of a well developed black hole and ring structure as shown in Figure 2(c). Some older supernovae may retain the black hole but lose the ring structure and thus appear as a lone black hole as shown in Figure 2(d).

Another 'event' which is detectable under proper conditions is the 'resonances' which apparently occur either in the earth regions or as a universe wide effect. These are detectable since they are extremely low frequency (ELF) effects and thus can excite the low frequency QND mode in these detectors. A typical response for this effect is shown in Figure 2(e). These effects are the subject of a seperate article. (5)

Conclusions

Only a brief indication of the potential of gravitational signal astronomy has been given in this article. SARA members, who of course have strong interest in radio astronomy, should be able to use gravity signals in partial confirmation of some of their radio observations. For example, the structure of our Galaxy Center is such a strong signal that it is detectable even though it is not in our zenith, as long as it is on our meridian. The structure seen is very similar to that determined by radio and infra red observations. The same applies to such structures in the Cygnus and Geminga regions. The suspected black holes in these regions appear to be detected in gravity observations.

The area of exploration with the use of this 'gravitational window' is wide open. Serious experimenters and amateur radio astronomers can help blaze this path. The sceptical professionals will have no recourse but to follow you also later on. Good luck with your experiments!

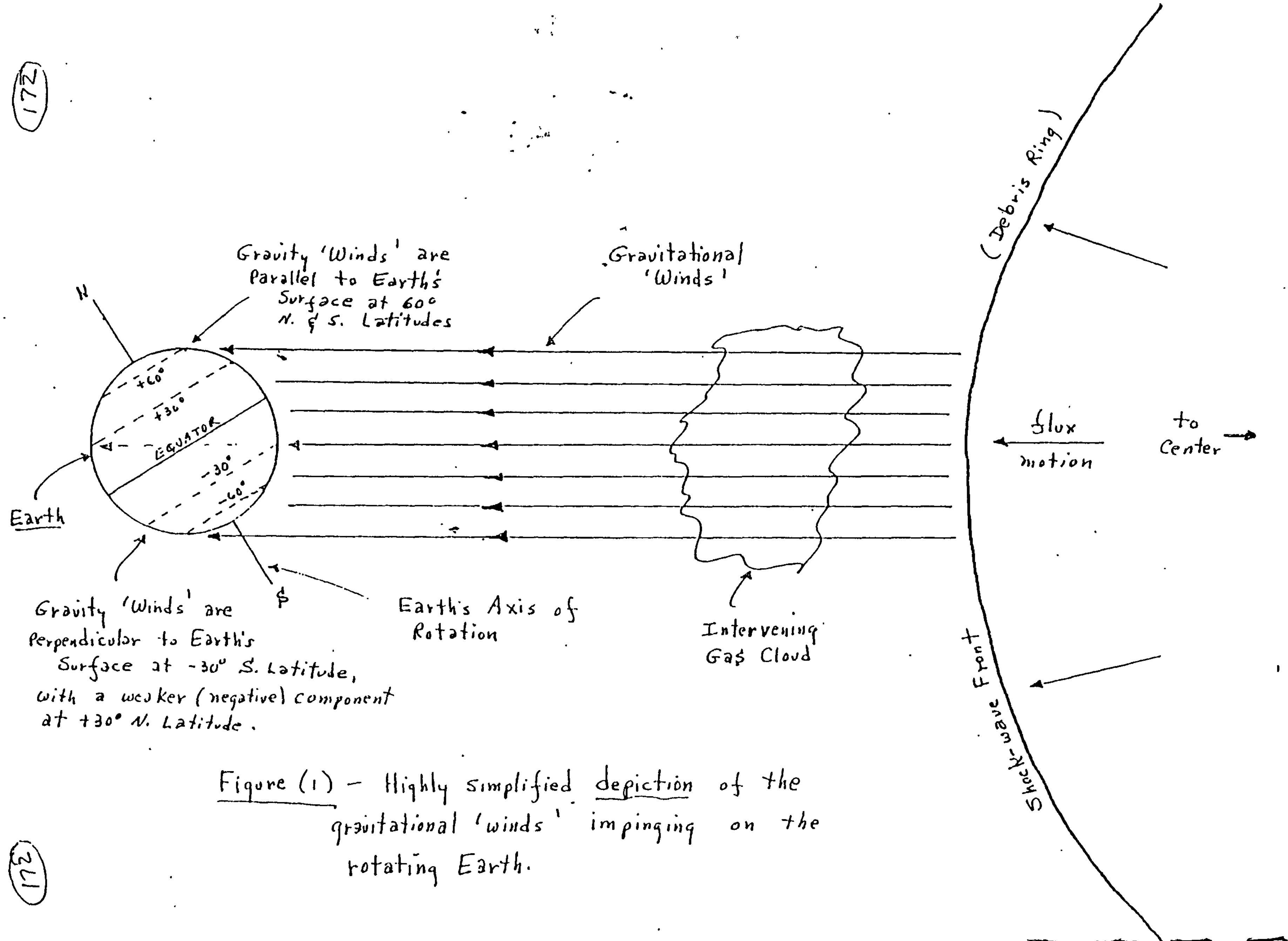

Figure (1) – Highly simplified depiction of the gravitational 'winds' impinging on the rotating Earth.

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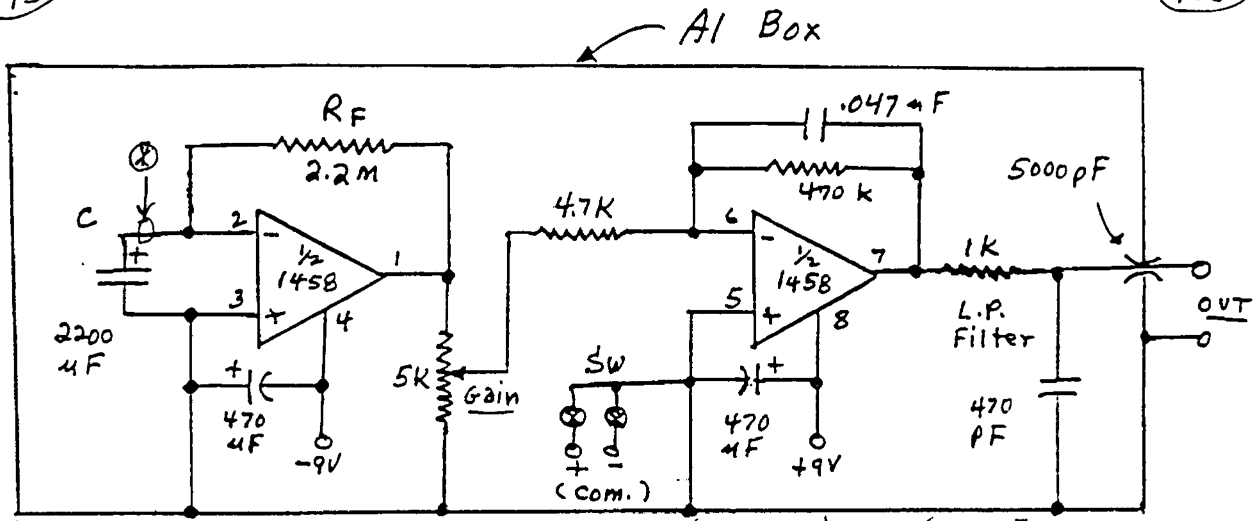

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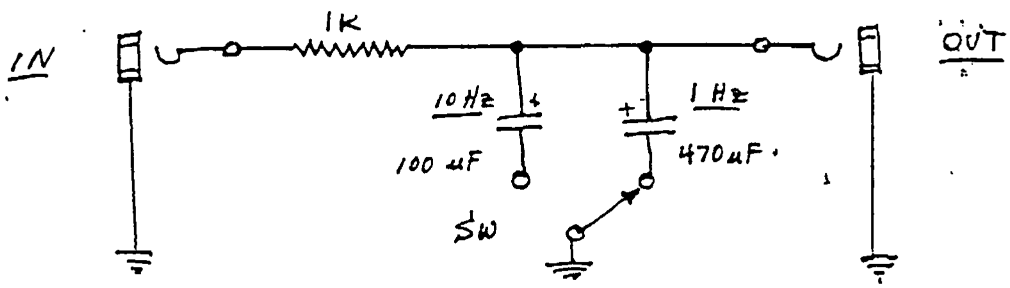
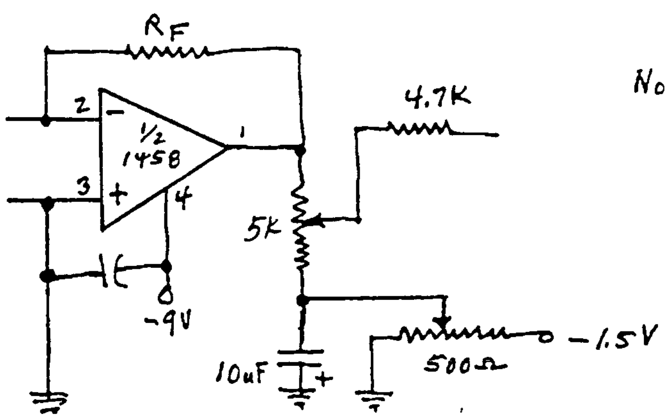
(a) Shielded Detector



(b) L.P. Filter



Note: other off-set methods may be used also.

(c) Off-set for circuit a.

Figure 1 - Detection Circuitry

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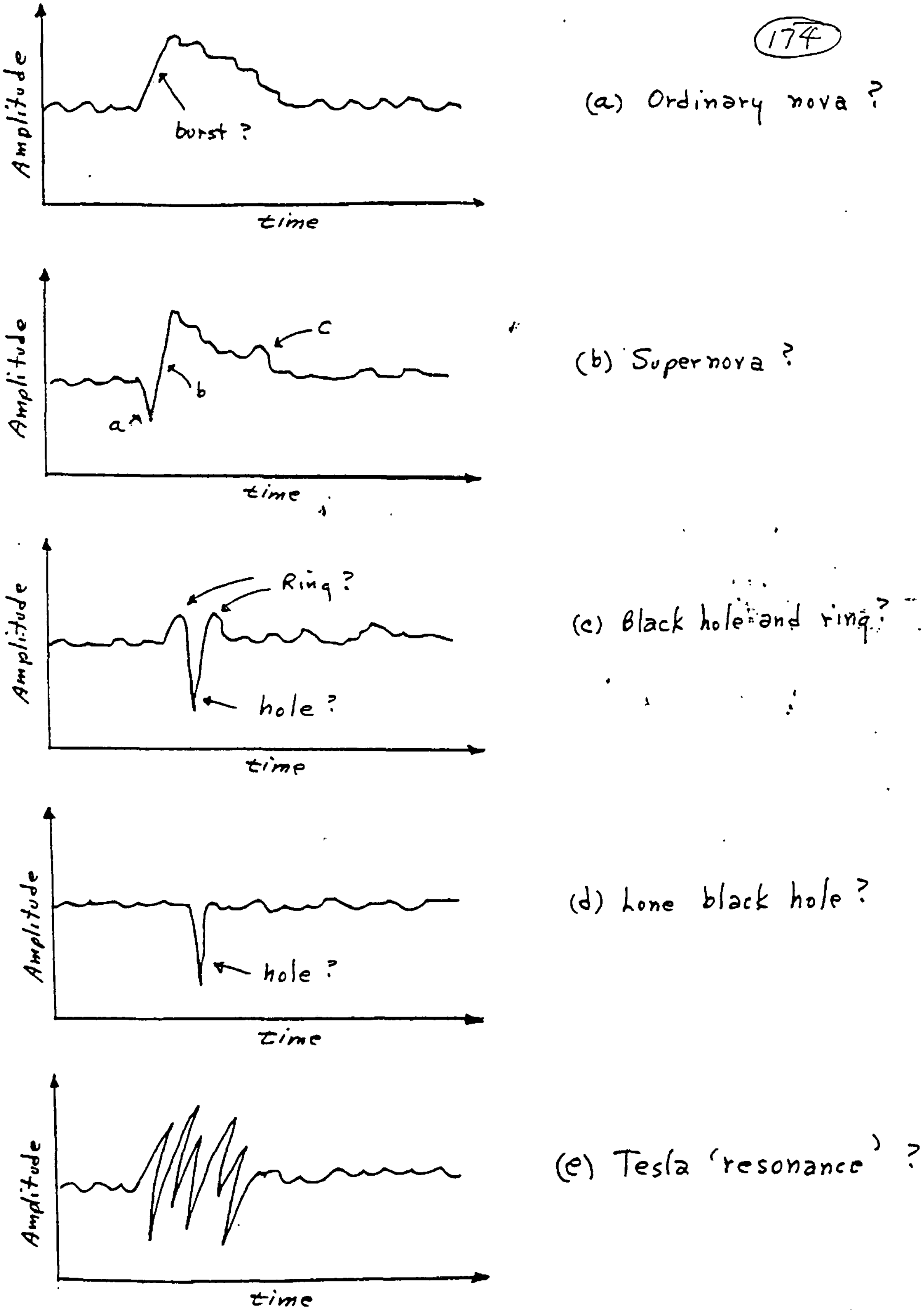

Figure (2) - Some detected responses.

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A LOW-COST ELECTRONIC GRAVITY 'SHADOW' SIGNAL DETECTOR

175

G. Hodowanec

The detection of gravitational signals of the scalar-field type have been noted by the author for many years now. Simple detectors of the electronic type (1) and the gravimeter scale type (2) have been used in these detections. Herein is described a simple electronic type detection unit which uses a C-mos type operational amplifier which works very well with but a low level +/- 1.5 volt battery supply. The current drain is so very low that alkaline AAA cells should last for essentially their shelf life in this application. While this detector unit will detect GW signals in an unshielded assembly version, it is recommended that the unit be constructed in a small aluminum box to provide for better isolation against possible interfering RF radiation signals. Assembly is not critical but good layout and wiring practices should be observed in order to avoid possible feedback instabilities due to the very high gain of the circuitry. The feedback resistance was made variable in order to control the detector sensitivity over a very wide range. A small zero-center tuning meter (having a +/- 100 uA response and about 1k resistance) was included to enable a visual display of the detector output over the range of about +/- 500 millivolts. The output may be loaded with various capacitor values in order to integrate the dc output such that the response time of the unit could also be varied over a wide range. Response to 'nearby' gravity shadow signals are best observed with a long time constant output, while the more distant events will respond better to a faster time constant. A high impedance input strip chart recorder unit may be connected directly to the output if a recording of the response is desired. Recorder speed should be in the order of three inches per minute for most nearby signal responses.

The detector unit responds to 'modulations' of the earth's gravity fields (g-fields) and thus responds to gravitational signals which arrive at the observer's position from directions which lie on the observer's meridian at that time. While best response will be from the zenith regions, strong signals anywhere on the meridian may sometimes over-ride the zenith signals. Thus it is possible to 'observe' the Galaxy Center structure even though it is not in the observer's zenith, since it is a strong signal. Thus this structure may be used as a test signal to determine proper operation of the detector unit. The structure should be observable twice daily, whenever it appears on the observer's meridian. Once, when it is in the observer's 'sky' region, and again, when it is on his meridian position underneath the earth, since it is also observable through the earth! Of course, the detector response is also reversed between the two observing positions. It is also possible to 'stack' detectors and thus, in effect, to create a 'Gravity Telescope' which has some directional properties.

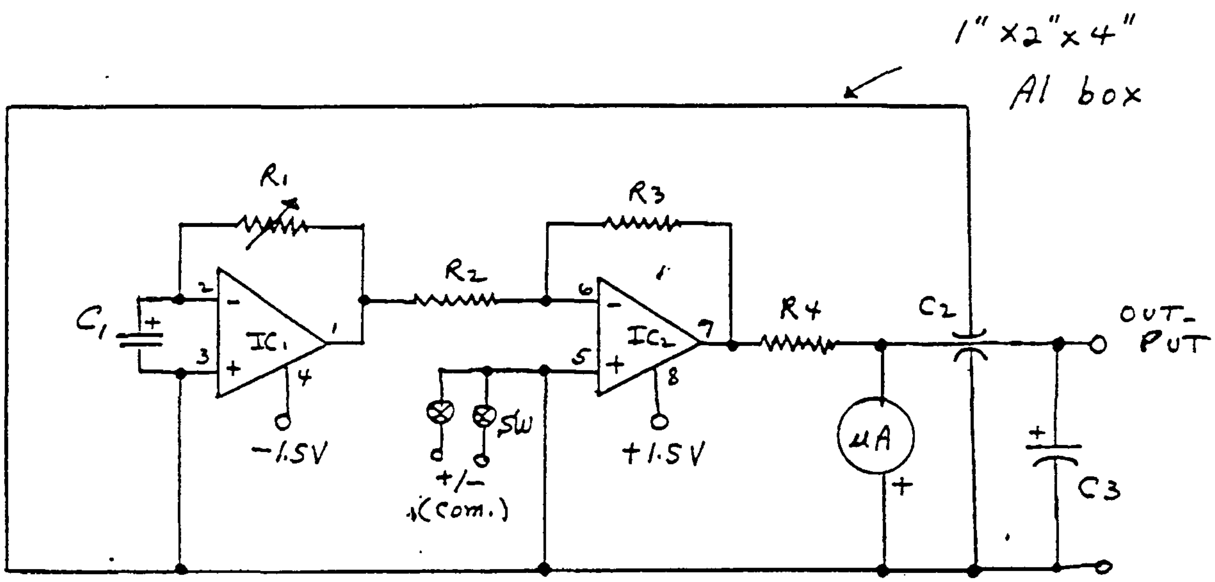
REFERENCES

(1) G. Hodowanec, "Gravitational Waves???", Radio-Electronics, April 1986.

(2) G. Hodowanec, "Simple Gravimeter Detects Gravity 'Shadow' Signals", TESLA '86, March-April 1986.

C-mos Gravity Signal Circuit

(176)



Parts list:

- C_1 : 470μF to 2200μF (10V) electrolytic capacitor (author used 1000μF)
- C_2 : Feed thru capacitor (author used 5000pF)
- C_3 : 47 μF to 2200μF (10V) electrolytic capacitor (use 220μF for nominal *integration*, increase to 2200 μF for 'nearby' responses)
- R_1 : 2M to 5M feedback potentiometer (author used well made miniature 5M unit)
- R_2 : 4.7K, 1/4 watt resistor, (same for R_4)
- R_3 : 100K, 1/4 watt resistor
- SW_1 : DPST miniature switch (ON-OFF)
- IC : Dual C-mos Op-amp, ICL 7621
- μA : +/- 100 μA (1kΩ) miniature tuning meter.

(176B)

Cosmology

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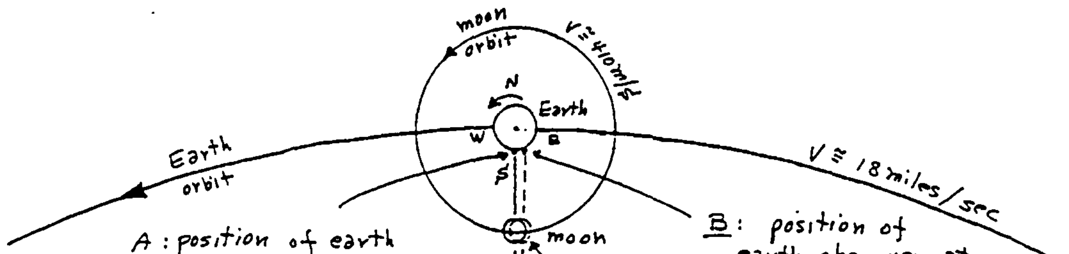
3/15/86
(GH)

I. Gravitational vs. Optical Eclipse of Sun by Moon (per Rhysmonic Cosmology).



A: position of earth observer at time of gravitational eclipse.

B: position of earth observer at time of optical eclipse.

moon shown (solid) at time of gravitational eclipse. moon shown (dotted) at time of optical eclipse.

Notes:

(1) Observer on earth has a relative movement as shown due to the earth's rotational velocity (≅ 16 miles/minute).

(2) Relative to earth, moon has a velocity eastward due to the moon's orbital velocity (≅ 410 m/min).

(3) The stellar aberration (the sun is our nearest star) due to the finite velocity of light and the earth's orbital velocity (≅ 18 miles/sec) places the optical image of the sun to the observer at position B, along the direction shown by the dotted line.

(4) The 'instantaneous' gravitational eclipse occurs in the direction shown by the solid line.

Light travel times:
moon to earth ≅ 1.3 sec.
sun to earth ≅ 8.3 min.

gravitational signal path (≅ instantaneous)

optical signal path (as aberrated ≅ 8.3 min. later)

angle of arc ≅ 22 seconds of arc (shown not to scale). ma

'apparent' position of sun for optical eclipse. (due to stellar aberration) & finite velocity of light

actual position of sun for both gravitational and optical eclipses.

(GH) Conclusion: Optical eclipses of the sun by the moon will follow the gravitational eclipse by about 8.3 min. due to stellar aberration and the relative movements of the earth and moon. This has been confirmed in the experiment of May 30, 1984. Gravity signals are essentially 'instantaneous' signals!

FURTHER CONFIRMATIONS BY THE AUTHOR AND OTHERS DURING SEVERAL ECLIPSES SINCE. SEEMS LIKELY THERE ARE MANY MORE 'EMBEDDED' IN EM ECLIPSE RECORDS (?)

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SIMPLE GRAVIMETERS FOR THE AMATEUR SCIENTISTS

(177 - 198)

G. Hodowanec

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Abstract

Gravimeters (gravity meters) are devices which measure the averaged acceleration of the earth's gravity field. Such instrumentation is best known for its use in determining changes in the earth's gravity field which may be due to variations in buried masses in the earth. Such mass density variations could indicate the presence of oil or mineral deposits and thus gravimeters are used in prospecting. Most such gravimeters are but specialized sensitive scale systems in which the position of a fixed mass as a function of gravity field variations can be suitably recorded. However, in order to minimize spurious responses due to local vibrations, temperature changes, winds, etc., complicated suspension methods are employed making such instruments much too costly for the average electronic experimenter-scientist. Described here, however, are a number of simple gravimeters, both mechanical and electronic in design, which can easily be built by the average electronic experimenter. While the units are sensitive enough for prospecting purposes, the amateur scientist may be more interested in observed gravity variations which are believed to be due to extraterrestrial gavitational effects. A number of repeatable variations are described and possible sources for these variations are given. Moreover, a number of other applications for the gravimeter are also described which should interest the experimenter. It is hoped that this material will foster increased interest in gravity and gravitation by the young experimenter-scientist who will be the foundation of our future scientific community.

SIMPLE GRAVIMETERS FOR THE AMATEUR SCIENTIST

G. Hodowanec

Introduction

Gravitation, per se, is a well-known force which is experienced by all people. Many see it in the actions of falling bodies, but especially notice its affect on their very own bodies as their weight. The force is unique in that while it is a matter of common everyday experience, it yet remains quite an enigma with respect to its true nature. Many also realize that the force of gravity is related to an object's mass, eg., if one has more body mass, one is 'heavier', and that such 'heaviness' can be measured by scale systems. But how such gravity fields interact with mass remains very much a mystery to mankind even though many theories have been advanced to explain that effect. Foremost among these have been the relations as developed by Newton and Einstein, but those relations really only 'describe the effect' and do not explain the true nature of gravitation. Yet such explanations are useful in providing a basis for a study of the earth's gravity field.

Gravity Defined

The effect where bodies apparently 'attract' each other is quantitatively summed up in the Law of Universal Gravitation as developed by Newton. Here, the force of attraction between two bodies, m,M, separated by a distance r is given by:

$$F = \frac{Gm\,M}{r^2},$$

where G is the so-called gravitational constant and has a value of about 6.67 x 10^{-8} if the centimeter-gram-second system of units are used. The gravitational field at any point is given by the force exerted on a unit mass at that point. The field intensity at a distance r from a point mass m is thus Gm/r^2 and acts toward m. The gravitational potential V at that point is the work done in moving a unit mass from infinity to that point against the field. Therefore, $V = -Gm/r$ and it is a scalar quantity measured in ergs per gram when the CGS units are used. While Newtonian gravity is describable as an 'attraction' between two masses as depicted in Figure 1(a), Einstein gravity is visualized as a curvature or warping of space and time around a massive body and is usually depicted as shown in Figure 1(b). However, here we will be more concerned with the earth's gravity field as defined by the 'weight' of an object.

Weight Defined

In its simplest terms, weight is generally defined as the force with which a test body is attracted toward the center of the earth. In terms of Newton's Law this becomes:

$$\text{Force} = \text{Weight} = W = \frac{mMG}{R^2} ,$$

where m is the test mass, M is the mass of the earth, R is the radius of the earth, and G is the gravitational constant. This weight will be in poundals (using English units) and in dynes (using metric units). The above equation may be simplified to:

$$W = mg \text{ , where } g = \frac{MG}{R^2} .$$

The value of g is a measure of the acceleration of the earth's gravity field (free fall) near the earth's surface and is generally considered to be constant at a particular location on earth. Thus this relation is similar to the familiar $F = ma$ seen in mechanics. The value of g is in the order of 32 ft/sec^2 or 980 cm/sec^2 . Since weight depends upon the amount of mass and the acceleration of gravity, a definition of a standard weight would require the fixation of this mass amount and also the location on earth where this weight was determined. By international convention, the standard mass is the International Prototype Kilogramme and is represented by a platinum-iridium standard

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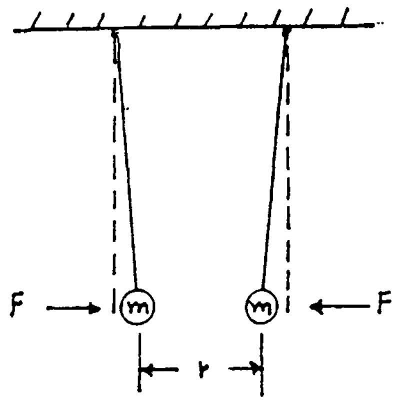
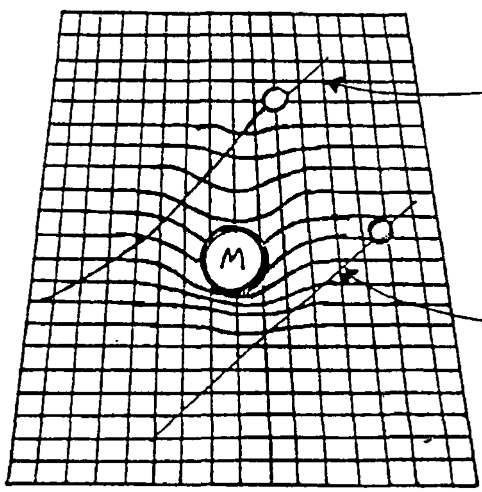


$$F = \frac{Gmm}{r^2}$$

For example, when the masses m are one gram each, and the spacing between the mass centers is one centimeter, then the force of attraction F is equal to:

$$6.67 \times 10^{-8} \text{ dynes.}$$

(a) Newtonian Gravitation



Curved path of a small particle around a larger mass due to the warping of space-time in the region around this more massive particle, M.

Path of a small particle in space-time in the absence of the more massive particle, M.

(b) Einstein Gravitation

Figure 1 -- Simplified present-day views on the phenomenon of gravitation.

preserved near Paris, France. Other secondary standards, based upon (182) this primary standard, are located in other countries as well. (182)

Dependency of Weight on Geographical Location

It can be seen from the above equations that weight on earth is dependent upon the earth mass, M , the earth radius, R , and the gravitational constant, G . The earth mass may be assumed constant and if the gravitational constant is assumed constant, then the earth radius is the only variable. Its value depends upon one's latitude position and height with respect to the ~~surface~~ center of the earth. The radius of the earth is about 15 miles less at the poles than at the equator. In addition, centrifugal forces due to the earth's rotation can reduce the 'pull' of gravity, being greatest at the equator and zero at the poles. Therefore, when consideration is taken of these factors, a ton weight (2000 lbs) that is first measured at sea-level at the north pole will be found to weigh about 7 lbs. less at sea-level at the equator. Also, for example, the value of g at Paris, France, is about 32.184 ft/sec^2 , while the value of g at New Orleans would be about 32.129 ft/sec^2, or about .17% less. While the overall mass of the earth is assumed to be constant, there may be localized variations in earth density which can and do affect the value of g locally and thus the weight. For example, the presence of a salt dome (which can signify oil deposits) may reduce the value of g above such a deposit, while 'heavy ore' deposits may significantly increase the value of g as depicted in Figure 2. Also, it will be shown later that the gravitational constant, G , may not really be constant in that it can be affected by certain 'cosmological events', both as very short term effects as well as somewhat longer term effects. Thus the accelerating factor, g , may vary at any particular location, and such variations may actually be measureable with devices which can be termed gravity meters or gravimeters.

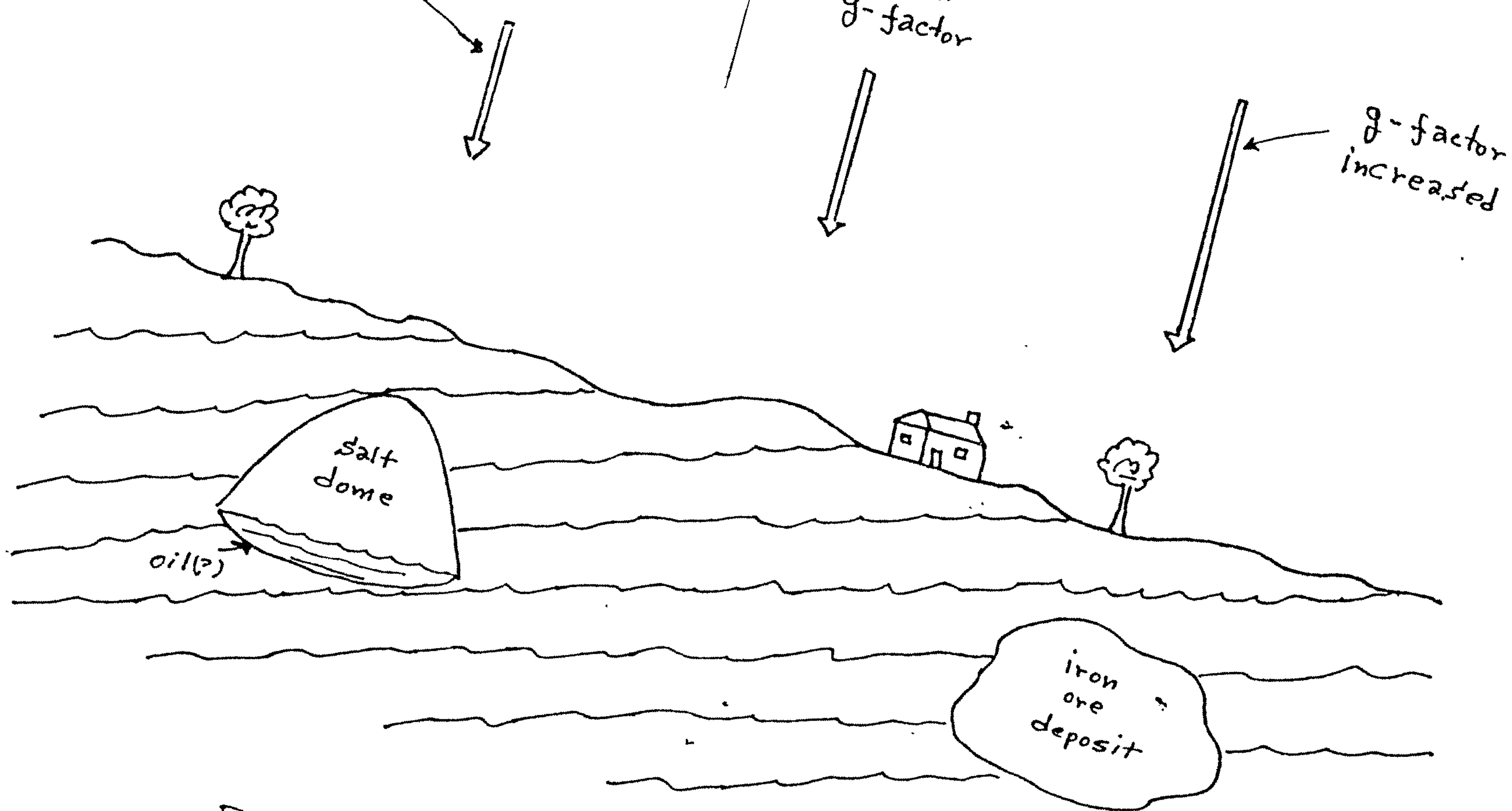


Figure 2 -- Variations in g-factor due to some localized 'buried' masses.

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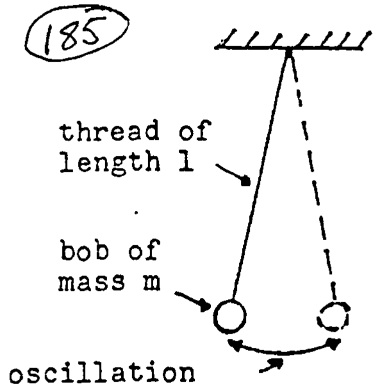
Mechanical Gravimeters

184 Gravity meters, presently, fall into two general classes of devices of a mechanical nature, but the author will later describe gravimeter devices which are of an electronic nature. Present day mechanical gravimeters are mostly either of the pendulum type or the sensitive balance scale type.

Pendulum Gravimeters: These systems have been used to obtain the most accurate determinations of the value of g at a particular location. It is shown in its most simplest form in Figure 3(a). Here a small bob (weight) is suspended from a point by a light thread. The period of oscillation for small amplitude swings is determined by the formula $T = 2\pi\sqrt{l/g}$, where l is the length of the thread and g is the acceleration of free fall. Thus g is simply determined here for any particular location. The most accurate measurements are made with specially protected torsion-type pendulums, such as was used in the many Cavendish type experiments in the past.

Balance Scale Gravimeters: These are, in effect, simply very sensitive spring balances in which the change in weight of a fixed mass is measured. It is shown in its simplest form in Figure 3(b). A somewhat practical form of this type of gravimeter is provided by a well-made postal scale which reads but a maximum of 8 ounces. Such a scale should be able to read to the nearest .01 ounce. That such a scale is a valid gravimeter system is seen in Figure 3(c) where the unit responded to a major cosmic mass structure which always appears in the Leo Region of the celestial sphere. Note the diurnal repeatability as seen with this simple device. More on this later. Some digital-type scales (based upon Hooke's Law, eg., springs) may also serve as simple gravimeters.

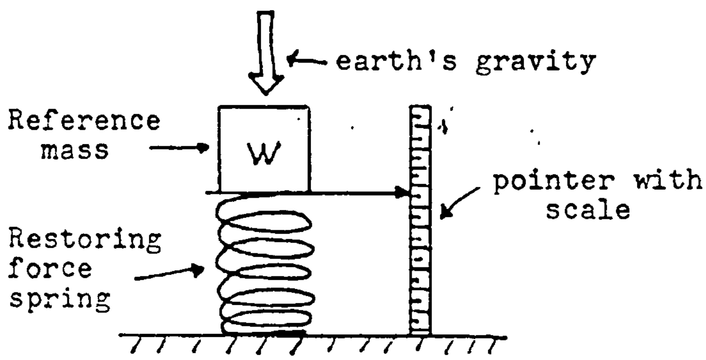
Practical mechanical gravimeters should respond only to the act-



$$T = 2\pi\sqrt{l/g} \quad \text{, from which,}$$

$$g = \frac{4\pi^2 l}{T^2}.$$

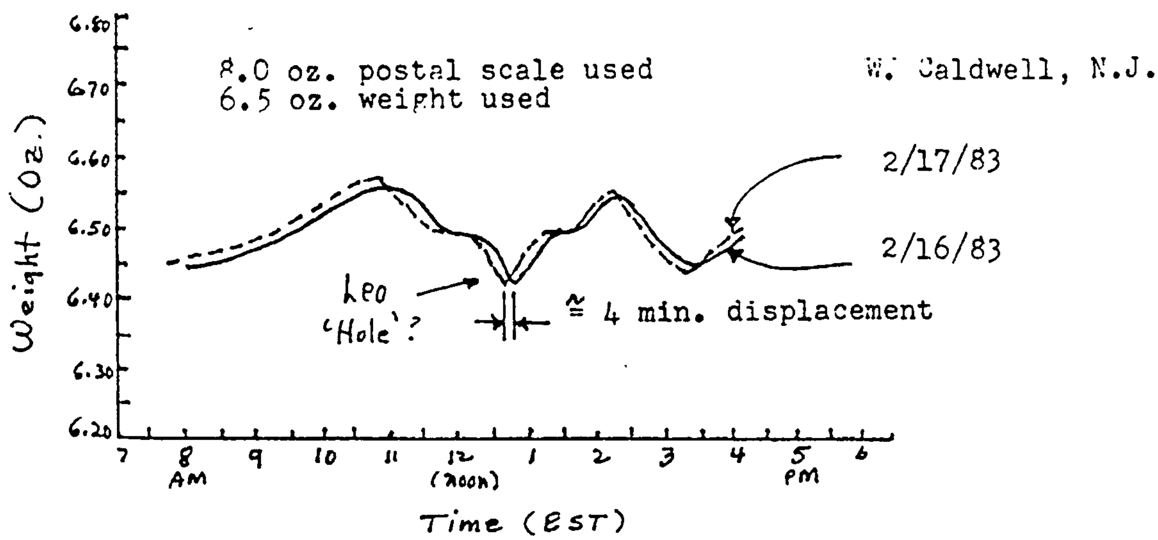
(a) Basic Penulum-type Gravimeter



W = mg, then if m is kept constant, and the spring obeys Hooke's Law, then:

$$g \propto W.$$

(b) Basic Spring Scale Gravimeter



(c) Response seen with Postal Scale Gravimeter

Figure 3 -- Basic Mechanical-type Gravimeters

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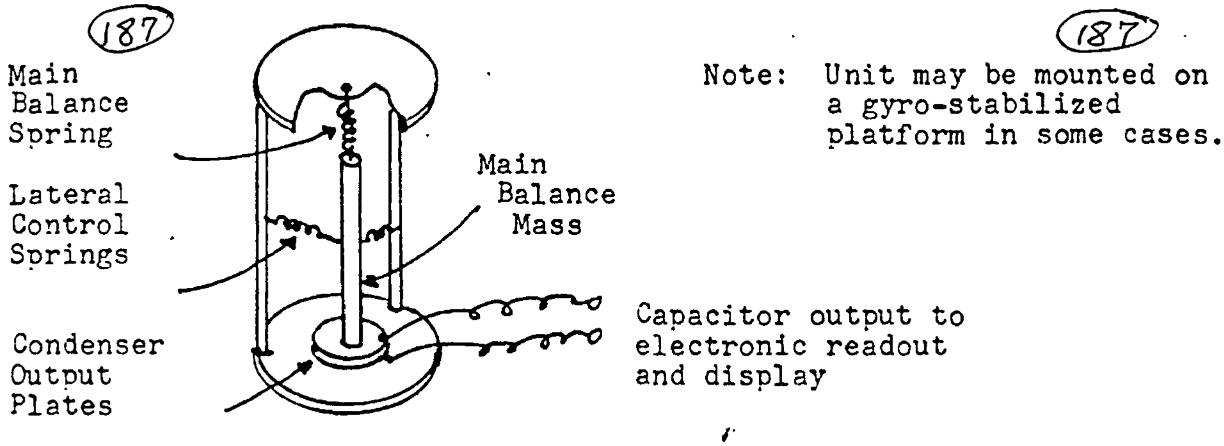
ual vertical variations in the value of g . Commercial gravimeters of this type are constructed so as to not only limit lateral movements due to winds, temperature variations, vibrations, etc., but also to provide for an electrical-type readout rather than a purely mechanical readout so that the variations could be electrically stored and/or displayed on some recorder unit. Therefore, these types of gravimeters are generally quite complicated and expensive, and thus beyond the means of the average amateur scientist. A depiction of a possible unit of this type is given in Figure 4(a).

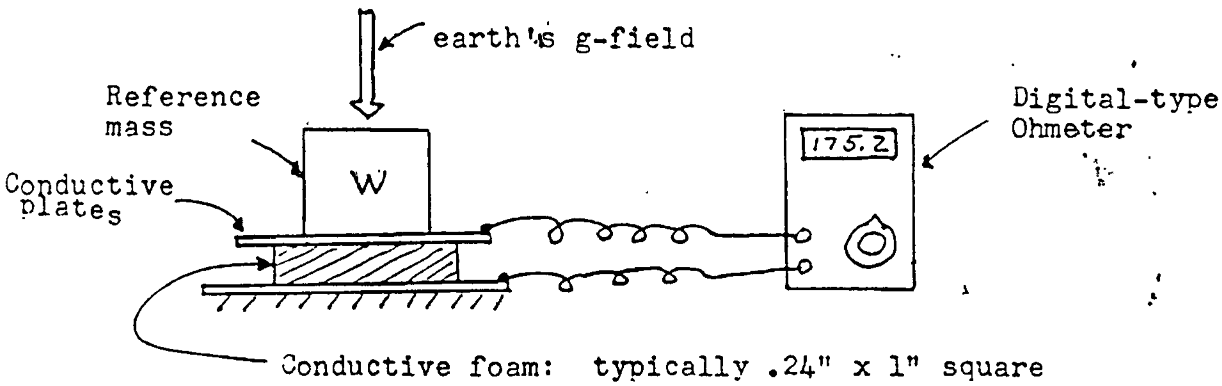
A more practical mechanical gravimeter for the amateur scientist is shown in simplest form in Figure 4(b). This is a typical spring balance system, but the 'spring' of this system is a <u>conductive</u> compressible foam material, such as that which is used to safely ship very static-sensitive integrated circuits. Here, any variations in weight will appear as variations in compression of the foam and thus as variations in the resistivity of the material. The resistance can be directly measured with an ohmeter, preferably one of the digital type. That such a device is a viable gravimeter for the amateur scientist is seen in Figure 4(c) where the response of the unit to what may have been a supernova-type event in the celestial sphere was recorded. More on this later. The experimenter may wish to try different sizes of foam as well as reference weights for different sensitivity to gravity events. The amateur scientist is also cautioned to remain within the elastic limits of the foam material.

<u>Electronic Gravimeters</u>

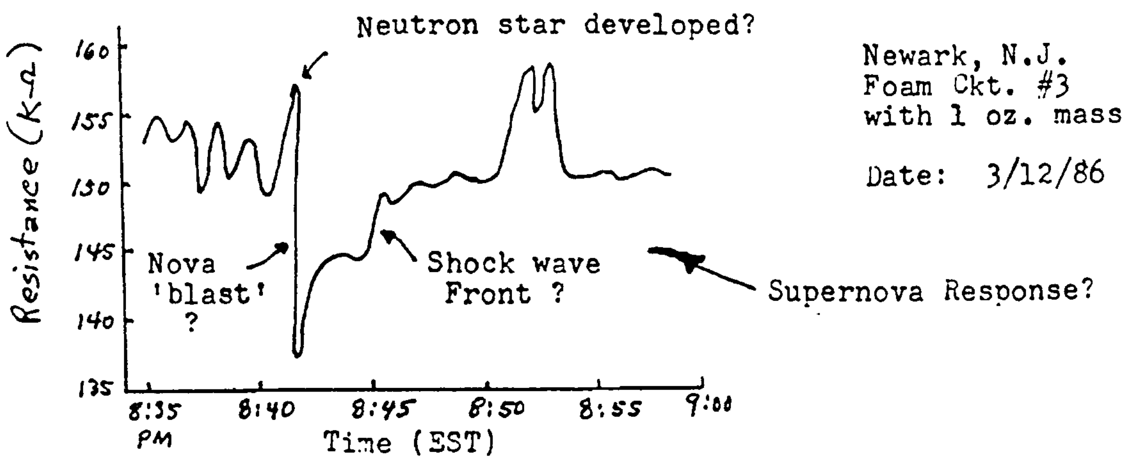
Over the past 15 years or so, the author has also developed many electronic-type gravimeters. Besides simplicity, the units have the advantage of ruggedness and freedom from many external influences such as vibrations, temperature effects, and electrical disturbances, and respond only to pure gravitational effects. Typical units have been



(a) Possible Commercial Gravimeter



(b) Novel scale-type gravimeter



(c) Typical response with above gravimeter

Figure 4 -- Simple Mechanicl-type Gravimeters.

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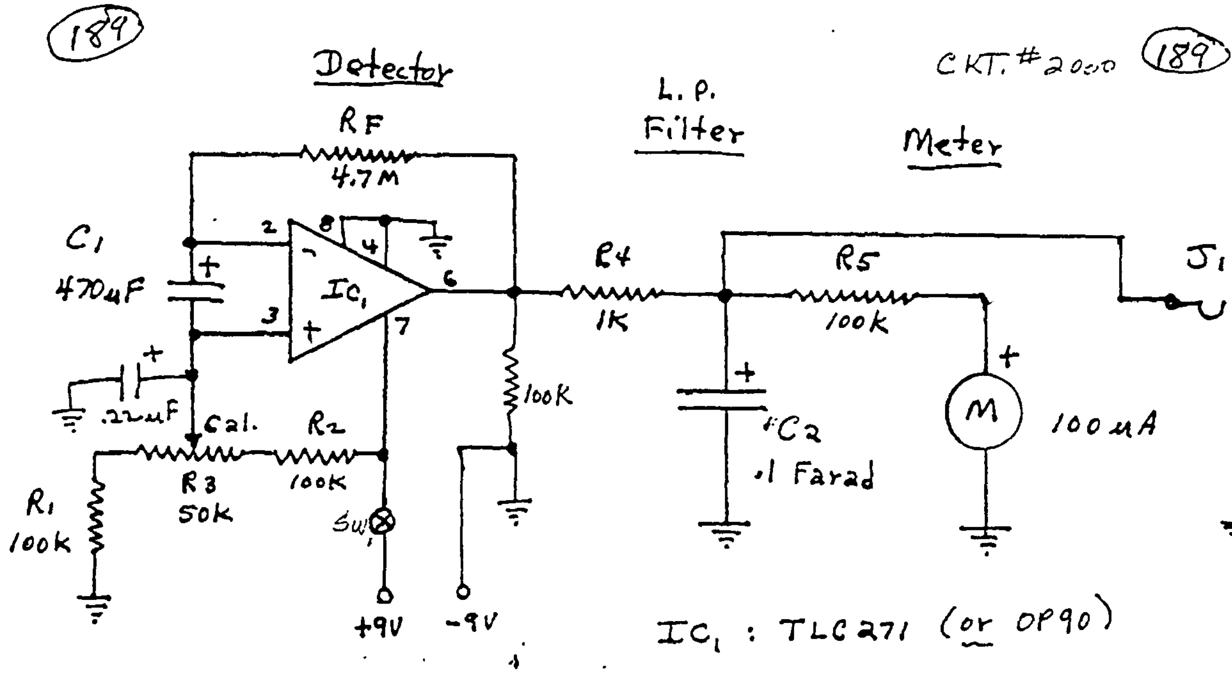
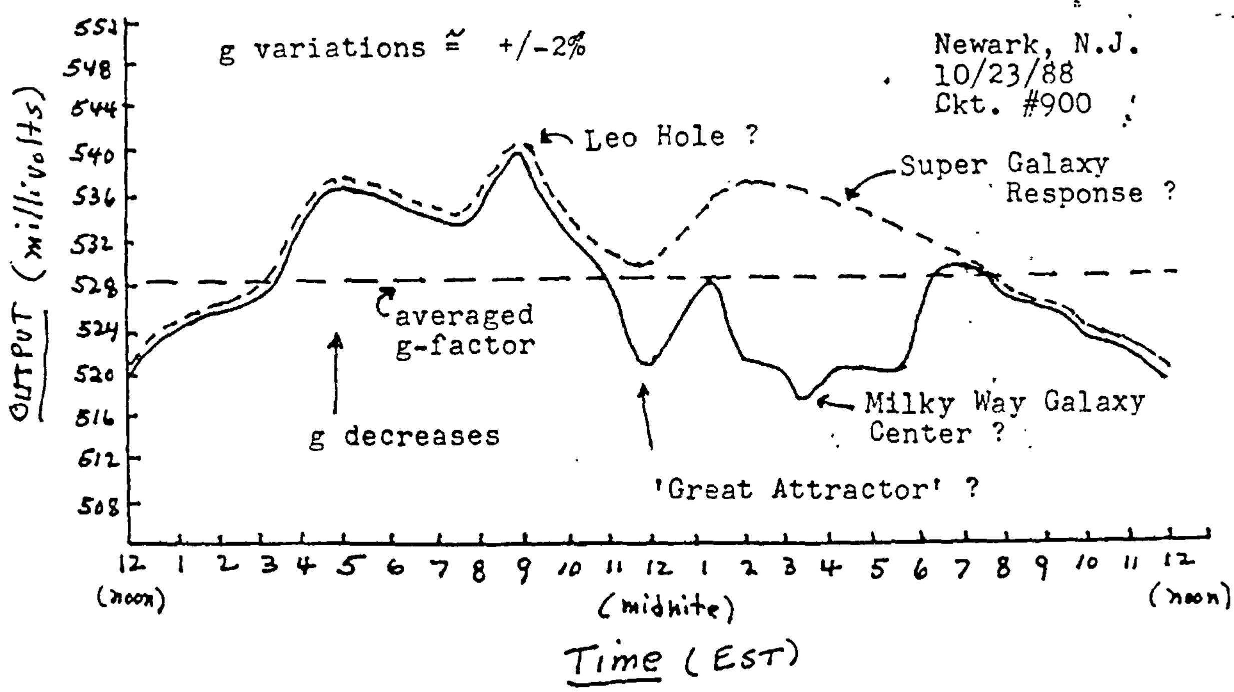
described in some other publications in the past, but one of the basic low-cost units will be described here.

Practical Electronic Gravimeter: The circuit shown in Figure 5(a) is extremely simple but it contains the three elements of the electronic gravity meters as developed by the author. These are (1), a detector section, (2), a low-pass filter section, and (3), the output meter. The detector section has been designed around a readily available low-cost programmable low-power operational amplifier, the TLC271 device. The unit operates at about 1 mA of current from a single 9-volt self-contained battery supply. This op-amp has extremely high input impedance and low input bias and off-set currents. It is operated with the non-inverting input off-set to approximately the mid-point of the battery supply, primarily to enable the output voltage to remain near the center of the 0-10 volt output meter scale. Some limited positioning of this operating point is provided by the calibration control, R_3 , so as to set a reference point for any series of measurements. Such off-set operation also enables the unit to respond to AC variations in the g-factor as well as the averaged DC component. The AC component is due to certain cosmic gravity impulses while the DC component largely reflects the relatively steady flux due to the earth's gravity. Therefore, the detector output is passed through a very low cut-off low-pass filter to smooth out (filter or integrate) these AC variations without jeapordizing the DC output levels. It can be shown that the DC output levels will closely follow the earth's gravity field variations and thus this unit is truly a gravity meter or gravimeter.

The detector section (IC_1) is operated as a current-to-voltage converter device of very high gain due to the use of a very large feedback resistance, R_F . Newtonian-type gravity impulses which are superimposed upon the earth's averaged gravity field will develop small



(a) Schematic of Simple Electronic Gravimeter



(b) Typical diurnal variation of the earth's gravity flux as measured with an electronic gravimeter.

Figure 5 -- Simple Electronic-type Gravimeter

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currents from the 470 uF electrolytic input capacitor, C_1 , due to a gravity induced 'polarization process' in the dielectric material of the capacitor. The more rapid current variations may be due to such factors as cosmic novae and supernovae, but the longer term variations are largely due a 'modulation process' of the earth gravity field which are caused by the presence of large density variations in certain masses which may be in line with the detector capacitor and the earth's gravity field. In other words, when such dense masses are located on the detector's <u>meridian</u> position (ie., the great circle on the celestial sphere which runs on a north-south line through the zenith), the density variations are superimposed upon the earth's gravity flux and thus are detectable with this device as changes in the DC output levels. Density variations of nearby masses are detectable as well as extremely dense remote masses such as astronomically distant 'black hole' structures. Thus this electronic-type gravimeter has extreme sensitivity without the problems of most mechanical type units.

For use as a g-factor measuring device (which is the role which we are considering here), the output of the unit is heavily filtered by the low pass filter made up of resistor, R_4 , and capacitor, C_2 . Capacitor C_2 used here is a small .1 farad unit* which was primarily intended for use as a keep-alive voltage unit for short term power supply failures for C-mos devices in computer units. ~~It is available from Radio Shack.~~ Thus this gravimeter will respond only to the very slowly changing variations in the earth's gravity field. To summarize: Capacitor element, C_1 , is an almost ideal current generator (excited by the earth's gravity flux) which is coupled to an operational amplifier configured as a current-to-voltage converter. This is an almost lossless current measuring scheme where the output voltage is proportional to the product of the input current and the feedback resistance.

* changed to .033 Farads recently.

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Thus the output voltage can be made reasonably high even with the very low picoampere currents developed by gravity flux in the input capacitor detection element. Linearity is assured as the open circuit of the capacitor maintains the input terminal voltages to the op-amp near virtual ground, but slightly current biased by the gravity induced polarization. The output voltage is read on the built-in voltmeter, but may also be coupled out to an external meter or a recording device such as a computer or strip chart recorder by means of jack, J_1 .

Although the current drain for the unit is low, an on-off switch is provided to conserve battery power during non-use periods. It must be remembered that due to the long time constant of the output filter, the unit must be allowed several minutes to stabilize after turn-on. While the unit is best constructed within a metal enclosure to avoid possible RF interference (RFI), the author found that the presence of the input protective networks within the op-amp device tended to suppress such RFI responses. Thus the prototype unit was constructed in a plastic box and no RFI problems were experienced.

Electronic Gravimeter Performance

While good performance as gravimeters may be obtainable from properly constructed and operated mechanical-type devices, the sensitivity of such units to external effects such as local vibrations or other movements generally limits their use to the amateur scientists lab area unless proper safeguards are used. The electronic gravimeter, however, does not suffer from any of these limitations and can be used anywhere, especially if a good grade of well-damped output meter is used. For a somewhat faster response to some gravity level variations, the amateur may want to reduce the value of the output filter capacitor. Perhaps a second .1 farad capacitor could be connected in series with the one shown in Figure 5(a). A SPST switch can be connected across one of the capacitors to short it out if the longer time constant filter is desired. In this way, two levels of output integration will be available, eg., with .1 farad in the filter circuit, or .05 farad in the filter circuit.

Therefore, it is recommended that the amateur scientist who wishes to enter this fascinating study of the earth's gravity field, begin by constructing the electronic gravimeter shown in Figure 5(a). A typi-ical diurnal variation in the measured g-factor as determined by this type of electronic gravimeter is shown in Figure 5(b). This particular gravimeter had an extra stage of DC amplification in order to better emphasize the DC variations on a strip chart recorder unit. As can be seen here, the earth's gravity flux varied about +/- 2% over a 24 hour period. These variations have been noted on all gravimeters built by the author (including mechanical-type units) and have been related by the author to the masses represented by two very large structures in our universe. One is the Milky Way Galaxy, our home galaxy, which is also optically visible to the unaided eye. The other structure, which was originally but a conjecture in the mind of the author, has since been consistently confirmed with many gravimeters. This is apparently a gigantic Super Galaxy System which forms the main body of our universe. It appears to have a spiral structure quite similar to the Milky Way Galaxy. As the earth rotates on its axis, the response of the detector varies as the unit 'scans' a different meridian with this rotation. The scanning 'beam' size here is essentially equal to the volume of the active portion of the dielectric in the detection capacitor element, C_1. Thus the gravimeter has extreme resolution. The presence of dense masses in-line with the detector-meridian position will 'modulate' the g-factor levels, very much like translucent or opaque objects can also modulate the transmission of light beams in its path. A gravimeter using a heavily filtered (integrated) output is thus able to follow the slow changes in earth gravity levels due to 'shadows' introduced by our own Galaxy masses (due to its close proximity), and also the slow changes caused by the Super Galaxy masses, (due to its over-riding concentration of masses). If the variation due to our Galaxy is removed from this response, the response due to the Super Galaxy is made much more apparent as shown by the dotted line response in Figure 5(b).

Since the dense structures in the universe are 'seen' on a daily basis, the response shown in Figure 5(b) is shown extended for a 48 hour period in Figure 6. Plotted this way, the response illustrates very well a cosine-type variation which also correlates very well with a cosine-type variation in the microwave background radiation levels which have been determined by a number of experimental astrophysicists in the past. These evaluations strongly suggest that the so-called microwave background radiation is but the heating manifestation of the gravitational impulse background in the universe and thus the two are one and the same. Thus this may be an alternate explanation for the background radiation rather than the so-called Big Bang theory.

Applications of Gravimeters

The experimenter or amateur scientist may by now be asking the question: but of what use are these gravimeters? The answer to that is that there are a great many applications once the amateur has gotten a firm understanding of the earth's gravity and how it is affected. One very common application has already been mentioned. That is its use in mineral and oil exploration, ie., prospecting. Generally, very expensive mechanical-type gravimeters are used by the professionals here, but the amateur prospector should be able to use this electronic gravimeter effectively in such an application. It has sufficient sensitivity to respond to earth gravity changes introduced by bending one's own body over the unit! Allowing for the long time constant for the unit, a reduction in g-factor in the order of 1 % can be observed!

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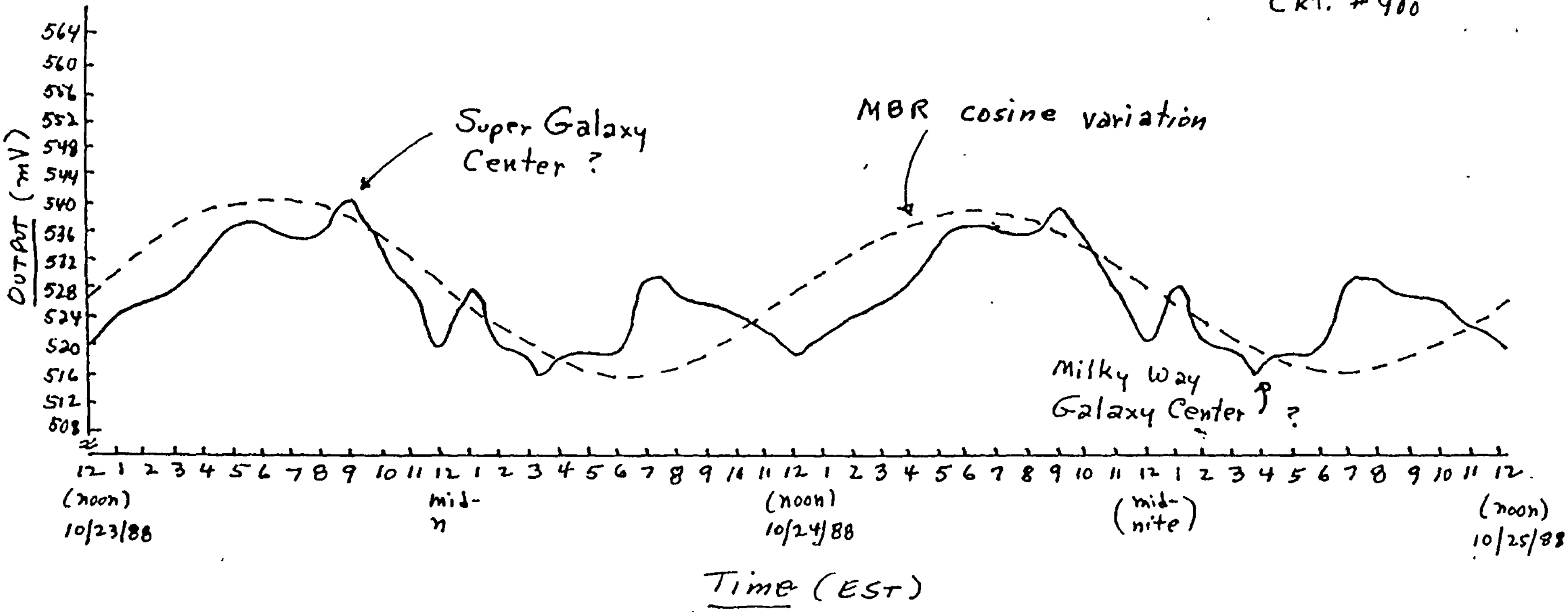

Figure 6 – Possible correlation between the q-factor variation and the cosine variation noted in the microwave background radiation (MBR).

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Based upon this observation, it should be possible for a submerged submarine to determine the presence of a surface vessel directly above it by purely passive methods, and thus of some use in the military.

Another possible use for the gravimeter device, especially the more sensitive and faster responding units, are as a navigation aid device. For there are fixed dense masses in the universe, such as the Galaxy Centers shown in Figure 5(b), and many, many others, which will appear on the gravimeter's meridian position on a daily basis. Thus, the longitudinal position of say, a submerged submarine, can be determined by this gravitational method. The celestial sphere does not have to be observed visually, and the depth of the sea waters has no affect on this response.

Another very important effect is that the gravity levels on earth may have a direct effect on the upper atmosphere jet stream patterns and thus could affect our weather patterns. As shown in Figure 5(b) the gravity flux variations on earth are now about +/- 2% daily. Prior to about Dec. 5, 1986, the gravity flux variations were only about +/- 1% ! Gravity flux changes due to a Milky Way Galaxy Center 'event' noted Dec. 6,1986 (where a possible supernova-type event had generated a new very deep 'black hole?' and accretion ring structure there) and a possible Super Galaxy Center 'event' on March 14, 1988, (which also appeared to increase the depth of the 'black hole?' there), may have been responsible for the increase in variations from 1% to 2%. These increased variation in the levels of the earth's gravity are believed to be (in part) responsible for much of the most unusual weather conditions seen world-wide in recent months and years, as well as an increased potential for earthquakes in unstable regions of the earth.

Another use for such gravimeters has been in the detection of the many supernovae events occuring in this universe. Such events are best detected with reduced filtering in the output of the detector units.

Presently, the author is concerned with the possible demise of the star Betelguese in the constellation of Orion. The Galaxy Center event of Dec. 6, 1986 apparently 'triggered off' another <u>very strong</u> supernova event which appears to lie on the same meridian as Betelguese. Since gravitational impulses are essentially 'instantaneous', the optical, ie., electromagnetic effects, from a possible demise of Betelguese will not reach us for about 300 years, since Betelguese is about 300 light years away from us. However, if such an event did indeed occur, then we are in for one 'helluva visual supernova' at that time!

Another application for the electronic gravimeter is to provide a correction signal to ordinary scales based on Hooke's Law mechanisms ie., springs. These errors are introduced by the earth gravity flux variations as seen in Figure 5(b) and appear on most such scale systems, including most common digital-type bathroom scales. Many consumers complain of the weight variations they see on such scales--they are real variations, but do not imply that ones's body mass is changing that rapidly! The author has demonstrated that such scale errors are correctable with gravimeters fed-back to the electrical readout of such units. However, these 'errors' should bring home to the amateur scientist the reality of these variations.

There are a great many other applications for gravimeters, especially the electronic versions, which will not be discussed here, but will come to the amateur researcher with increased understanding of the earth's gravity as well as gravitation in general.

<u>Conclusions</u>

This article is an attempt on the part of the author to introduce to the serious experimenter and the amateur scientist (and hopefully to the professional scientist as well) a new approach to the field of gravitation, especially the earth's gravity field. The electronic gravimeters described here are very simple and low in cost and may be used in any location (the author works in a basement area of his home). It is a very sensitive device, more so than any commercial mechanical-type gravimeter, which must be highly damped to limit their response to spurious measurements. It is hoped that sufficient details and data were provided here to encourage the serious amateur scientist to enter into this fascinating and largely yet unexplored field of electronic (and mechanical) gravity field monitoring. The rewards in personal satisfaction as well as increased knowledge of our universe is there for the taking! There is much to be discovered yet!

Cosmology Note

GH Labs
Newark, N.J.
11/18/89
(gh)

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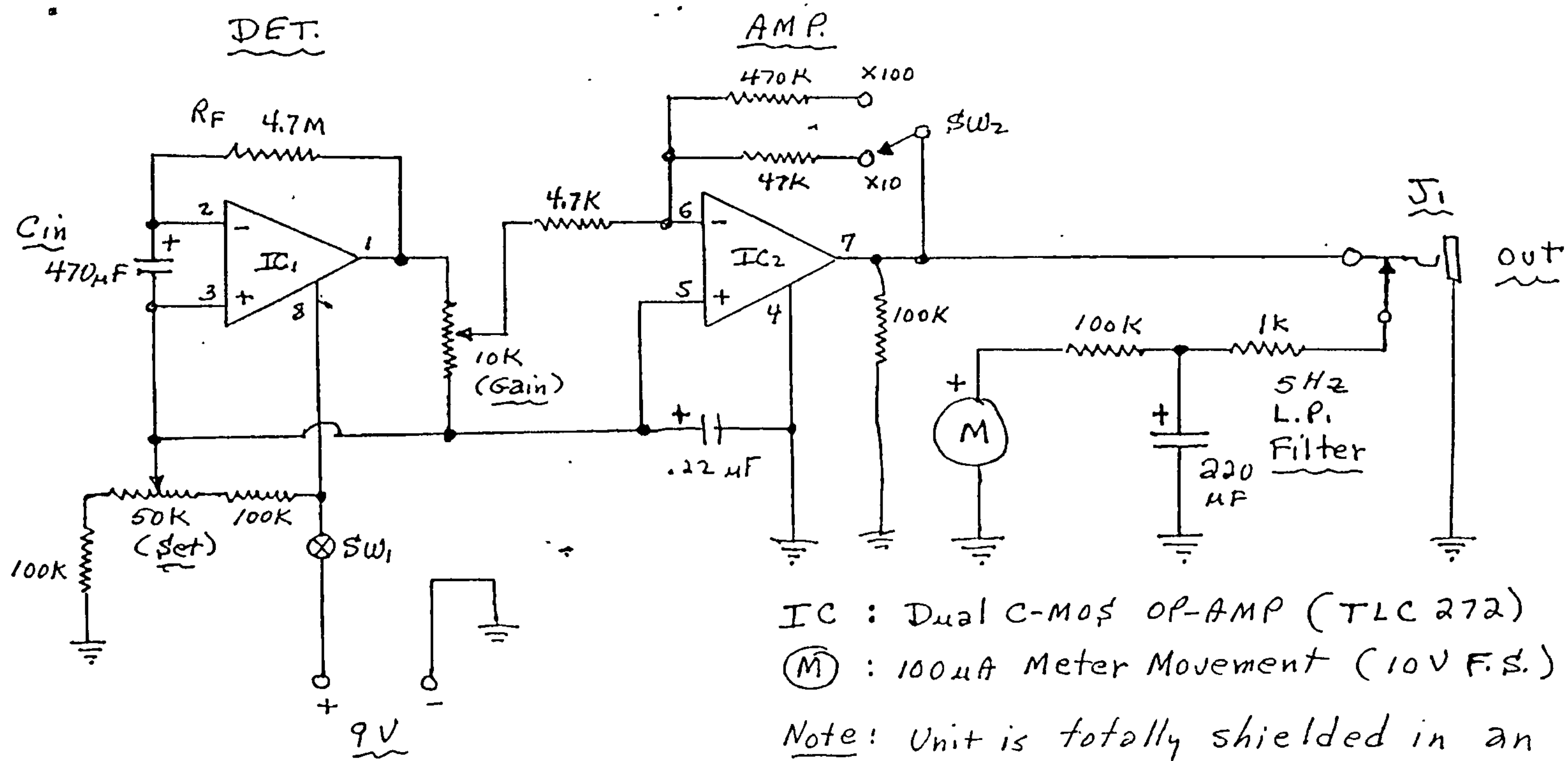
GW Circuit #1400

(Revised as #1400A on 1/14/92)



IC : Dual C-MOS OP-AMP (TLC 272)

(M) : 100μA Meter Movement (10V F.S.)

Note: Unit is totally shielded in an aluminum box.

Remarks:

1. Use J_1 output jack for external filters and/or meters.
2. Use x10 amp. gain for gravimeter response of g-field only. Use x100 amp. gain for display of 'cosmic' g variations.
3. Use variable gain control to set system sensitivity.
4. Use set control to position response on meter.

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(199) (199)

"Are Cosmological Effects the Source of 1/f Noise in Electron Devices?"

G. Hodowanec

Abstract

A simple circuit for detecting what could be gravitational-waves of a new kind is described. The energy distribution and frequencies of the detected pulses appear to be similar to that seen in "flicker" or "1/f" noise in electron devices. It is, therefore, postulated that the true source of 1/f noise could be these cosmological effects. Of interest to the circuit designer is the possibility of cancellation or reduction of 1/f noise in low frequency circuits. Of interest to the astrophysicist is a possible new "window" to the universe. The simplicity of the circuits and the minimal equipment requirements should enable many independant investigations into the reported phenomenon.

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"Are Cosmological Effects the Source of
1/f Noise in Electron Devices?"

G. Hodowanec

The low frequency behaviour of most electron devices is characterized by noise which has a Gaussian amplitude distribution as well as a power spectrum which is inversely proportional to frequency, giving rise to the names "flicker noise" and "1/f noise" for this noise. Much effort has been expended in studies of this noise and the status as of 1970 was reviewed by van der Ziel (1). A more recent attempt to explain 1/f noise was made by Stoisiek and Wolf (2) who improved on earlier attempts but still left open the question of the true source of this noise. This letter presents a new approach to the origin of 1/f noise which is based upon the author's original work in cosmology (3) as well as a background in solid state and thermionic electronics.

A basic concept in the author's cosmology is the premise that sub-phenomena particles (which he now calls "rhysmons" after the original Greek technical term for atoms) form a matrix structure which is the very fabric of the universe. Modifications to this structure result in the myriad manifestations of nature, including the effects known as the electric field, the magnetic field, and the gravitational field. The early experiments of the author (1975) were intended to prove that under certain conditions, the electric field and the gravitational field were indistinguishable. An experiment was devised in which loosely bound electrons in the dielectric of a capacitor were to be "polarized" by gravitational "perturbation" effects introduced by sharply bringing a localized mass up

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to the capacitor. is would induce a small movement of charge in the capacitor givirise to a small current, i_1 , as shown in Figure (1)a. Thisuld be equivalent to the small movement of charge caused by the appltion of a small external electric field to the capacitor as shown Figure (1)b. The gravitational effect was possible in terms the author's cosmology. To detect the very small charge movems, a very sensitive current detector was required. The advenf the integrated circuit operational amplifier provided such a cunt detector. The circuit which was developed is extremely simplnd is shown in Figure (2). IC_1 is a current-to-voltage convertin which the output voltage, V_1, is equal to $i_1 R_1$ where i_1 is tcurrent pulse developed in capacitor C_1 and R_1 is the feedback retor of the circuit. R_2 is a level control for the buffer amplifistage IC_2 which has a voltage gain of twenty. For the values shc a current pulse of one nanoampere (10^{-9} amp) in C_1 can develop mV at output, V_2. This output is more than adequate to drive t pulse analyzers, audio amplifiers, oscilloscopes, or other rrding device.

Original testsed a large capacitor (15,000 uF) for C_1, thus a large input timenstant (the intrinsic input impedance of IC_1 is in the order of2k ohms) necessitated use of a zero-center voltmeter for the ording device. Test results were dramatic, but it was later ertained that Doppler Effects introduced by the presence of a strclocal FM radio station were masking the results. When the input cactor was reduced to 10 uF, perturbation effects now "rang" the cirt at about 45cps with a decay time of 1-2 sec.. The recording deviin this case was a low noise audio amplifier. However, it was obved that a low-level background pulsating

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ringing persisted even though perturbation tests were halted. First impressions were that the background ringing was due to neighborhood arcings, as appliances were turned on and off, since the circuit was also extremely sensitive to short electromagnetic pulse effects. Reduction of C_1 to 1 uF not only increased the natural frequency of the rings, but also increased the intensity and the number of bursts being detected. It was ascertained at this time that the source of the detected signals was very much external to the environment.

Another concept in the author's cosmology inferred that gravitational collapse, such as a supernova, should create a new kind of gravitational wave front (not the same as predicted in General Relativity) which would appear to the detector dielectric element as equivalent to an alternating electric field. According to current supernova theory (4), this gravitational pulse should be Gaussian in amplitude, have a frequency in the order of 1 kc, and have burst periods in the order of 3-100 milliseconds. These bursts, according to the author's cosmology, would also reach any portion of the universe in about 10^{-44} seconds, ie., the pulses would be received in real time. Using an approximation of about one supernova per galaxy per 300 years, and about 90-100 billion galaxies in the universe, it was estimated that 10-15 bursts per second from supernova effects was reasonable. To optimize the detection of such bursts, the input capacitor was reduced to .22 uF in order to ring the circuit at about 500 cps for a broad resonance with such effects. It was now possible to ring the circuit with the perturbation mass of a pin point as shown in Figure (1)a. The entire circuitry was double-shielded in an aluminum box within another steel box to eliminate electromagnetic fields from affecting the detector. Strong burst-type pulses continued to be

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detected, even when additionally shielded within another steel cabinet. These pulses have been continually observed by the author ever since the first experiments in 1975. Many detectors have been built by the author, some by select colleagues, and all detectors performed similarly. In multiple detector tests, coincidence of bursts was noted. The observed bursts are Gaussian in amplitude and are in the order of 3-100 milliseconds long. A typical single sweep of bursts as seen on an oscilloscope is shown in Figure (3). The burst amplitudes are an inverse function of the frequency of the bursts, ie., the greater the amplitude, the lower the frequency of such bursts. Relative amplitude and frequency of detected bursts is plotted in Figure (4)a. The typical response of 1/f noise in transistors (5) is plotted in Figure (4)b for comparison. The similarity in plots is quite evident.

The response of the detector as averaged by a digital voltmeter at output, V_2, is shown in Figure (5). This rough plot was made over a 24-hour period on May 10, 1981. For one earth revolution, the response is seen to be slightly anisotropic. Even with averaging, structure is seen in this plot, although only the major variations are shown. The peaks and dip recorded at 9:30 PM was roughly correlated with the autumn equinox at 12h right ascention, located in the Virgo region near the zenith at this time. This structure in the detector response moved about 4 minutes earlier each day and was followed for several weeks, and thus appears to confirm the observation that the burst response of the detector was related to our location on earth with respect to the rest of the universe. A tentative explanation for this response, in terms of the author's cosmology, was made that (1), the universe is finite and spherical in shape, (2), the universe has a hard-core center of galaxies, and (3), the earth

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is located appreciably off-center in this scheme. The response also suggests an alternate explanation for the microwave back-ground radiation detected by Penzias and Wilson (6).

Conclusions: A simple circuit for the detection of what could be gravitational waves of a new kind has been described. Sources for these waves could be supernovae, novae, star quakes, etc., and the detected energy distribution and frequencies of such events are approximately as that expected (7). The energy distributions and frequencies also closely approximate those seen in flicker or 1/f noise in electron devices. It is, therefore, postulated that 1/f noise in electron devices is being generated by these gravitational wave fronts in a manner similar to that ascribed to this detector.

The author is developing many technological uses for this circuit; cancellation or reduction of 1/f noise, for example. In cosmology, the author is developing many new or alternate explanations for cosmological effects; the nature of electromagnetic wave propagation, for example. However, the possible correlation of 1/f noise with cosmological effects given here should be of great interest to society members and others. The experiments are extremely simple and much of the author's data can be verified readilly.

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References

(1) A. van der Ziel, Proc. I.E.E.E., Vol.58,pp.1178-1206, 1970.

(2) M. Stoisiek and D. Wolf, I.E.E.E. Transactions on Electron Devices, Vol. ED-27, No.9, Sept. 1980.

(3) G. Hodowanec, Unpublished Brief, June 1980.

(4) C. Misner, K. Thorne, J. Wheeler, Gravitation, W. H. Freeman and Co., 1973.

(5) Application Note, AN-421, Motorola Semiconductor Products.

(6) R. Wilson, Science, Vol.205, 31 August 1979.

(7) S. Hawking, W. Israel, Eds., General Relativity, Cambridge University Press, 1979.

Figure Captions

Figure (1) - Electrical effects in capacitors (a) mass perturbation effect, (b) electric field effect.

Figure (2) - Basic circuit of the experimental detector.

Figure (3) - Typical pulses observed on an oscilloscope.

Figure (4) - Correlation of burst noise with 1/f noise (a) burst noise, (b) 1/f transistor noise figure.

Figure (5) - Averaged response of detector in 24 hour period.

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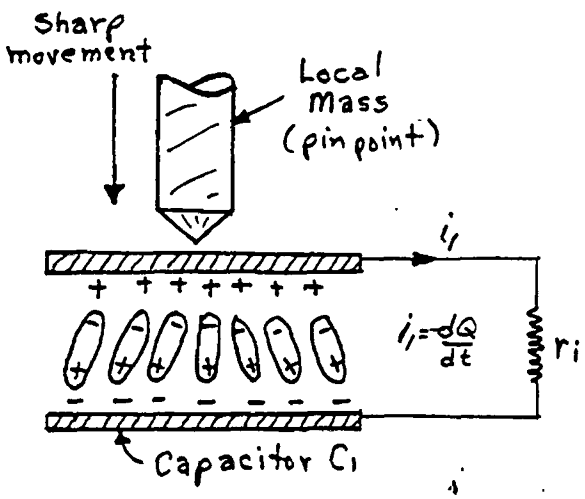


Fig. (1) a

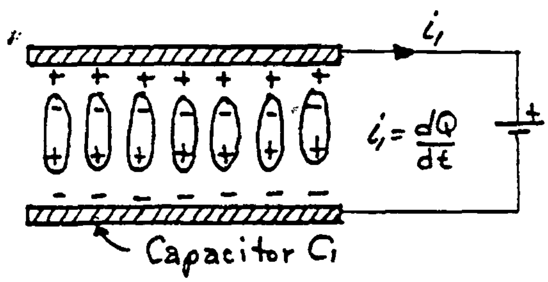
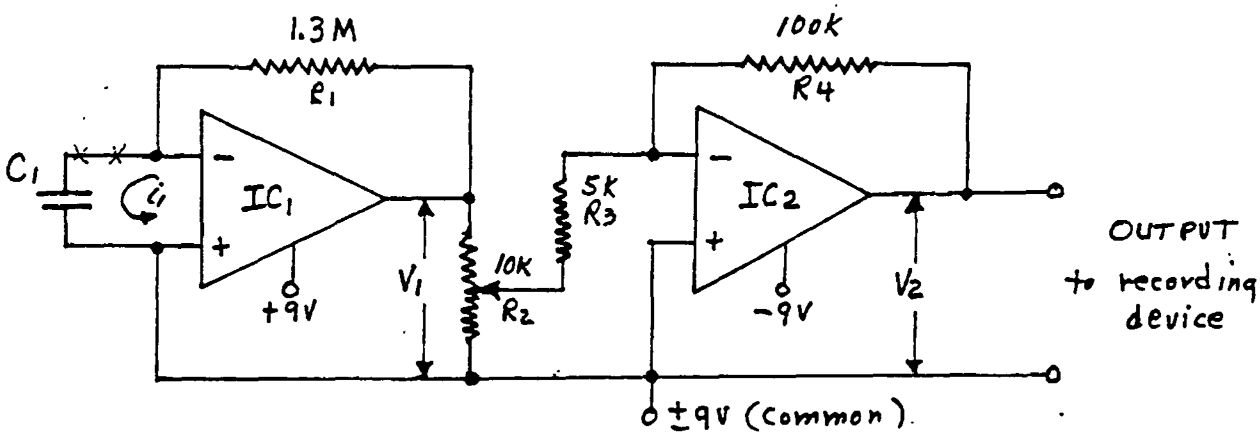


Fig. (1).b



C_1 : .22 uF (Radio Shack Cat. No. 272-1070)

IC_1, IC_2 : 1458, Dual Operational Amplifier

Fig. (2)

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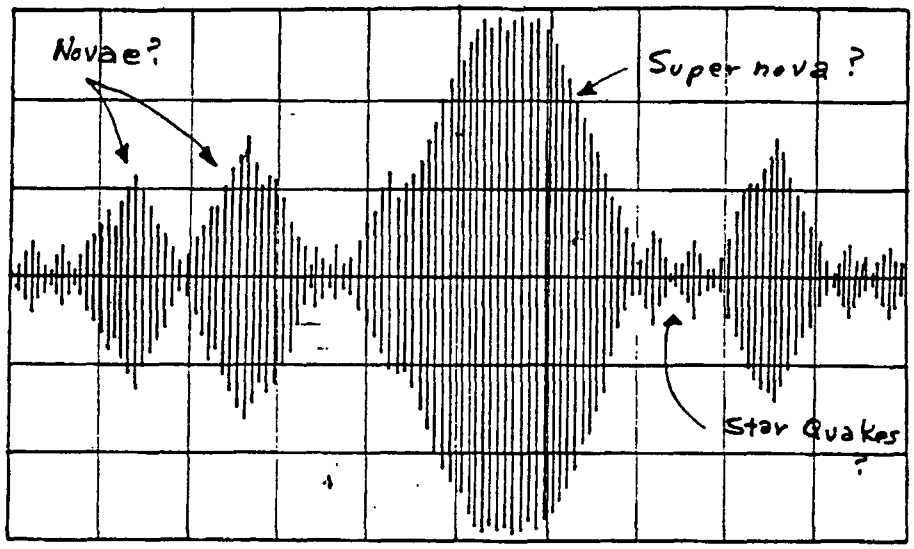

Vertical: .05V/cm
Horizontal: 20ms/cm
Ringing: 550 cps

Fig. (3)

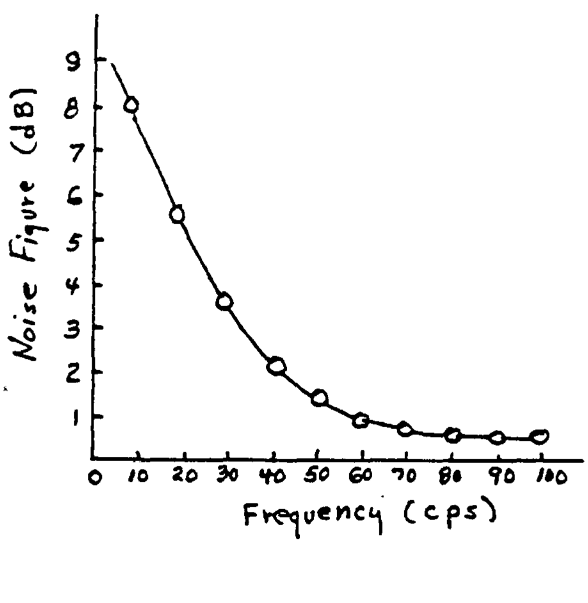

Fig. (4) b

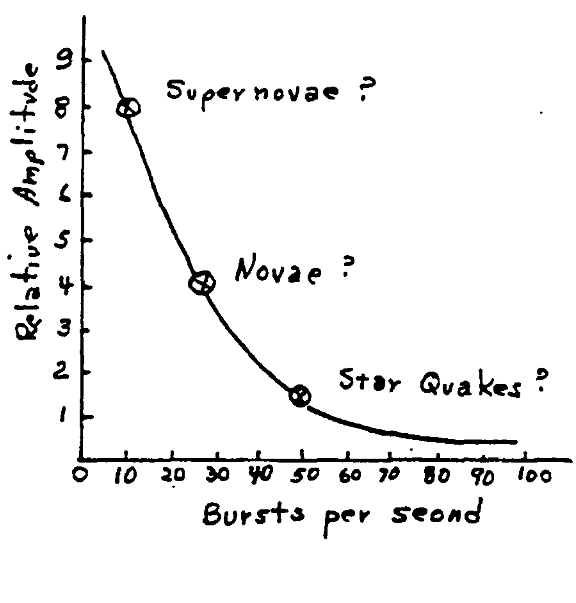

Fig. (4) a

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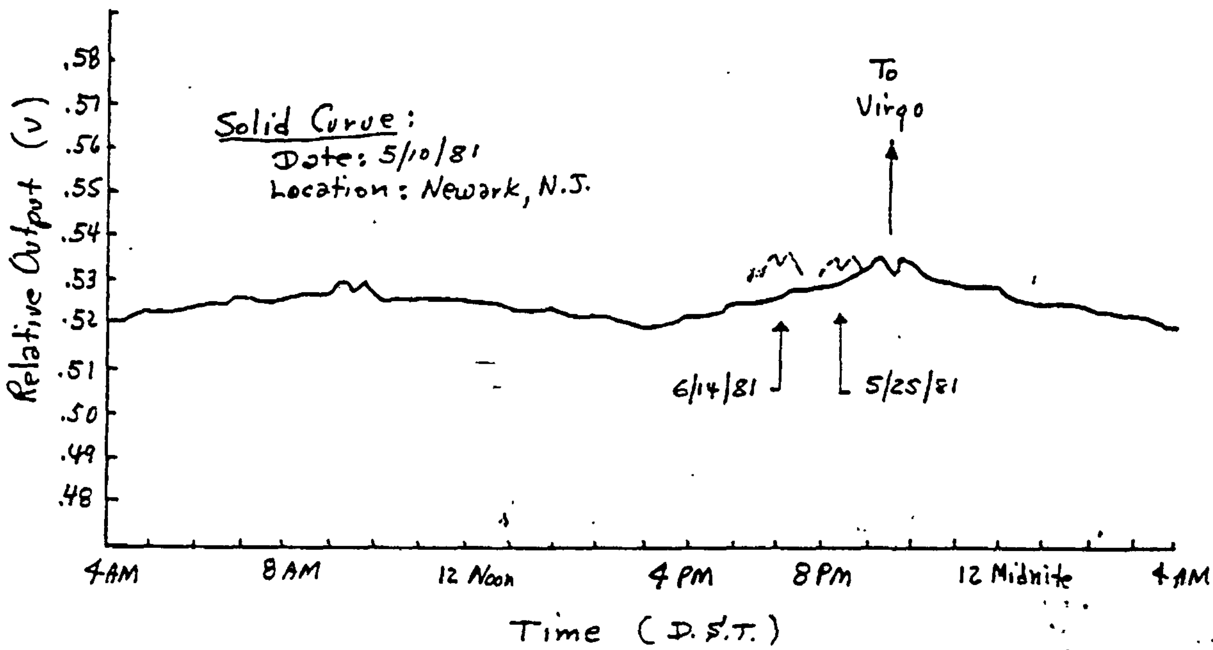

Relative Output (v)
.58
.57
.56
.55
.54
.53
.52
.51
.50
.49
.48
Solid Curve:
Date: 5/10/81
Location: Newark, N.J.
To Virgo
6/14/81
5/25/81
4AM
8AM
12 Noon
4PM
8PM
12 Midnite
4AM
Time (D.S.T.)

Fig. (5)

(209) (209)

Cosmology Notes

GH Labs
4/4/88
(gh)

Detection of Novae and Black Holes

QND-type gravity detectors which 'ring' around 500-600 Hz at the input are ideal for detecting the actual formation of the neutron star or black hole in the supernova-type astronomical event. These will appear as gaussian-type pulses when displayed on an oscilloscope. However, nova and supernova, as well as the resulting black hole type structures which appear following the supernova events, are best displayed with the 1/f type 'shadow' gravity detectors, where the output is integrated to obtain an envelope-type response for the event. Simple explanations for these types of responses follow:

Nova Responses

Novae are stars which 'explode' and thus eject some of their outer layers and most of their atmosphere. This is a momentary and transitory type of event which must be 'caught in the act', so to speak, since they do not ordinarily leave permanent traces which may be 'observable' with this system in further scans of that region. The novae generally have two characteristic 'signatures' when detected with shadow type detection systems. These are depicted in Figure (1). As the extremely fine resolution 'beam' of the detector scans a nova event (as a function of the rotation of the earth), it will first detect the actual explosion, primarily as a sharp gradient in the earth's gravity field, due to the 'modulation' of the earth gravity field by the sudden displacement of a large amount of mass at the nova event. This will appear as the 'burst' response depicted in the nova event. As the 'beam' moves with the earth rotation, it will pull away from that expanding mass in the nova event and thus the response will fall off, or tail, as shown in the depiction of Figure (1). In some cases, some shock-wave modulations may appear, if the exploding star was in or near a gassy or dusty environment. Nova events apparently occur quite often and thus are also 'seen' quite often with this detection system.

Supernova Responses

Supernovae are believed to be the demise of some more massive stars and thus are less frequent events than novae, but still are 'seen' fairly often with the shadow detection systems. This is primarily due to the fact that supernova are detectable when located <u>anywhere</u> on the detector's meridian location, but generally in the zenith regions or directly through the earth. However, the detections can be limited to certain depths in space by properly adjusting the output signal integration, ie., the output filter of the detection circuitry.

Supernova responses as detected with this system generally have three characteristic 'signatures' as is depicted in Figure (2). Initially 'seen' is the collapse of the star to a neutron star or black-hole. While this is noted as a gaussian-type 'ring' in the QND type of detectors, in the shadow type detectors it appears as a very sudden change in averaged earth gravity levels, due both to the movement of much mass in the supernova event as well as its compaction (implosion) into the neutron star or black hole. This is followed immediately by the explosive 'burst' of much of the stars outer layers and atmosphere. Since much mass is involved in this process (with high velocity movements), the shock-wave front from the core event will 'pile up' some surrounding material as a ring (or rings) of debris which are also

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generally detectable with these systems. Again, due to the rotation of the earth, a 'tailing' effect is also present. An additional characteristic response for supernovae is that they do generally leave some lasting traces of their existence, primarily the black holes and an 'accretion' ring.

Black Hole Responses

A new black hole usually retains an accretion ring structure and the characteristic 'signatures' are as depicted in Figure (3). They can be quite pronounced in the first few days following the supernova event. Here, the fine resolution scanning 'beam' of the detector can sweep across the entire structure of the black hole and accretion ring as shown in Figure (3). The black holes and accretion rings generally have very long lifetimes, but the detection system may also pick-up black holes without the accretion ring. These may be very old supernovae events which have since 'lost' such structures in an in-fall type of mechanism. Our own Galaxy Center now has a new and very pronounced 'black hole' structure since about December 6, 1986!

Conclusion

These simple explanations of some prominent 'observable' events in gravitational astronomy should be of interest to the inquisitive experimenter, as well as amateur astronomers. It should also be of prime interest to the professional astrophysicists once they are able to shed their 'inhibitions' due to their academic training.

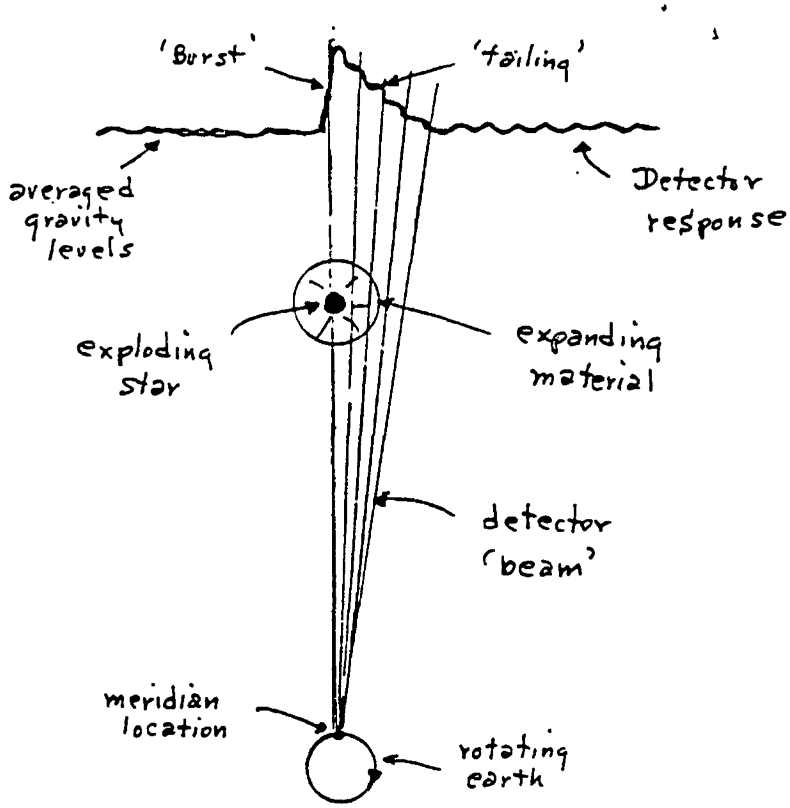

Figure (1) Nova Event Response

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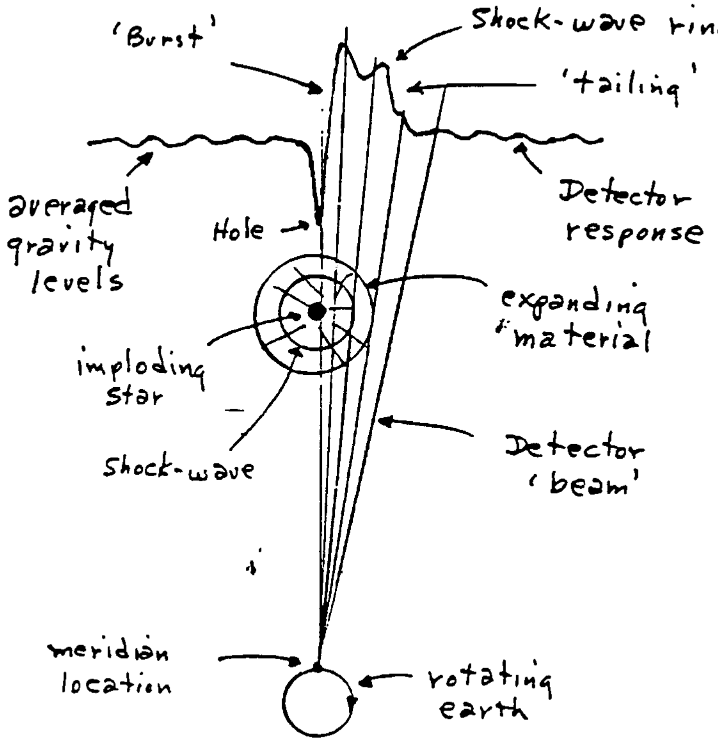

Figure (2) Supernova Event Response

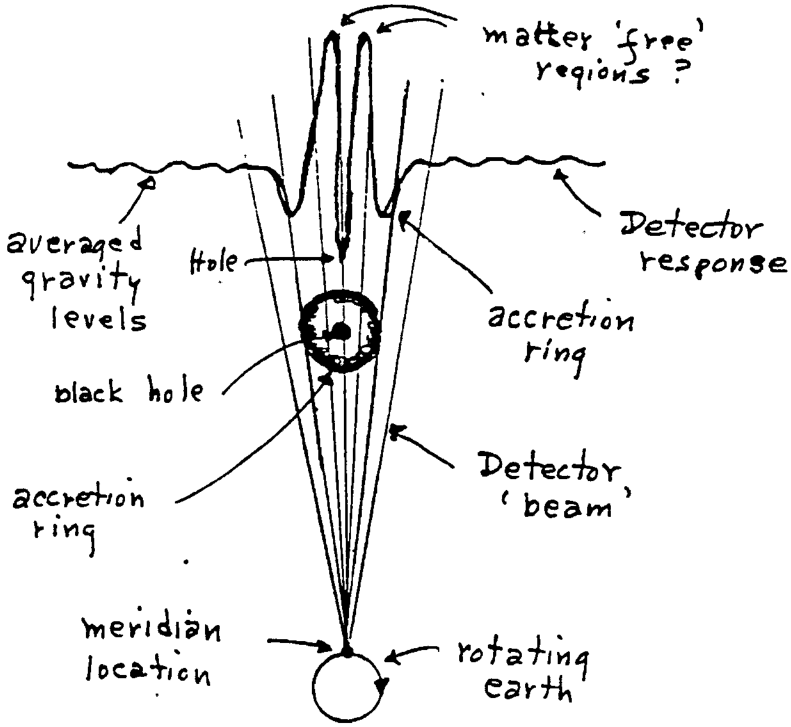

Figure (3) Black Hole with Accretion Ring

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Cosmology Notes

March 18th
GH (1988)

Gravitation

Gravitation in the Newtonian (and Rhysmonic) sense is a field theory which has physical reality and thus can possess an energy-momentum density. Moreover, the energy-momentum may be transferred by the field 'instantaneously', (more accurately in the Planck Time interval of about 5.4×10^{-44} seconds) to any region of the universe. This does not imply that there is a physical movement of local space structure over these distances any more than water is moved in water waves or air is moved in sound waves. Only the effect is transferred. This mechanism is more fully discussed in my Monograph. Therefore, the gravitational field in Newtonian gravitation (and in Rhysmonic gravitation) is a physical field which can carry energy and momentum. The physicality is due to the sub-structure of space, the rhysmoid (or aether, if you wish) which is a plenum and not an empty space. Even Einstein admitted to the physical reality of space, but most Relativists either ignore it or wish he had never stated that.

Einstein started off by denying (ignoring, actually) any physical reality to space and proceeded from purely mathematical and geometric considerations in describing space. He developed 'field' equations of the metric of space-time by forming tensor quantities from the field functions and their derivatives. From this he concluded that 'matter' could influence the metric of space-time. However, this approach does not allow the consideration of the gravitational field as a physical field capable of carrying energy and momentum. Therefore, most Relativists will deny the existence of any energy transfer on this basis, except in the case of quadrupole-type gravitational radiation, which in reality is but a form of electromagnetic type radiation. Moreover, the quadrupole radiation involves at least two rather slow moving masses and thus will have very low frequencies and thus extremely low energy content, while propagating at the same speed as light. Thus such signals will take a long time to span astronomical distances and suffer much losses in the process, and thus would be very difficult to detect. None-the-less, I believe that I have detected such signals using the EM detection capabilities of my detectors. However, as you now know, I concentrate mainly on the Newtonian type force field gradient gravitational impulses which generally are received as 'noise' signals, but with the proper detection circuitry they can reveal their hidden 'secrets'.

Scalar-Type Fields

Scalar fields and scalar waves are used in many contexts now, but I use the term scalar field in the original context of E. T. Whittaker who developed the concept in his classic paper of 1903. To paraphrase him, "when two vectors are directed parallel to each other in some fixed direction in space, they can be fully specified by their magnitude only, and thus by two scalar quantities only". This greatly simplifies the interaction and analysis of fields in terms of their scalar aspects. In this case, the fields interact in a simple algebraic superposition of fields, with no need to use vector or tensor analysis.

Scalar fields in this sense may be considered as fields of potentials in the rhysmoid (or aether). Pure spatial potential fields are not 'observable' since they do not produce any force gradients which can interact with other gradients or energy density functions (matter) to make their presence known. However, any field gradients (energy gradients) or variations in the energy density will be recognized as fields and matter in this context. Thus the concepts of matter and energy are fundamental to our recognition of a physical universe.

Scalar Field Interactions

Scalar-type fields and interactions can be developed by many processes, but I will limit myself to the interactions with the earth's gravity field as a way of illustrating such interactions. That the earth's gravity field is a well-defined scalar-type field in the aether (or rhysmoid) and thus a function of the substratum or plenum of space, with high penetration powers, ie., impervious to shielding effects, should be quite apparent to experimenters and amateur scientists who are not encumbered by the Relativists view of gravitation. This is a relatively strong force gradient field, and at any particular observers position, may be considered as a parallel field directed toward his earth center. Thus it is possible to 'generate' local scalar-type fields which are parallel to the earth's gravity field and actually observe these interactions (as given in my many simple experiments). Many other simple and some not so simple demonstrations are also possible. However, I will emphasize only some aspects which involve scalar-type fields developed in or generated by simple capacitor elements.

Interaction in a Capacitor

The earth's gravity field is a readily available scalar-type field which contains many gradients (ie., impulses) as well as an averaged gradient level which can interact with the dielectric structure of the capacitor element. This interaction is possible since the electron-ion structure of the dielectric is a 'bound' structure and thus may be subject to 'polarization' by the force gradients in the gravity field. It is generally not possible to polarize 'free' or orbital electrons, or 'free' ions, except under special conditions. For example, if a plasma of free electrons and ions in a gas tube are 'directed' in a particular parallel direction by a small local magnetic field, the interaction of such a plasma with the gravity field may be possible. (See my experiment).

Returning to the dielectric, the vertical gravity gradients can 'polarize' the electron-ion structure of the dielectric in the capacitor (possible in a physical field theory) to set up an internal scalar-type E-field in the capacitor. This scalar E-field may, in turn, 'charge' the capacitor plates to drive a small external current flow in the capacitor circuitry.

The reverse process may take place also. A voltage applied to the capacitor plates by an external source can 'polarize' the electron-ion structure of the dielectric of the capacitor. When the voltage is suddenly removed, the dielectric returns to its unstressed condition with the development of a scalar-type E-field impulse which can leave the capacitor in very much the same way a gravitational impulse field had entered the capacitor. Both of these fields are immune to shielding and have very long range. It should be noted that these are truly scalar-type fields, divorced from accompanying electromagnetic (EM) radiations since ther is no real drift of electrons or ions in this* process. In rhysmonics, as well as conventional theory, EM radiations reouire a movement of charge, eg., electrons, in space, in order to develop the interlocking electric and magnetic field vectors necessary in this radiation process.

There are many ways to develop such scalar field 'transducers', since many electron devices satisfy the above requirements, more or less. These include solid state devices such as diodes and transistors as well as plasma devices such as gas tubes or even the avalanche effects in solid state devices. The gravity signal detectors that I have developed largely take advantage of the tremendous amplification factors of IC devices to develop useful output signal levels from these various low level processes. The prudent use of circuitry enables the extraction of latent information and energy in these 'noisy' gravity signals.

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Note Added 4/3/88

A rhysmonic theory interpretation of the interaction of a scalar-type field, eg., the gravitational field, with a 'bound' electron-ion pair, either in a dielectric or a gas plasma, will be discussed in an article now under preparation.

* Some 'drift effects' or impulses as seen in LED devices, for example, may result in emmision of light (an EM radiation) as an electron in an atom 'drops' to a lower orbit. However, in this case, the ion is relatively immobile and the 'effects' are due to the 'drift', so to speak, of the electron alone. In another process (see Note above), it is possible to develop in a bound electron-ion structure (under certain conditions) an interaction with pure scalar-type fields, eg., the gravitational field, where polarization can take place, and vice versa, where polarization effects can develop pure 'radiated' scalar-type fields.

SOME DATA FROM THE AUTHOR'S WORK AT "HENDERSON INDUSTRIES" TO ELECTONI-CALLY COMPENSATE DIGITAL READOUT SCALES FOR THE EFFECTS OF GRAVITY FLUCUATIONS

3/16/83

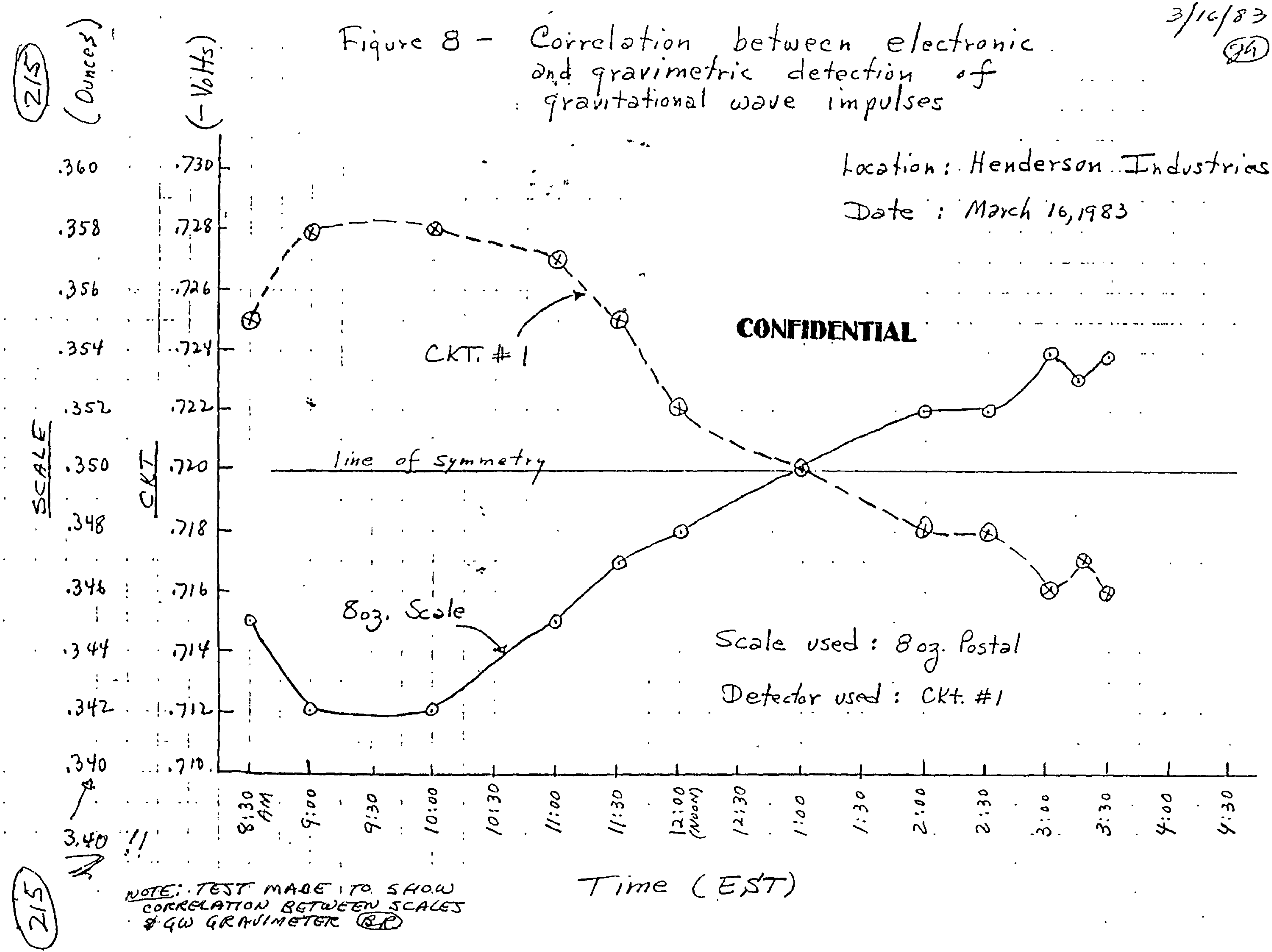

Figure 8 - Correlation between electronic and gravimetric detection of gravitational wave impulses
215
(Ounces)
(-Volts)
SCALE
CKT
.360
.358
.356
.354
.352
.350
.348
.346
.344
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.730
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.724
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.718
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.712
.710
3.40 !!
Location: Henderson Industries
Date: March 16, 1983
CKT. #1
CONFIDENTIAL
line of symmetry
8oz. Scale
Scale used: 8oz. Postal
Detector used: CKt. #1
8:30 AM
9:00
9:30
10:00
10:30
11:00
11:30
12:00 (NOON)
12:30
1:00
1:30
2:00
2:30
3:00
3:30
4:00
4:30
Time (EST)
NOTE: TEST MADE TO SHOW CORRELATION BETWEEN SCALES & GW GRAVIMETER
215

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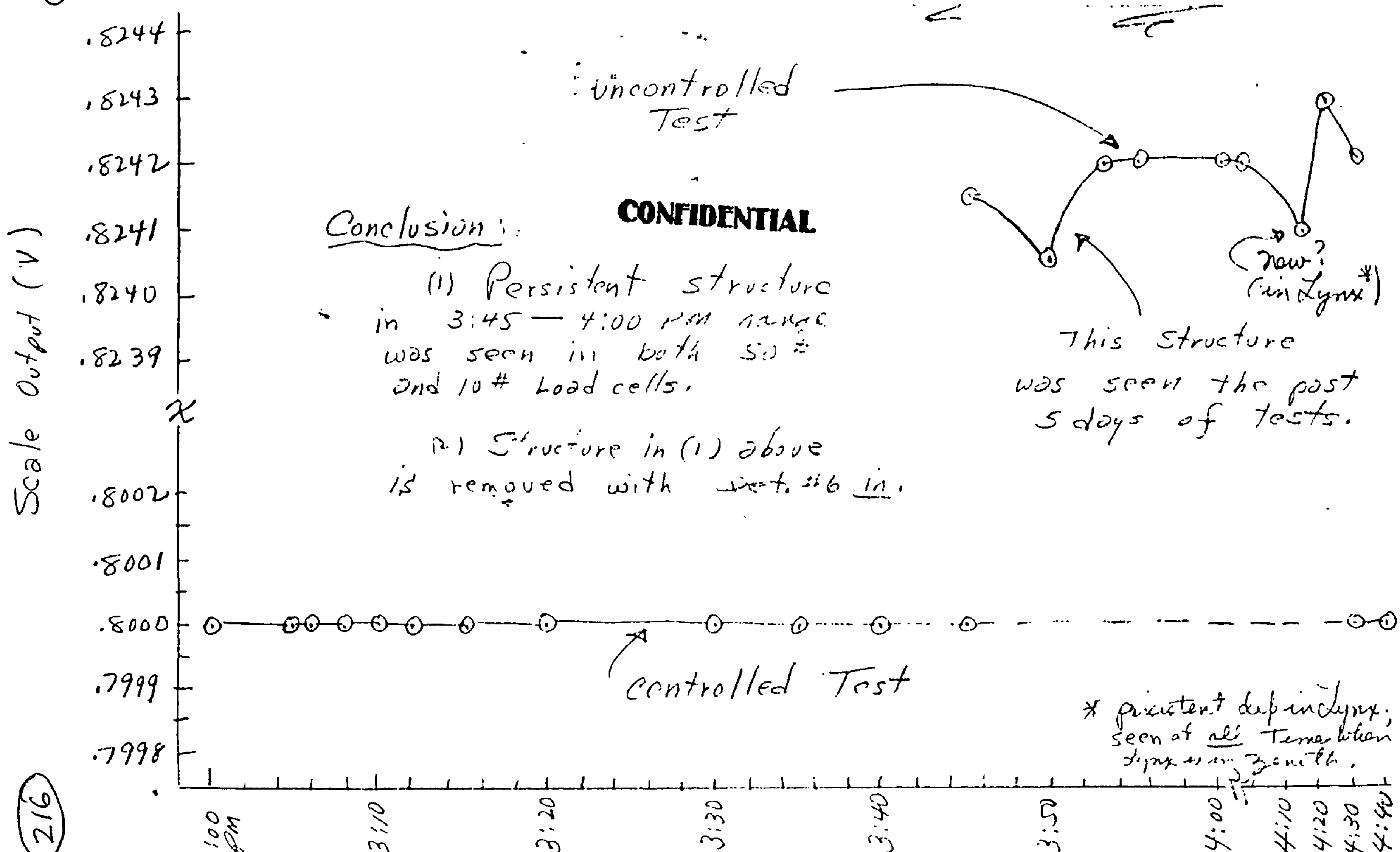
Scale Test (1)

5/12/83 (SA)

with 10# Load cell

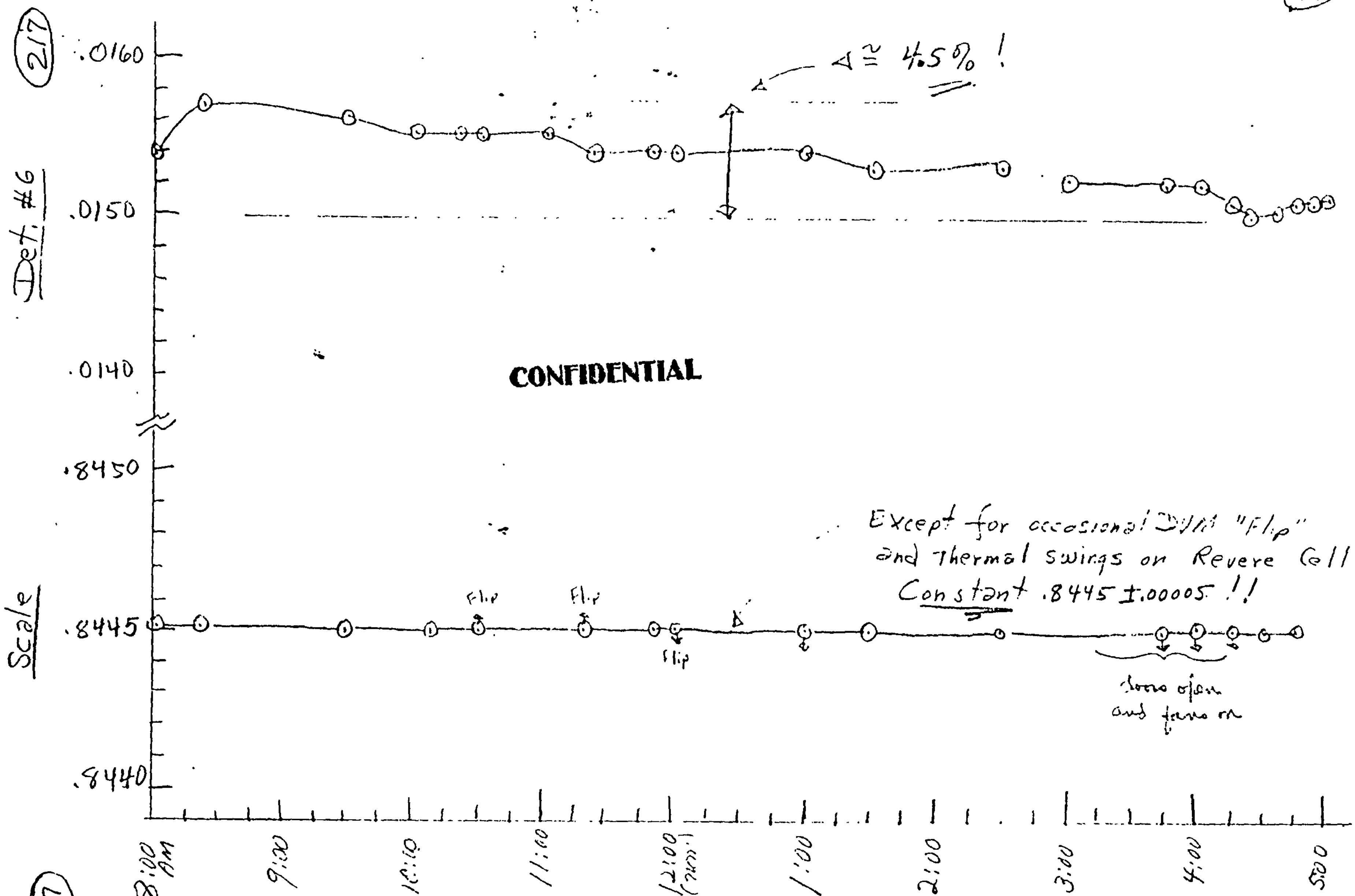


NOTE: TEST MADE TO SHOW THAT 'CONTROLS' WORKED. WHEN CONTROL TAKEN OUT, THE STRUCTURE RETURNED (BR)

216

Scale Test

5/23/83
(94)



217

NOTE: THIS CRUDE TEST SHOWED THAT SYSTEM CORRECTION WORKED

Time → (D.S.T.)

218

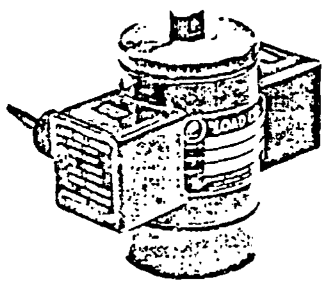
218

NOTE: LOAD CELL USED IN TESTS. (10 & 25 LBS.)

Revere LOAD CELLS

UNIVERSAL SUPER PRECISION (USP)

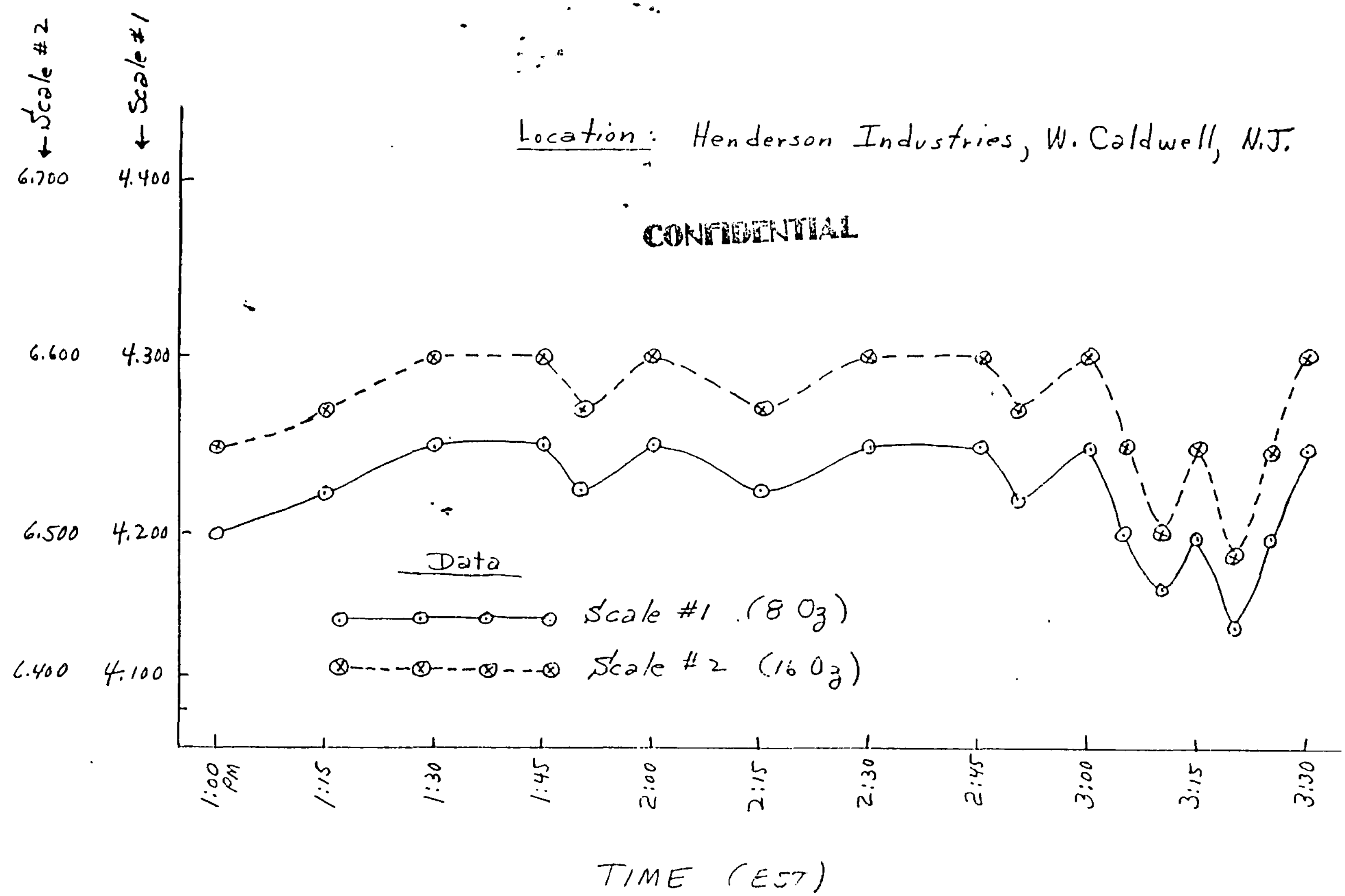
10 TO 300,000 LBS. CAPACITY



USP load cells, combining high linearity with low deflection, are used in both tension and compression service. Either connectors or cable can be furnished. Single or dual bridges are available in all capacities, excepting 10 and 25 pound units which are made only with single bridges. Universal cells up to 1000 pound capacity have integral internal overload stops, and have overload ratings of 500%.

SPECIFICATIONS	
Single and Double Bridge	(USP) Universal Cells
1. EXCITATION ELECTRICAL (RECOMMENDED)	15 volts, AC or DC (12 volts, AC or DC, 10 & 25 lb. cells only)
2. TERMINAL RESISTANCE, INPUT AT 72° F	350 ± 1% ohms
3. TERMINAL RESISTANCE, OUTPUT AT 72° F	350 ±1% ohms
4. OUTPUT, RATED	3.000 mV/V ±.1% in compression
5. ZERO BALANCE	±1% of rated output
6. NONLINEARITY (MAXIMUM)	.05% of rated output, 10 & 25 lb. cap. cells .1%
7. REPEATABILITY (MAXIMUM)	.02% of rated output, 10 & 25 lb. cap. cells .05%
8. HYSTERESIS (MAXIMUM)	.03% of rated output, 10 & 25 lb. cap. cells .06%
9. CREEP (MAXIMUM)	.03% of rated output, in 20 minutes, 10 & 25 lb. cap cells .05%
10. TEMPERATURE EFFECT ON RATED OUTPUT 15° F TO 115° F (−9° C TO 46° C)	±.0008%/° F of rated output (±.0014%/° C of rated output)
11. TEMPERATURE EFFECT ON ZERO BALANCE 15° F TO 115° F (−9° C TO 46° C)	±.0013%/° F of rated output (±.0023%/° C of rated output)
12. OVERLOAD RATING, SAFE	150% of rated capacity (500% for universal cells up to 1000 lb. capacity)
13. OVERLOAD RATING, ULTIMATE	225% of rated capacity (500% for universal cells up to 1000 lb. capacity)
14. INSULATION RESISTANCE (MINIMUM)	5,000 megohms
15. ATMOSPHERIC PRESSURE COMPENSATION	for cells up to 1000 lb. capacity Internally compensated to maintain performance within specified tolerances over normal range of atmospheric pressures

Figure 3 – Comparison of Weight Variations on each Postal Scale



(219)

(219)

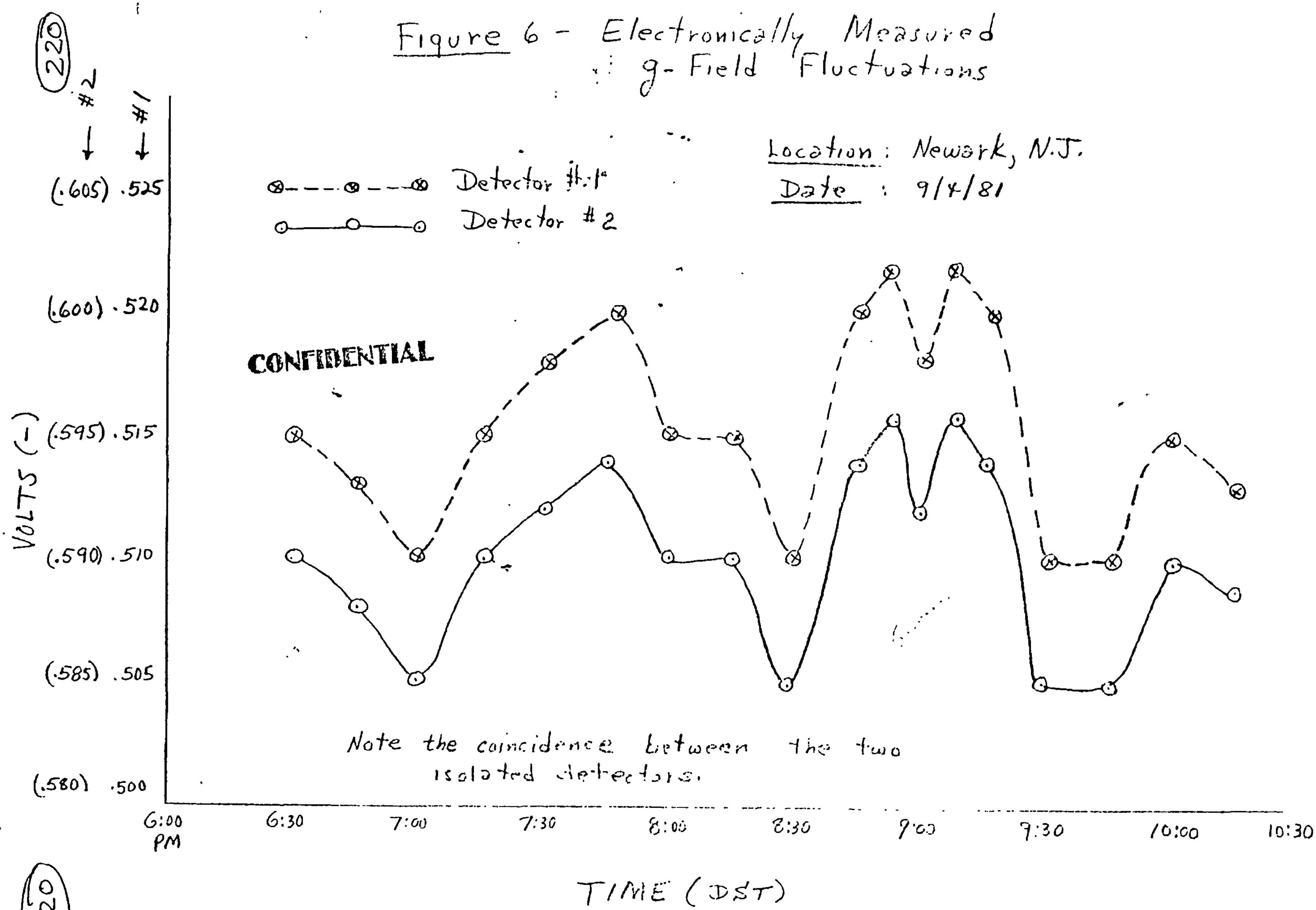
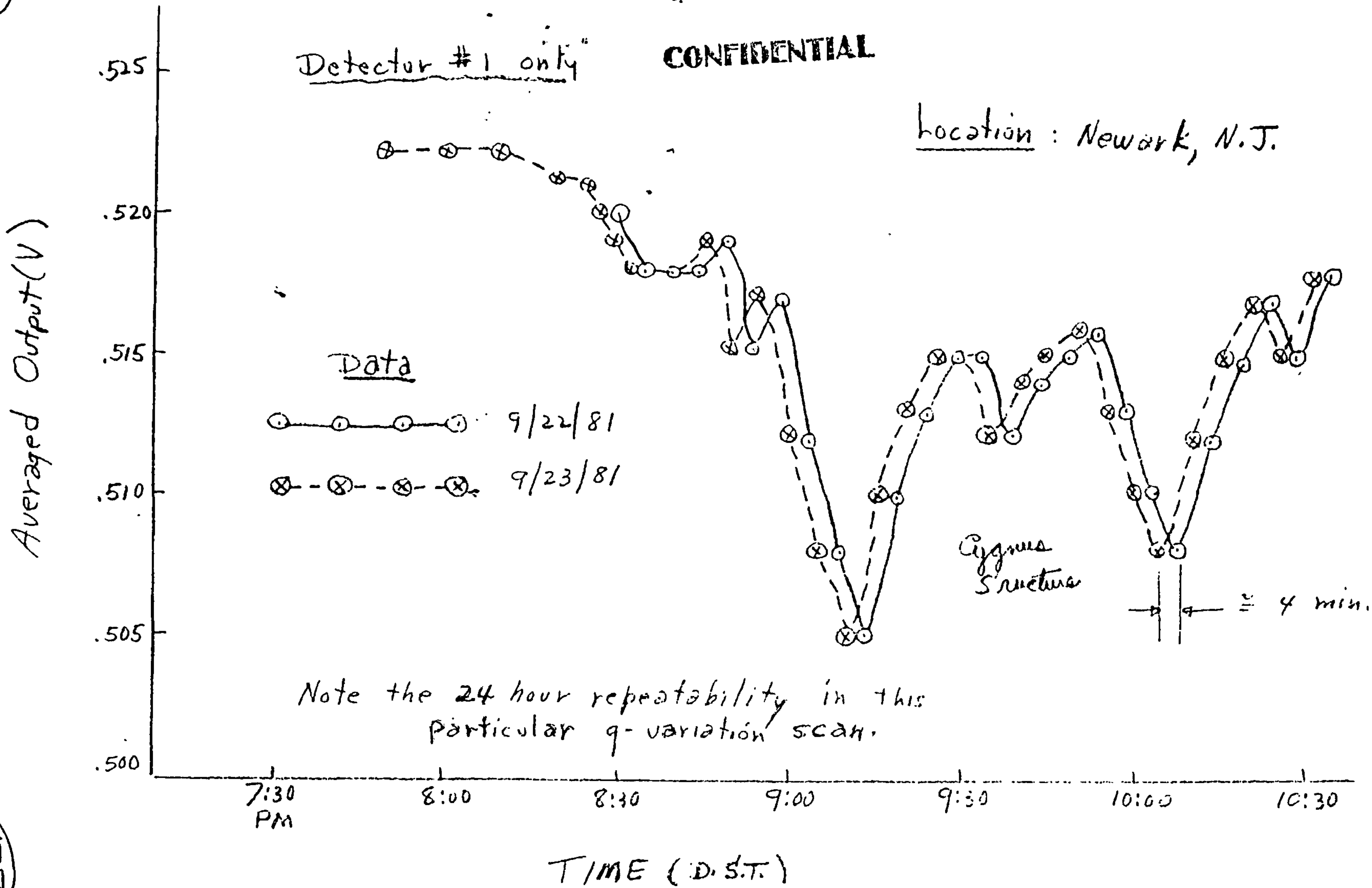


Figure 6 - Electronically Measured g-Field Fluctuations
Location: Newark, N.J.
Date: 9/4/81
Detector #1
Detector #2
#2
#1
(.605) .525
(.600) .520
(.595) .515
(.590) .510
(.585) .505
(.580) .500
VOLTS (-)
CONFIDENTIAL
Note the coincidence between the two isolated detectors.
6:00 PM
6:30
7:00
7:30
8:00
8:30
9:00
9:30
10:00
10:30
TIME (DST)

Figure 7 — Electronically Measured q-Field Variations



222

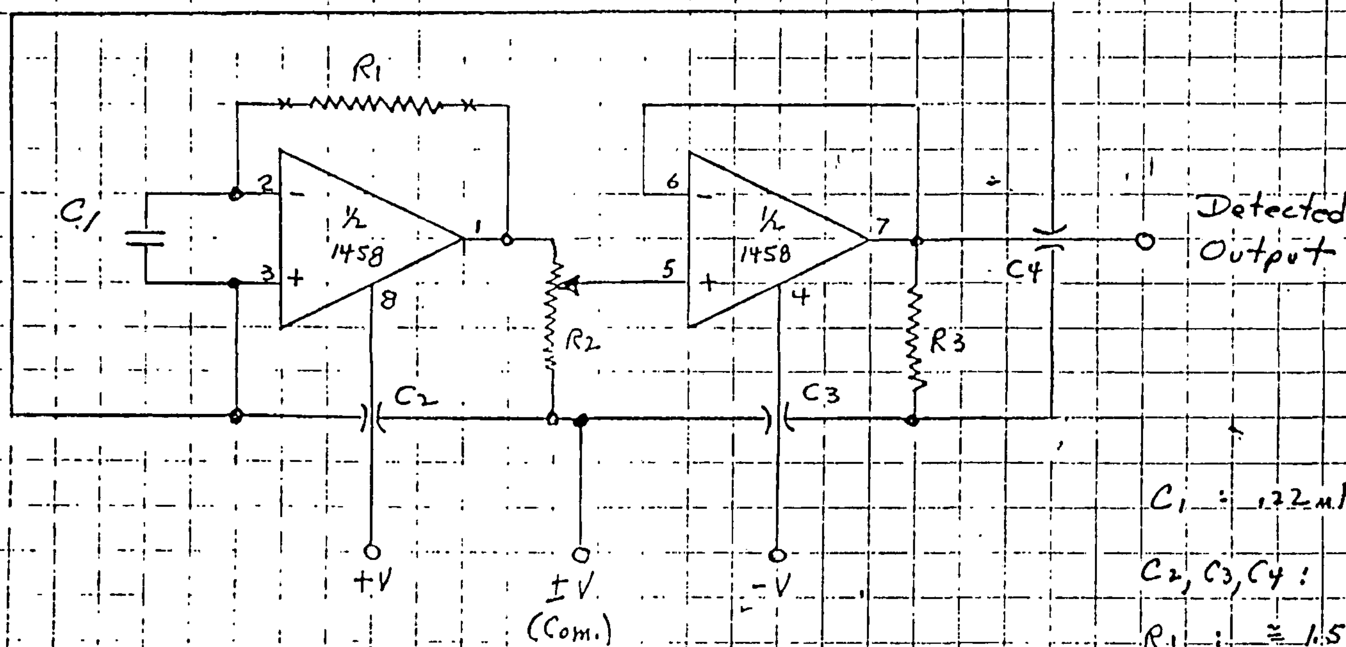
3/15/83 (gh)

Basic Gravitational Impulse Detector

(For use with Scale Systems)

NOTE: THIS IS THE CIRCUIT PROPOSED FOR THE (SCALE) SYSTEMS. (BR)

CONFIDENTIAL



C_1 : .22 mF @ 50V

C_2, C_3, C_4 : 5000 pF Filtercon

R_1 : ≅ 1.5 M

R_2 : 10 K trimpot

R_3 : 5 K

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Notes: ① Circuit must be completely shielded from electromagnetic fields, including bias and output ports.

② Circuit is readily adaptable to single supply voltage.

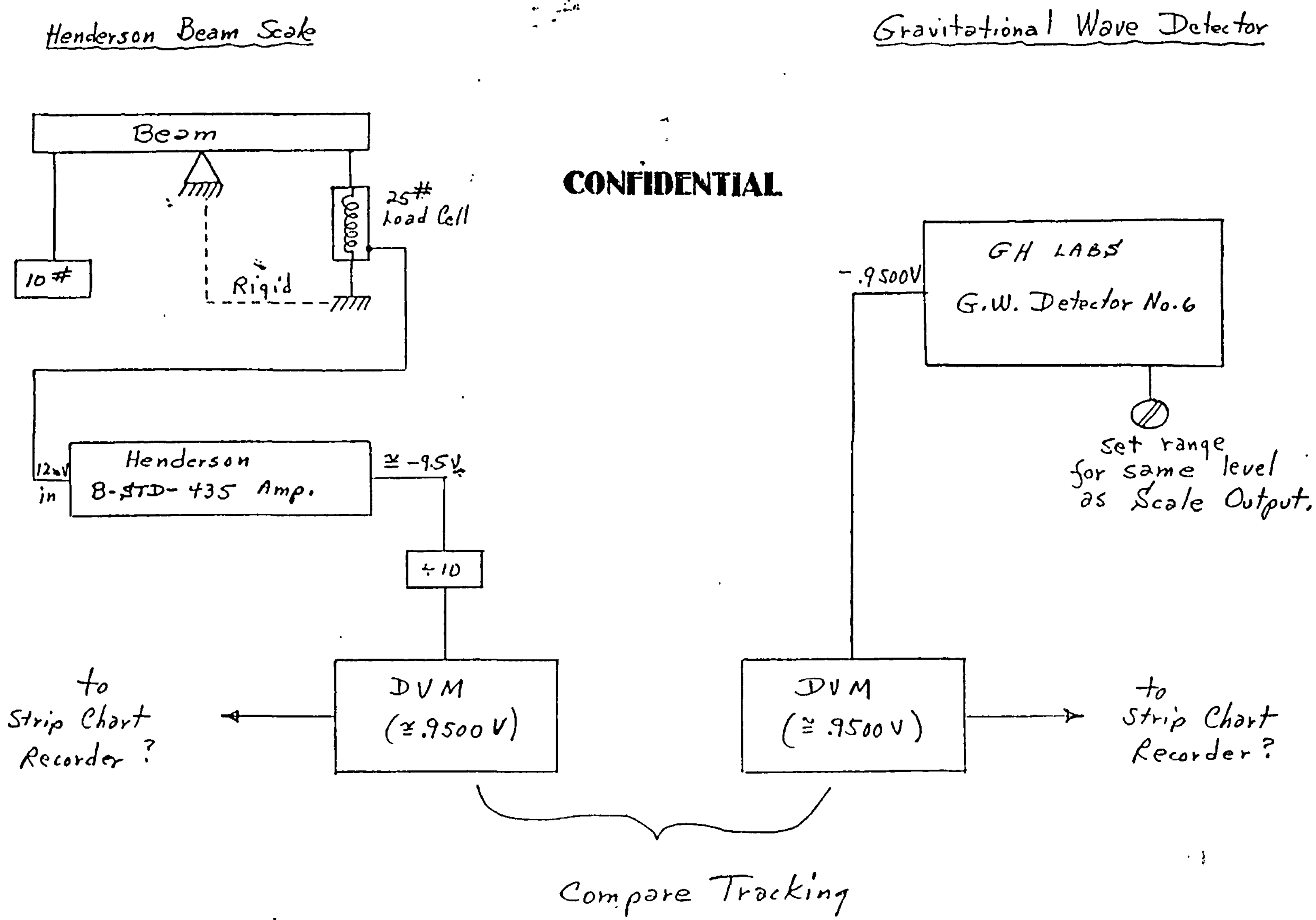
223

3/24/83

Scale Accuracy: Final Tests

NOTE! THIS TEST WAS PROPOSED (gh)
FOR THE DOUBTING THOMASES
AT PLANT, SOME E.E.S AND M.E.S.
(WHO REMAINED UNCONVINCED).
ONE OLDER M.E. WAS CONVINCED (BR)

CONFIDENTIAL

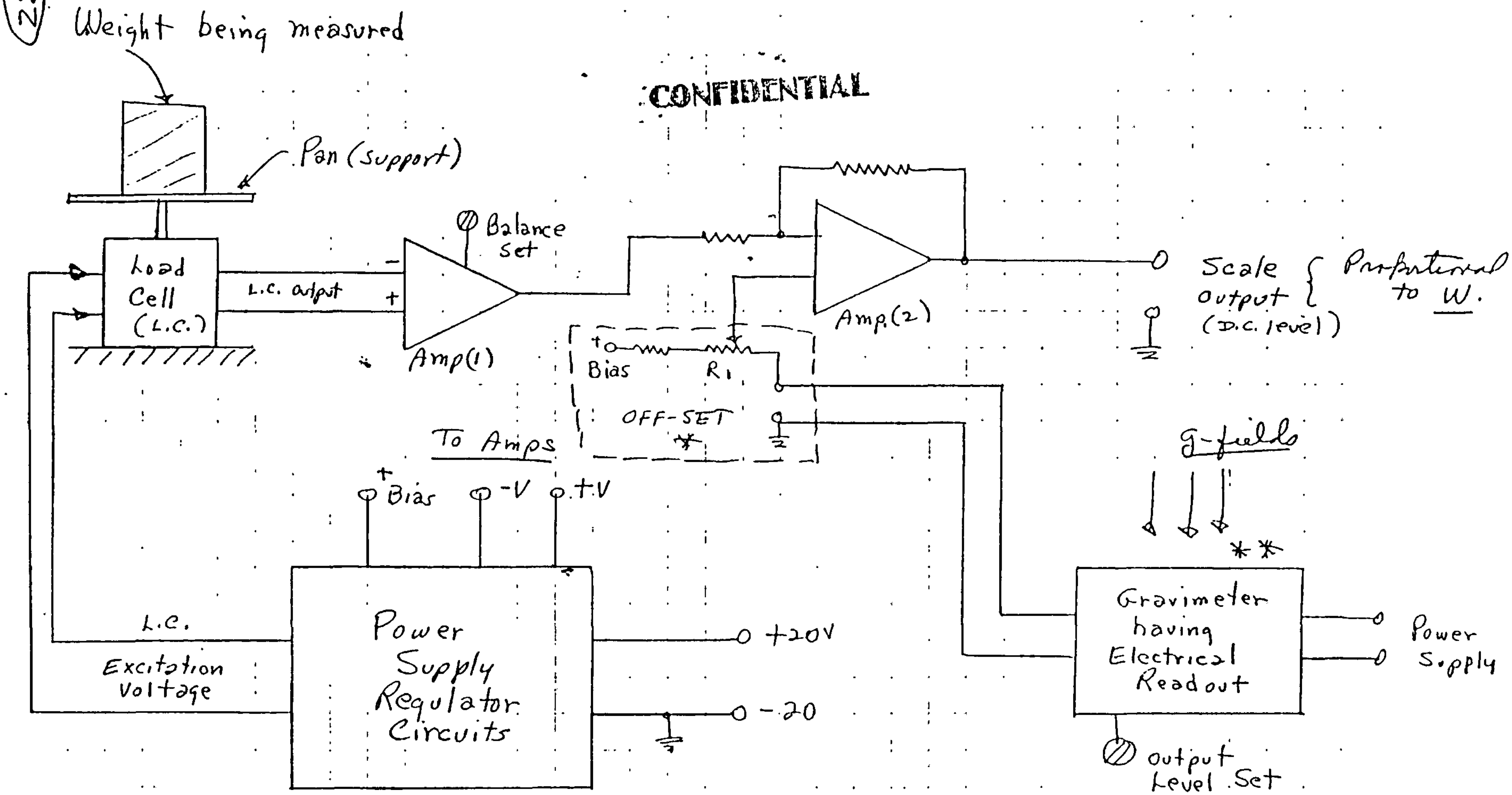


223

g-fields

Typical Scale System Adapted to Automatic g-field variation control (Block Diagram)

2/27/84



* Typical OFF-set system used
(1) To control zero
(2) To adjust for pan variations

** See attached: Gravimeter will generate a compensating signal which is fed back to amplifier to compensate for fluctuations in g-field effecting measurement of W.

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GRAVITATIONAL SIGNAL ASTRONOMY

G. Hodowanec

GREGORY HODOWANEC
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NEWARK, NJ 07106

Introduction

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The author has developed a new cosmology (1) which predicted the existence of monopolar-type (longitudinal) gravitational signals which were detectable with simple scalar field detection systems. Some of these systems have been previously reported in the literature (2, 3, 4), while other unpublished works on these topics are available from an Archives House (5).

This article describes a simple version of an electronic type of scalar signal detector which has proven itself over the years as a very sensitive gravimeter device. Of interest to the experimenter-scientist is that the averaged value of the earth's gravity field at the observer's longitudinal location will also include 'structure' or variations in this averaged field. These variations are believed to be due to various active cosmic effects such as novae, supernovae, star quakes, coupled rotating large masses, etc., as well as such passive effects as 'gravitational shadows' which are created by the presence of very dense masses, eg., galaxies, black holes, etc., which may also lie in line with the observer's longitudinal position on earth. Some detected signal responses are briefly described in a later section. Many signals are of unknown origin at present.

Circuitry

The circuitry used by the author in the unit and tests as described here is shown in Figure (1). It is essentially a standard GW signal detector design but it has been optimized to some extent for observations of our own Milky Way galaxy region. The detector section is of the quantum-non-demolition (QND) type in that it will respond to aperiodic events in the cosmos with faithful response to the amplitudes of such events. However, since the 'natural resonant' frequency of the input section is much less than 1 Hertz, the response of the unit will be largely to 1/f noise signals and thus to low frequency output level variations. Filtering of the output response is used to develop a 'waveshape' for the cosmic event. The higher the cut-off frequency of this filter, the more distant is the detected event. This unit was fabricated with an internal low pass filter having a cut-off frequency of about 21 Hertz which is quite effective in emphasizing the responses developed in our own Milky Way galaxy. These 'responses' can be displayed on the built-in meter unit or recorded on a strip chart recorder unit. The amplifier stage of the unit which has a gain of about 100X has also been designed as a low pass filter with a cut-off frequency of about 400 Hertz to further emphasize only the responses from our own galaxy regions. The gain control and a variable meter sensitivity control may be used to optimize the overall system response. For example, if the experimenter desired to 'look' at some events at low gain levels, the meter sensitivity can be increased, ie., the range is reduced, to maintain an adequate display on the meter, or record on the strip chart. At the higher gain levels it may be necessary to reduce the meter sensitivity, ie., increase the meter range, to keep the responses on the meter or the strip chart recording. An output jack for the external meter or chart recorder unit and an on-off switch for the unit are also provided for. All parts are available from Radio Shack or your local parts supply house. A suitable output meter is obtainable from Radio Shack: use the 15 volt meter (1 mA movement) with the internal range resistor shorted out. The sensitivity ~~switch~~ control can be marked for 1.5, 3.0, and 4.5 V.

Experimental Results

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With the proper adjustment of the gain and sensitivity controls of this unit, much 'structure' will be seen superimposed upon the averaged gravity fields of the earth. Although this structure is displayed on the built-in meter, it is best seen recorded on the strip chart with a paper speed of about 3 inches per minute. Figure (2) shows just a few of the many signals which will appear at the output of this simple detection unit.

Shown in Figure (2a) is what may be the 'imprint' of a typical nova event. Such novae occur quite often so that the experimenter should have little trouble in 'catching' such an event.

Shown in Figure (2b) is the more rare supernova event. Such events when 'caught' by the detector appear to have three characteristics: the actual collapse of the star to a neutron star or black hole as seen at a , the 'blast' of the outer envelope of the star as seen at b , and the start of the formation of a shock ring structure as seen at c . If a major supernova event is followed for a few days (4 minutes earlier each day) the experimenter may be lucky to note the development of a well-developed black hole and ring structure as shown in Figure (2c). Some older supernovae may retain the black hole but lose the ring structure as shown in Figure (2d).

Shown in Figure (3) is an actual plot of our own Galaxy Center as recorded on 11/19/88 with this unit. The strip chart recorder unit is a D'Asonval meter type and thus the recorded traces are a bit slanted in this scan. This is the new Galaxy Center response (as developed after an explosive event noted at the center on 12/6 of 1986)! Developed at about the same time was a more 'local' supernova event (believed to possibly have been the star Betelguese in Orion?). Here the two events are almost on the same meridian and thus overlap, but the Galaxy Center is in the zenith region while Betelguese is under the earth. The two events can be seperated more with an observation about 12 hours earlier or later, where the two events would show up as well-defined black holes and ring structures. It is believed that these two events are largely responsible for our strange weather patterns seen since December 1986!

Conclusions

Only a very brief indication of the potential of gravitational signal astronomy is given in this article. Amateur radio astronomers should be able to use gravity signals in partial confirmation of some of their observations. However, it must be remembered that gravitational signals are essentially instantaneous signals! A word of caution here: While gravity signals prior to 12/6/86 confirmed in a large measure structure which was quite similar to that observed by radio and infra red observations (at the Galaxy Center), that structure no longer exists there since 12/6/86! The radio and infra red observers will have to wait better than 22,000 years to note that there was a super explosion at the Galaxy Center! The Betelguese event, if true, will become apparent to radio observers in about 300 years, however. This is due to the finite speed of light. Also, suspected black holes in the Cygnus and Geminga regions have been confirmed with this unit. One colleague informed me that he had collected much data on the Cygnus black hole in recent years.

Exploration with this gravitational 'window' is yet wide open. Serious electronic experimenters and amateur scientists can help to blaze the path. The sceptical professionals will have no recourse but to follow later. Good luck with your experiments!

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References

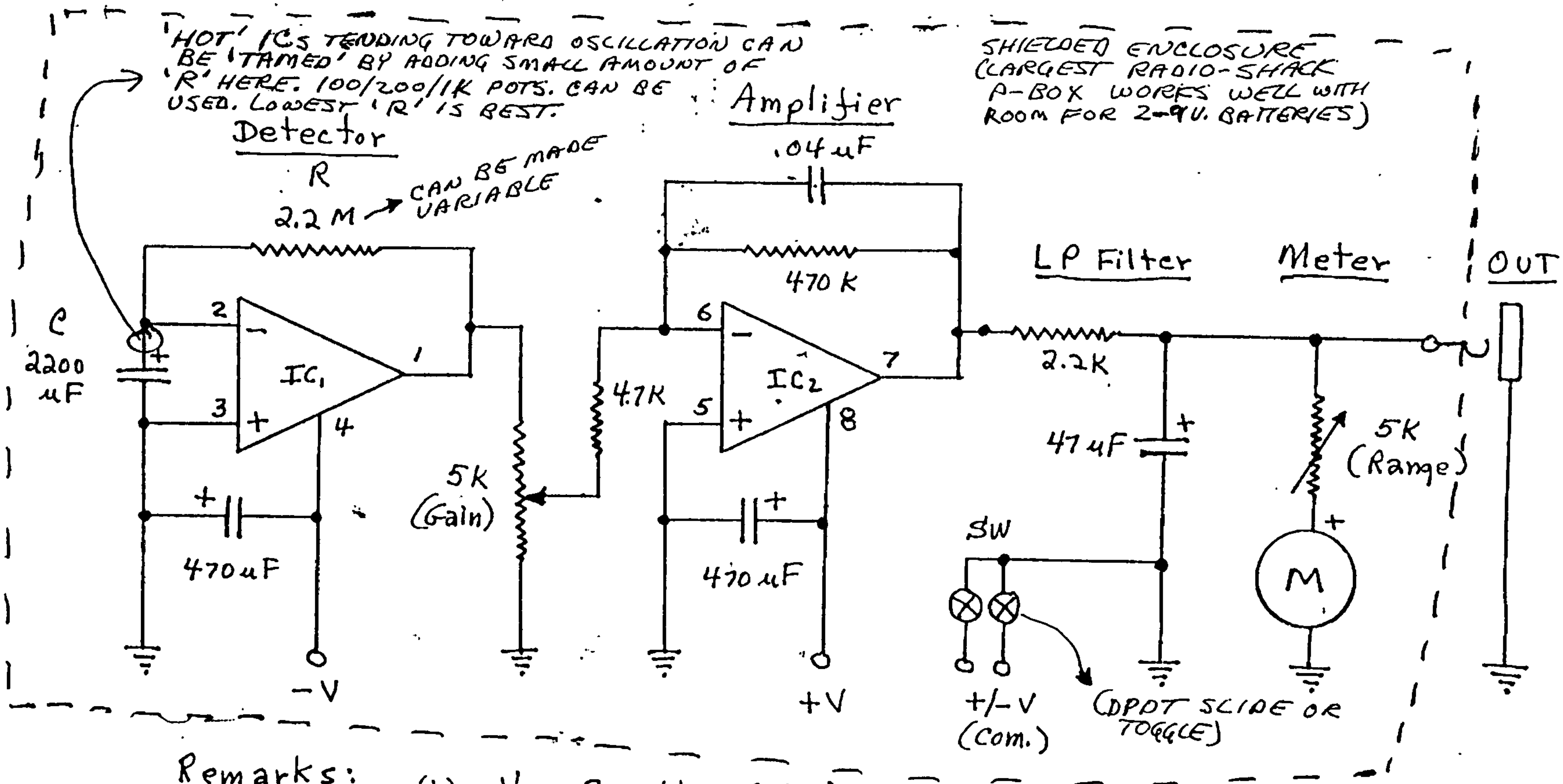
(1) G. Hodowanec, Rhysmonic Cosmology, August 1985. (-available from Rex Research)

(2) G. Hodowanec, "Simple Gravimeter Detects Gravity 'Shadow' Signals", TESLA '86, March-April 1986.

(3) G. Hodowanec, "All About Gravitational Waves??", RADIO-ELECTRONICS, April 1986.

(4) G. Hodowanec, "All About Gravitational Impulses", RADIO-ELECTRONICS, Electronics Experimenters Handbook, January 1989.

(5) G. Hodowanec Unpublished Works, Available from Rex Research P.O. Box 19250, Jean, NV, 89019.



Remarks:

(1) V = 9 volts (X 2)

(2) M = 1 mA meter movement (METER CAN BE OMITTED FOR JUST RECORDER USE)

(3) All resistors are 1/4 W, 5% carbon. (1/4-1/8W FILM OK)

(4) Electrolytic capacitors are 10-25 W.V. units.

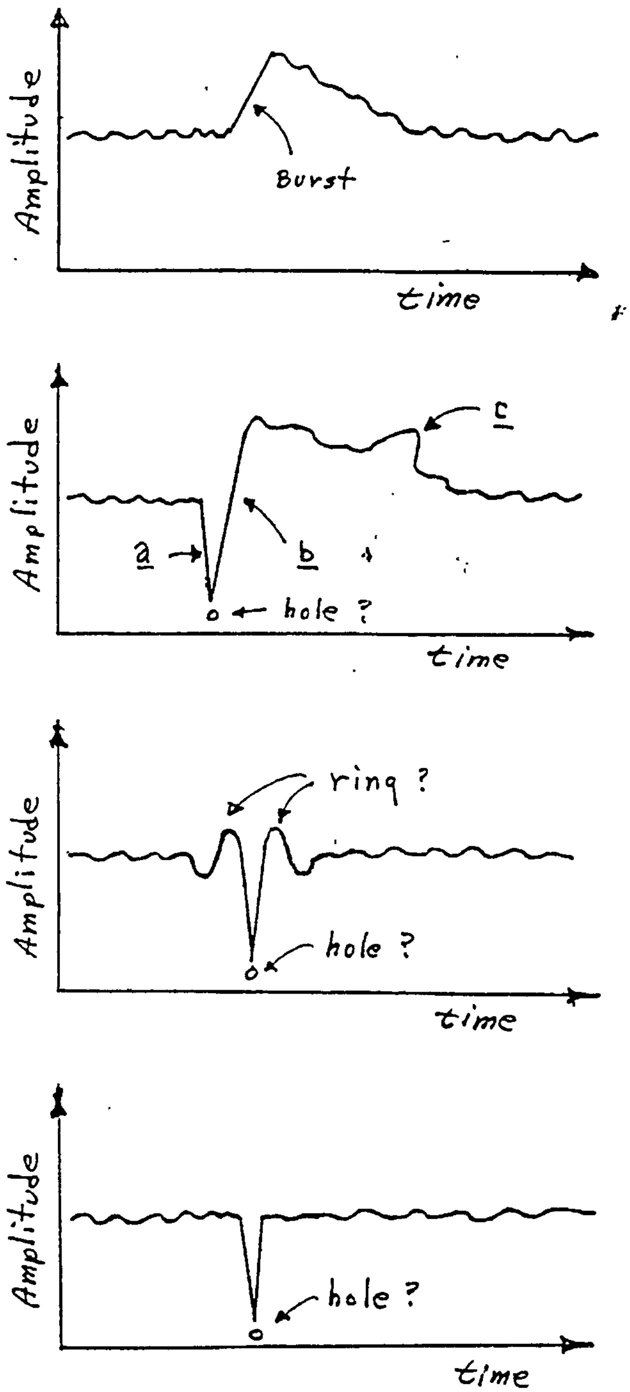
(*) (5) IC1, IC2 = 1458 bipolar device. (ALSO TL082, LF353, ETC.)

NOTES ADDED BY BILL RAMSAY (FROM EXPERIENCE)

NOTE: USE AXIAL CAP. FOR 'C' MOUNTED FLAT ON BOARD. KEEP LEADS SHORT. USE GOOD 'POINT TO POINT' TECHNIQUES.

Figure (1) : Schematic circuit of the detector unit.

(*) USE 8 PIN IC SOCKET SO THAT VARIOUS OTHER ICs CAN BE TRIED.



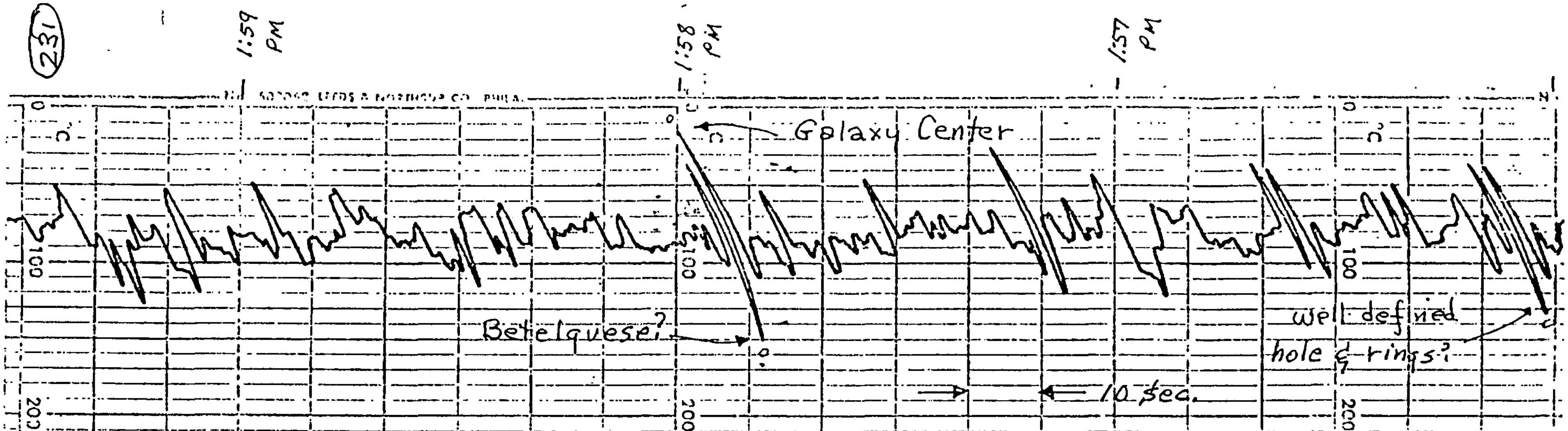
(a) Nova ?

(b) Supernova ?

(c) Black hole and ring structure ?

(d) Old black hole ?

Figure (2) - Some detected responses



Remarks:

① Low gain used (Filter ≅ 21 Hz)

② EST time used.

③ Chart speed = 3"/min.

④ Full scale ≅ 1.4 volts.

⑤ Location : Newark, N.J.

⑥ Date : 11/19/88

⑦ Since the detector responds to all meridian signals some distortion of signals may be present!

⑧ Note : Galaxy Center was in my zenith for this scan!

Figure (3) - Typical low-level scan of Galaxy Center.

IS THE UNIVERSE REALLY EXPANDING?

(232)

ABSTRACT

Greg Hodowanec

(232)

The expansion of the universe has been invoked from the 'Big Bang' theory of the creation of the universe and as the only logical explanation for the redshifts observed in the spectra from distant galaxies. The author, however, utilizing a 'new' cosmology developed by him, shows that redshifts are but a necessary consequence of the process of EM wave propagation and that the universe must be finite and spherical. Therefore, the universe is <u>not</u> really expanding!

Introduction

233 The vastness of our universe was not realized until about 1919 when a study of novae in so-called 'spiral nebulae' were found to be, on the average, at least one hundred times further away as those which appeared at times in our own galaxy. Therefore, these objects were found to be 'extra-galactic', and the universe received an enormous extension in space. Determination of a velocity of approach or recession for these extra-galactic nebulae, ie., galaxies, indicated that practically <u>all</u> galaxies were <u>receding</u> from us. This was culminated, in 1929, by the announcement by E. P. Hubble, that the velocity of recession was proportional to the galaxy distance, eg., galaxies at a distance of d million light years, have velocities of about 100d miles per second. Present day cosmologists postulate an expansion for the universe primarily because of the Hubble relation. This enabled an explanation for the 'redshifts' in the spectra of distant galaxies in terms of a Doppler Shift effect (which would be proportional to the velocity of recession). No other 'effect' was known which would explain this without further ad hoc assumptions.

Hubble Constant

In general, the velocity of recession of a galaxy at a distance d, is given by:

$$v = H_o d ,$$

where H_o is a constant of proportionality called the Hubble Constant. Since this factor is determined from experimental observations and certain assumptions, ~~it~~ is uncertain and thus has changed value many times over the years. The constant has a value ranging from about 50 to 100 km/sec per megaparcec. The presently accepted value is 55, but recent work indicates 75 may be more correct. The current value of 55 will be used in the following illustrations for this constant. Therefore, the present day calculated Hubble factor is:

$$H_o \cong 5.9 \times 10^{-29} \text{ per centimeter of light travel time.}$$

Since light (in vacumn) travels at 2.977×10^{10} cm/sec, it will have a travel time, t_o, of 3.36×10^{-11} sec for the one centimeter length. Therefore, this equation can be re-expressed as follows:

$$v = H_o d = H_o/t_o \times d = H_t d, \text{ where } H_t \text{ is now}$$

$$H_t = H_o/t_o \cong \frac{5.9 \times 10^{-29}}{3.36 \times 10^{-11} \text{ sec}} \simeq 1.76 \times 10^{-18} \text{ sec}^{-1}.$$

Thus, for a galaxy at a distance, d, say one million light years, which is 10^6 L.Y. $\times 9.46 \times 10^{17}$ cm/L.Y. or 9.46×10^{23} cm away, the velocity is:

$$v = H_t d = \frac{1.76 \times 10^{-18}}{\text{sec}} \times 9.46 \times 10^{23} \text{ cm}$$

$$= 1.67 \times 10^6 \text{ cm/sec or } 10.4 \text{ miles/sec.}$$

Therefore, the original Hubble factor was about ten times too high! The present Hubble factor may be a factor of 2 or 3 too low now?

However, the author has developed a 'new' cosmology in which an alternate explanation is given for the observed redshift in the spectra of distant galaxies.[1] This cosmology enabled a new approach to the basis of electromagnetic wave propagation.[2] In essence, it restores an up-dated version of an 'aether' as the constituent of the vacumn. A substratum particle which he termed a rhysmon, after another early Greek term for the atom, forms the very fabric of the universe and is the basis of this rhysmonic cosmology. Some concepts, essential to any discussion of the EM wave propagation process, will be briefly presented here. Further details will be found in the references cited above.

Basic Rhysmonics

The substratum, or the new aether of the vacumn, is a storehouse of potential energy provided by the extremely small spherical objects called the rhysmons. The rhysmons are contained within individual 'orbits' and have energy equal to one Planck Constant quantum of action, h. Individual rhysmons intertwine with other rhysmons in a matrix structure structure as shown in Figure (1). In this planar view it is seen that interweaving results in short directed rhysmonic vectors which now have energies of $h/2\pi$, or $\hbar$ quantum of action. From this construction, one can define some additional parameters based upon Planck's Constant and his system of Natural Units.[3] These are given in Appendix I for reference. The complete matrix structure is shown in three-dimensional form in Figure (2). This basic cell is reminiscent of R. Buckminster Fuller's vector equilibrium[4] in that all directed energy vectors in the pure rhysmoid, ie., the undisturbed vacumn, cancel their energies and thus display no effects or phenomena which can be observable. The basic cell structures interlock with other cells to form the vacumn of the universe. This interlocking is depicted for an extended planar view in Figure (3). Maximum use of energy content requires that the three-dimensional universe be in spherical form. Shown in Figure (3) are the directed vectors as given in a single instant of time as given by the Planck Time, T*. In the next instant of time, T*, all the vectors reverse direction, and then restore to the original direction in time, T*, later. Thus the universe is like a movie, in which each frame in the cinema of existence lasts for only Planck Time, T*. As seen in Figure (3), directed vectors join head-to-tail to form an 'instantaneous' vector which can span the universe. The instantaneous vectors are especially significant in the rhysmonic explanation of the nature of gravitation. However, the interaction of these vectors in the process of EM wave propagation must be discussed briefly here as they are essential to a discussion of the redshift mechanism. This simple interpretation of the structure of the universe forms the basis of rhysmonics.

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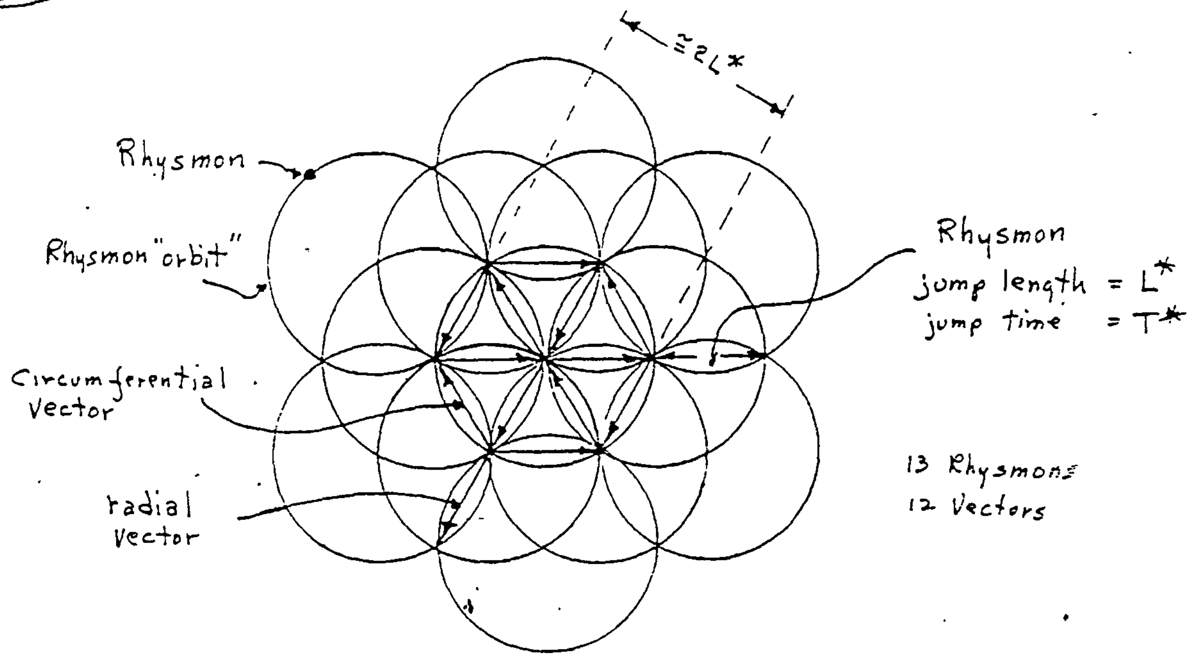


Figure (1) - Complete planar view of balanced forces of vectors in basic cell of matrix structure.

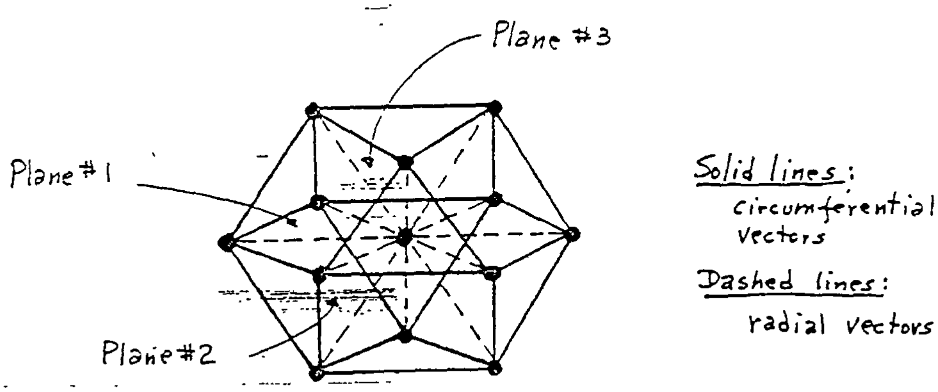


Figure (2) - Three dimensional view of vector equilibrium of basic cell of matrix structure.

Electromagnetic Wave Propagation

237 As is shown in the planar view of the circumferential vectors of the basic cell of the matrix structure of Figure (1), the closest approach of any two adjacent parallel directed vectors is approximately two times the Planck Length, or 2L*, which is equal to about 3.2×10^{-33} cm. Since the magnetic component in electromagnetic wave propagation is at right angles to the direction of the propagation and since curl or a rotational vector geometry is involved, magnetic field reversal cannot take place closer than this closest approach of parallel vectors, or 2L*. It can be shown that a similar requirement is needed for the electric field (curl) vectors, (See References). Therefore, for each magnetic field (or electric field) reversal, ie., for each half wavelength of electromagnetic wave propagation, the wavelength must increase by this increment of 2L*, or 4L* for the entire wavelength. Since this increment is independant of the wavelength of the EM wave, it is a linear factor, and thus also the 'Hubble' factor, but it is not treated as a velocity factor. Therefore, rhysmonics provides a solution to the redshift problem without the need for postulating an expanding universe.

Determination of L* from Astronomy

The incremental factor of 4L* can be determined from astronomical data, confirming in part this explanation for the redshifts in distant optical spectra. Shown in Figure (4) is a simple sketch depicting the magnetic component in EM wave propagation and it is shown in cross-section with the direction of propagation noted. The electric field component is directed into the paper at (+) and out of the paper at (-). Since the magnetic field lines are made up of closed loops of rhysmonic vectors (see references), at the closest approach the increment, $\triangle$, is approximately 2L* as was indicated in the previous section. Note that this increment is the basic cell

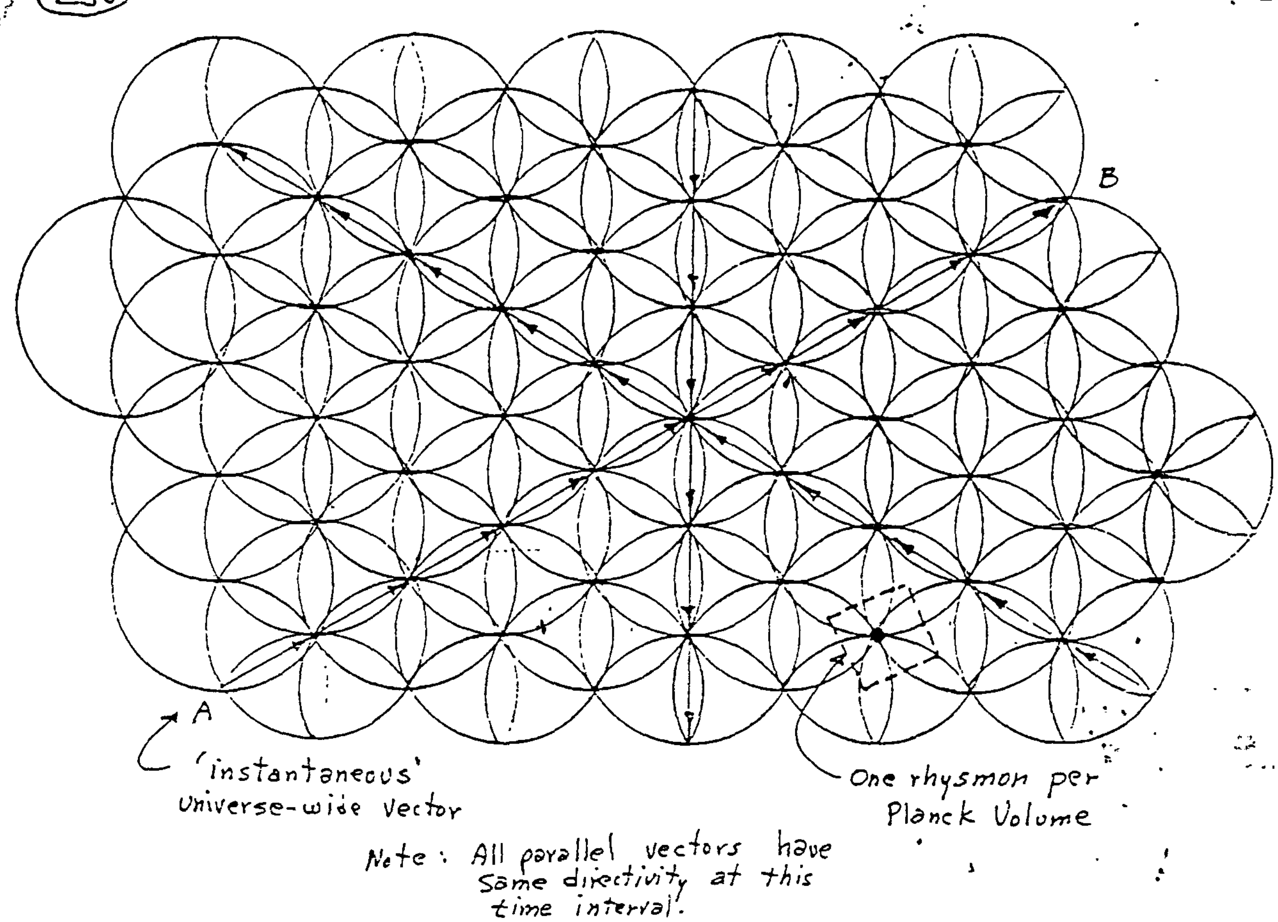
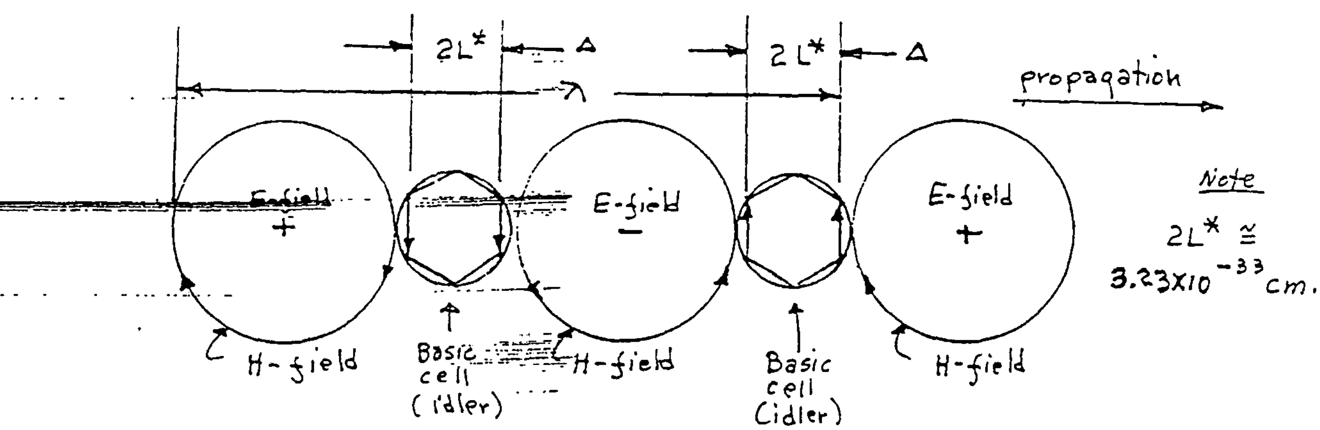


Figure (3) - Extended planar view of basic cell of matrix structure.



Clarification of rhysmonic 'idler' concept.

Figure (4) - Vector depictions for EM wave propagation.

of the matrix structure of the vacumn and may, in a broad sense, be considered as the 'idler wheel' in Maxwell's mechanical model for EM wave radiation.

The relation of the rhysmonic model to astronomical data can be made as follows: The best overall estimate of the radius of the visible universe, R_o, from various determinations, is about:

$$R_o \cong 1.2 \times 10^{10} \text{ L.Y. or } 1.14 \times 10^{28} \text{ cm.}$$

Redshift of EM wavelengths from the far gamma ray regions ($\cong 10^{-13}$ cm) to the deep red region ($\cong 7.5 \times 10^{-5}$ cm) would be an incremental change ($\Delta\lambda$) in wavelength in the order of 7.5×10^{-5} cm. Therefore, the number of incremental steps needed for light in the universe to go 'dark' in R_o, the radius of the visible universe is:

$$\frac{1.14 \times 10^{28} \text{ cm } (R_o)}{7.5 \times 10^{-5} \text{ cm } (\Delta\lambda)} \cong 1.52 \times 10^{32} \text{ increments.}$$

From this, we have a new 'Hubble' factor of:

$$H^* \cong (1.52 \times 10^{32})^{-1} \text{ or } 6.58 \times 10^{-33} \text{ per } \underline{\text{wavelength}} \text{ of}$$

light travel time. Compare this with the present Hubble factor of:

$$H_o \cong (1.7 \times 10^{28})^{-1} \text{ or } 5.9 \times 10^{-29} \text{ per } \underline{\text{centimeter}} \text{ of}$$

light travel time.

As was shown in Figure (4), 2L* was about 3.23×10^{-33} cm, and thus L* is about 1.61×10^{-33} cm. From the above astronomical determination, 4L* is about 6.58×10^{-33} cm and thus L* is about 1.64×10^{-33} cm, in close agreement with both the Planck and rhysmonic determination.

Conclusions

Rhysmonic cosmology predicted that electromagnetic wave propagation would require about a 2L* (double Planck Length) increase in wavelength with each half wavelength of EM wave propagation. For the full wavelength the increase would be in the order of 4L*, due to the nature of the propagation process in this theory. The process has been depicted in Figure (4) for the magnetic component only. Therefore, this mechanism results in increased wavelengths for EM waves as a function of the time (or length of path) of the propagation. Thus, the redshifts in the spectra of distant optical phenomena are part of this propagation process, and <u>not</u> the result of an expanding universe. 240

240 A rough calculation based upon the presently accepted radius of the <u>visible</u> universe agrees rather closely with the concepts of this theory. Therefore, a new 'Hubble' factor, H* , as determined by rhysmonic cosmology, is fundamentally more accurate, and thus may be used to calculate astronomical distances without the uncertainties of the present Hubble factor. The wavelength-distance relation is given simply by:

$$d \cong \Delta\lambda / H^* \cong z\lambda_0 / H^* ,$$

where the units are in centimeters.

To answer the title question: <u>No</u>, the universe is <u>not</u> expanding according to rhysmonic cosmology. Therefore, the universe may be an essentially static, finite, and spherical closed system with no need to postulate either an expansion or a 'Big Bang' creation process.

REFERENCES

(1) G. Hodowanec, Rhysmonic Cosmology, To Be Published, 1985.

(2) G. Hodowanec, "The Nature of Electromagnetic Wave Propagation", Unpublished Short Paper, April, 1985.

(3) Max Planck, The Theory of Heat Radiation, Dover, 1959.

(4) R. Buckminster Fuller and R. Marks, The Dymaxion World of BUCKMINSTER FULLER, Doubleday Anchor Book, 1973.

APPENDIX I

Planck Units (also rhysmonic units)

h = Planck's Constant = 6.624×10^{-27} erg-sec.

$\hbar$ = Planck's Reduced Constant = 1.054×10^{-27} erg-sec.

L* = Planck Length = 1.616×10^{-33} cm.

T* = Planck Time = 5.391×10^{-44} sec.

C* = Planck Velocity = L*/T* = C = 2.977×10^{10} cm/sec.

M* = Planck Mass = 2.177×10^{-5} gm.

Rhysmonic Units

E* = Rhysmonic Energy = 1.96×10^{16} ergs.

A* = Rhysmon Action = $\hbar$ above.

F* = Rhysmon Force = 1.21×10^{49} dynes.

Rhysmon radius = 1.62 $\times 10^{-66}$ cm.

Rhysmon volume = 1.78×10^{-197} cm^3.

Rhysmon number = 2.37×10^{98} rhysmons/cm^3.

EXPERIMENTS WITH GRAVITY 'WAVE' SIGNALS

G. Hodowanec

ABSTRACT

Present-day communications systems largely make use of vector type radiation fields, ie., electromagnetic waves, to convey information between distant points at the speed of light. Scalar type radiation fields, such as the gravitational field, however, might eventually be useful to convey information essentially 'instantly' according to the author's theories. With the development of very sensitive scalar type field detectors by the author, it is now possible to demonstrate some effects which appear to be attributable to such scalar fields. Several simple experiments which illustrate some of these points are described. These should provide a starting point for further experiments and investigations into these effects by the inquisitive experimenter and the open-minded private researcher.

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INTRODUCTION

A field in physics may be defined as a region in space which is under the influence of some 'effect', typically an electric, magnetic, or gravitational effect. A commonly observed effect is that of the electromagnetic field. This field consists of interlocking closed loops of electric and magnetic lines of flux, and thus are vector type fields, or as is sometimes referred to in electromagnetic theory, as whirlpool fields. Such fields must therefore be described in terms of vectors, since a magnitude and direction is necessary to fully describe such fields. The theory of electromagnetism has been highly developed along these lines and thus is now useful in many aspects of high technology.

Less understood is the theory of fields which are conservative in nature and thus can be described in terms of magnitude alone. Such fields are called scalar fields. A common example of such a field is temperature, even though the gradient of such a scalar field will be vectorial. The gravitational field is also a scalar field and the gradients in this field are also vectorial. Less well-known are the conservative or scalar aspects of electric and magnetic fields. A scalar electric field is realized when the field is generated by the application of a voltage between two parallel plates, ie., a typical parallel plate capacitor. An example of a 'curl-free' or scalar field (conservative) in magnetism is seen in the H-fields which emanate from the end of a bar magnet into the space just beyond it. Such a field is scalar for only a short distance, however.

Scalar fields of the electric, magnetic, and gravitational type have interesting properties compared to their vector field counterparts. For example, scalar fields easily penetrate ordinary

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matter, while the gradients of such fields can also interact with matter. The scalar fields emanating from the end of the bar magnet, for example, can easily penetrate a thick material mass, provided the mass is non-magnetic and thus cannot support induced fields which can counter the penetrating field components. Therefore, while these properties of scalar fields could provide a basis for a new communication system, proper methodology will have to be developed for the generation and detection of such signals before the system could become viable. Effort and progress in these aspects are being made.

BACKGROUND

A major step forward in the possibility of effecting scalar signal communications has been made with the development of very sensitive scalar field detectors by the author.[1] These detectors are presently being used in a wide range of applications by the author, including such facets as gravitational signal astronomy, gravity field measurements, 1/f noise cancellation, Hooke's Law type scale error-corrections, esoteric energy detection, and many other uses. Discussed in this brief article will be the potential for using scalar fields, eg., gravitational fields, in possible methods for communicating or signaling purposes.

SCALAR FIELD DETECTOR

The scalar field detector used by the author in the experiments described in this article is very simple and is shown in Figure (1). It is a 1/f noise type detector and uses a C-mos op-amp which operates with a +/- 1.5 volt supply. The unit is assembled in an aluminum box with self-contained batteries and the output is brought out with a filter type feedthru in order to eliminate possible response to RF type ambient signals.

Shown in Figure (2) is a simple audio amplifier which may be used with this detector. The readily available 386 IC has a gain of 200 times and provisions are made for headphone use also. Small telephone amplifiers or mini-amplifiers are commercially available which make suitable ready-built audio amplifiers. The author used a mini-amplifier available from Radio Shack (#277-1008) for these tests with good results. The headphone jack is desireable for headphone listening to the many scalar signal sounds generated naturally in the universe and/or by man. Headphone listening also facilitates the detection of some of the weaker scalar field effects to be noted in these experiments.

SCALAR FIELD GENERATION 245

245 Scalar fields of the gravitational type are generated profusely in the universe and are detectable with the simple circuit of Fig. (1). The unit will respond to the individual impulses of gravity gradients as a 'noise spectrum' which can be heard with the audio amplifier or displayed as 'grass' on an oscilloscope. Careful listening to the audio signal response will also reveal, not only 'noise', but also some coherent responses and 'musical' tones as well. These will be considered later.

Man-made scalar gravitational signals are largely due to oscillating masses or rotating asymmetric masses. A translation of mass will also generate 'signals' which are due to perturbations of an apparent standing-wave pattern in the universe's background radiation which is believed to have been created by the various violent processe in the universe.[2]

Local weak scalar signals of the 'pure' electric type or the 'curl-free' magnetic type may be generated with the circuits shown in Figure (3). These signals have been detected at about 75 feet, the maximum lab distance available. However, they are at about the same level as the background radiation and thus are sometimes diffi-

[illegible] of different pulse rates for these generators helps to properly identify the correct scalar signal. In general, low pulse rates must be used with these signals.

Scalar signals of the pure electric field type are generated mainly by charge impulses which are divorced from any accompanying magnetic components. The curl-free magnetic modes utilize parallel magnetic fields (H-fields) generated near the pole of a magnetic source field (in loose terms, a magnetic monopole). Scalar fields of the electric type can also be generated by special coil configurations in which the magnetic component (but not the electric components) is cancelled. These configurations are under consideration by the author.

EXPERIMENTAL TESTS

Listening to the sounds of scalar signals being detected by the detector of Figure (1) on headphones can be quite impressive. Adjust the amplifier sound level for best response to the particular sound being studied. Of particular interest are some of the 'musical' sounds which appear to come from the same points in our Galaxy on a daily basis. At the author's location of about 42° N. Latitude, these sounds seem to originate in the Perseus and Auriga regions of our Galaxy. Perhaps <u>some</u> of these signals might be extraterrestrial intelligence signals, thus those experimenters interested in SETI (Search for Extraterrestrial Intelligence) may want to investigate this aspect of this detector.

The detector is also extremely sensitive to modulations of the ambient gravitational field by local mass translations.[2] The so-called microwave background radiation (MBR) appears to have a standing-wave pattern structure in the universe which has a 'wavelength' of about .25 centimeter, corresponding to the 3° K black-body temperature for this radiation. The local translation of mass affects this structure

as a rather intense perturbation which appears as a strong 'rushing' sound in the detector audio output. The experimenter may best observe this effect by slowly waving his arm back and forth at about a 1-2 Hz rate so as to establish a strong 'resonance' effect and then stops 247
247 this movement at some peak swing. He will then note that this resonance effect will continue for many minutes, even hours, or until the coherent effect is destroyed by some other gravitational effect, such as your own beating heart, or by oscillating a mass, starting with large excursions which are then tapered down to a standstill. That these modulations are truly due to mass in motion, can be seen by oscillating a pendulum, or rolling a mass. These devices will disturb the vacuum, ie., the gravitational background, independently of any human action. This effect will drop off with the square of the distance as with all scalar signals. The author has detected the oscillation of a pendulum 150 feet away which appeared to have the same response in detected intensity as when the pendulum was only 5 feet away.* Therefore, such signals could have very extended ranges. There is one drawback, however. Scalar signals, once generated, tend to propagate continually until dissipated or over-ridden in some way. However, the perturbations can be encoded, eg., if a gravity signal is pulsed at some rate, the pulsed rate will be maintained. For example, if the 5 Hz LED scalar signal generator shown in Figure (3) is pulsed <u>on</u> every 5 seconds, the gravitational field will be excited with 5 Hz pulses every 5 seconds even if the original excitation has ceased. It appears that gravitational communications will probably require some sort of pulse-code modulation which can defeat the continuing propagation characteristics of the vacuum.

It is also interesting to note that it seems that maximum energy excitation takes place at about the 1-2 Hz rate. This appears to be a natural resonance frequency either as an earth resonance or as a universe resonance effect. Lightning stroke induced HV scalar signals also appear to be good source for these very low frequency excitations.[3] There is room for much research here.

PSYCHIC EFFECTS ?? (248)

(248) There are many sources for gravitational perturbation excitations at the local level. For example, a good 1-2 Hz resonance can be established by simply pressing the thumb and first finger together at this rate. When a good rate is established, cease the excitation with the fingers. The modulation will now continue at this same rate. Now <u>think</u> hard to slow down this rate: the rate will slow down!! Then think hard to increase the rate: the rate will increase!! Relax and the rate will return to the original excitation!! Are these psychic effects or are they a ~~contol~~ control of time? Or are they related to unconcious heart beats or muscle tensions as if nerve impulses are scalar in nature? I will leave it to the reader to perform the experiment and decide for himself. That these effects are apparently real is seen in that the experiment can be recorded on tape and stored.

CONCLUSIONS

A new area of scalar field research has been opened up due to the development of very sensitive scalar field detectors by the author. The brief notes on some experiments given here are but the tip of the iceberg. There is room for much research and development in this area. The author hopes that dedicated experimenters and open-minded private researchers will enter this new field and contribute to the 'new science' now being investigated by just a few 'pioneers' in a potentially promising vast new field of endeavors.

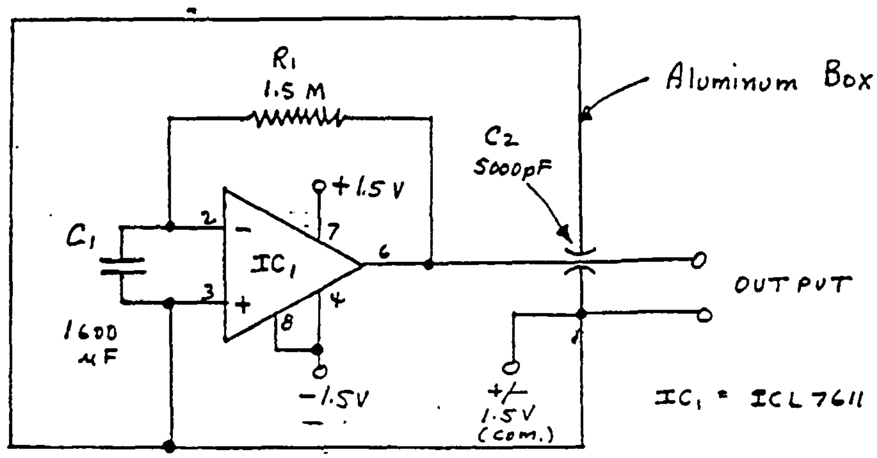

Figure (1) - Scalar Field Detector Used in the Author's Experiments.

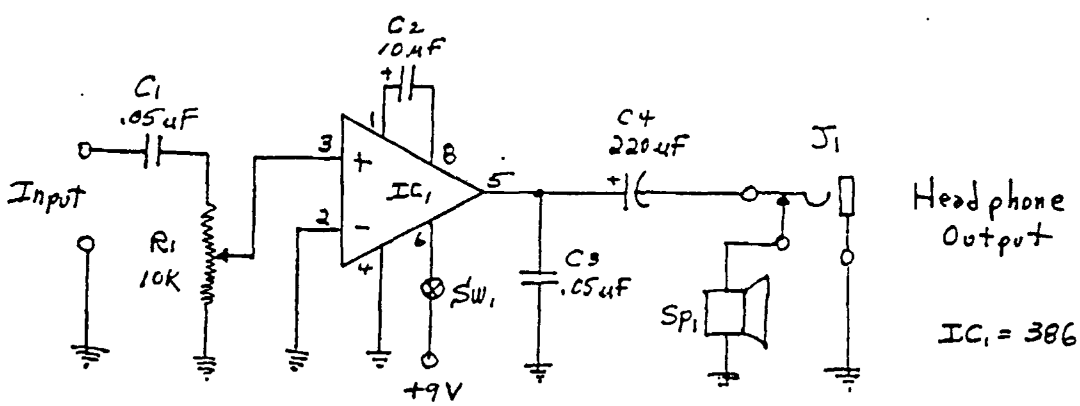

Figure (2) - Simple Audio Amplifier Useful With the Scalar Field Detector.

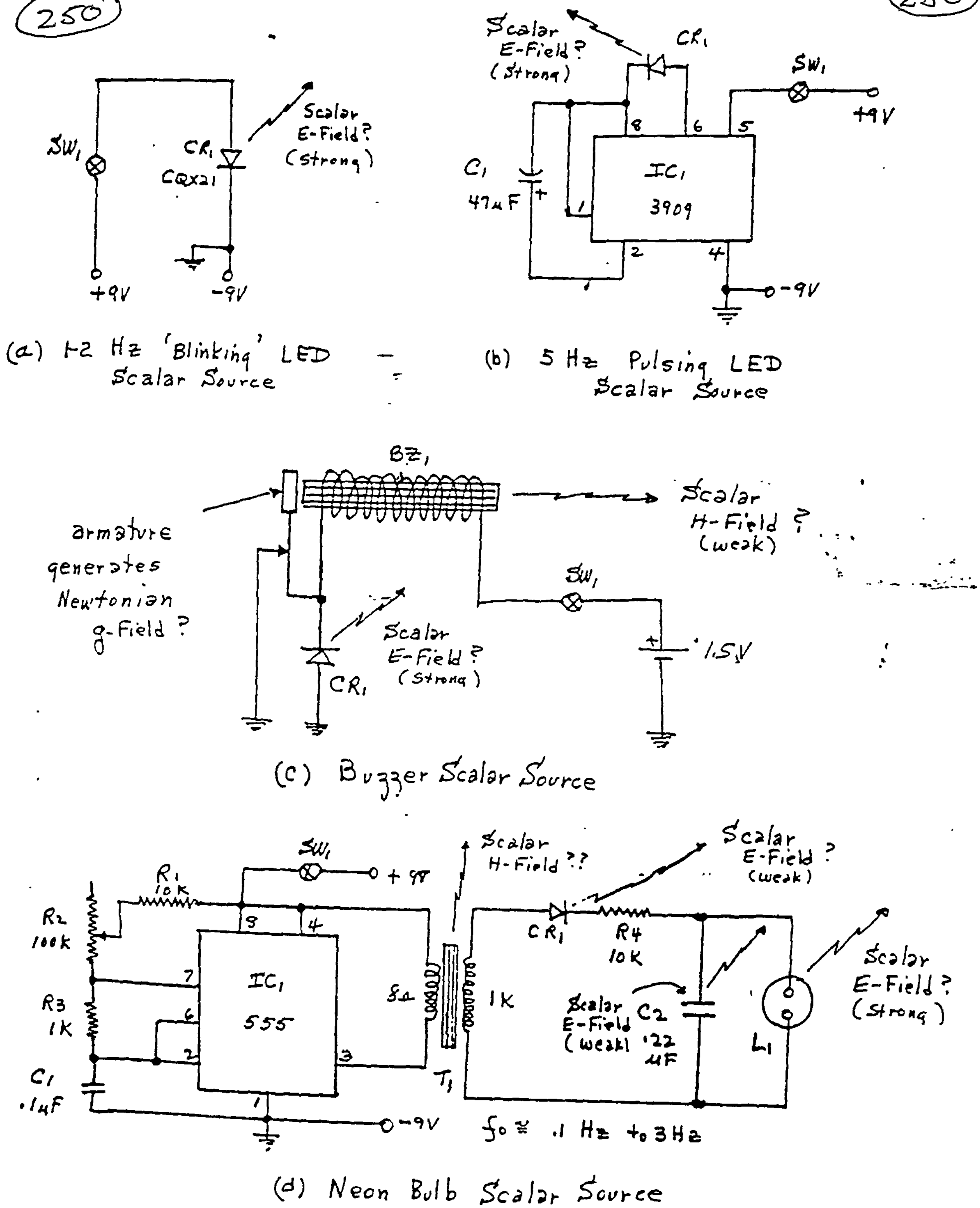

Figure (3) - Some Simple Circuits Which Give Indication of Being Scalar Sources. Note- all circuits are constructed in shielded boxes.

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Figure (1)

R_1 - 1.5 megohm, 1/4 w, resistor
C_1 - 1600 uF, 4 V, electrolytic capacitor
C_2 - 5000 pF, feedthru, filter type preferred
IC_1 - C-mos, ICL7611

Figure (2)

R_1 - 10k potentiometer
C_1,C_3 - .05 uF ceramic capacitor
C_2 - 10 uF, 10 v, electrolytic capacitor
C_4 - 220 uF, 15 V, electrolytic capacitor
SW_1 - SPST miniature switch
J_1 - miniature closed circuit jack
IC_1 - 386
Sp_1 - 8-16 ohm miniature speaker

Figure (3)

circuit a
CR1 - CQx21 blinking LED
SW_1 - SPST miniature switch

circuit b
C_1 - 47 uF, 15 V, electrolytic capacitor
CR_1 - high output LED
SW_1 - SPST miniature switch
IC_1 - 3909

circuit c
BZ_1 - small 3-6 V buzzer unit
CR_1 - 1000 V diode
SW_1 - SPST miniature switch

circuit d
R_1,R_4 - 10k, 1/4 w, resistor
R_2 - 100k potentiometer
R_3 - 1k, 1/4 w, resistor
C_1 - .1 uF, 50 V, capacitor
C_2 - .22 uF, 200 V, capacitor
SW_1 - SPST miniature switch
CR_1 - 1N914 type diode
T_1 - 1k to 8 ohm miniature transformer
L_1 - NE-2 neon bulb

REFERENCES

(1) G. Hodowanec, "Gravitational Waves???", RADIO-ELECTRONICS, April 1986.

(2) G. Hodowanec, Rhysmonic Cosmology, August 1985.

(3) G. Hodowanec, "Simple Detection of Tesla's Earth Resonances?", Unpublished, July 1986.

Possible Addendum to the 'Experiments' Artcle

--------------of the vacuum. The buzzer scalar source of the type shown in Figure 3(c) can apparently do this to some extent. The strong desired scalar signals from the diode CR_1 appear to be followed by a 'cancellation' pulse, either from the scalar H-field shown, the g-field generated by the armature, or possibly some remaining E-field pulse at the breaker points. These fields may act in such a way that desired 'buzzing' scalar signals are strongly transmitted, but they are not strongly repeated, ie., the repeating pulses appear to be way, way down in level. Therefore, it was possible to transmit low speed Morse Code signals by these means. While some brief tests were made at about a distance of about 200 feet, the range is probably much greater than that, even though a very low level (1.5 volt) buzzer source was used. Perhaps the early radio experimenters with their 'spark gap' induction coil transmitters were really using scalar 'waves' in addition to EM waves in their systems.

Note: This insert can probably be used at the end of the material on page 9 of the original draft.

This is Insert "B" Circuit

(253)

P6ssible Addendum to 'Gravity Experiments' Article

(253)

An interesting experiment can be performed with this pendulum, which is a two pound weight suspended from a six foot height with a light weight string. Set the pendulum in motion with about a five foot arc length. Adjust the detector volume for a good response to this swinging disturbance of the vacuum, ie., the universe. Now take the detector along in your car. Notice that the response remains about the same intensity even when the detector is inside the car. Now drive slowly to a distance of about one mile from the site of the pendulum. You will notice that the pendulum response will fall off with distance (probably at the $1/r^2$ rate) but will still be noticeable at the one mile distance. Now slowly return to the original site of the pendulum. As you return, you will notice that the response will continually increase in level and will have the original amplitude when you have returned to the site. However, most likely, the pendulum has stopped its oscillations by this time, but the disturbance in the universe remained! This effect appears to be typical of scalar signals or gravitational perturbations in this universe.

Note; This material could probably be inserted into experiments section on page 9 of the original draft of this article.

This is Insert "A" circuit

SOME PREVIOUSLY PUBLISHED MATERIAL
ALONG WITH SOME MANUSCRIPTS SOME
OF WHICH WERE PUBLISHED IN EDITED
FORMS

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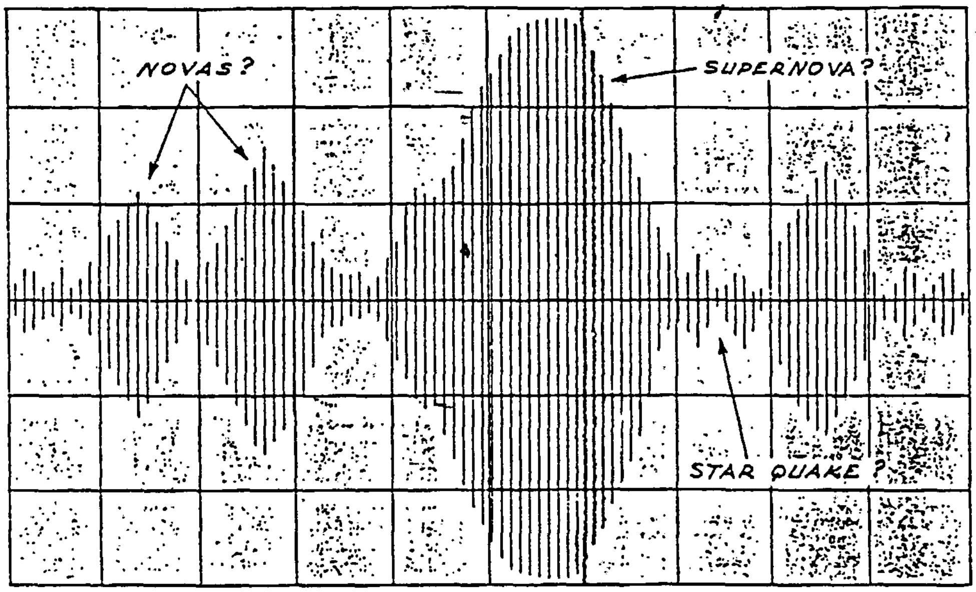
RADIO - ELECTRONICS

APRIL '86

ALL ABOUT Gravitational Waves???



Are gravitational waves the source of noise in electronic devices? The author believes so, and describes a simple circuit to detect the waves.

GREGORY HODOWANEC

EINSTEIN PREDICTED THE EXISTENCE OF gravity waves—the counterpart of light and radio waves—many years ago. However, he predicted the existence of quadrature-type gravity waves. Unfortunately, no one has been able to detect quadrature-type gravity waves.

Consequently, the author developed, over the years, a new cosmology, or theory of the universe, in which monopole gravity waves are predicted. The author's theory does not preclude the existence of Einsteinian gravity waves, but they are viewed as being extremely weak, very long in wavelength, and therefore very difficult to detect unequivocally. Monopole signals, however, are relatively strong, so they are much more easily detected.

Monopole gravity waves have been detected for many years; it's just that we're used to calling them 1/f "noise" signals or flicker noise. Those noise signals can be seen in low-frequency electronic circuits. More recently, such signals have been called *M*icrowave *B*ackground *R*adiation signals (MBR); most scientists believe that to be a relic of the so-called "big-bang" that created the universe.

In the author's cosmology, the universe is considered to be a finite, spherical, closed system; in other words, it is a black body. Monopole gravity waves "propagate" any distance in Planck time, which is about 10^{-44} seconds; hence, their effects appear everywhere almost instantaneously. The sum total of background flux in the universe gives rise to the observed microwave background temperature, in our universe, of about 3°K.

Sources of monopole gravity waves include commmon astrophysical phenomena like supernovas, novas, starquakes, etc., as well as earthly phenomena like earthquakes, core movements, etc. Those sorts of cosmic and earthly events cause detectable temporary variations in the amount of gravitational-impulse radiation present in the universe.

> The author has developed a new cosmology that predicts the existance of a new type of gravitational signal. We are publishing the results of some of his experiments that back up his theories in the hope that it will foster experimentation as well as alternate explanations for his results.

Novas, especially supernovas (which are large exploding stars), are very effective generators of oscillatory monopole gravity waves. Those signals have a Gaussian waveshape and a lifetime of only a few tens of milliseconds. They can readily impart a portion of their energy to free particles like molecules, atoms, and electrons.

The background flux, in general, is fairly constant. Variations in the background flux are caused by the movements of large mass concentrations like galaxies, supergalaxies, and black holes. Those movements create gravitational "shadows," analogous to optical shadows. When the Earth-moon-sun alignment is just right, the gravitational shadow of a small, highly concentrated mass—a black hole, for example—can be detected and tracked from the Earth. So, keeping those facts in mind, let's look at several practical methods of detecting gravitational energy.

Electrons and capacitors

As stated above, gravity-wave energy can be imparted to ordinary objects. Of special interest to us are the loosely-bound electrons in ordinary capacitors. Perhaps you have wondered how a discharged high-valued electrolytic capacitor (say 1000 µF at 35 volts) can develop a charge even though it is disconnected from an electrical circuit.

While some of that charging could be attributed to a chemical reaction in the capacitor, I believe that much of it is caused by gravity-wave impulses bathing the capacitor at all times. And the means by which gravity waves transfer energy is similar to another means of energy transfer that is well known to readers of Radio-Electronics: the electric field.

As shown in Fig. 1-*a*, the presence of a large mass near the plates of a capacitor causes a polarized alignment of the molecules in the capacitor, as though an external DC voltage had been applied to the capacitor, as shown in Fig. 1-*b*.

You can verify that yourself: Drop a

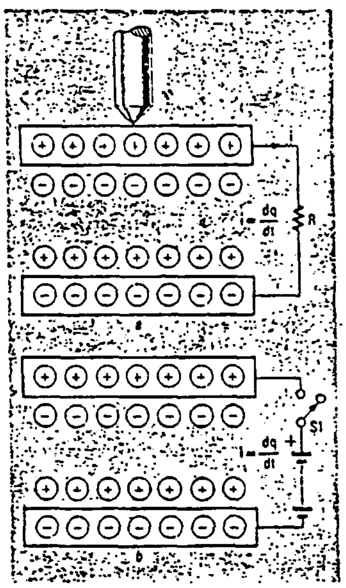


FIG. 1—A CAPACITOR CAN BE CHARGED by a gravitational impulse (*a*), just as it may by a DC voltage (*b*).

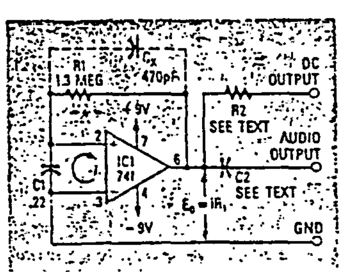


FIG. 2—A BASIC GRAVITY-WAVE DETECTOR is very simple. The charge build-up on capacitor C1 due to gravity-wave impulses is amplified by IC1 for output.

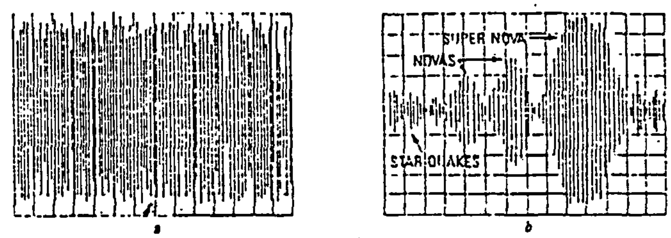


FIG. 3—DISPLAY OF GRAVITY-WAVE SIGNALS from the circuit in Fig. 2 reveals 1/f signals (*a*) and amplitude-modulated astrophysical events (*a*).

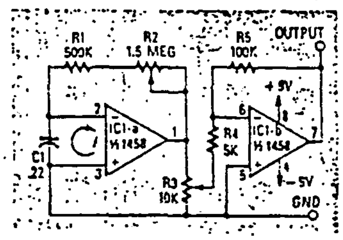


FIG. 4—A BUFFERED OUTPUT STAGE makes the gravity-wave detector easier to use.

fully-dischaged 1000-µF, 35-volt electrolytic capacitor broadside on a hard surface from a height of two or three feet. Then measure the voltage across the capacitor with a high-impedance voltmeter. You will find a voltage of about 10 to 50 mV. Drop the capacitor several times on opposite sides, don't let it bounce, and note how charge builds up to a saturation level that may be as high as one volt.

In that experiment, the energy of free-fall is converted to polarization energy in the capacitor. The loosely-bound electrons are literally "jarred" into new polarization positions. In a similar manner, graviational impulses from space "jar" electrons into new polarization positions.

Here's another experiment: Monitor a group of similar capacitors that have reached equilibrium conditions while being bathed by normal background gravitational impulses. You'll observe that, over a period of time, the voltage across all those open-circuited capacitors will be equal, and that it will depend only on the average background flux at the time. Temperature should be kept constant for that experiment.

I interpret those facts to mean that a capacitor develops a charge that reflects the monopole gravity-wave signals existing at that particular location in the universe. So, although another device could be used, we will use a capacitor as the sensing element in the gravity-wave detectors described next.

The simplest detector

Monople gravity waves generate small impulse currents that may be coupled to an op-amp configured as a current-to-voltage converter, as shown in Fig. 2. The current-to-voltage converter is a nearly lossless current-measuring device. It gives an output voltage that is proportional to the product of the input current (which can be in the picoampere range) and input resistor R1. Linearity is assured because the *non-DC-connected* capacitor maintains the op-amp's input terminals at virtual ground.

The detector's output may be coupled to a high-impedance digital or analog voltmeter, an audio amplifier, or an oscilloscope. In addition, a chart recorder could be useful to record the DC output over a period of time, thus providing a record of long-term "shadow-drift" effects. Resistor R2 and capacitor C2 protect the output of the circuit; their values will depend on what you're driving. To experiment, try a 1K resistor and 0.1 µF capacitor.

The output of the detector (E_O) may appear in two forms, depending on whether or not stabilizing capacitor C_X is connected. When it is, the output will be highly amplified 1/*f* noise signals, as shown in Fig. 3-*a*. Without C_X, the circuit becomes a "ringing" circuit with a slowly-decaying output that has a resonant frequency of 500–600 Hz for the component values shown. In that configuration, the circuit is a *Quantum Non-Demolition* (QND) circuit, as astrophysicists call it: it will now actually display the amplitude variations (waveshapes) of the passing gravitational-impulse bursts, as shown in Fig. 3-*b*.

An interesting variation on the detector may be built by increasing the value of sensing capacitor C1 to about 1000–1600 µF. After circuit stability is achieved, the circuit will respond to almost all gravity-wave signals in the universe. By listening carefully to the audio output of the detector you can hear not only normal 1/*f* noise, but also many "musical" sounds of space, as well as other effects that will not be disclosed here.

An improved detector

Adding a buffer stage to the basic circuit, as shown in Fig. 4, makes the detector easier to work with. The IC used is a common 1458 (which is a dual 741). One op-amp is used as the detector, and the other op-amp multiplies the detector's

256 A

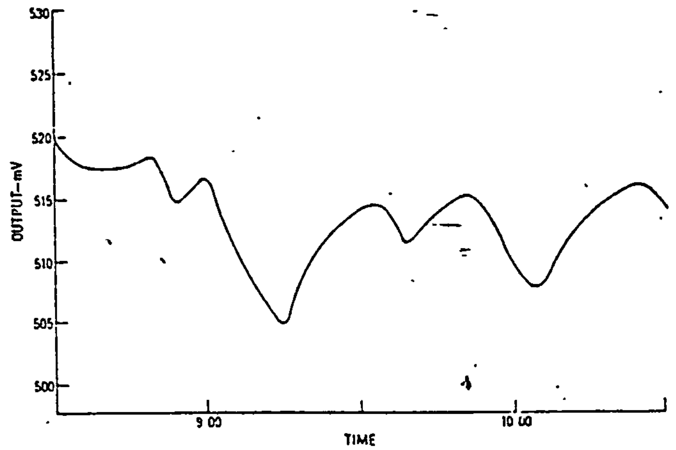


FIG. 5—THE SAME GRAVITATIONAL "SHADOW" passed the author's monitor location on two consecutive days at approximately the same time.

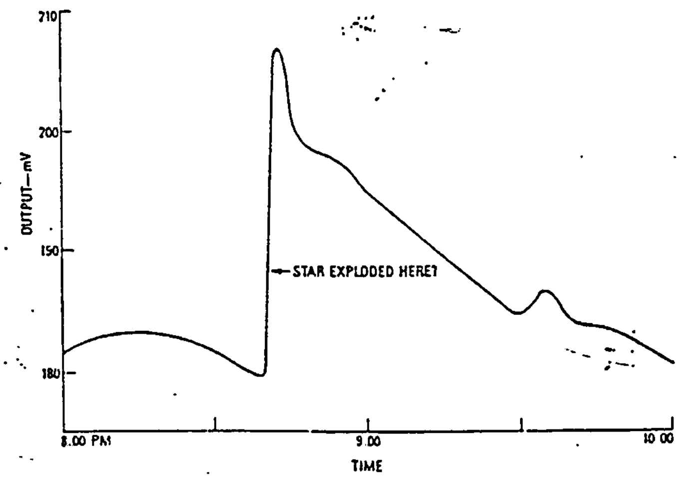


FIG. 6—THE EXPLOSION OF A SUPERNOVA just after 8:30 pm produced the sharp slope in this curve.

output by a factor of 20. Potentiometer R3 is used to adjust the output to the desired level.

When used unshielded, the circuits presented here are not only sensitive detectors of gravitational impulses, but also of *electromagnetic* signals ranging from 50–500 GHz! Hence, these circuits could be used to detect many types of signals, including radar signals.

To detect only gravity waves, and not EMI, the circuit should be shielded against all electromagnetic radiation. Both circuits are low in cost and easy to build. Assembly is non-critical, although proper wiring practices should be followed. Initially, you should use the op-amps specified; don't experiment with other devices until you attain satisfactory results with the devices called for. Later you can experiment with other components, like low-power op-amps, especially CMOS types, which have diodes across their inputs to protect them against high input voltages. Those diodes make them much less sensitive to electromagnetic radiation, so circuits that use those devices may be used to detect gravity-waves without shielding.

The circuit in Fig. 4 is the QND or ringing type, but the feedback resistance is variable from 0.5 to 2 megohms. That allows you to tune the circuit to the natural oscillating frequency of different astrophysical events. Huge supernova bursts, for example, have much larger amplitudes, and lower frequencies of oscillation than normal supernovas and novas. Hence you can tune the detector for the supernova burst rate that interests you. With the component values given in Fig. 4, the resonant frequency of the circuit

RHYSMONIC COSMOLOGY

Ancient and Renaissance physicists postulated the existence of an all-pervasive medium they called the *ether*. Since the advent of sub-atomic physics and relativity, theories of the ether have fallen into disuse. Rhysmonic cosmology postulates the existence of rhysmons, which are the fundamental particles of nature, and which pervade the universe, as does the ether.

Each rhysmon has the attributes of size, shape, position, and velocity; rhysmons are arranged in space in a matrix structure, the density of which varies according to position in the universe. The matrix structure of rhysmons in free space gives rise to the fundamental units of length, time, velocity, mass, volume, density, and energy discovered by physicist Max Planck.

Fundamental postulates of the Rhysmonic Universe can be summarized as follows:

- The universe is finite and spherical,
- Euclidean geometry is sufficient to describe Rhysmonic Space.
- The edge of the universe is a perfect reflector of energy.
- Matter forms only in the central portion of the universe.

The matrix structure of rhysmons allows the instantaneous transmission of energy along a straight line, called an energy vector, from the point of origin to the edge of the universe, where it would be reflected according to laws similar to those governing spherical optics.

In Rhysmonic Cosmology, mass, inertia, and energy are treated as they are in classical mechanics. Mass arises, according to the author, because "particles in rhysmonic cosmology must be the result of changes in the 'density' of the rhysmonic structure, since the universe is nothing more than rhysmons and the void."

In a "dense" area of the universe, such as the core of a particle, a number of rhysmons are squeezed together. This means that every particle has a corresponding anti-particle, or an area of correspondingly low density. In addition, a particle has an excess of outward-directed energy vectors, and an anti-particle has an excess of inward-directed energy vectors. Those vectors are what we usually call electric charge.

Gravity is not a force of attraction between objects; rather, two objects are impelled towards each other by energy vectors impinging on the surfaces of those objects that do not face each other. Newton's laws of gravitation hold, although their derivation is different than in Newton's system.

Gravitational waves arise in various ways, but, in general, a large astronomical disturbance, such as the explosion of a supernova, instantaneously modulates the rhysmonic energy vectors. That modulation might then appear, for example, superimposed on the Earth's gravitational-field flux—and it would be detectable by circuits like those described here.

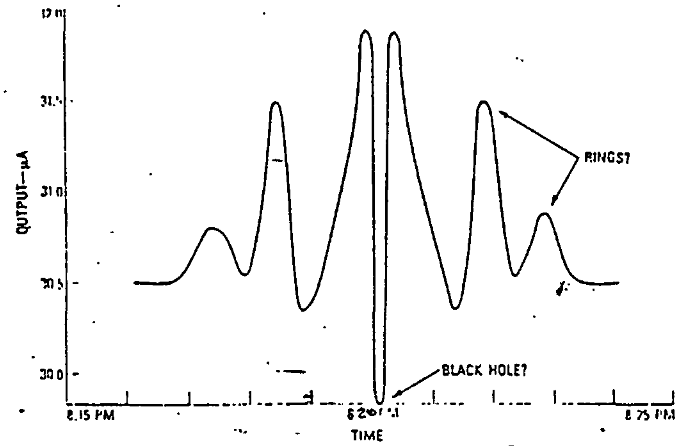


FIG. 7—THE SHADOW OF A BLACK HOLE passed the Earth and produced the dip in the curve just after 8:20 pm. That occurred four days after the explosion of a supernova that was detected on July 1, 1983.

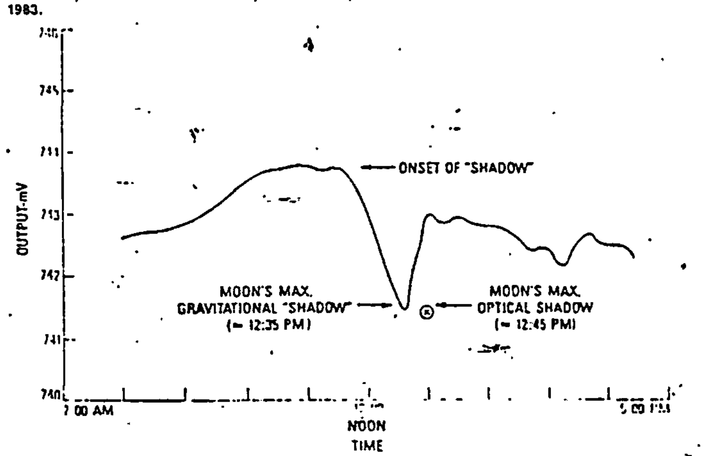


FIG. 8—ECLIPSE ON MAY 30, 1984 produced a gravitational shadow that preceded the optical shadow by about eight minutes.

PARTS LIST—SIMPLE DETECTOR

All resistors ¼-watt, 5%.
R1—1.3 megohm
R2—see text
Capacitors
C1—0.22 µF
C2—see text
C_X—see text
Semiconductors
IC1—741 op-amp

PARTS LIST—BUFFERED DETECTOR

All fixed resistors ¼-watt, 5%.
R1—500,000 ohms
R2—1.5 megohms, potentiometer
R3—10,000 ohms, potentiometer
R4—5000 ohms
R5—100,000 ohms
Capacitors
C1—0.22 µF
Semiconductors
IC1—1458 dual op-amp

can be varied between 300–900 Hz. The circuit of Fig. 4, or a variant thereof, was used to obtain all the experimental data discussed below.

In addition, the circuits that we've described in this article were built in an aluminium chassis and then located within an additional steel box to reduce pickup of stray EMI. Power and output connections were made through filter-type feedthrough capacitors.

In the QND mode, coupling the detector's output to an audio amplifier and an oscilloscope gives impressive sound and sight effects. Fluctuations generally reflect passing gravitational shadows. The author has taken much data of the sort to be discussed; let's examine a few samples of that data to indicate the kind of results you can expect, and ways of interpreting those results.

Sample scans

Shown in Fig. 5 is an unusual structure that was repeated exactly the next day, but four minutes earlier. The pattern was followed for several weeks, moving four minutes earlier per day. That confirms the observation that the burst response of the detector was related to our location on earth with respect to the rest of the universe. The change of four minutes per day corresponds with the relative movements of the earth and the body that was casting the "shadow."

The plot of Fig. 6 appears to be a supernova, probably in our own Galaxy, caught in the act of exploding. The plot of Fig. 7 was made four days after another supernova explosion; that plot reveals that that supernova left a well-developed black hole and "ring" structure. You may find it interesting to consider that visual indications of those supernovas will not be seen for several thousand years! As such, it might be "quite a while" before we get a visual confirmation of our suspected supernova!

Last, Fig. 8 shows a plot of the moon's gravitational shadow during the eclipse of May 30, 1984. Note that the gravitational shadow preceded the optical shadow by about eight minutes! That gives credence to our claim that gravitational effects propagate instantaneously. Relatedly, but not shown here, a deep shadow is consistently detected whenever the center of the galaxy appears on the meridian (180°), hinting of the existence of a "black hole" in that region.

Conclusions

In this article we discussed the highlights of a new theory of the universe that predicts the existence of monopole gravity waves. We then presented details of a circuit that can be used to detect monopole gravity waves. The author has monitored those signals for ten years with many different circuits, so is confident that you will be able to duplicate those results. Needless to say, the subject of gravity waves is a largely unexplored one, and there is much yet to be learned. Perhaps this article will inspire you to contribute to that knowledge. In your experiments, you might consider trying the following: Operate several detector circuits at the same time and record the results. Separate the detectors—even by many miles—and record their outputs. In such experiments, the author found that the circuits' outputs were very similar. Those results would seem to count out local EMI or pure random noise as the cause of the circuit response.

For more information on the subject of gravity you might consult *Gravitation*, by C. Misner, K. Thorne, and J. Wheeler, published by W. H. Freeman and Co., 1973. Also, the article, "Quantum Non-Demolition Measurements" in *Science*, Volume 209, August 1, 1980 contains useful information on the QND type of measurement used here. R-E

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RADAR SIGNAL DETECTOR

If you think that a sensitive radar detector is a complicated and expensive piece of equipment, have we got a surprise for you!

GREGORY HODOWANEC

RADAR DETECTORS ARE USUALLY COMPLICATED and expensive devices, but a simple, yet effective, detector can be built in a small plastic case for less than ten dollars! The circuit, which can be tuned to respond to signals between 50 MHz and 500 GHz, is a modified version of the author's gravity-wave detector presented in April's issue. We'll actually present two different circuits, an "economy" and a "deluxe" model.

How they work

The economy model's schematic is shown in Fig. 1, and the deluxe model's schematic is shown in Fig. 2. The main difference between the two circuits is that the economy model simply drives a piezo-electric transducer directly from an op-amp, while the deluxe model uses an LM386 audio power amplifier to drive a small speaker. Doing that allows the extra op-amp stage to be used for additional buffering, and that makes for a more sensitive detector.

The first op-amp in each circuit (IC1-*a*) functions as a current-to-voltage converter. Then, in the economy model (Fig. 1), IC1-*b* buffers the output to drive the piezo buzzer. Potentiometer R5 sets the switching threshold of IC1-*b*; normally it is adjusted so that the circuit barely triggers on background noise, then it's backed off a bit. That should provide plenty of sensitivity to incident RF.

Resistors R3 and R4, and capacitor C4, serve to "split" the supply voltage. To get more sensitivity from the detector, those components could be eliminated and two series-connected nine-volt batteries used instead. In that configuration, the junction of the batteries would be connected to the point where R3, R4, and C4 now meet. Alternatively, for mobile operation, twelve volts could be tapped from your car's cigarette-lighter jack.

The deluxe model functions in a similar manner, except that IC1-*b* is configured as a ×20 buffer amplifier to drive the LM386. Potentiometer R2 adjusts threshold here, and potentiometer R5 functions as a volume control.

In both circuits, input capacitor C1 functions as a "transmission-line" that intercepts both electrical and magnetic components of incident radar signals. While it is a low-Q circuit (it is very broadband), the response may be further optimized by trimming C1's lead lengths for the desired frequency, as shown in Fig. 3. To detect typical road-radar systems, the input capacitor's leads should be about 0.5–0.6 inches long.

In both circuits the detector provides a "ringing," or slowly-decaying output with a resonance of about 400–600 Hz for the component values shown. Feedback resistor R1 may be adjusted for another "ring" frequency, if desired.

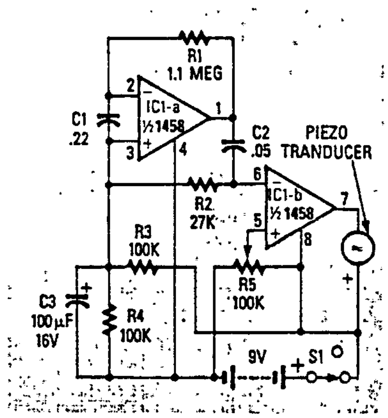

FIG. 1—THE ECONOMY RADAR DETECTOR needs only one IC and a few discrete components.

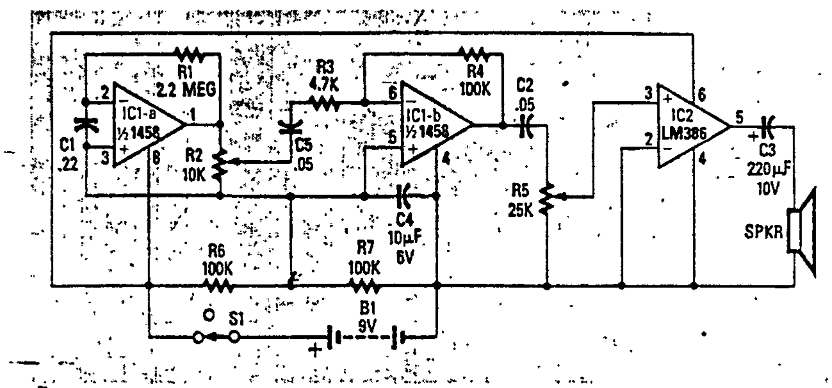

FIG. 2—DELUXE RADAR DETECTOR adds a buffer amplifier and an audio power amp to drive a speaker.

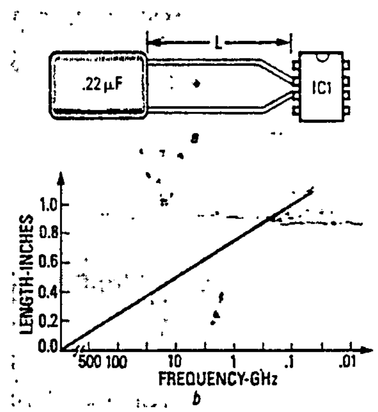

FIG. 3—VARY THE LEAD LENGTHS OF C1 to tune the input circuit.

Construction hints

Whichever detector you choose, build it in a non-metallic case so that incident RF won't be blocked. However, make sure that only R1 provides feedback to the detector's input. Since the gain of the detector is so high, unwanted feedback can force the input stage into continuous oscillation, rather than the "ringing" oscillation that decays in time. Should unwanted feedback become a problem, a small capacitor (0.005–0.01 µF) across resistor R4 may help, as may a 200–500 µF capacitor across the battery.

Perfboard construction is preferable to PC-board construction because reduced wiring capacitance and the absence of a ground plane will reduce the chance of unwanted feedback. Likewise, it's better to use a small *shielded* speaker for output because magnetic (and gravitational) energy from the speaker could feed back to the input. So keep C1 as far from the speaker as possible.

The detector should perform properly with little adjustment. After applying

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RADAR SIGNAL DETECTOR

continued from page 52

power, background noise should be heard. You may want to vary the value of R1 slightly to get a pleasant ringing frequency. Then adjust the threshold control (R5 in Fig. 1; R2 in Fig. 2) so that received signals are just above the $1/f$ noise background.

You can test the detector on the workbench by generating a millimeter-wave microwave signal. You don't need a fancy signal generator—just "arc" a small inductor (say 500 mH) across a nine-volt battery. A properly-functioning detector should ring loudly when a signal is generated in that manner fifty feet from the detector. You may want to experiment with different inductors at different distances from the detector.

PARTS LIST—ECONOMY MODEL

All resistors ¼-watt, 5%.

R1—1.1 megohm
R2—27,000 ohms
R3, R4—100,000 ohms
R5—100,000 ohms, panel-mount potentiometer

Capacitors

C1—0.22 µF
C2—0.0 µF
C3—100 µF, 16 volts, electrolytic

Semiconductors

IC1—1458 dual op-amp

Other components

S1—SPST switch
Piezo-electric transducer

PARTS LIST—DELUXE MODEL

All resistors ¼-watt, 5%.

R1—2.2 megohms
R2—10,000 ohms, trimmer potentiometer
R3—4700 ohms
R4, R6, R7—100,000 ohms
R5—25,000 ohms, panel-mount potentiometer

Capacitors

C1—0.22 µF
C2, C5—0.05 µF
C3—220 µF, 10 volts, electrolytic
C4—10 µF, 6 volts, electrolytic

Semiconductors

IC1—1458 dual op-amp
IC2—LM386 audio power amplifier

Other components

S1—SPST switch
SPKR—8–100 ohm miniature speaker

Conclusions

Both circuits pick up low-level pulsed-RF signals. The detector responds to very short pulses and will continue to ring for several milliseconds. But the circuit will respond only to the beginning and the end of a CW (continuous-wave) signal. Using either circuit, you'll soon be able to recognize various signal sources by their "signatures." Microwave towers, for example, provide lots of varied output.

Either circuit could be used for purposes other than radar detection. For example, you could use one to detect a hidden radio transmitter (provided the transmitter is a pulsed type). The detector could be used as a leakage detector at a microwave tower. The detector could also be used to detect leakage or arcing in home power lines, as well as outdoor power-transmission lines. In fact, the uses to which this circuit may be put are limited only by your imagination! **R-E**

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EDITORIAL

Diversity's the word!

Selecting the features that go into an annual like the **1989 Experimenter's Handbook** is no easy task. The editors must carefully examine the contents of a year's worth of magazines and make some tough decisions as to the relative "worth" of each article. Because an article's value depends to a large extent on who's doing the reading, we spend quite a bit of time thinking about *you*, the reader, and what you would most want to see.

Among our readers, two general characteristics are universal: You love to tinker, build, and experiment; and you are curious—not just about *how* things work, but also about *why* things work, and how you can make them work even better. That's where the similarities end: Among you are experienced engineers and students who are just starting out; computer whizzes and computer-phobics; audiophiles and automobile buffs; teenagers and retirees; and thousands of electronics technicians, servicemen, and hobbyists—all with their own tastes and preferences.

This years **Experimenter's Handbook** truly has something for everyone! Projects for the home—ranging from the simple *Phony Burglar Alarm* to *Phonlink*, a computerized home-control system. For your car, we have a digital dashboard, including a speedometer and tachometer to build and install. For video systems, there's our *Stereo-TV Decoder*, and a special SAP-decoder attachment for it. For improved signal reception, we present the *Miniature Wideband Amplifier* and for improved audio, a commercial zapper for your FM radio. For your test bench, build the *In-Circuit Digital IC Tester*. For holiday cheer, decorate the timely *Electronic X-Mas Tree*.

To satisfy your curiosity, we have articles on the latest in cellular-telephone technology and high-definition television. To stir your imagination we present a new theory about gravity and a glimpse of the automobile of the future. There's even a special section on Surface Mount Technology—including several SMT projects you can build yourself.

We've assembled a magazine brimming with information and challenges. Now it's your turn—to learn, to build on that knowledge, and to have a great time doing it!

—The Editors

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1989 ELECTRONICS EXPERIMENTER'S *handbook*

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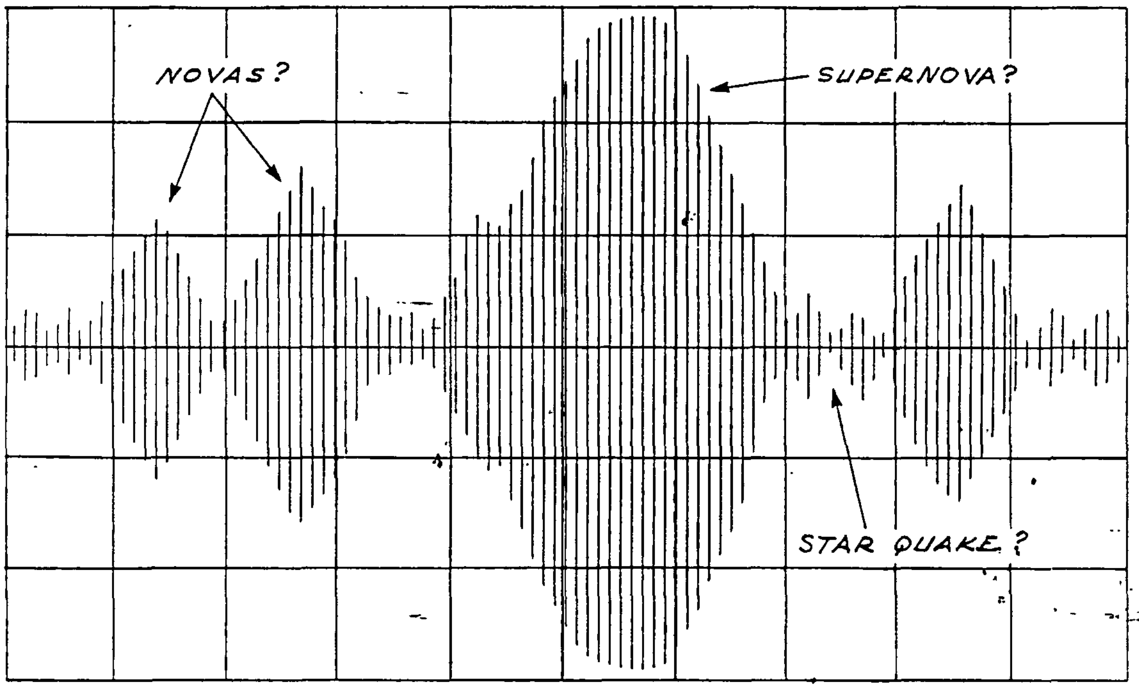
ALL ABOUT

Gravitational Impulses



New data shows repeatable and predictable gravity detected from the center of the milky-way galaxy. Build a simple gravity detector and observe that phenomena for yourself.

GREGORY HODOWANEC

THE MAIN PROBLEM TODAY IN ATTEMPTING to observe gravity signals has been the insistence by astrophysicists that only the quadrupole radiated gravity signals predicted by Albert Einstein are permissible in the universe: even though quadrupole-type gravity signals have eluded detection. On the other hand, monopole-type gravity signals that exist profusely in the universe are produced by Newtonian gravity gradients, which are easily detected with a simple device developed by the author.

New scalar definition

A field in physics may be defined as a region in space which is under the influence of some "effect": typically an electric, magnetic, or gravitational effect. Vector type fields must be described in terms of both magnitude and direction. Less understood is the theory of fields that are scalar in nature and described in terms of magnitude alone. A common example of a scalar field is temperature; even though the gradient of such a field will be vectorial. Less well-known are the scalar aspects of gravitational, electric, and magnetic fields.

The author uses the term *scalar* in a unique way. When all the vectors of a force are directed *parallel* to each other, the force can be fully specified by a magnitude only. Therefore, any two forces whose vector fields run *parallel* to each other will interact (as scalars) in a simple algebraic superposition with no need to use vector analysis.

A scalar electric field is realized by the application of a voltage between two parallel plates, where all the electric lines of force are *parallel* to each other. A scalar magnetic field is realized in the H-fields that emanate from the end of a bar magnet into the space just beyond the magnet. Such a "curl-free" magnetic field is scalar for only a short distance because that is the region where the magnetic flux lines are all *parallel*. Similarly, the earth's gravitational-field is also a scalar field because the gravity flux is *parallel* and directed downward only.

The author has developed a device to detect gravity waves, and explains its operation with a new scalar field theory. We are publishing the results of some of his experiments in the hope it will foster experimentation in gravity detection. By confirming the author's data, new ideas and concepts might emerge to form the basis of a new technology.

It is the author's presumption that scalar gravitational, electric, and magnetic fields may interact with each other only when the fields run exactly *parallel*. Taking that theory a step farther means that energy can be transferred from one scalar field to an other.

Capacitor charging

Traditionalists recognize the polarization "effect" in a dielectric that is placed between the parallel plates of a capacitor. If a DC voltage is applied to the plates of a capacitor, an electric field will develop between the plates. A traditionalist would see the electric field as a vector force directed from the negative plate to the positive plate. The magnitude would depend upon the intensity of the electric field generated by the movement of electrons from one plate to the other. But few traditionalists recognize the scalar nature of such parallel electric fields, and their possible interaction with other similarly directed (scalar) fields; primarily,

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Earth's ever-present gravity field. The presence of a scalar gravity field on the plates of a capacitor will cause the molecules to polarize just as though an external DC voltage were being applied.

In Fig. 1, the dielectric in the capacitor is shown polarized by the Gravity-fields; that results in a potential difference across the capacitor that drives a current. Because the gravity-fields are modulated by various universe and terrestrial processes, the energy components are both DC and AC in nature. Therefore, as long as the vectors of the gravitational and electric fields run parallel to each other, then both fields can be considered scalar fields, which means energy from one field can be transferred to the other. The gravity field may be visualized as squeezing the plates, however minutely.

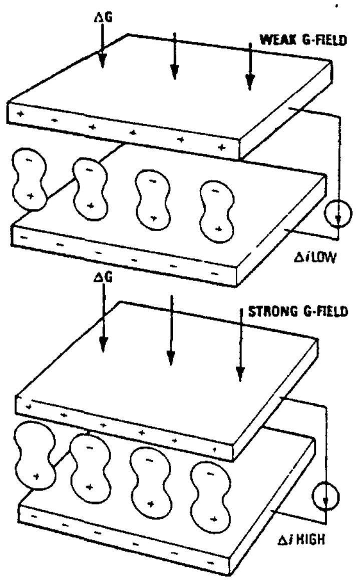

FIG. 1—POLARIZATION EFFECT IN A CAPACITOR is due to the actions of a gravity field. The change in current flow, Δi, through the capacitor is proportional to the gravity field, ΔG.

✻ NOTE A

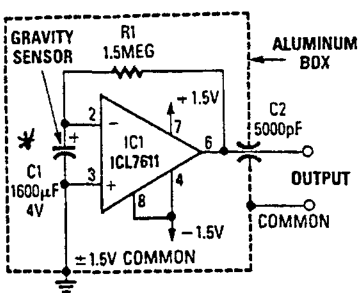

FIG. 2—THE BASIC GRAVITY DETECTOR is a current-to-voltage converter. The current through capacitor C1 is proportional to changes in the strength of the gravity field. IC1 amplifies the signal generated across capacitor C1 to drive a chart recorder or digital multimeter.

✻NOTE A

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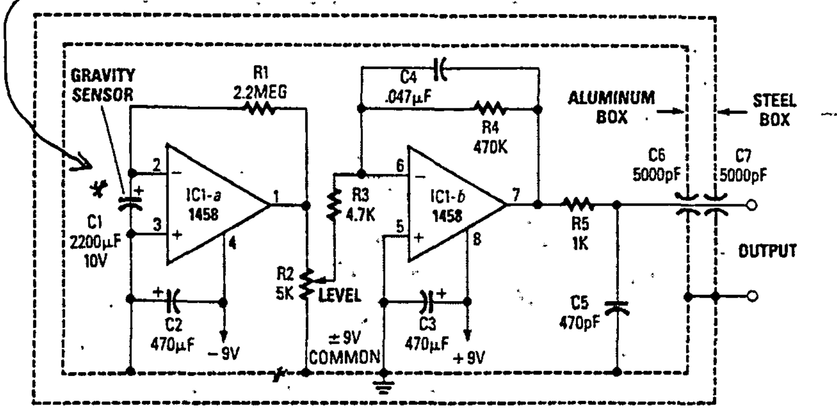
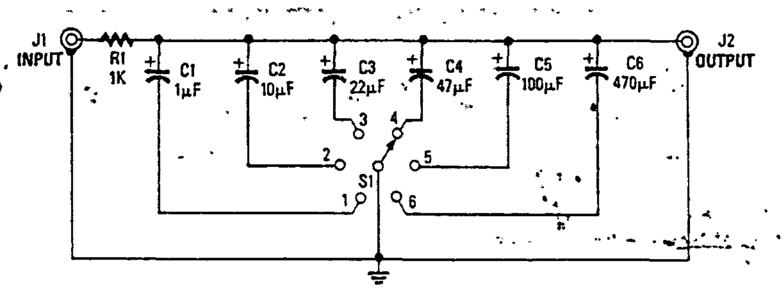


FIG. 3—A BUFFERED GRAVITY DETECTOR increases the detector's sensitivity to gravity fields, and also adds frequency stability to the detector. The aluminum box, the outer steel enclosure, and feedthrough filter capacitors C6 and C7, isolate the detector from electromagnetic interference (EMI).



S1 POSITION	FILTER CUT-OFF	S1 POSITION	FILTER CUT-OFF
1	1KHz	4	21Hz
2	100Hz	5	10Hz
3	45Hz	6	1Hz

FIG. 4—GRAVITY DETECTOR OUTPUT FILTERING will limit the detectors response to certain astronomical distances. The lower cut-off frequencies of 21 Hz to 1 Hz are best for gravity sensing within our own galaxy. Most of the author's chart recordings were done using a 10 Hz filter. The filter should be placed in a RFI shielded enclosure.

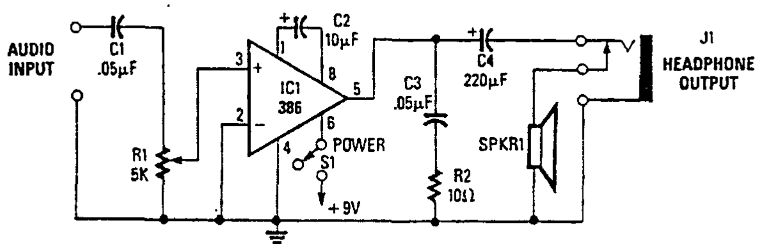


FIG. 5—A SIMPLE AUDIO AMPLIFIER can be used to listen to gravity signals that sometimes contain a musical rhythm.

Thermal tests were conducted at an independent laboratory. Heating the electrolytic capacitor in a shielded hot oil bath (75°C), and cooling in a shielded ice bath (0°C) had no discernible effect on signal output. However, chilling in a shielded dry-ice bath (−79°C) resulted in a steady decrease in amplitude, frequency, and burst rate until the only signal remaining was the 1.5 volt DC. The question was raised: Shouldn't the burst rate have remained constant if caused by gravity waves. The laboratory found that the total effective capacitance decreases rapidly at temperatures less than −30°C. A 300 to 400 fold decrease was observed at −79°C, so that 1600µF at −79°C would have an actual capacitance of only 4µF; effectively, there was very little capacitance in the detector at that temperature, which would account for the diminished burst rate.

NOTE A: FOR STABILITY, ADD SERIES RESISTANCE (≈ .5K OR 1K Ω ADJUSTABLE)

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PARTS LIST

BASIC GRAVITY DETECTOR
R1—1.5 Megohms, ¼-watt
C1—1600 µF, 4 volts, electrolytic
C2—5000 pF, Feedthrough type
IC1—ICL7611 (Intersil) op-amp
Aluminum Enclosure

BUFFERED GRAVITY DETECTOR
All resistors are ¼-watt, 5%
R1—2.2 Megohms
R2—5000 ohms, potentiometer
R3—4700 ohms
R4—470,000 ohms
R5—1000 ohms
Capacitors
C1—2200 µF, 4 volts, electrolytic
C2–C3—470 µF, 10 volts, electrolytic
C4—.047 µF, ceramic disc
C5—470 pF, ceramic disc
C6–C7—5000 pF, feedthrough type
Semiconductors
IC1—LM1458 (National) op-amp
Miscellaneous: Aluminum enclosure, Steel box.

LOW PASS FILTER
All resistors are ¼-watt, 5%
R1—1000 ohms
Capacitors, 10 volts, electrolytic
C1—1 µF
C2—10 µF
C3—22 µF
C4—47 µF
C5—100 µF
C6—470 µF
Other components
J1–J2—coaxial connector
S1—SPGT rotary switch
Miscellaneous: Aluminum enclsoure RF shiled.

AUDIO AMPLIFIER
All resistors are ¼-watt, 5%
R1—5,000 ohms, potentiometer
R2—10 ohms
Capacitors
C1, C3—.05 µF, ceramic disc
C2—10 µF, 10 volts, electrolytic
C4—220 µF, 15 volts, electrolytic
Semiconductors
IC1—LM386 (National) linear audio amplifier
Other components
J1—Phone jack, 2-circuit type, with one circuit normally closed
SPKR1—8–16 ohms miniature speaker

OTHER GRAVITY DETECTOR
All resistors are ¼-watt, 5%
R1—200 ohms, potentiometer
R2—2 Megohms, potentiometer
Semiconductors
IC1—LM741 (National) op-amp
Miscellaneous: Aluminum enclosure RF shield.

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Hodowanec, Gregory. *All About Gravitational Waves*, **Radio Electronics**, April, 1986, pages 53–56.
Hodowanec, Gregory. *Rhysmonic Cosmology*, 1985.

Browian agitation of the electron-ion structure in capacitors is attributed only to thermal actions by traditionalists. While thermal actions contribute to some aspects of white-noise, the author concludes that much of the white-noise, and especially the low-frequency 1/*f* type impulse noise, is very much independent of the thermal environment. Indeed, the energy causing noise of those types is directly attributable to gravitational fields. The 1/*f* noise is simply the mathematical expression for the rate of occurrence of gravity field events. It is termed 1/*f* noise because the stronger impulses are generated less frequently than the more moderate impulses, and the moderate impulses are seen less frequently than the weaker impulses.

An electrochemical or battery effect does occur in electrolytic capacitors, thereby introducing an additional small voltage component across the capacitor; however, the electrochemical voltages are very small when compared to the gravity field effects, and can, therefore, be neglected.

A flat (planar) type of capacitor positioned so that the flat side is up, is more effective as a gravity detecting element than a tubular-type of capacitor. Different capacitor types (electrolytic, mylar, polystyrene, paper, ceramic disc, etc.) will give the same response to the gravity field provided the effective capacitances are equal.

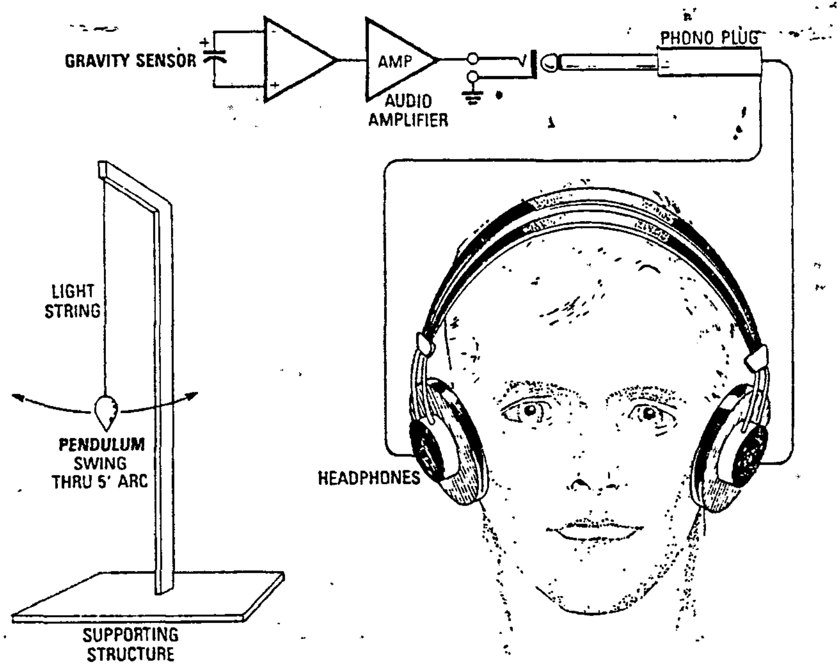

FIG. 7—A PENDULUM IN MOTION will disturb the underlying structure of the universe. Adjust the detector's volume for a good response to the swinging disturbance of the vacuum. Even though the pendulum will eventually stop swinging, the disturbance in the universe continues to remain!

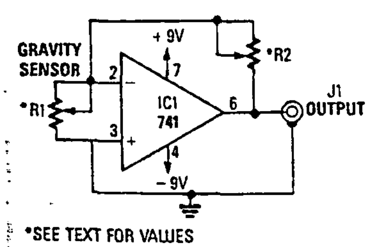

FIG. 6—A GRAVITY DETECTOR THAT USES a resistor sensor to detect gravity signals. Like the capacitor sensor, the resistor sensor is a 1/f noise detector. Shield the detector unit from possible RFI interference.

Gravity detectors

A scalar gravity-signal detector is shown in Fig. 2. The small gravity-impulse current generated across capacitor C1 is coupled to the input of IC1 for amplification. IC1 functions as a current-to-voltage converter. The capacitance, C1, and the feedback resis-

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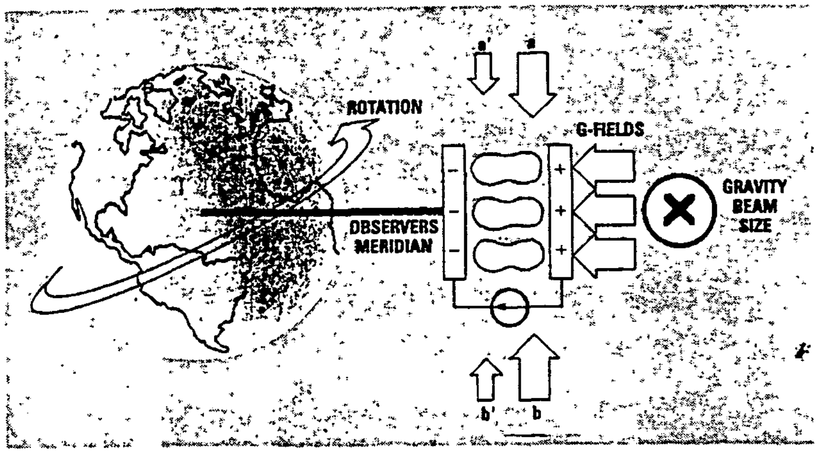

FIG. 8—THE POLARIZATION EFFECTS on a capacitor are caused by the g-fields, *X*, perpendicular to the flat capacitor plates. As the Earth spins, the capacitor sensor sweeps across the cosmos in a beam like fashion. G-field components, *a* and *b* that are tangential to the flat capacitor plates do not affect the capacitor.

tance, R1, are chosen sufficiently high in value so that input circuit "resonances" are very much less than 1 Hz.

Varying C1's value will have an affect on the response time to gravity-field fluxuations; that is because the op-amp's output is a harmonic type oscillation, where the polarization "stress" induced in the capacitor's dielectric by gravity flux is also "restored" by the reverse electric potential developed by the feedback resistance in that circuit. Therefore, the "oscillations" are a function of both the sensing capacitance and the feedback relationship, and will, thus, have different frequencies for different capacitor and feedback resistor values.

The use of CMOS op-amp ICL7611 enables efficient operation with a ± 1.5 volt battery supply. The unit is assembled in a small aluminum box with the batteries enclosed within the box, and the output is brought out with a feedthrough capacitor in order to eliminate any possible response to ambient RF-type signals.

An improved gravity sensor is shown in Fig. 3. The extra op-amp, IC1-b, will add additional gain and frequency stability. Op-amp output off-set components may be included, however, the author found nulling the op-amp to be unnecessary. The gravity detector is enclosed within an aluminum box which is also within another heavy steel box in order to shield the detector from any electromagnetic interference (EMI). A highly permeable magnetic mu-shield was also used to guard the detector against the Earth's magnetic field, and stray magnetic fields generated by the power company's AC line voltage. However, the author found mu-shielding unnecessary. Tests showed no apparent difference in data when using a mu-shield, or when the aluminum box was used alone.

Most gravity detection will require additional output filtering, as shown in Fig. 4. The cut-off frequencies of the filter will limit the detectors response to certain astronomical distance ranges. For example, if the output shunt-capacitance is about 470μF, then the response appears to be largely limited to our own immediate group of galaxies. With lower values of output shunt-capacitance, i.e., a higher filter cut-off frequency, the response will include gravitational effects from deeper in space.

Scalar fields of the gravitational type are generated profusely in the universe. The individual impulses of gravity gradients will be heard as a "noise spectrum" through an audio amplifier, or seen as "grass" on an

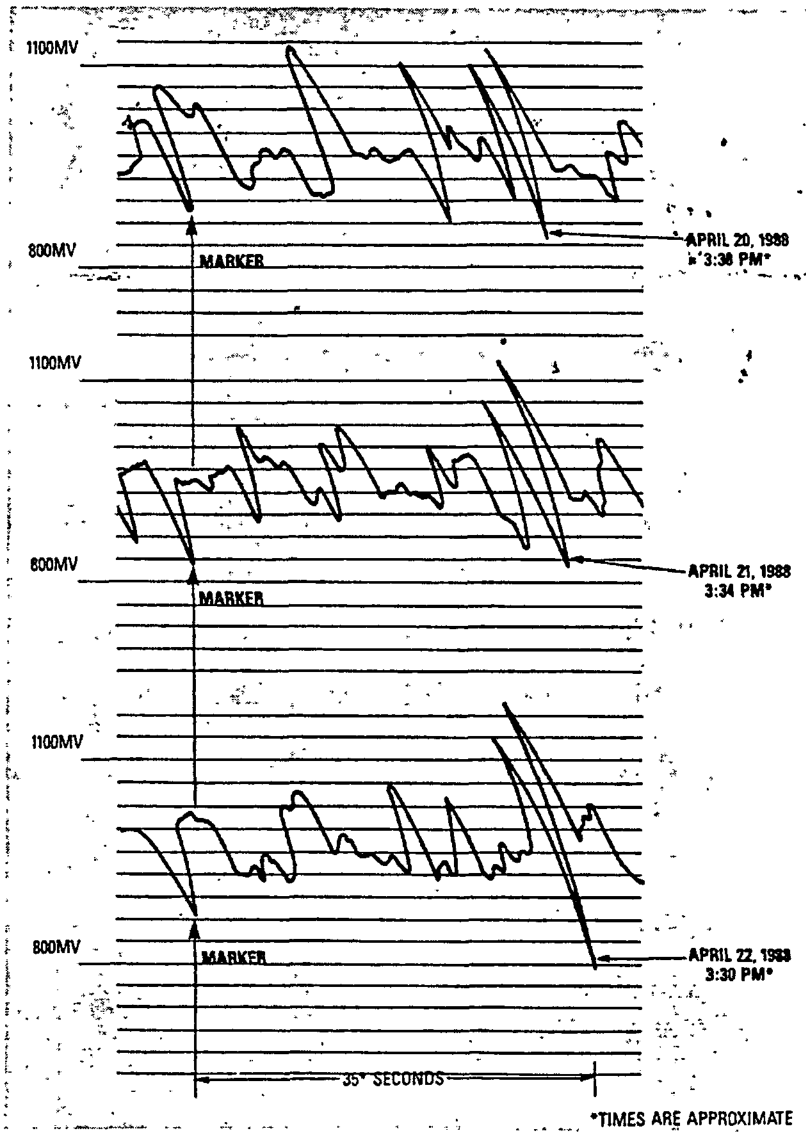

FIG. 9—DATA SHOWS REPEATABLE AND PREDICTABLE gravity impulses detected from the center of the Milky-Way galaxy. A sidereal day is about 23 hours and 56 minutes. If measurements of astronomical events are timed from an Earth's position, then the event should be seen about 4 minutes earlier each day by civil (24 hour) time. That fact is shown by the author's data, where the galaxy center appears four minutes earlier on three successive days.

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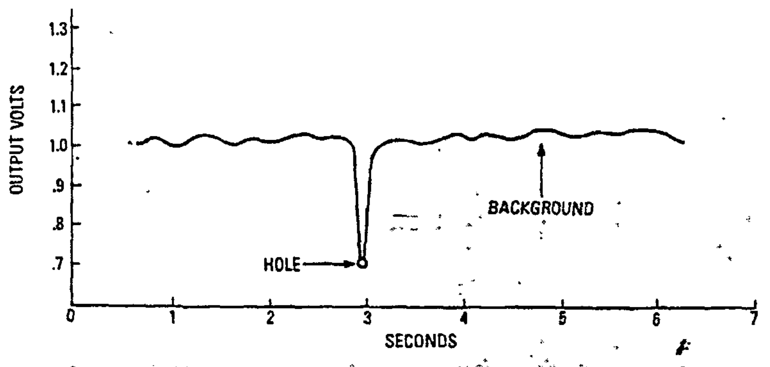

FIG. 13—ANCIENT BLACK HOLE GRAVITY RESPONSE.

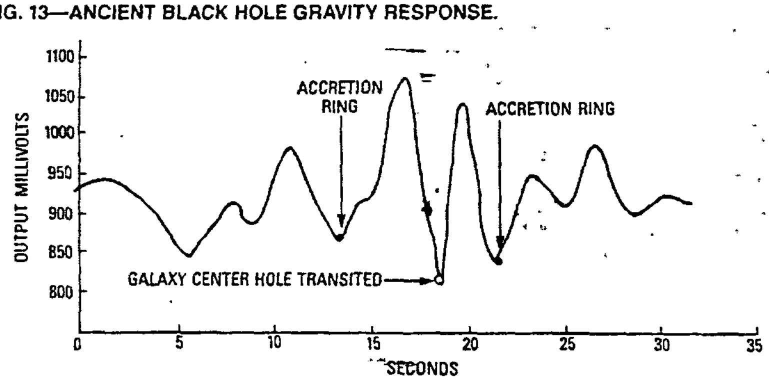

FIG. 14—MILKY-WAY GALAXY CENTER GRAVITY RESPONSE.

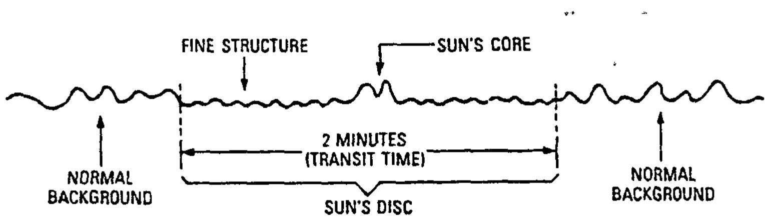

FIG. 15—OUR SUN'S CORE GRAVITY RESPONSE.

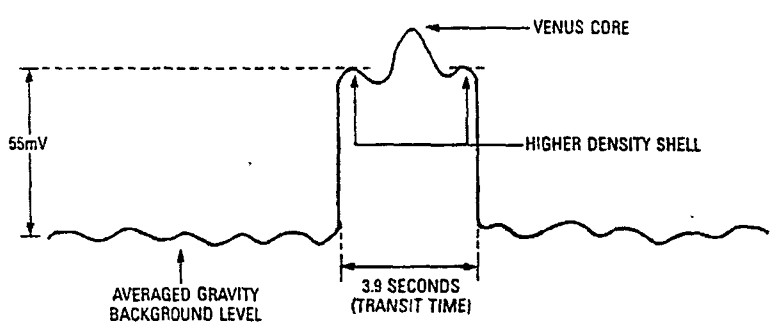

FIG. 16—VENUS PLANETARY GRAVITY RESPONSE.

impressive. Adjust the amplifier's sound level for best response to the particular sound being studied. Of particular interest may be some of the coherent "musical" sounds which appear to come from the same direction of space on a daily basis. At the author's location of 42° N. Latitude, those sounds appear to originate from the Perseus and Auriga regions of our Galaxy when those regions appear in the author's zenith.

Perhaps *some* of those signals might be extraterrestrial intelligence signals, and experimenters' interested in SETI (Search for Extra-Terrestrial Intelligence) might want to investigate that aspect of the detection process. Since gravity impulses travel everywhere almost instantaneously, communication between different galactic cultures would not be limited by the long time intervals required by speed-of-light communication by radio-wave.

Man-made scalar flux signals are largely due to oscillating or rotating masses. A *translation* of mass will generate signals that are due to the perturbations of an apparent standing-wave pattern in the universe's background radiation. That those modulations are truly due to mass in motion can be seen by oscillating a pendulum, or rolling a mass, which will disturb the gravitational background. The author has detected the oscillation of a pendulum 150 feet away that appeared to have the same response in detected intensity as when the pendulum was only 5 feet away. A local translation of mass will appear as a strong rushing sound in the detector's audio output.

As shown in Fig. 7, an interesting pendulum experiment can be performed with a two pound weight that is suspended by a light-weight string from a height of six feet. Set the pendulum in motion with about a five foot arc length. Adjust the detector volume for a good response to the swinging disturbance of the vacuum, ie., the universe. Even though the pendulum will eventually stop swinging, the disturbance in the universe continues to remain! That effect appears to be typical of gravitational perturbations in the universe. Apparently, once the gravity disturbance is generated, the gravity impulses tend to propagate continually until dissipated or over-ridden in some way. It appears that gravitational communications will probably require some sort of modulation that can defeat the continuing propagation characteristics of the vacuum.

Gravity astronomy

Astronomy, in recent years, has undergone a revolution in both theoretical considerations and observational methods. The revolution has not only opened new observational techniques at electromagnetic frequencies other than visible light, but has also given evidence that our universe, in its furthest reaches, also obeys the same scientific principles as those observed here on Earth. Among the new observational methods were attempts to detect gravitational signals. Such signals would be a new window into the universe, and would disclose many aspects not observable with the present-day electromagnetic techniques.

The astronomical gravity signal detection units are special modifications of the basic gravity detector. The modifications are: the input resonance frequency is normally kept much less than one hertz per second, additional amplification is used, and the output is passed through a low pass filter.

The effectiveness of the capacitor element as a detector in gravity-signal astronomy is shown in Fig. 8. The earth's gravity field is in parallel with the polarized electric field in the planar capacitor dielectric. Furthermore, it can be shown that any gravity com-

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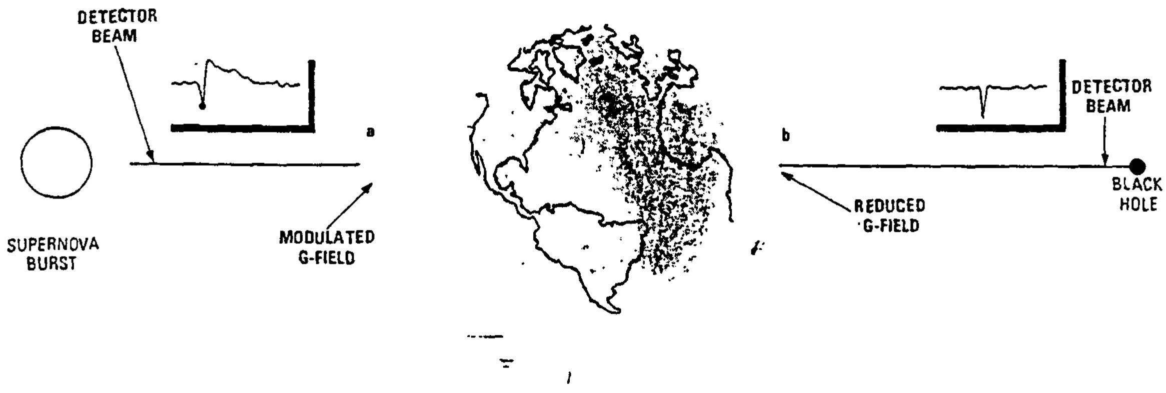

FIG. 10—TWO COMMON ASTRONOMICAL GRAVITY EVENTS. A Supernova burst causes a modulated g-field, while a Black Hole causes a reduced g-field.

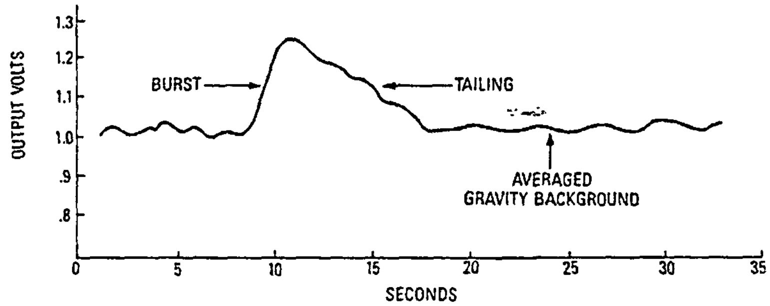

FIG. 11—TYPICAL NOVA GRAVITY RESPONSE.

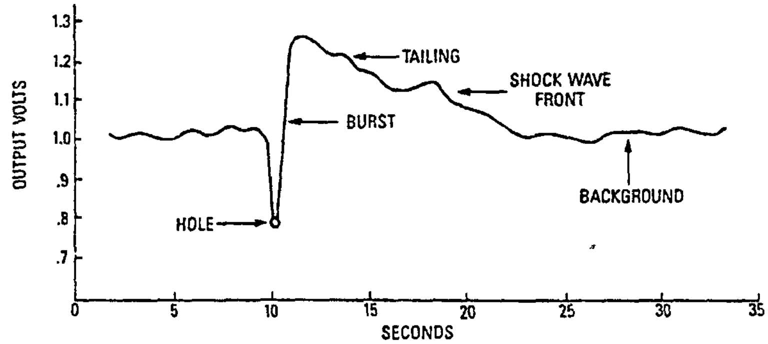

FIG. 12—TYPICAL SUPERNOVA GRAVITY RESPONSE.

oscilloscope. Figure 5 shows a simple audio amplifier that can be used with the detector. The readily available LM386 IC has a gain of about 200. The author also used an audio amplifier available from Radio Shack. (#277-1008) with good results.

Another simple gravity detector shown in Fig. 6 uses a low-cost LM741 op-amp. Here, the 1/*f* noise is generated in a carbon composition resistive element rather than in a capacitive element. The current impulses developed in the resistor by gravity signals are also highly amplified and converted to voltage impulses by the op-amp. To facilitate the more critical adjustment of the Fig. 6 circuit, both the input resistance and the feedback resistance are made variable. Input resistance R1 is generally in the order of 100 to 200 ohms for most of the IC's tested. For optimum results, the feedback resistance R2 is generally in the order of 1000 to 10,000 times R1's value. The experimenter should first adjust the input resistance to about 150 ohms, and then adjust the feedback resistance for maximum 1/*f* noise response. Then, re-adjust the input resistance for optimum results.

The output voltage from the gravity detector can be used to drive either a chart recorder, or fed to a DMM (*D*igital *M*ulti*M*eter) and plotted by hand. The detector's output voltage varies quite slowly, with most observations taking several seconds or minutes to record.

Gravity Communication

Present-day communication systems largely make use of the interaction of electric and magnetic flux fields in a vector type radiation field, ie., electromagnetic waves, to convey information between distant points at the speed of light. Such systems range over the entire electromagnetic spectrum, from the very low frequencies (VLF) to the super high frequencies (SHF), reaching past the microwave frequencies and well into the optical range of frequencies. Such vector-type radiation fields have been extensively developed over the years and are in common use today. However, according to the author's theories, scalar-type radiation fields, such as the gravitational field, might eventually be useful to convey information "instantly"

Scientists recognize the physical universe in basic terms such as mass, energy, fields, etc., and all else is but an integration of such factors. The author theorizes that gravitation has 'infinite' wavelengths and are thus not wave-like. Moreover, gravitational impulses travel at Plank's time interval of about 5.4×10^{-44} seconds, and do not propagate at the speed of light—a slow speed when compared to Plank's time constant. The gravity impulse is a monopole and appears to travel almost instantaneously everywhere in the universe.

Listening to the sounds of scalar gravity signals with the audio amplifier can be quite

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BLUE BOX

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office to silence the ringing signal. When Pop released S4, the folks can talk to Junior without Junior getting charged because his AMA tape did not show his call was answered—the DC loop must be closed for at least three-seconds for the AMA tape to show Junior's call was answered. All the AMA tape showed is that Junior let the phone ring at the old homestead for almost 30 minutes; a length of time that no Bell Operating Company is likely to believe twice!

A modern Red Box is simply a conventional telephone that's been modified to emulate the vintage 1940 military field telephone. Aside from the fact that the operating companies can now nail every Red Box user because all modern billing equipment shows the AMA information concerning the length of time a caller let the target telephone ring, it's use has often put severe psychological strain on the users.

Does getting electronics mixed up with psychology sound strange? Well it isn't because it's what helped Ma Bell put an end to indiscriminate use of the Red Box. The heyday of the Red Box was the 1950's and 1960's. Mom and Pop were lucky to have finished high school, and almost without exception, both elementary and high schools taught honesty and ethics. Mom and Pop didn't have the chance to take college courses in *Stealing 101* that masqueraded under quaint names such as *Business Management*, *Marketing*, or *Arbitrage*. When Junior tried to get the old folks to use his "free telephone" they just wouldn't go along. So Junior installed the Red Box at his end. He gave one ring to notify the family to call back. When Pop called Junior, it was Junior who was using the Red Box. Problem was, Junior didn't know that the AMA tape for Mom and Pop's phone showed a 20- or 30-minute ringing. When Ma Bell's investigators showed up it was at the old homestead; and it was only then that the folks discovered their pride and joy had been taught to steal.

There are no hard facts concerning how many Red Boxes were in use, or how much money Ma Bell lost, but one thing is known: she had little difficulty is closing down Red Boxes in virtually all instances where the old folks were involved because Mom and Pop usually would not tolerate what to them was *stealing*. If you as a reader have any ideas about using a Red Box, bear in mind that the AMA (or its equivalent) will get you every time, even if you use a phone booth, because the record will show the number being called, and as with the Blue Box, the people on the receiving end will spill their guts to the cops. **R-E**

WIDEBAND AMPLIFIER

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tween the NE5205 case and the groundplane. If you prefer, electrically-conductive epoxy may be used for that.

Capacitors C1, C2, and C3 are 0.1-µF surface-mounted high-frequency ceramic chips. A small drop of quick-drying adhesive such as *Crazy Glue* will hold them stationary during soldering. Solder coupling capacitors C1 and C2 to their respective pads on the input and output signal traces. Bridge the gap between V_{CC} and the small ground plane with decoupling capacitor C3 and solder it into place.

The last step in the assembly portion of the project is to strap the top and bottom ground planes together. Don't run long wires to do that. A better, and a far easier way to accomplish the task is with inexpensive, self-sticking ¼-inch copper tape; the kind used in making stained-glass windows. (The tape can be purchased at most craft centers.) Wrap the tape around the edge of the board to the top and bottom ground planes and then flow-solder the tape to the copper foils.

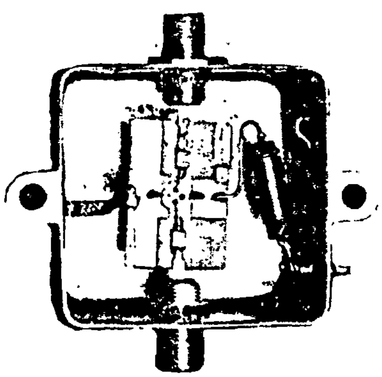

FIG. 7—THE AMPLIFIER CAN BE BUILT into existing equipment, or made part of a stand-alone device, such as this CATV amplifier.

Applications

The amplifier can be used in a wide variety of applications, such as a CATV line amplifier, a 70-MHz satellite amplifier, or a composite video amplifier. The circuit can also improve the operation of 2- to 160-meter amateur radio equipment; AM, FM, CB, and shortwave radios; 50-ohm test equipment; frequency counters; and oscilloscopes. By using a phantom power source on the signal lead, it can even be used as a rooftop antenna preamplifier, such as shown in Fig. 6. Your application will determine whether or not a case is needed. The board either can be incorporated in a piece of existing equipment or mounted in an RF-tight case (see Fig. 7) for stand-alone use. **R-E**

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GRAVITY

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ponent arriving from other directions such as vectors *a* and *b* will be largely canceled because those vector components are not parallel with the electric field in the capacitor; leading to reduced gravity components *a'* and *b'*. Only the gravity components arriving along a line through the observer's meridian and the center of the earth will be most effective in exciting the capacitor element of the gravity detector

Gravity telescope

The gravity-signal detector "sees" the zenith of the observer's celestial sphere through a very small aperture. That small aperture "beam" sweeps across the celestial sphere (at the observer's latitude) at the rate of the earth's rotation. In that respect, the earth's rotation has a period of 23 hours, 56 minutes, and 4.1 seconds of civil (ordinary) time, and that period is called a *sidereal day*.

As shown in Fig. 9, the Milky-Way galaxy center as observed on the author's meridian appears predictably about four minutes earlier each day with respect to standard (civil) times. Also note that another gravity event occurs approximately 35 seconds before the galaxy-center appears, which was used by the author as a marker. The author suggests that the chart recordings are gravity signals emitted from the Milky-Way galaxy center, and *not* random electrical fluxuations that traditionalists call noise.

To locate astronomical objects, use a circular-type-chart star finder, which is more generally known as a planisphere. The charts are calibrated for different Earth latitudes in standard (civil) times for each day of the year.

The sky charts, or planispheres, are also calibrated in terms of right ascension and declination, so that objects may be located in terms of those parameters if they are known. For example, the galaxy center is known to be located in the Sagittarius constellation region in the southern hemisphere at about 17.7 hours right ascension and about -29° declination. Locating that spot on the meridian of the observer's celestial sphere will enable the experimenter to use the planisphere to determine the day and time of day when the Milky-Way galaxy center will appear there.

The gravity detection process is shown in Fig. 10 for two common galactic gravity events. A Supernova implosion will generate an oscillatory modulation of the g-field to an observer at position "A". A Black Hole, on the other hand, will actually reduce the g-field for an observer at position "B". The effects of those cosmic events, and others, will now be considered in more detail.

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XMAS TREE

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Construction

The PC board can be made photographically using the foil pattern shown in PC Service, or the pattern can be used as a guide for applying liquid and tape resist by hand. Although the foil pattern itself is only 5-inches high, the PC board material must be 6¼ inches high because the tree's 1¼-inch trunk is part of the PC board. Since etching large copper areas not only takes excessive time but also shortens the life of the etchant, we suggest you trim away the unwanted PC board material before you etch the board. Or, if you prefer to cut the tree to size after the pattern is etched, protect the foil of the large unused trunk area with resist and simply let the copper remain. As long as the trunk's foil doesn't come in contact with any of the circuit traces it makes no difference whether it's there or not.

If you want to decorate the front of the tree, do it before the holes for the components are drilled. For example, the author sprayed the component side with a bright automotive metallic-green paint. To prevent a defined line, a cardboard mask was held about ½-inch above the board. Then, the edge of the PC board was "dusted" with a fine mist of white paint to simulate snow. After allowing for adequate drying, again using a cardboard mask, the trunk portion of the board was painted with a metallic-brown paint.

Allow the decorative paint to dry overnight before drilling the component mounting-holes. Then install and solder the eight jumpers, the resistors, the IC's, and the capacitors. Then insert all the LED's, observing the polarities shown in Fig. 2. Position the LED's so that they are raised approximately ½ inch off the board. To do that, turn the board over and lay it down on a flat surface, being careful not to allow any LED's to fall out; that can be done easily by holding a piece of stiff cardboard against the LED's while turning the board over. Keeping the board parallel to your work surface, solder one lead of each LED. Turn the board over and carefully look across the surface to see whether the LED's are straight and at the same height. If not, correct as needed. When you're satisfied with their alignment, solder the other lead of each LED.

Adding the base

Prepare the surfaces of the battery holders and the PC board for gluing by sanding the back of each holder and a ⅜-inch strip on both sides of the circuit board at the bottom of the trunk. Mix a small amount of a 5-minute epoxy and apply some to the ⅜-inch strip on both sides of the circuit board. With the battery polarities opposite each other, sandwich the PC board between the holders. Hold the assembly firmly on a flat surface that's covered with a piece of wax paper. You will have a few minutes working time before the epoxy sets to ensure proper alignment. Make certain that the holders are even and that the circuit board is centered and upright between the holders. In about 5 minutes the glue will have set up sufficiently, and the tree can be lifted from the wax paper. Use acetone or flux remover to clean excess glue from the bottom of the battery holders. As with most other cleaners, be careful not to touch the painted surface.

After allowing at least one hour for the epoxy to cure, solder a jumper wire at one end of the battery holders, across the adjacenet positive and negative terminal lugs. From the battery source ends, solder the positive and negative leads directly to the foil traces—as shown in Fig. 2. The LED's will start to flash as soon as the batteries are installed. Any LED that fails is most likely defective, or installed with reversed polarity.

You can add a final "dress up" by gluing a colorful felt material over foil traces on the back of the board. **R-E**

GRAVITY

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Galactic events

A few of the more prominent galactic events will be briefly described to aid the experimenter in recognizing their signatures.

Nova: A Nova is believed to be a star that ejects its outer layers in a violent explosion. As shown in Fig. 11, the large transit movement of mass creates two prominent features (or signatures) for that explosive event; the "blast" itself is then followed by the "tailing" of the blasted material as the gravity detector moves away due to the rotation of the earth. A Nova generally does not leave a lasting gravitational trace because the amount and density of the expelled material is not that great; although new Nova explosions are commonly observed.

Supernova: A Supernova is believed to be a star that exceeds a certain critical mass and then collapses to a small dense Neutron Star, or a Black Hole structure and, in that process, expels much of its gaseous material. The entire collapsing process, which occurs only in a few hundred milliseconds, is observable with the author's gravity detector. As shown in Fig. 12, a plot of a Supernova has certain prominent features. First, there is the actual collapse of the core of the star that generally appears as a sharp dip. The expulsion of the gaseous mass layer is now much more pronounced, which again gives rise to the tailing effect like the one of an ordinary Nova. Supernova, however, also shows a mass build-up due to shock-wave action, and that might appear as a bump in the tailing response.

Black Hole: A Black Hole-type structure is generally developed by a very massive Supernova event, and is usually developed 24 to 48 hours after the event. An ancient Black Hole, as shown in Fig. 13, appears as a rather deep gravity shadow of very narrow width (time of response) since it is rather small in size—being only a few miles in diameter.

Galaxy Center: The Milky-Way center collectively generates a massive and predictable gravity response, as shown in Fig. 14.

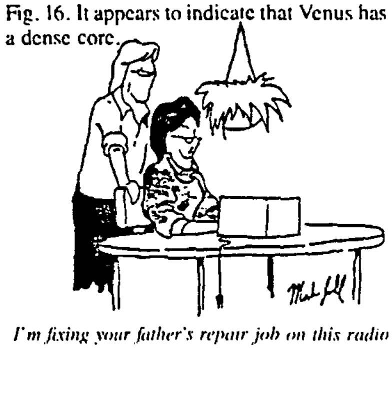
Solar system events

Those who possess a strip chart recorder may wish to observe the planets that make up our solar system. The outer planets while massive are of low density and thus difficult to observe unless their exact time of transit on the observer's meridian is know; and even then the results are often difficult to plot. The inner planets, while denser, must be observed in a background relatively free of other cosmic events. It is unfortunate, but the gravitational background of cosmic events tend to mask solar system gravity sources.

Probably the easiest local astronomical body to observe will be our sun. It is located on the observer's meridian at noon and at midnight. Using a low system gain, a typical scan of the Sun is shown in Fig. 15. The twin peaks of the scan seen in the center of the scan are believed to represent the nuclear core. The body of the sun is gaseous (low density), and, thus, gravitationally transparent. The sun's mass shows little differential from the averaged background level, except for the core, which shows an increase in density that measures about 50 mV above the averaged background level of about 1.5 volts.

The Moon is *not* an interesting object for gravitational observation because it's difficult to detect against a background of gravity events that tend to mask the moon's transit.

To catch the planet Venus you must know the right ascension location for the day you want to scan. A scan for Venus is shown in Fig. 16. It appears to indicate that Venus has a dense core.



I'm fixing your father's repair job on this radio

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SIMPLE GRAVIMETER DETECTS GRAVITY 'SHADOW' SIGNALS

by G. Hodowanec

Abstract

Briefly described is a simple gravity meter (gravimeter) where the restoring force or 'spring' of the scale system also provides for an elecrical readout for the system. The unit is extremely sensitive to the many gravity field variations which are due to passing cosmic mass 'shadows', as well as other cosmic effects, as they appear superimposed on the earth's static gravitational field. The simplicity of this system should enable electronic experimenters, amateur astronomers, as well as other interested investigators to contribute to the exploration of our universe in terms of these gravity signals.

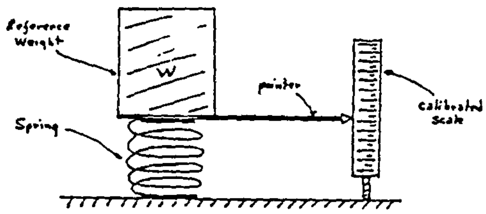
Background

The development of rhysmonic cosmology[1] by the author has led to the prediction of a new type of gravitational 'wave' radiation signal and its detection by simple electronic circuit means.[2] The electronic circuit detector is well-suited to the detection of the more transient cosmological effects, such as nova bursts and starquakes, for example, since the electrons in the detector element readily respond to such gravitational signals. The electronic detector, moreover, also serves as a gravimeter, or gravity meter, since it retains an averaged DC component which reflects the level of the earth's static gravity field, as well as any gravitational 'shadows' of cosmic masses or other effects which may be superimposed upon this gravity field. However, the electronic detector element, which is usually but a small capacitor, has only a limited number of perturbable electrons available, and thus much amplification is necessary to obtain suitable signal output levels. The more conventional gravimeter, however, makes use of a more massive detector element, usually a weight made of lead, brass, or steel, and thus there is now a much greater interaction with the gravity signals. By the same token, however, the more massive detector element will not respond as well to the more rapid transient gravitational effects, such as the rapid oscillatory motions of the star core in the supernova blast. However, the units are suitable for the detection of the more slowly moving 'shadow' effects and these could actually be enhanced by the increased mass of the detector element. A few of these gravimeters are now briefly considered.

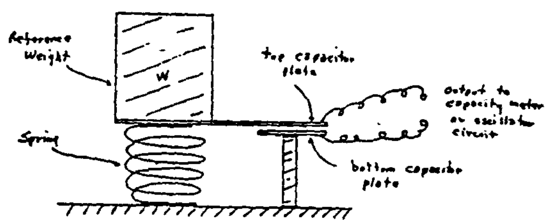
Gravity Meters

Gravity meters, in essence, are simply very sensitive 'spring-type' scale systems. Probably the simplest generally available gravimeter is the ordinary household postal scale unit, especially the well made eight ounce version which has an extended scale pointer. Such a unit, used with a two to four ounce weight, will show up many of the deeper gravitational 'shadows' which may transit this scale system, especially the 'black hole' in the Leo region of the sky.

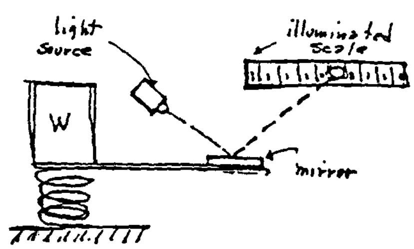
The basic spring scale gravimeter is shown in simplified form in Figure 1(a). The reference weight, W, is resting on a spring element which is used well within its elastic limits so as to have an essentially linear response with weight variations, ie., the system obeys Hooke's Law. The readout is simply a pointer attached to the reference weight; this readout can be direct as shown, or smplified with a lever system. Shown in Figure 1(b) is a simplified sketch of a system where the weight position mechanism can be converted to an electrical signal and thus used with an electronic readout system. The method shown here is a variable capacitance in form, and can be read directly, or indirectly, say to control the frequency of an oscillator. In either case, the change in capacitance is used to relate to a change in the mass



(a) Basic gravimeter with mechanical readout.



(b) Basic gravimeter with capacitive readout.



(c) Basic gravimeter with optical readout.

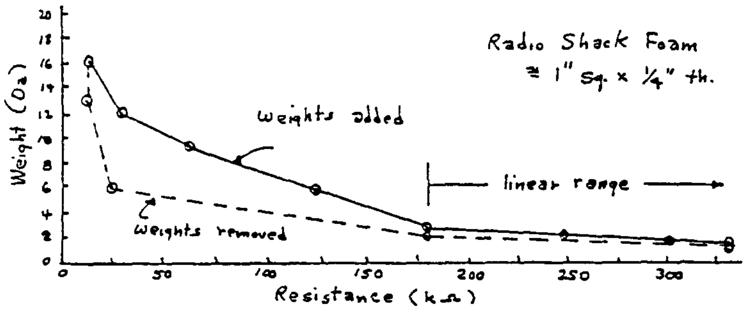
Figure 1. Simple depictions of Basic Gravimeter.

position, and thus a change in the weight. Inductive or resistive elements could also be used in similar fashion to effect an electronic readout of weight variations. Shown in Figure 1(c) is a simplified sketch of a system where the weight position readout mechanism is an optical system having an expanded scale.

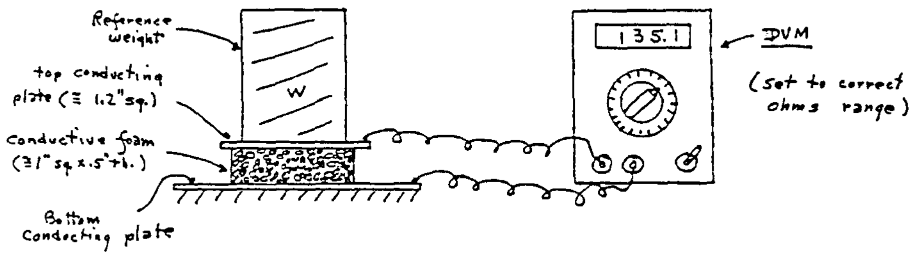
Hooke's Law scale systems are available in many versions, many of these being known as load-cell type units. The spring/readout system may also appear in many versions, ie., as bi-metallic strips, strain gauges, LVT's (linear variable transformers), piezo elements, as well as other types. In practice, gravimeters, especially the commercially available versions, are somewhat more complex and thus quite expensive, but most are based upon the above simple scale types. An especially simple compressible variable resistance type of gravimeter, easily constructed by the experimeter, is considered next.

Simple Gravimeters

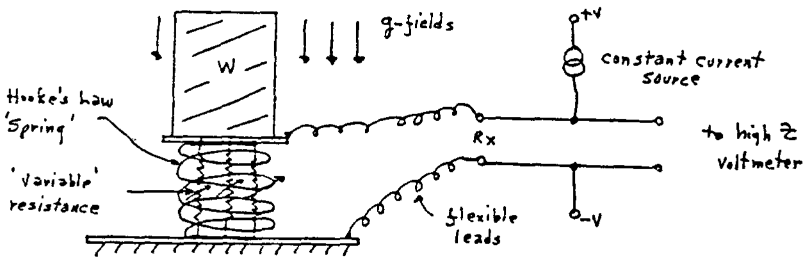
Suitable compressible resistive material is found in several forms, but one readily available material is the conductive foam used by many semiconductor manufacturers to protect static sensitive devices during handling and shipment. A material which was used by the author in some more recent prototype tests is that available from Radio Shack as Part No. 276-2400. Since this material is deformable at high compression levels,it must be used well within its elastic limits as shown in the curve of Figure 2(a). This curve for the Radio Shack material was obtained by adding (and removing) incremental weights to a one inch square of the foam sandwiched between two conducting plates, and then measuring the compressed resistance of the material. As can be seen here, a linear weight-to-resistance response was achievable only if the weight is limited to about three ounces or less. Some hydroscopic effects may also be present on humid days.



(a) The limitations of conductive foam resistors.



(b) Simplest Gravimeter: Practical Realization.



(c) Simplest gravimeter: Basics.

Figure 2. Simple gravimeter using conductive foam.

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The simplest practical realization of this gravimeter is shown in Figure 2(b), while the basics of the system are given in Figure 2(c). The weight, W, when kept under three ounces, will vary with g-fields present while supported by the compressible foam resistor 'spring' as shown. This variable resistance is placed in series with a constant current source. The variatins in resistance (which reflect the variations in the weight) are now read as voltage variations on a high impedance voltmeter. The DVM shown in Figure 2(b) usually contains a built-in constant current source for the resistance ranges, and thus the output voltage changes are read directly as resistance value changes. For the experimenter who wishes to couple the detector to an external voltmeter, strip recorder, or computer system, the simple constant current source shown in Figure 3(a), or any other true constant current source that is available, may be used instead. The simple detectors were built as prototypes by the author using small plastic experimenter boxes which had aluminum cover plates as shown in Figure 3(b). One unit contained the simplest detector only as shown in Figure 2(b), while the other unit also contaianed the variable constant current source shown in Figure 3(a). The aluminum cover plate also served as the bottom conducting plate for the sandwiched foam.

Experimental Results

The experimental data shown here was obtained with the simplest circuit as depicted in Figure 2(b) and assembled as shown in Figure 3(b), with an external constant current source. Similar results were obtained with the unit having the built-in constant current source, but this unit was intended for later use with an analog strip recorder. The data shown was obtained at arbitrary times, in half-hour segments, except for the Leo Region data which was obtained when this region was known to be directly underneath our position on earth.

Only the more prominent excursions in the data

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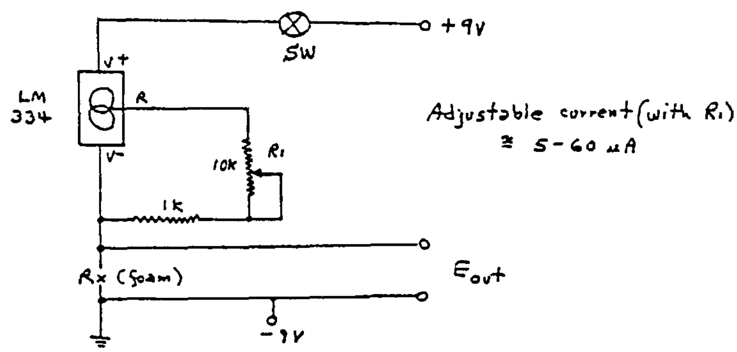
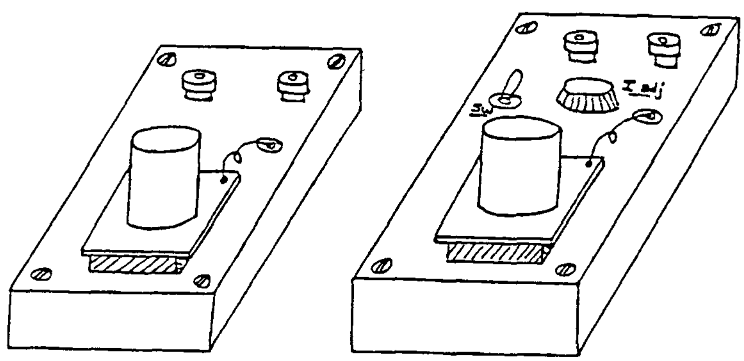


(a) Simple constant current source.



(b) Assembled test units.

Figure 3. Author's prototype gravimeters.

(275)

were recorded (by hand), but there is much fine structure in reality in this data. The response of the gravimeter appears to be essentially due to a straight line 'beam' of about one inch cross-section, inline with our position on earth and the center of the earth. Thus it has very fine resolution. While it normally detects massive objects out in space, it can also detect closer-in mass which may be inline with the detector-earth center line position. For example, a person working two floors above the detector can drive the detector 'nuts' by walking to a position directly overhead the detector unit. Some preliminary tests with the electronic (capacitor) version of the gravimeter had indicated that it was possible to 'sweep' across a space object and thus develop a sort of two-dimensional planar image of this object. Detection is also possible of objects which lie off the zenith and center of earth axis, using the help of gravitational 'shadows' provided by the moon's or sun's position also. Perhaps the shadows of the planets could be used as well. Since the gravimeter position on earth 'sweeps' a slightly different portion of our celestial sphere each day, the detector response is sometimes 'surprising'. Some of the more massive objects are 'seen' on a daily basis, even when they are located somewhat off-center of the observing location. A few of the 'observations' of the simple gravimeter are now given.

Novae: The detection of novae with this detector can take place fairly often since supernova 'blasts' occur at about the rate of about fifteen per second in this universe, and novae by a factor of at least ten times more often (per rhysmonic theory and observations). Therefore, the chances of catching a nova in the act of 'blasting' is fairly good. Shown in Figures (4) and (5) are examples of apparent nova blasts as seen with this detector. There are two prominent features, or signatures, for these blasts. First, when the exploding star discards its outer layer, there is an increase in gravitational flux due to the rhysmonic winds created by the rapid outward movement of

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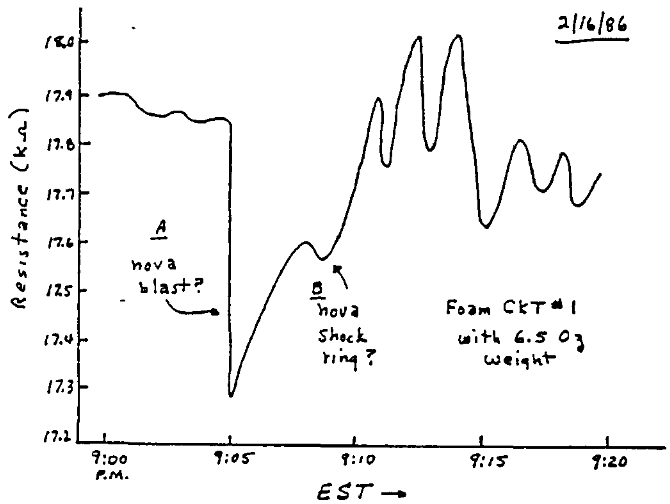

Figure 4. Nova as detected with excess weight.

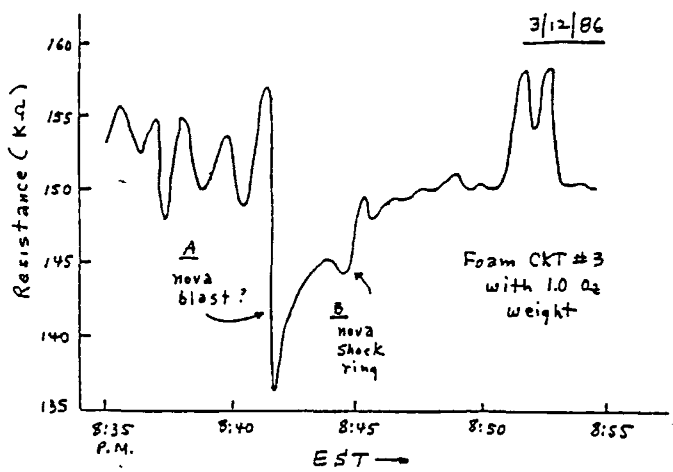

Figure 5. Nova as detected with reduced weight.

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a large amount of mass. In addition, it should be remembered, that for a supernova, the remaining core of the exploding star will 'oscillate' down to a neutron star or 'black hole' size and thus become a highly concentrated mass. However, this oscillatory process can be detected only with the electronic (capacitor) version of the detector which is operating in the QND mode. (See Ref. 2). The net result will appear as an apparent sharp increase in the weight of the mass of the gravimeter element (in the direction shown in the figures when the supernova is located directly beneath our detection prsition on on earth). At this time, all scales in that locality, except balanced-type scales, will read an apparent increase in weight. In general, the 'sweeping' action of the detector, which is a function of the earth's rotation, will move the detector 'beam' away from the expanding star mass, but it will soon catch up with the shock wave of this blast, which is now piling up space debris in what will eventually be the 'blast ring' of this nova. This effect is the second feature or signature of novae. The nova renmants usually can be followed for a few days (four minutes earlier each day) and the development of the black hole and ring structure can sometimes be quite dramatic. Both the nova of Figures (4) and (5) show these characteristic traits, even though they were caught on different days and at different times.

Black Holes: Apparent black holes usually appear with massive supernova events, coming into view after the outer mass of the star had a chance to move away. Ordinary novae, in which only a portion of the star's outer envelope is lost, generally leaves a fairly dense star behind which may or may not be detectable with this sytem. There are also apparent black holes which do not appear to be associated with any

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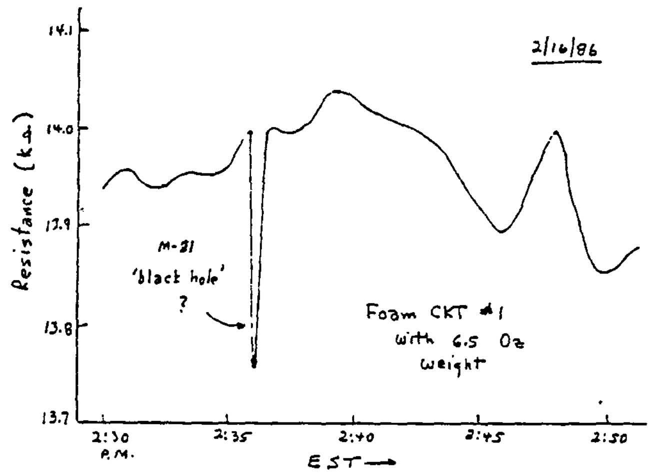

Figure 6. Black hole as detected with excess weight.

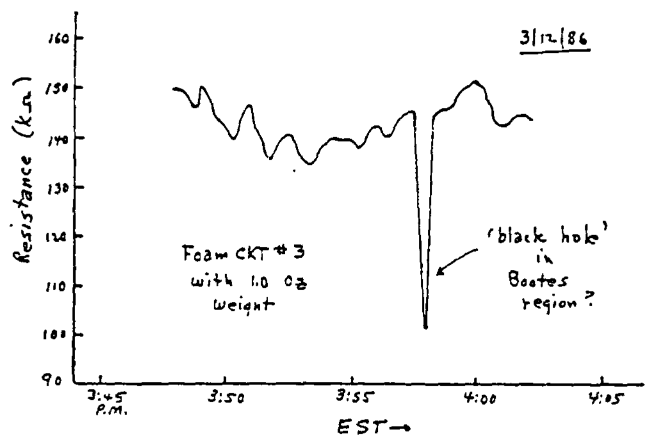

Figure 7. Black hole as detected with reduced weight.

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blast ring structure. These may be very old novae where the rings may have long dissipated into space and thus cannot be seen with this system. Two apparent black holes, as detected with the simple gravimeter, and which seem to be of this type, are shown in Fig. (6) & (7).

Super Black Holes: One of the conjectures of rhysmonic cosmology was that perhaps the center of our universe may contain a supermassive black hole (or holes). In essence, our universe may be one gigantic super spiral galaxy itself, where the spiral arms could be made up of collections or chains of galaxies. Microwave background radiation (MBR) measurements seem to indicate the universe to be somewhat 'hotter' in the direction of the constellation of Leo. Past gravitational 'wave' scans also seemed to confirm the increase in background energy in this direction. However, in addition, the GW scans of this region always indicated that real massive object (or objects) also appear to be located in this region. These objects even affected simple postal scale type gravimeters. Scans of this region with simple gravimeter described here indicate that this area of the universe may contain two super-massive black holes which are gravitationally bound to each other, ie., they are precessing about each other. As a result, the gravitational shadows of these objects are continually changing, depending upon the particular positions of these objects with respect to our location here on earth. Shown in Figure (8) is a typical 'view' of this region which appears to indicate two separate black holes. Shown in Figure (9) is a recent scan of this very same region, but now multiple very dense masses are apparently 'seen'. It is possible to explain this effect if the two massive holes are now precessing in a path which is largely in-line with our position on earth. Thus at times, the holes themselves are in a direct line with us and

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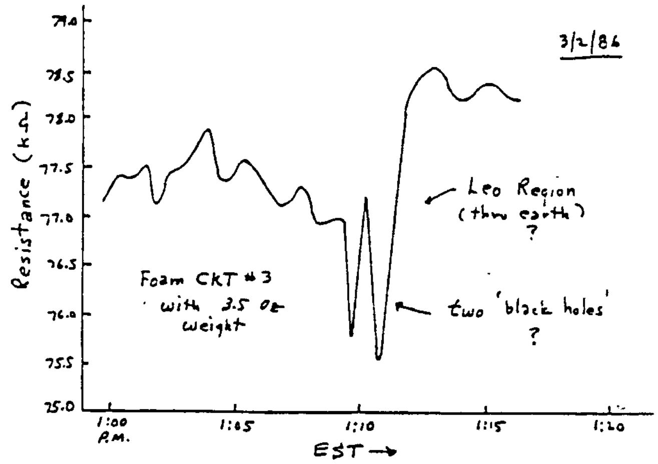

Figure 8. Black holes in Leo region as detected under deformed foam conditions.

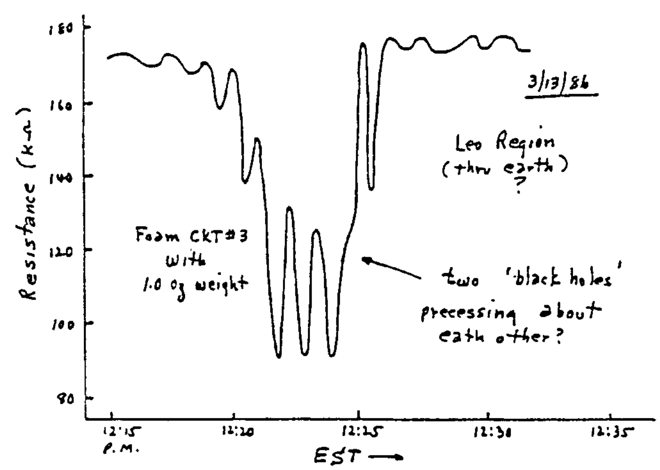

Figure 9. Black holes in Leo region as detected under normal foam conditions.

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thus sum up their shadows, and then move out of line for reduced shadow effects. The precession is apparently very rapid.

CONCLUSIONS

The purpose of this brief article was to introduce the reader-experimenter to yet another simple but sensitive version of gravimeter which responds very well to cosmic gravitational 'shadow' signals. The reader is given some limitations for the resistive 'spring' material in order to avoid the error the author made some time back-exceeding the elastic limit of the foam with the resulting poor and flattened response to gravity signals. As with all sensitive scientific equipments, the experimenter is cautioned to use proper techniques in these experiments. For example, the system must be protected against local shocks and vibrations. The data may be 'colored' with earth core effects or earthquakes, since the earth's 'shadow' is also used in these tests. Moreover, the weight-resistive 'spring' system must be properly centered with the earth's center and allowed to stabilize before useful measurements are undertaken. The technique is open to further experimentation and development by both the electronic experimenter and the amateur astronomer, as well as those professional observers who now may become interested in this material.

REFERENCES

(1) G. Hodowanec, Rhysmonic Cosmology, August 1985.
(2) G. Hodowance, "Gravitational Waves???", Radio-Electronics, April 1986.

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Scalar Fields and Their Interactions

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Abstract

The methods of rhysmonic cosmology are applied to the subject of scalar fields. In that context, it is shown that electricity, magnetism, and gravitation can all interact. The vector field type interaction of electricity and magnetism as electromagnetic effects are fairly well understood. Less well understood are the possible scalar field type interactions of gravitation with electricity and magnetism. Such interactions will be known as electrogravitation and magnetogravitation and are briefly considered in these notes.

Part 1: Some Basic Concepts

Introduction

A cosmology developed by the author is a basic cosmology and thus it may be applied to many scientific endeavors. However, the viewpoints to be expressed here will largely be limited to the incorporation of some of its tenets to the long-range "forces" noted thus far in our universe. These forces may be classified as the electrical force, the magnetic force, and the gravitational force. While some of these concepts were apparently also used in the past, there had not been viable correlations between those concepts with much of today's scientific concepts or tenets. It could be that today's science may be incomplete in many aspects, especially, perhaps, with regard to these long-range forces of electricity, magnetism, and gravitation. While the vector field interactions of electricity and magnetism have been fairly well developed in the area of electromagnetism, leading to much of today's technology, the scalar field interactions between electricity and gravitation, leading to the relatively unknown and unexploited area of electrogravitation, should be further investigated. Even less is known of the scalar field interactions between magnetism and gravitation which could lead to the area of magnetogravitation as a promising new energy source. Electrogravitic effects have already been used by the author to develop sensitive electronic gravimeters which respond to the great many gravitational signals present in this universe.

A better understanding of electromagnetism, electrogravitation, and magnetogravitation will lead to much new technology which will benefit all of mankind. Not only will there be new sources of energy, new modes of transportation, but also myriads of new practical applications which are now beyond our present technology. New knowledge of the nature and structure of our universe which will be obtainable with this

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understanding will enable mankind to proceed on to new heights. It is the hope of the author that the material briefly presented here (and in his past and future publications) are firm steps in that very direction. The time has come for the development of this New Science.

Some Premises

The trio of long-range forces in this universe may be depicted as shown in Figure (1) and briefly summarized there. Gravitation is shown there as the apex of this triangle of forces since it is believed to be a most basic force, fundamental in the design of the universe itself. However, electricity and magnetism are shown as forming the base of this triangle since they have been developed more completely and thus form the very foundations of our present technologies, electromagnetism. The interaction of electricity and magnetism, forming the branch shown as electromagnetism, is a vector field type of interaction which was quite apparent to most early researchers of the classical school of thought in the past and thus it was developed extensively. It can be shown that even this well-established branch may still contain conceptions which are not all that apparent to many conventional researchers.

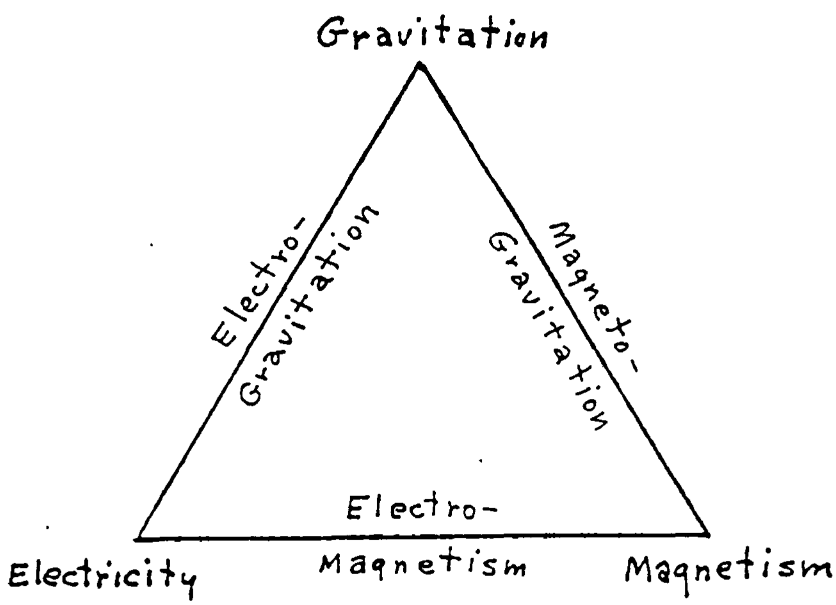

Figure 1. The basic long-range "forces" of the universe.

There are also two side branches shown in the depiction of Figure (1) which are essentially scalar field type interactions and thus also not as readily apparent to many conventional researchers. These form the branches which may be termed electrogravitation in the case of the interaction between scalar electric fields and gravitation, and magnetogravitation in the case of the interaction between scalar magnetic fields and gravitation. While electric and magnetic fields, by their very nature, may appear in either vector or scalar form, the gravitational field by its very nature, can appear only in the scalar form. These side branches are areas of research in which esoteric energy sources and unconventional propulsion means might be developed. While some research has been done in these areas for many years, it has largely been ignored and even ridiculed by conventional science since it required one to change in "thinking" to overcome the prejudices established by some of the current tenets in scientific theories. It will be the objective of these brief notes to present sufficient inputs to indicate to present day researchers that the science of today is more incomplete rather than incorrect, and that the future 21st Century physics and technology may very well lie in the relatively unknown and undeveloped branches of electrogravitation and magnetogravitation.

Remarks:

(1) Electricity and magnetism interact in vector field form, i.e., as "whirlwind" type fields which are interlocked and also propagate at essentially the speed of light. While these field aspects are fairly well understood, there are some little understood aspects which are uncovered with the new cosmology.

(2) Electricity and gravitation also interact, but only in the scalar field modes. Such electrogravitic effects are not well known although they have been recognized in the past. The author has used these effects in simple gravity meters as well as gravitational astronomy techniques.

(3) Magnetism and gravitation also interact, but also only in the scalar field modes. For the magnetism to react, the fields must be of the "curl-free" type and thus these effects have had even less recognition in the past, but have been increasingly utilized in recent esoteric energy schemes.

(4) While these "forces" are recognized as "different" forces, they are actually but different aspects of the same basic force, the fundamental force of the rhysmoid or vacuum, or as is put sometimes, the zero point energy of the universe.

References:

[1] N. Tesla. "The Transmission of Electrical Energy Without Wires," Notes of a Lecture, The Electrical World and Engineer. March 5, 1904.

[2] G. Hodowanec. "Gravitational Waves???," Radio Electronics. April 1986. (pp 53-56)

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Scalar Fields and Their Interactions

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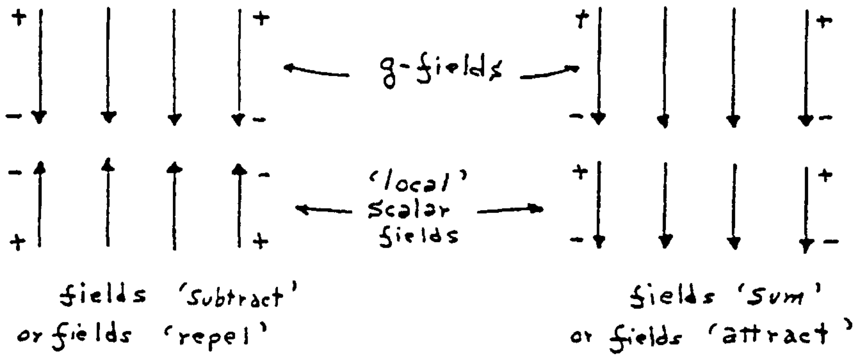
Part 2: Scalar Fields Simplified

Scalar Fields

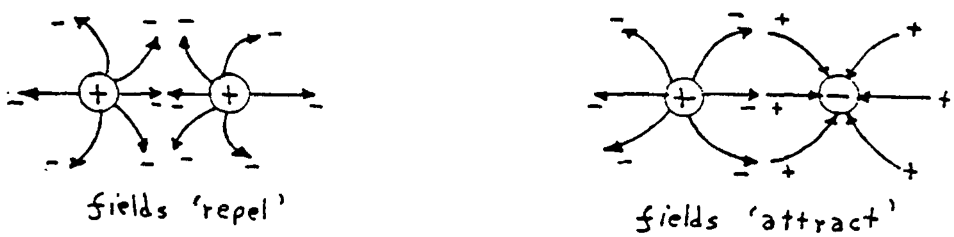
Scalar fields are essentially potential fields which are conservative in nature and thus may be describable in terms of magnitude alone. Such fields are well known, the most commonly observed ones being that of temperature and gravitation. However, the gradients in such fields are also directed energy vectors and as such may add or subtract algebraically, primarily the components which are in the same (parallel) directions. For example, the earth's static electric field and gravitational field are both directed towards the center of the earth. In a small region near the earth's surface the fields may be considered parallel fields having a vertical orientation. Therefore, these fields may interact algebraically with 'locally' created scalar fields and thus could lead to new processes, energy sources, as well as levitation or anti-gravity mechanisms.

Scalar flux (gradients) in rhysmonic theory are directed energy vectors and thus they have a reality since they are "observable" dynamic effects in the rhysmonic matrix structure (aether) which makes up this universe. They are similar to the "lines of force" imagined by Faraday and Maxwell, and are also much the same as those depicted as flux lines in conventional electrostatic and magnetostatic representations. Therefore, the interaction of gravitational flux with a "local" scalar flux field as depicted in Figure 2(a), is very similar to the interaction of electrostatic flux lines as shown in Figure 2(b) and the magnetostatic flux lines shown in Figure 2(c). The similarity is due to the fact that all these flux lines are actually the same directed energy vectors in the rhysmonic matrix structure (aether) of the universe. Therefore, E-, H-, and g-fields are just but different aspects of the basic rhysmonic flux fields.

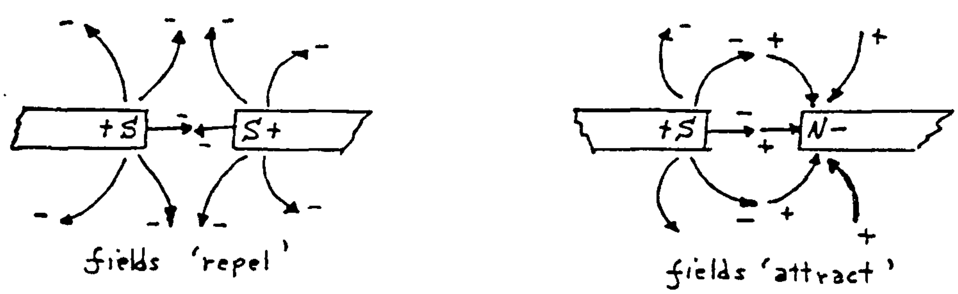
The "pure" scalar (potential) field structure of the universe is not directly "observable" since that structure exists as a "perfectly-balanced geometric and mechanical" structure with the fundamental (unit) energy vectors "cancelling" out each other's "energies," so that no "observable" effects are now present. However, the scalar field gradients as depicted in Figure (2) are 'observable,' either in direct interactions between the gradients, or as interactions with matter, most likely with charged or ionized matter. For example, the scalar aspects of a mass which is placed on a simple scale system will react to the scalar flux of the earth's g-field with a force of acceleration which is recognized as the 'weight' of that mass. However, other scalar interactions may be more subtle and thus would require special instrumentation.



(a) Gravity flux interaction with 'local' scalar flux.



(b) Scalar flux interaction between 'charges'.



(c) Scalar flux interaction between magnetic 'poles'.

Figure (2) - Interaction of Scalar Flux Gradients.

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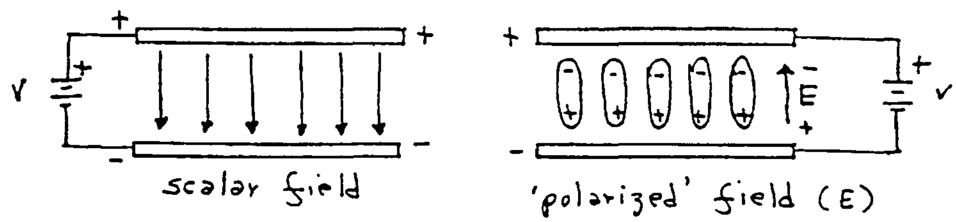
To aid in the visualization of these scalar interactions, the scalar flux gradient may be depicted as "flowing" from + to -, i.e., from regions of high flux density to regions of lower flux density.

Scalar Field Generation

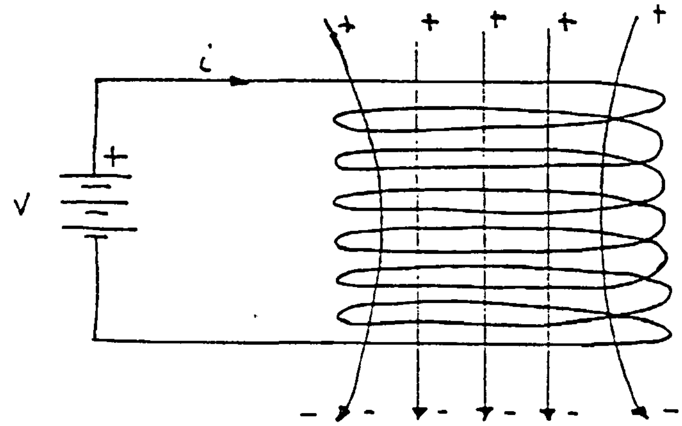
Since the scalar fields as considered in rhysmonics are but aspects of electric, magnetic, and gravitic force fields, their generation involves only these force fields. Scalar fields may be developed at the 'local' level with the basic generation methods depicted in Figure (3). A scalar E-field is generally related to the presence of static charges. A rather uniform scalar E-field at the local level may be generated by charging the plates of a simple parallel plate capacitor as shown in Figure 3(a). The characteristics of this E-field (as generated here) are well known in conventional theory, but few researchers consider the scalar field nature of the flux between those plates! Scalar H-fields (curl-free fields) may be generated with a simple coil configuration as shown in Figure 3(b). While the scalar portion of the flux is limited just to the central regions of this coil, the area could be increased with special coil geometries. Again, many researchers ignore the scalar aspects of the flux in these coil configurations. Gravitational fields are due to the 'shielding' actions between masses as was considered in reference (2). A gravitational flux is by its very nature, scalar, and such a flux is created at the local level just by the presence of two masses as depicted in Figure 3(c). The relations between masses are given in parameters classically determined by Newton, but the nature of this "force" eluded him, although he related it to the presence of an 'aether.'

Scalar Field Detection

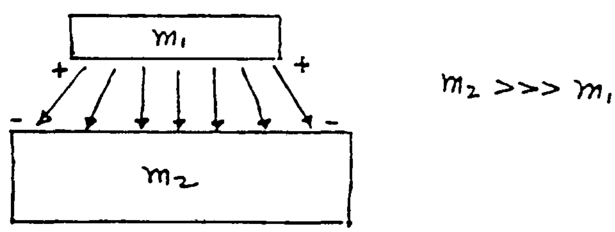
Scalar field detection generally involves the inverse of the processes shown in Figure (3). Polarization effects in a dielectric placed in the capacitor element shown in Figure 3(a) constitutes a very effective detection mechanism for scalar flux gradients and is considered briefly below and in more detail in reference (3). The coil configuration as shown in Figure 3(b) may also serve as a scalar flux detector in that any incoming scalar flux in this coil will 'drive' a small electron flow (current) in the coil. That current may then be amplified to a more useful detection response. The detection of gravitational flux had always been noted in scale systems of various types. Sensitive Hooke's Law scale systems have been used as gravimeters for some time now. The author had previously described a simple scale system with electrical readout which was useful in observing gravitational disturbances in the earth's g-fields which were due to various astronomical events. Such detectors are highly responsive to g-field variations since the test mass interacts with these fields at the nuclear scalar levels.



(a) Scalar flux fields in a simple capacitor.



(b) Scalar flux fields in a simple coil.



(c) Scalar flux fields between two masses.

Figure (3) - Basic generation of scalar flux fields.

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The simple electronic scalar flux detector shown in Figure (4) and further described in reference (3), responds to all three aspects of scalar flux (gradient) fields, i.e., the E-, H-, and g-fields. The unit operates primarily as an electrogravitic device and has proven to be most sensitive in these detections. Briefly stated, incidental scalar flux 'polarizes' the dielectric of the capacitor and the polarization field 'impulses' are coupled out as small current flows which are then highly amplified to suitable detection outputs. This is a most useful detection unit and it may well have innumerable applications in possible future scalar field technology devices.

The subject of scalar fields is actually much broader than that simply depicted here. For example, the scalar aspects of the 'fields' present within the nucleous of an atom (which fields also interact with external scalar flux in the phenomena of gravity) will vary with the different nuclear structures. This aspect, which many look upon as a possible new 'force' in nature, is shown by rhysmonics to be just another aspect of the rhysmonic matrix structure of the universe. These and many other aspects will be considered by the author in future reports and articles.

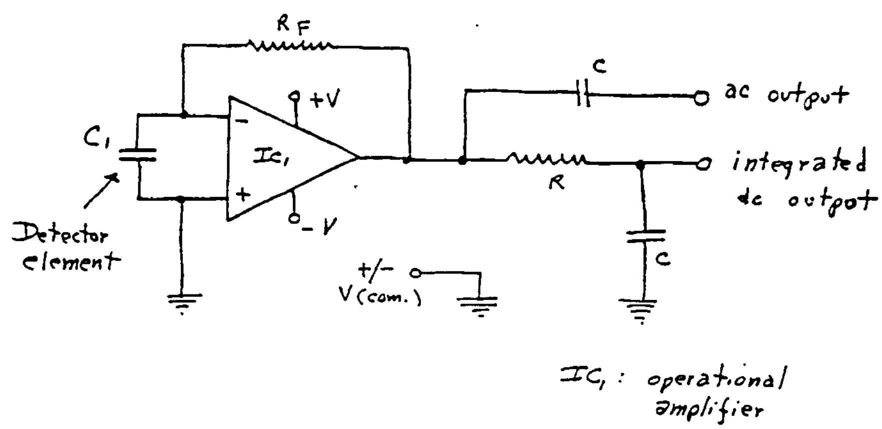

Figure (4) - Simple electronic scalar flux detector.

References:

[1] N. Tesla. "The Transmission of Electrical Energy Without Wires," Notes of a Lecture, The Electrical World and Engineer. March 5, 1904.

[2] G. Hodowanec. "Gravitational Waves???," Radio Electronics. April 1986. (pp 53-56)

[3] G. Hodowanec. "Simple Gravimeter Detects Gravity *Shadow* Signals," Tesla 86. March-April1986.

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Scalar Fields and Their Interactions

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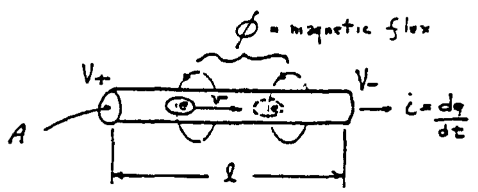
Part 3: Topics in Electromagnetism

Introduction

The subject of electromagnetism from the viewpoint of rhysmonic theory has been considered by the author in his brief monograph [1]. This study has verified many of the concepts of the classical physicists as well as some of the more modern researchers, but it has also disclosed many facets which were and still are not all that apparent to most present day conventional (orthodox) researchers. For example, from the viewpoint of the author's cosmology, the finite velocity of light (or EM radiations) and also the so-called red-shift in the propagation of light over long distances is simply explainable. In particular, it is shown that the magnetic field is related to the process of the relative movement of a charge (primarily the electron) within the rhysmonic sea (or if you wish, the aether). The intensity of the magnetic field will thus be a function of both the number of charges (or electrons) involved, and, most importantly, the relative movement or drift velocity of the electrons within this rhysmonic sea. The rhysmonic sea in the author's theory is essentially a stationary sea, and thus this movement is in relation to that reference. When the relative movement is restricted, such as a current flow in a wire element, the nature of the magnetic field structure may be determined to some extent. This has important connotations which will be further considered under the topics in magnetogravitation.

Determination of Coil Flux

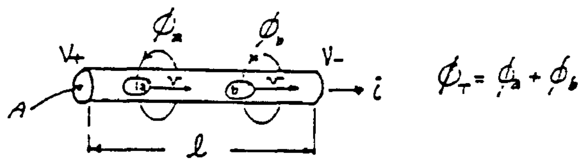
The author believes that coils will be a very important part in future esoteric energy sources and thus he will elaborate a bit on the drift velocity theme expounded above. That philosophy in coil design will enable the fabrication of coils of "high efficiency" in terms of power input requirements. Consider the following:



Section of current carrying conductor.

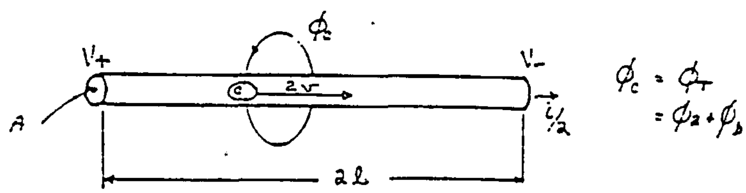
Premise

An electron drifts under the influence of an electric field, E, established by the voltage, V, across a conducting wire element of length, l. The magnetic flux is established by the interaction of the excess rhysmonic vectors of the spinning and drifting electron with the spatial circumferential rhysmonic vectors. (See proposer's Monograph). This establishes a stored energy stress in the rhysmoid, i.e., the vacuum space, which is presently known as the magnetic field. This flux moves at the rate of the drift velocity, v, of the electron and is thus a motional flux field. Moreover, the energy content of the flux field is proportional to this drift velocity. It can also be shown that the drift velocity of the electron, and thus the magnetic flux energy, is related to the conductive wire length and the current in this length. The wire cross-section, A, and the material are assumed to be constant. It should be pointed out that while the rhysmonic effects involved here take place at the velocity of light, C, the drift velocity is a macroscopic effect which is superimposed on the rhysmonic process and thus has a velocity of but just a few centimeters per second.



Determination of total magnetic flux

With a constant cross-section for the conducting element of length, l, and a constant terminal voltage, V, the total magnetic flux is that generated by the equal drift velocities, v, of electron a and electron b, i.e., (Note- The relative size of the flux loop will be used as a depiction of the flux energy content).



Relationships when length of cross-section is doubled

When the constant cross-sectional conductor element length is doubled to, 2l, the current, i, for the constant voltage, B, will be halved as per Ohm's law. When the current is halved, i.e., the electron carriers are

(292) (292)

Scalar Fields and Their Interactions

Part 4: Topics in Electrogravitation

Introduction

The earth's gravity field (g-field) is relatively constant near the surface of the earth and is directed toward the center of the earth. However, it may be considered to be essentially a vertically-oriented and parallel field at any particular site and to contain a flux which will accelerate any test mass at about 980 cm/sec or 32 ft/sec, the so-called free-fall constant of the earth's gravity field. Such a flux field (actually a directed scalar type field) has much energy content as can be seen when that energy is "extracted" in various falling water schemes, e.g., the hyrdo-electric power plants such as that at Niagara Falls. The Russian physicist, Landau, had developed some simple relations that show the potential gravitational energy content near the earth's surface to be possibly greater than 400 KW-hours per cubic foot! Providing that suitable mechanisms are developed for the "energy extraction processes," this gravitational field will be a most valuable pollution-free low-cost energy source. Some thoughts on electrogravitic interactions are given here, but the more important magnetogravitic interactions will be considered in Part 5.

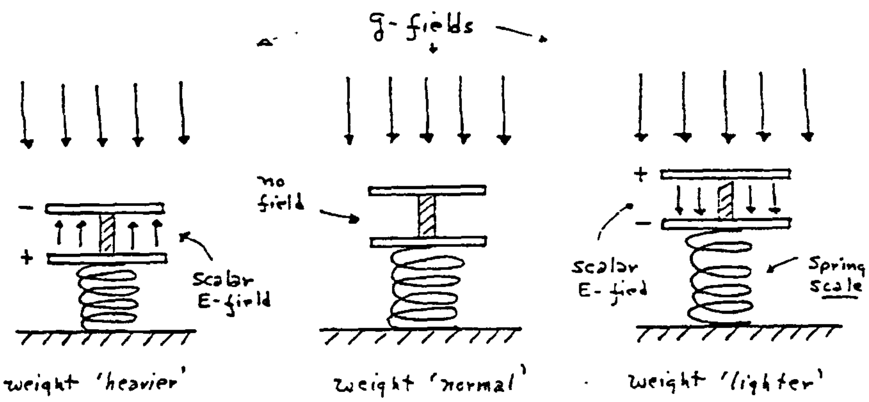


Figure (5) - Interaction of a "local" scalar E-field with the earth's gravity field. (Biefeld-Brown Effect).

Simple Electrogravitic Interactions

Some electrogravitic interactions have been reported in the past and some additional interactions have been reported by the author. Only some brief references to some of these experiments will be given here. For example, the charging of capacitors just upon standing and in some

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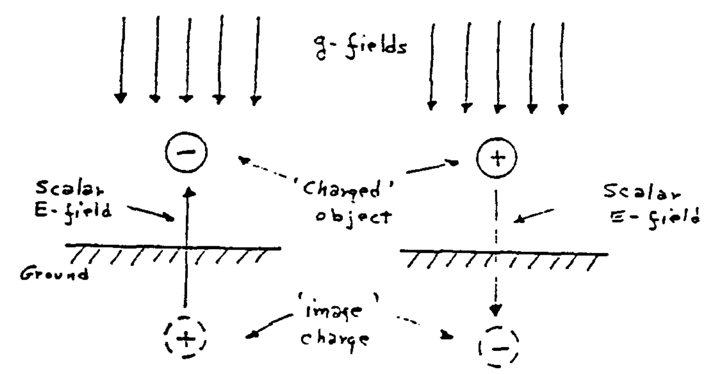
free-fall experiments had been reported by the author [2]. The interaction of a charged parallel plate capacitor as depicted in Figure (5) had been disclosed as the Biefeld-Brown effect many years ago. Simple experiments by the author appear to indicate that isolated "charges" may also interact with the earth's gravity field somewhat as depicted in Figure (6). Here a light negatively charged object is seen to be "attracted" to the earth, while a similar light positively charged object is seen to be "repelled" by the earth. It is believed that a scalar type field formed by the charged object and its "image" charge results in an interaction with the gravity field as was visualized in Figure (2). That these are primarily gravitational effects are seen in observations that the simple charge experiments do not seem to be affected by electrostatic and magnetic shielding effects and perform well in deep basement areas.



Negatively charged object is "repelled" <u>toward</u> ground.

Positively charged object is "repelled" <u>away</u> from earth.

Figure (6) - Interaction of a charged object with the earth's gravitational field.

Verification of the above charge effects, the Biefeld-Brown effect, and some other electrogravitic experiments will be found in reference (5) and thus will not be repeated here. Instead, some experiments which appear to indicate an interaction of gravity with an ionized gas (plasma) will be considered now.

Ion-acoustic Oscillations

An excellent introduction to this subject was given by Moray B. King at the 1984 Tesla Symposium. That paper inspired the author to take a second look at some experiments he had performed many years ago using some military-surplus gas-type regulator tubes. In particular, operation of a surplus Navy-type 300 volt radioactive unit appeared to have had some interesting effects, and, fortunately, the author still had the device on hand.

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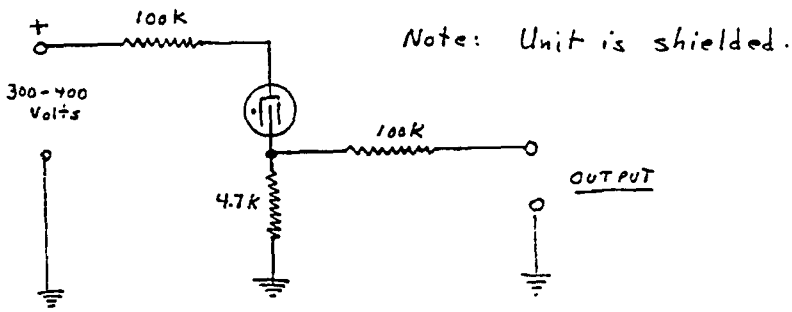
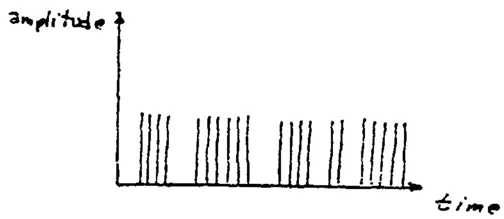


(a) Gas tube test circuit.



(b) "Modulated" 400 Hz response

Remarks:

(1) Monitoring the output on an oscilloscope appears to indicate the detected output to be of a sine wave nature and not triangular as would be expected for a relaxation type oscillator. The response is thus indicative of a "resonance" type oscillation.

(2) The maximum amplitude oscillation at about 400 Hz may be an interaction with supernova "burst" frequencies, which range from 100 Hz to 1000 Hz, but peaks near 400 Hz.

(3) That the interaction with gravitic effects may be the prime mechanism here is indicated by the fact that external scalar impulses could introduce "modulations" in the circuit response, very much the same way as is done with the many other 1/f noise detection devices.

Figure (7) - Possible ion-acoustic interactions with the earth's gravitational field.

The unit was re-evaluated in the circuit shown in Figure (7) which was contained in a metal case which was largely made of steel but had an aluminum bottom plate. Thus it was electrostatically shielded and partially magnetically shielded. When the unit was "fired" on at somewhat over 300 volts as shown in Figure 7(a), much noise output, somewhat similar to the author's 1/f noise detectors, was obtained, but if the unit was exposed to a very slight magnetic field, the unit would go into a strong resonant-type oscillation, generally near 400 Hz. At times

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this oscillation would appear to be modulated with "random telegraphic" type pulses and these reminded the author of the supernova type "burst" pulses seen with his QND type GW signal detectors. Some other oscillations could be made to appear depending on the DC supply voltage and the orientation and strength of the magnetic field present. The strongest commonly observed frequencies were 43 Hz, 330 Hz, 400 Hz, and 920 Hz. These were very intense oscillations, thus the output voltage had to be scaled down about twenty times in order to avoid overdriving the author's audio amplifier input.

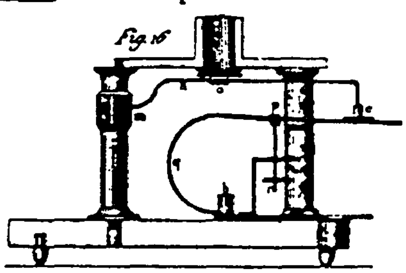
While the effects noted here may yet be just relaxation type oscillations in the gas tube device, the presence of definite resonant frequencies which were quite independent of the supply voltages but could be affected by a small leakage magnetic field (scalar fields?) may indicate a possible interaction with the earth gravitational fields. The possible presence of earth E-field components had been discounted due to the shielded operation of the unit and the basement location. Therefore, it appears possible to be a type of interaction used by T. Henry Moray in his esoteric energy device many years ago and the ion-acoustic resonance expounded by Moray King at the 1984 Tesla Symposium. In fact, two things stood out: 1 -- the oscillations could be "initiated" either with the presence of a small magnetic field (or just the initial pulsing of such a field) and 2 -- the oscillations appeared to be more pronounced in the daytime hours than at night. Both of these aspects had been noted by T. Henry Moray! Since some of these radioactive gas regulator tubes might still be available (or perhaps some experimenters may still have them in their "junk box" as the author did), they may provide a simple way to investigate possible ion-acoustic and gravity interactions as a possible new energy source. T. Henry Moray appeared to have demonstrated that potential many years ago. It is possible that Moray had used both the electrogravitic and magnetogravitic aspects in his device!

References:

[1] N. Tesla. "The Transmission of Electrical Energy Without Wires," Notes of a Lecture, The Electrical World and Engineer. March 5, 1904.

[2] G. Hodowanec. "Gravitational Waves???," Radio Electronics. April 1986. (pp 53-56)

[3] G. Hodowanec. "Simple Gravimeter Detects Gravity *Shadow* Signals," Tesla 86. March-April 1986.



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Scalar Fields and Their Interactions

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Part 5: Topics in Magnetogravitation

Introduction

It had already been noted in Part 4 that the earth's gravity field near the surface of the earth may have an energy content of better than 400 Kw-hours per cubic foot. While that gravitational energy may also be "extractable" in terms of electrogravitic devices, the author believes that magnetogravitic devices or methods would be more practical, especially since there has been more evidence of such interactions, both in the past and in some more recent experiments.

The simple circuit of Figure (4) in Part 2 is an effective gravimeter device and thus it may be used to measure the earth's gravitational flux level, i.e., the gradient in that flux level. If a coil is arranged around the detecting capacitor element of this gravimeter circuit as shown in Figure 8(a), it can be shown that the apparent scalar flux transiting the detector element may be greatly increased when the gravity flux and the coil magnetic flux are "flowing" in the same directions.

This interaction apparently takes place only with a transient flux, i.e., the coil flux is, in effect, either increasing or decreasing. The effect is most pronounced when an existing coil current is abruptly interrupted to develop the so-called back EMF in the coil. Here, the scalar flux now present in the coil may be many orders of magnitude greater than the initial flux which was present during the "magnetizing" stage of this process.

The process may be visualized as depicted in Figure 8(b). During the coil flux build-up time, the scalar flux due to the coil current "opposes" the earth's g-field flux and thus little effect is seen on the average detected gravity flux levels. However, when that coil current is suddenly cut-off, the coil energy which was "stored" in the "curl" of the external magnetic field is now rapidly returned to the coil, developing the high output voltage across the coil as is observed in conventional physics.

However, it is believed that there is an additional effect present in this process also. Components of the flux which had been stored in the external magnetic field may now interact with the gravitational field flux in algebraic fashion since the flux of both are in the same direction. This flux "sums" from over a wide volume of space and will appear in concentrated form within the coil geometry. {It should be noted here

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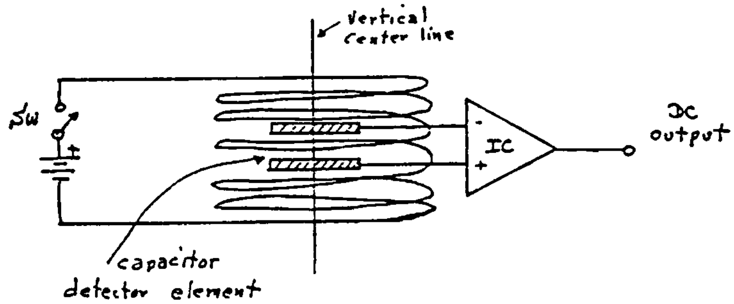
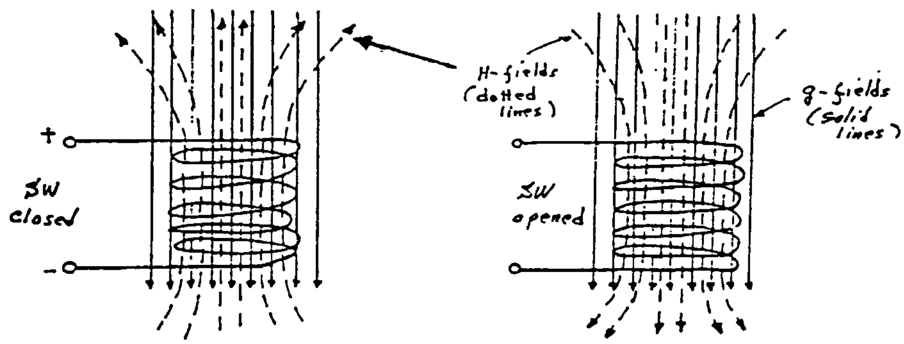
that this effect is present when the coil is essentially "immovable" with respect to the rhysmonic background (aether). Should the coil be light in "weight" or the flux generated be "strong," levitation or an "attraction" by the g-fields may take place instead. Some simple experiments which apparently indicate such effects are described in reference (5).} The return of the original flux is thus "enhanced" with additional flux which is "extracted" from the gravitational field.



(a) Coil arrangement with the electronic gravimeter.



g-fields and h-fields "subtract"

g-fields and h-fields "add"

(b) Interaction of coil flux with earth's gravity flux.

Figure (8) - The effect of coil flux (scalar flux) on the gravimeter circuit of Figure (4).

In other words, the coil energy is "magnified" to use Tesla's expression for the energy increase seen in his Tesla Coils and his Magnifying Transformers or Transmitters. Therefore, this could be a viable way to "extract" the latent energy present in the earth's gravity field and it is

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essentially similar to the process used in extracting gravity energy with falling masses, especially waterfalls. The author believes that this process or mechanism would be more effective only with vertically oriented coils. This may be due to another "effect" which is introduced by the earth's rotation, but this will not be discussed here. Some of these interactions, many of them due to Tesla, will now be briefly considered.

Magnetogravitic Interactions

A simple depiction of the interaction of a coil with the earth's gravity field in this magnetogravitic mode is shown in Figure (9). Here a double-pole double-throw switch is used to alternate the direction of current flow in the coil. If the coil is made up of many turns, i.e., a very long length of wire, the magnetic flux developed in such a coil may be quite high, but the current requirements from the battery, V, could be quite low, due to the factors discussed in Part 3. The interactions seen are briefly listed in Figure (9).

The aspects mentioned in Figure (9) have been noted, more or less, since the days of Joseph Henry and Michael Faraday. It was more specifically utilized by Nikola Tesla in his early Tesla Coils [8] and in some experiments at Colorado Springs [9], as well as by many others since that time. It has more recently been applied by Joseph Newman [10], who also included a novel "motor" interaction to drive the switching mechanism. The author had also applied these aspects to a simple dc type tripolar motor system which was able to run for <u>many</u> days on a single carbon-zinc cell! [11] This area is extremely fertile for esoteric energy devices and the author hopes that he has provided some insights into at least some of the potential here.

Probably the most interesting aspects for these techniques has appeared in Tesla's Magnifying Transmitter, which he developed more fully at Colorado Springs at the turn of the century! Since many researchers have looked at this work from many angles or viewpoints, the author will conclude this brief "rhysmonic look" at scalar fields with still another interpretation of the Colorado Springs experiment.

Tesla's Magnifying Transmitter

Tesla had great promise for this system in both energy transmission as well as communication purposes. He correctly realized that it was <u>not</u> operating in the ordinary electromagnetic (vector) mode but in a longitudinal or <u>scalar</u> mode. His device is rather easily explained in terms of rhysmonics, as will be shown in the simple depiction shown in Figure (10). It is really a modification of his earlier Tesla coils, but it now has some additional connotations.

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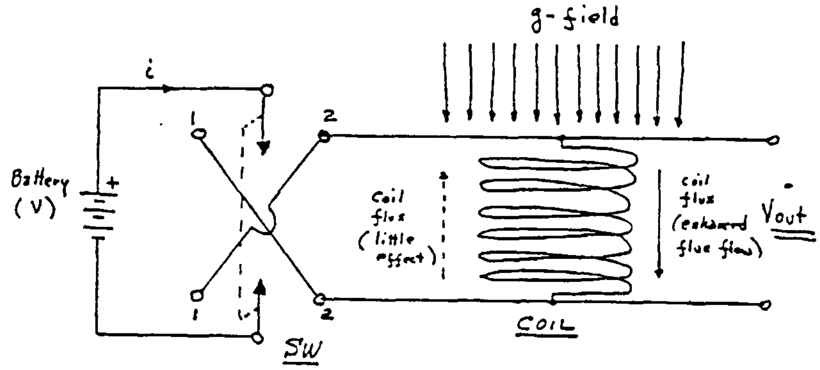


Operation:

SW Position	Coil Flux	Output	Comments
#1 closed	Upward	$V_{out} = V$	no effect from g-field
#1 open	Downward	$V_{out} >>> V$	much increased flux!!
#2 closed	Downward	$V_{out} > V$	increased flux flow
#2 open	Upward	$V_{out} = V$	no effect from g-field

Remarks:

(1) When SW is in position #1 (closed) and in position #2 (opened), output V_{out} is battery voltage only.

(2) When SW is in position #1 (opened) and in position #2 (closed), then the output V_{out} is many times the battery voltage!!

(3) The conditions given in (1) and (2) above are for the transient opening and closing of the switch SW.

(4) The power of the coil in the enhanced flux flow mode is very high since an appreciable electron current flows in the coil under such conditions. This is somewhat similar to the enhanced electron flow seen in a high inductance choke coil where a DC current flow is interrupted. The return flux (at high potential) will generate a large current flow which continues for an appreciable time afterwards as a rather strong "brush" type of discharge.

Figure (9) - Magnetogravitic effects seen in a coil.

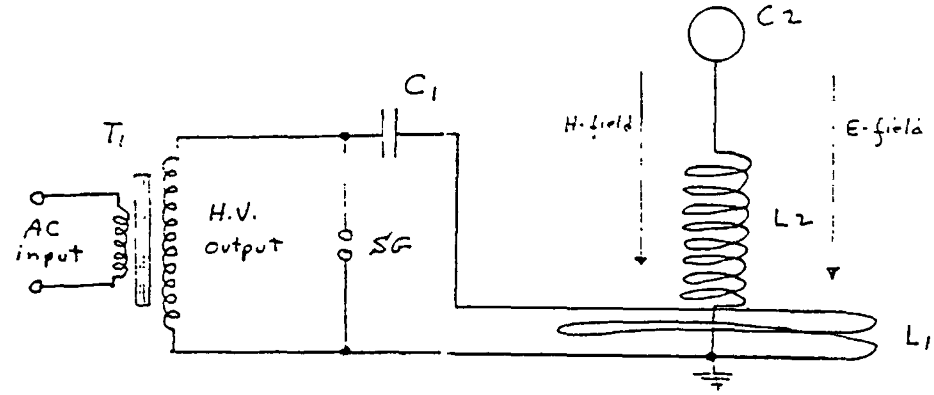
In this particular presentation, a high voltage transformer, T_1, of the normal kind is used to charge a capacitor, C_1, in the simple resonant circuit made up of L_1 and C_1 as shown in Figure 10(a). The ac voltage from the high voltage transformer, T_1, drives a coil current in the primary winding, L_1, which is made of large radius. The <u>scalar</u> flux which is generated in the central regions of this coil interacts with the gravitational field (using the proper polarity) and the flux "sums," i.e., the voltage sums, and thus builds up on the capacitor, C_1, as depicted at (x) in the waveforms shown in Figure 10(b). The time constant of the LC circuit "smooths" the voltage rise as shown at (y) in that figure. The voltage builds up until it reaches the breakdown potential of the spark gap, SG. At this time, the disruptive discharge of the capacitor results in a high frequency oscillatory resonance in the LC, circuit which then decays to the point where the charging process repeats. Thus, the output consists of "bursts" of high frequency excitations, but at a low frequency rate, typically only a few cycles per second.

Tesla most likely placed this coil in the vertical position and made it of large diameter in order to develop a large-area, vertically oriented, longitudinal (scalar) field in the central region which could then interact usefully with a smaller diameter coil (solenoid), L_2, of extended length which would also act as an air-core transformer in stepping up the high voltage developed by the primary coil to still higher output voltages. Tesla had in mind the "excitation" of the aether, most likely the earth E-fields which were known in his time. At times, Tesla used flat pancake spiral coils since they could develop large area scalar type fields with a much smaller coil radius, and they also had some electrical breakdown advantages.

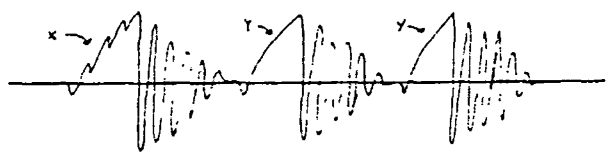
From the author's viewpoint, the interaction is as discussed here, with magnetogravitic effects, since the device generated much higher currents and voltage (power) than could be explained in terms of conventional electromagnetics. The scalar H-field flux generated by the primary coil also enables a high current to flow in the secondary coil, L_2, and this may be used to place a high charge of electrons on the elevated spherical capacitor, C_2, used by Tesla. Thus this capacitor could be charged to a very high potential and thus a very high scalar type E-field could also exist between that capacitor and the ground.

With proper circuit arrangement, the scalar E-fields and the scalar H-fields could be directed in similar directions, thus further emphasizing the scalar interaction of the locally generated scalar fields with the universe's scalar field, i.e., aether. Therefore, in this manner, a rather large area scalar flux could be vertically directed well into the earth's atmosphere or into the earth itself. Tesla noted that corona effects extended far out from his transmitter and it can be assumed that those effects actually extended well into the earth's atmosphere.

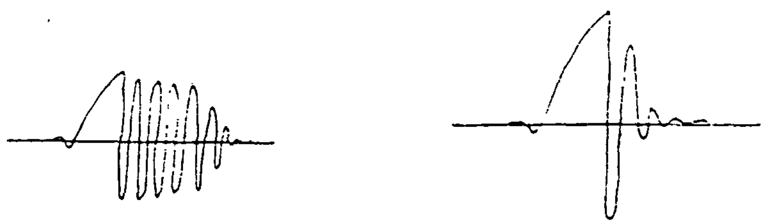
The cyclic nature of the charge build-up on Tesla's elevated capacitor results in the continual "extraction" of gravitational energy which can be "stored" in that capacitance. However, as Tesla pointed out, that energy could be utilized at a much slower rate with its high scalar field energy content, and thus could be used to "excite" various scalar mode resonances, the earth's E- or G-fields, or even of the universal aether itself, as is postulated in rhysmonics.



(a) Tesla's Basic Circuit (simplified).



(b) Typical Waveforms (simplified)



High Q waveform for
HF high voltage outputs

Highly damped waveform
for efficient scalar excitations

(c) Modified Waveforms (simplified)

Figure (10) - An analysis of Tesla's Magnifying Transmitter.

For the excitation of the high frequency, high voltage mode of his magnifying transmitter, Tesla designed the equipment with high Q coils, such that a more extended period of high frequency oscillation would take place as depicted in Figure 10(c). However, for the low frequency

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"stationary wave" modes he apparently applied techniques (mainly methods of discharging his capacitor rapidly, i.e., very highly damped oscillations) such that the scalar aspects of the system are now emphasized. Tesla was now able to say that he was using the longitudinal (scalar) mode of operation where the Hertzian (EM) mode as developed by the HF oscillations were now very much reduced, as is depicted also in Figure 10(c).

While Tesla only referred to "earth resonances," rhysmonics appears to indicate that his resonances may have also been "universe wide." Tesla appears to have succeeded in developing such effects on a grand scale, which had been his intent all along, since he was very much interested in the power transmission capability of these techniques. The author, however, has been able to demonstrate these effects on a much smaller laboratory scale. [12] These effects are most likely present in all esoteric energy sources which make use of coils or magnetic fields in their mode of operation.

Conclusions

The aspects of scalar fields and their interactions as given here are just but the tip of the iceberg in the potential of electrogravitation and magnetogravitation. While such aspects may have been used in the past, and even today, in many cases they were not recognized as such or they were considered from other viewpoints. It is hoped that the rhysmonic viewpoints given here will encourage the many followers of Tesla to look further into these aspects, many of which had possibly already been considered by Tesla in his own way back at the turn of the century. The author hopes that by the turn of this century the fields of electrogravitics and magnetogravitics will have been firmly established as the basis of a new science and technology which the author has now termed: Gravitronics.

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[1] G. Hodowanec. Rhysmonic Cosmology. Self-published, August 1985. (1st Edition now out of print).

[2] G. Hodowanec. "Gravitational Waves???," Radio Electronics. April 1986. (pp 53-56)

[3] G. Hodowanec. "Simple Gravimeter Detects Gravity *Shadow* Signals," Tesla 86. March-April 1986.

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[6] M. King. "Macroscopic Vacuum Polarization." Proceedings of the Tesla Centennial Symposium. Colorado Springs: International Tesla Society, 1984.

[7] T.H. Moray & J.H. Moray. The Sea of Energy. Salt Lake City: Cosray Research Institute, 1978.

[8] N. Tesla. My Inventions. Hart Brothers, 1982. (p. 75)

[9] N. Tesla. Colorado Springs Notes. Beograd: Nolit, 1978. (p.43)

[10] J. Newman. The Energy Machine of Joseph Newman. Self-published, 1985.

[11] G. Hodowanec. Unpublished Data, February 1984:
A small motor ran about 24 hours on a single fresh C-cell without the energy feedback mechanism. The same unit ran 9 days with the energy feedback unit in the system. The unit failed due to brush-commutator problems rather than a shortage of energy.

[12] G. Hodowanec. "Gravitronics: Communicating with Gravity Signals." (To be published by Radio Electronics.)

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Some Remarks on Tesla's 'Earth Resonances'

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On July 3, 1899, Tesla made an interesting observation of the effects of lightning discharges on his detecting apparatus at his lab in Colorado Springs. [1] This apparatus responded to lightning discharges as a closure of a relay contained inthe simple circuitry as shown in Figure 1. What Tesla apparently observed was a repetition of storm activity (as it affected his apparatus) wich had a period of about one half hour as shown in Figure 2. He concluded that this showed the existence of stationary waves originating in excitations either in the earth's atmosphere and/or in the excitations of the earth as a whole.

Since Tesla was known to be an exact and reliable experimenter, his experimental data has been accepted by most open-minded researchers, but many have attempted to explain his data in other terms as well. [2] The writer, who has always been active in esoteric research, but who only became aware of Tesla's work since the publication of the 1984 Tesla Centennial Symposium Proceedings, is also convinced of the validity of Tesla's observations. However, he now will offer even another explanation for the effect which is related to Tesla's work, but is primarily based upon the writer's cosmological theories and experiments with scalar potential fields. [3,4,5]

Tesla's periodic excitations might be connected with an effect of scalar potential fields which had been observed by the writer for many years now, using sensitive scalar flux field detection circuits which had been developed by the writer. [3,4,5] In essence, what has been discovered is that if a **periodic disturbance** in the scalar potential field is made, this disturbance will **repeat** with this period at the **disturbing location** until the energy is dissipated or disturbed in some otherwise fashion. For example, if a short scalar impulse signal of say 2 Hz is activated but two times only, spaced one minute apart, then this impulse will **repeat at that location every minute** until it dissipates in some way, or is disturbed by some other 'local' scalar field actions. Depending upon the original intensity of the scalar perturbation, the effect can be observed for many, many minutes, or even hours! The scalar impulse signal may be as simple as the cyclic movement of one's arm near the detector.

It is believed that the effect is a 'local' effect and may be related to scalar potential field disturbances which occur on the **observer's meridian position** on earth, primarily. However, disturbances **off** the meridian position may be observable if they develop a vertical component at the meridian of the observer. Tesla appeared to have detected such effects

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when he remarked that close-by lightning discharges do not necessarily create strong detected signals as may some more distant discharges. In this context, a more distant discharge which happened to lie on the detector's meridian might develop a more intense response than a close -by discharge which lay somewhat off the detector's meridian position!

The actual resonating mechanism is not too clear at present, but it is definitely related to a vertical scalar-type flux field gradient present at the observer's meridian location. These could be modulations of the earth's atmosphere (Schumann resonances), the earth itself (Tesla resonances), or possibly only of the earth's E- or g-fields, or even of the aether (zero-point energy) itself. The scalar flux may be essentially electrical, magnetic, or gravitic in nature, since all are the same scalar flux vectors in the aether and thus really the same entities, but in different aspects.

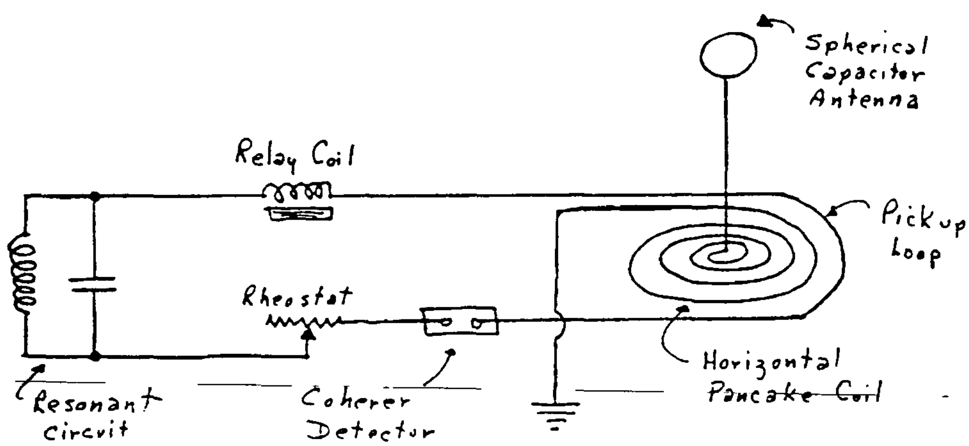

Figure 1. Tesla's Circuit

That Tesla's apparatus as shown in Figure 1 was a scalar flux field detector is further elaborated in Figure 3. For clarity here, it will be assumed that the lightning discharges were modulating the earth's E-fields, (although they could just as well modulate the earth's g-fields or the aether directly, since all are really the same entity.) Assume that the scalar flux field is at the moment directed downward as shown in Figure 3. This scalar field will "charge" the spherical antenna element negatively, with a flow of electrons from ground, through the coil and up to the capacitor antenna element. At the same time, the scalar flux will enhance the electron flow with a direct interaction with the electrons in the extended pancake coil used by Tesla. Thus there will be a useful

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current impulse induced in the antenna-coil combination by the scalar flux field which was developed by the lightning discharge. Since the scalar field as developed here is essentially one of high potential but low current, Tesla made use of the transformer properties of his detector unit to convert the signals to more useful lower voltages at higher current levels (using but a few turns to couple to the many -turned pancake coil assembly). Therefore, a scalar flux field had been converted into a very useful electromagnetic (EM) impulse by this simple apparatus devised by Tesla.

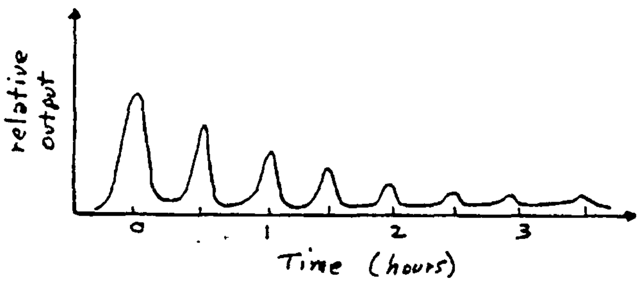

Figure 2. Response of July 3, 1899.

It had been established by Tesla (and by many others since his time) that lightning discharges tend to develop many scalar and vector type field disturbances in the aether. The scalar field disturbances appear to be generally extremely low frequency (ELF) effects, while the vector field components (RF fields) appear to lie generally in the VHF regions of the radio spectrum. The writer has observed very strong flux effects at 1-2 Hz! [5] Therefore, if the parallel resonant circuit in Tesla's detector is tuned to one of the many scalar-type signal frequencies, and the rest of the circuit (especially the "cohering detector" and the relay unit) is adjusted for maximum sensitivity, a voltage pulse of sufficient current can be developed to close the relay unit with each "local" lightning discharge present. Thus Tesla's detector could be (and probably was) a viable detection unit for lightning discharges which developed an apprciable vertical scalar component at his lab site. It could also detect other scalar fluxes due to other cosmic effects, since Tesla noted that the earth appeared to be "alive" with scalar flux signals!

Going back to the writer's scalar flux observations of repeating flux field disturbances, one is required to imply that there may have been two storms that day in July 1899, which occurred about one-half hour apart. These storms did not necessarily need to have been in the immediate vicinity of Tesla's lab (although the one he reported on was), since the only requirement is that they be located on the observer's meridian position. Therefore, the earlier storm could have been located

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relativel far from his lab, but on his meridian position! Tesla made no reference to such a preceding storm, if it occurred, but he had no reason to expect a relation between the two. However, it is known that the Colorado Springs area experienced many thunderstorms in periodic fashion, a fact observed by Tesla himself.

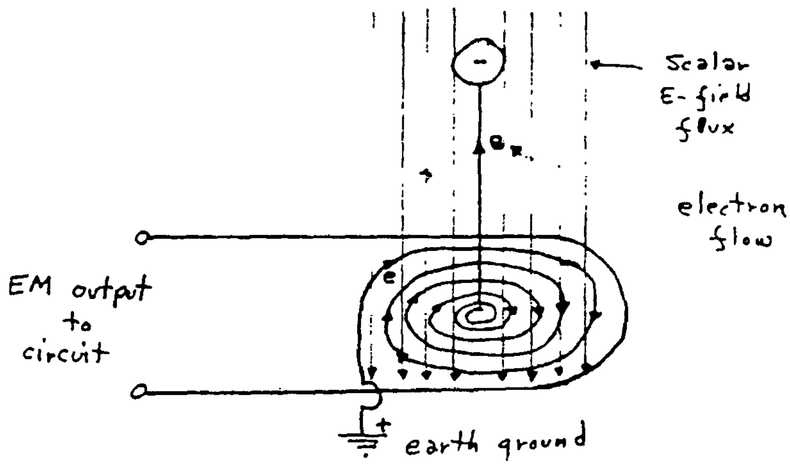

Figure 3. Scalar flux to EM flux conversion.

Therefore, Tesla may have observed an effect on a much larger scale, which the writer observes at will, on a much smaller laboratory scale. I hope this material has been of interest to the members of the International Tesla Society and that it induces some of you to look further into these aspects. With the technology of today, observations can be made with less massive detection circuits than that used by Tesla as can be seen with some of the writer's detection circuits.

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[2] Proceedings of the Tesla Centennial Symposium. Colorado Springs: International Tesla Society, 1984.

[3] G. Hodowanec. Rhysmonic Cosmology. Self-published, August 1985. (1st Edition now out of print).

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Do Intense Scalar Fields Affect Life Processes?

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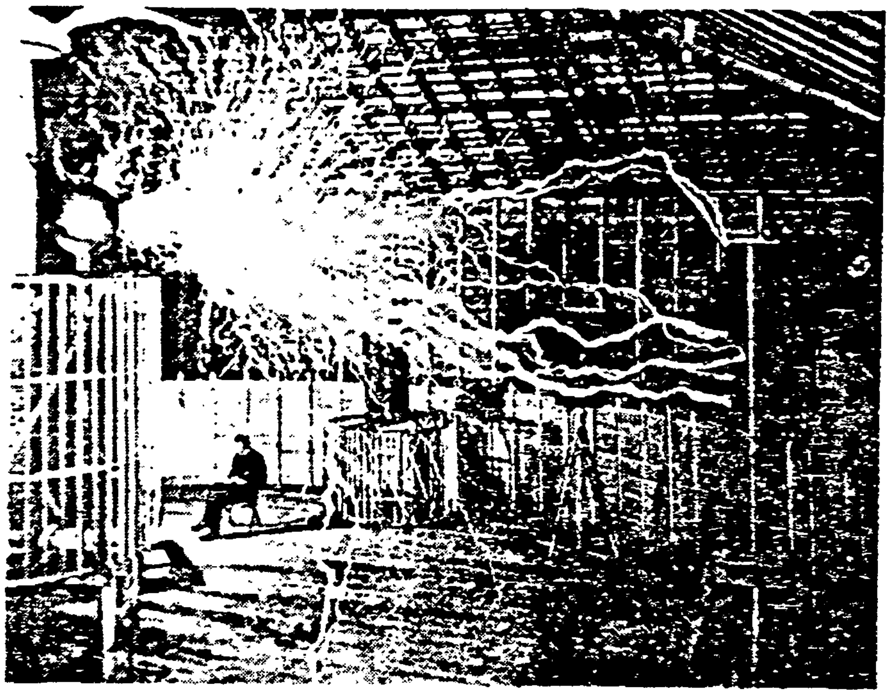
There has always been a question as to the possible effects of a strong scalar-type field, e.g., the Tesla field, on living organisms. On a smaller scale, it had been shown that scalar-type magnetic fields did affect the lifetimes of small organisms. Such scalar magnetic fields are present at the pole pieces of magnets. Small organisms which were living on top of a south magnetic pole piece were shown to have reduced lifetimes compared to organisms which were living on top of a north magnetic pole piece. Interaction between the scalar magnetic field and the earth's gravity field could result in a reduced gravity field on top of the north magnetic pole and an increased gravity field on top of the south magnetic pole. Gravity fields are thus increased when scalar flux is directed in the same direction as the gravity field, and reduced when the flux is directed in the opposite direction. The life forms, therefore, appeared to prosper more under the reduced gravity field conditions. Perhaps that is why small life forms are rather rare at the earth's north pole region (actually a south magnetic pole), but appear to be much more abundant at the earth's south pole region (actually a north magnetic pole).

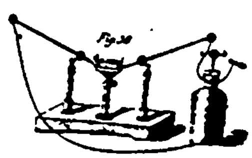
What would have been the effect of the very strong longitudinal scalar Tesla fields on humans if the power levels Tesla had under consideration in his power transmission system had ever become operational? The answer to this question is that the humans and all earthly life forms had always existed in a very strong scalar type field, the gravity field of the earth, and to a lesser extent some strong scalar-type electrical fields as well. The gravitational field near the earth's surface has an energy content of better than 400 KW-hours per cubic foot according to the Russian physicist, Landau. That this may be so is seen in the "extraction" of this energy by means of the falling water at hydroelectric plants! The only effect humans notice from this gravitational flux gradient is that they also experience an acceleration toward the earth, better known as their weight! The more massive the human is, of course, the greater is the effect, and the effect can be quite dangerous if an unchecked acceleration is suddenly checked by another mass at rest!

Since the Tesla field may also be a form of scalar field similar to the gravitational field, there may be only effects such as the change in weight of a person located in such a field. However, if a person were located in a vector-type field, eg., an electromagnetic (or EM) field, having the same energy content as seen in the gravity field, that person would probably be badly burned or even vaporized, since the human body would possibly absorb much of the energy in a heating process, very much the same as is seen in the microwave ovens of today. Fortunately, it is difficult to develop such EM energy densities, except in drastic processes such as an atomic bomb.

Thus, scalar-type field, while containing much energy content, react differently with material bodies, accelerating the bodies rather than heating the bodies. Therefore, the energy system proposed by Tesla could have become a viable system provided the system removed all vestiges of EM radiation in the process. Tesla's early tests did not do so, so that there could have been problems in his proposed further tests. However, further research could have developed the necessary methodology for the safe introduction of such wireless power transmission systems. That day may yet come!



Nikola Tesla--seated near his magnifying transmitter. The magnifying transmitter was built during 1899 in Colorado Springs, CO. With it Tesla was able obtain discharges of 12M volts or more. (Photo from *Colorado Springs Notes*)



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Cosmology

GH Labs
Newark, N.J.
3/15/86
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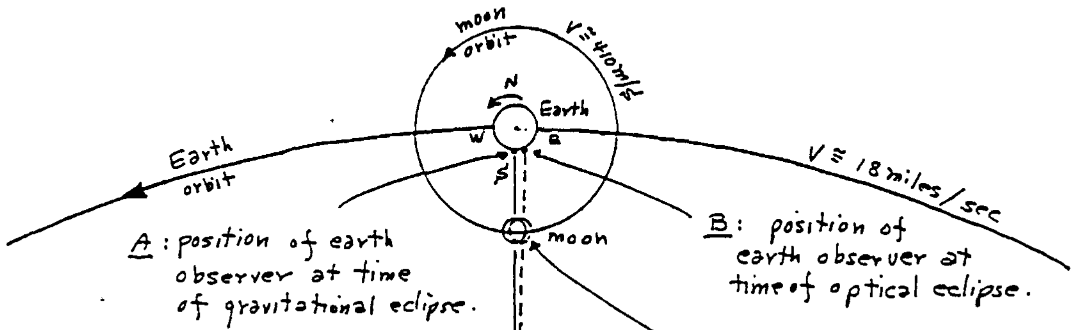
I. Gravitational vs. Optical Eclipse of Sun by Moon (per Rhysmonic Cosmology).



moon shown (solid) at time of gravitational eclipse. moon shown (dotted) at time of optical eclipse.

Notes:

(1) Observer on earth has a relative movement as shown due to the earth's rotational velocity (≅ 16 miles/minute).

(2) Relative to earth, moon has a velocity eastward due to the moon's orbital velocity (≅ 410 m/min).

(3) The stellar aberration (the sun is our nearest star) due to the finite velocity of light and the earth's orbital velocity (≅ 18 miles/sec) places the optical image of the sun to the observer at position B, along the direction shown by the dotted line.

(4) The 'instantaneous' gravitational eclipse occurs in the direction shown by the solid line.

light travel times:
moon to earth ≅ 1.3 sec.
sun to earth ≅ 8.3 min.

gravitational signal path (≅ instantaneous)

optical signal path (as aberrated ≅ 8.3 min. later)

angle of arc ≅ 22 seconds of arc (shown not to scale). ma

'apparent' position of sun for optical eclipse. (due to stellar aberration) & finite velocity of light

actual position of sun for both gravitational and optical eclipses.

Conclusion: Optical eclipses of the sun by the moon will follow the gravitational eclipse by about 8.3 min. due to stellar aberration and the relative movements of the earth and moon. This has been confirmed in the experiment of May 30, 1984. Gravity signals are essentially 'instantaneous' signals!

BR FURTHER CONFIRMATIONS BY THE AUTHOR AND OTHERS DURING SEVERAL ECLIPSES SINCE. SEEMS LIKELY THERE ARE MANY MORE 'EMBEDDED' IN EM ECLIPSE RECORDS(?)

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THE COSMIC CONNECTION

Easily repeated experiments show weight changes in tune with cosmic activity.

WHILE EMPLOYED by a manufacturer of electronic scales, Gregory Hodowanec made an amazing discovery. He was assigned the task of learning why weight measurements wander under fixed load, and stabilizing the readings. Even with attention toward electrical disturbances, temperature variations, and spurious vibrations, the problem could not be eliminated. Heavy low-pass filtering helped, but was of limited value.

After extensive experimenting, he found the fluctuating scale readings were synchronized with celestial events! He further found that what has traditionally been regarded as random noise in electronic circuits is similarly related.

His solution to the wandering scale problem was both highly unorthodox and highly successful. He devised an electronic circuit which was particularly noisy—that is, it correlated well with cosmic activity—and he used this "error" signal to compensate the precision scale for its instability.

Like so many other engineering anomalies, this one was never reported in any professional journal, yet the method was a technical success. In fact, the manufacturer preferred not to publicize the method to the competition.

We introduce Hodowanec's discovery in Part One of this article and extensively survey the geophysics literature, showing that "gravity fluctuations" have been frequently noted over the years. Suggestions are also included as to how you can observe such fluctuations with an ordinary mechanical scale.

Part Two is an article written by Gregory Hodowanec in which he reports weight fluctuations observed with a sensitive postal scale, as well as an ingenious "scale" built from a piece of conductive foam. He continues with plans for building two versions of an all-electronic gravity disturbance detector and suggests possible applications.

For geophysicists, the purely electronic designs are far superior to mechanical gravity meters, and avoid problems with temperature, vibration, and air currents. If electronic detectors were professionally accepted, they could offer an inexpensive alternative to present-day gravity instruments.

You can fully shield an electronic unit electrically and magnetically if you like. It will still respond to extraterrestrial activity, because this is not a local electromagnetic disturbance—it is a "cosmic connection!"

Gravity Fluctuations: An Overview

Part 1

Introduced by Bill Ramsay
Supporting Evidence by Ernst Knoll

Gravity is considered a relatively constant force, the one producing the familiar 980 cm/sec² acceleration. The precise value for a particular spot on earth depends on the elevation above or below sea level.

However, even at identical elevations, it's widely known that there are small differences in gravity from one place to another around the earth. Aside from supposed effects due to the earth's rotation, the usual explanation is that the mass of the earth is different at these places than what it is elsewhere. Some of these gradients (called *gravity anomalies*) are believed to cause the observed bulges or depressions on the ocean's surface of many feet in places. Much of the earth's surface has been mapped according to gravity anomalies, some from satellites.

What is not so widely known—or perhaps known but not admitted—is that there are also gravity anomalies (fluctuations) which occur over *time*. Usually these are subtle, but on rare occasions they may vary by as much as several percent over a few days! Those of half to one percent are more common. Most common are ever present minute variations lasting from microseconds to seconds.

Theoretically, the ever-changing positions of the sun and moon oscillate the apparent force of gravity here on earth. While this oscillation is thought to be responsible for driving the ocean tides, the force is so small compared to the size of the fluctuations we just mentioned as to be entirely negligible. Even at maximum, the tidal force varies by 3×10^{-6} m/sec² over a six hour period according to classical gravitation theory, which amounts to a change of only three parts in ten million in the 980 cm/sec² figure. The gravitational effect from other sources—Jupiter, for instance—is so much smaller even than this,

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that it cannot be detected directly.

You can see that classical tidal forces in no way account for variations of tenths of a percent, or sudden fluctuations lasting for a few seconds. Yet, this is exactly what is occasionally noticed while using ordinary weight scales, and easily detected with very sensitive instruments. Invariably such things are disregarded as "uninteresting background phenomena." The exception is when they stand in the way of human progress.

HODOWANEC'S DISCOVERY

Some years ago, Gregory Hodowanec (pronounced Hoe-doe-wahn-eck) was employed to eliminate such fluctuations for a company manufacturing precision electronic-readout weight scales. (The scales used load cells as the active element.) How could these new generation scales be marketed as "precise" when they failed to show the same readings, under constant load, from moment to moment? In fact, such readings were very precisely showing *actual* measured weight variances!

Working on this "problem," Hodowanec began observing the fluctuations. The most intense reappeared each day with the same general forms (intensities and time durations). He observed that some obeyed the rules of astronomical timekeeping, that is, they occurred about four minutes earlier on each succeeding day. Some were correlated with known cosmic structures (planets, stars, star clusters, etc.) passing directly overhead at the exact times the observations were made!

There was an especially easy-to-spot cosmic structure at times when our galaxy's central core region was overhead. Astronomers have long speculated that there must be mass concentrations at the core of every galaxy. In the case of our own galaxy, the core is visually obscured by very bright nebulae, but radio-telescope mappings do show several massive structures, the most pronounced of which is likely the core and possibly a black hole.

Now, a change-of-weight measurement is what allowed Hodowanec to observe this cosmic activity. Considering that weight is really the force of gravity acting on a mass, and that a constant load sitting on a scale does not vary in its mass (as far as we know), Hodowanec regarded fluctuations in weight as directly demonstrating fluctuations in the strength of the local gravity. It seemed natural to refer to these fluctuations as waves in local gravity, or *G-waves*.

Before moving on, it should be mentioned that some scientists searching for other "types" of gravity waves object to this usage. Einstein's general theory of relativity predicts an extremely weak "quadrature" gravitational wave, which scientists accept. These are strictly speculative, since there's really been no success in observing "their" gravity waves. Hodowanec, on the other hand, has been entirely successful in observing a type of gravity action which is completely unexpected. Ironically, instead of evoking interest from conventional scientists, his discovery has brought contempt.

It's often difficult to free our thoughts from patterns impressed there by years of exposure to widely publicized scientific beliefs. To do so requires that we see subtle connections between things which come to us prepackaged as distinct and unconnected—as do virtually all the findings in today's highly specialized science. In retrospect, the term "G-wave" may have been an unfortunate choice, because it encourages simple-minded assaults. A good response to these objections is, "Until you find some of your own, discussion is pointless. If and when you do, then we'll sort it out."

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Gregory Hodowanec next discovered that fluctuations in the level of background noise in certain electronic circuits were occurring at the same time as the weight fluctuations. This was especially true of amplifiers operating at high gain, such as the ones in the electronic scales. As with the weight fluctuations, these ever-present "random noises" have traditionally been considered uninteresting background phenomena. They still are by most!

Extensive experimenting revealed that the stronger noise variances could be used to directly observe the same actions as those seen as weight fluctuations. The two correlated very well. Hodowanec determined by experiment that common electronic components (such as capacitors) in certain circuit combinations could be used to emphasize responsiveness to these actions, and that this electronic viewing method showed much greater detail than was possible with the scale method.

He used both these methods—weight variances and electrical noise—to do mappings of our galaxy's core. He found the same general structures as those mapped by radio-telescopes *except* for some obvious differences in their relative positions. One structure in particular appeared much closer to the core. This is the sort of rearrangement we might expect to find if the two mapping techniques had been used at vastly different time periods, since everything in the universe is in constant motion.

Remembering that radio-telescopes receive signals traveling at light speed, and therefore that their picture of the galaxy core is delayed by some 30,000 years, Hodowanec felt his techniques were likely observing actions which were instantaneous, and therefore showing the core as it is *now*, and not as it was 30,000 years ago when its images started their journey to earth. If true, this is quite a discovery—especially since the images could be compared with optical and radio ones to see what changes there had been over the many thousands of years, and thereby form much more accurate models of our universe.

Hodowanec's postulate was confirmed during several solar eclipses when he, and others using similar techniques, observed distinctive responses some 8 minutes *ahead of* the visual events. Since 8.3 minutes is known to be the time required for light to reach the earth from the sun, these results tend to verify that G-wave actions are instantaneous.

Our sun is a medium-sized star, so it seems reasonable to consider that if G-wave actions from 93 million miles are easily observable during an eclipse, those of much more massive structures at much greater distances should be also. This seems to be the case in fact, because the more subtle aspects of G-waves are not nearly as diminished by distance as optical ones are—perhaps not diminished at all, but merely overridden or swamped out by a wealth of similar activity in the vicinity. Very simply, G-wave actions are *not* the same as electromagnetic actions and therefore not obligated to obey the same laws.

As we have already seen, what Hodowanec observed cannot be accounted for using traditional theory. The theory says that sun and moon are predominant; the effect of any other cosmic structure is undetectable. Nevertheless, countless celestial bodies—be they sun, moon, planets, galaxy core, or anything else—give a G-wave response. The response, however, does not occur when a body is at just any position in the sky; it mainly appears at the time a body crosses the observer's meridian, or using other terms, when it is within a few degrees of either passing directly overhead (zenith) or directly underneath (nadir) the observer's position on earth.

Hodowanec has a theory as to why this might take place, and as he has done more to try to organize this new science than any previous worker, it deserves consideration. For reasons beyond the scope of this introductory article, he finds it productive to think in terms of extraterrestrial sources *modulating* the existing gravity of the earth. Since the local force of gravity is directed entirely downward for any human-sized spot on earth, he believes this force is strongly modulated by whatever happens to be vertically aligned with it (on the meridian) at that spot. Furthermore, he believes that unless the extraterrestrial force is perfectly parallel with the local force of gravity, it will *not* algebraically add to or subtract from the local force (will not modulate it). This distant force is too weak to act on its own; thus, there will be no observable effect. In this concept the earth's gravity itself is what is doing the actual work, and extraterrestrial effects are merely modulating the intensity of this local "workhorse."

WEIGHT FLUCTUATIONS AND MASS MEASUREMENT

To a traditionally-trained scientist, all this talk of weight fluctuations sounds pretty ridiculous. For this reason we will review supporting evidence from other sources later in this article. And, because apparatus for observing fluctuations is so easy to construct, we encourage you to see it for yourself.

Still, if these fluctuations are as common as we state, why don't they present a problem for laboratory measurements? Weighing is a fundamental activity in every lab in the world, and surely if things were this uncertain, science would have been out of business long ago!

The reason why this is not so, is that we are discussing changes in weight, *not* changes in mass. Mass measurement is used exclusively in laboratory work. Confusion can result because the measurement of either is often called "weighing." Measurement of weight consists in *directly* measuring the force exerted by gravity on an object.

Measurement of mass, however, is a *comparison* of the force exerted on the object with that exerted on a reference object. Basically, the procedure is conducted with the help of a horizontal arm balanced at its pivot point. The object to be "weighed" is placed in a scale pan hung from one end of the arm, and reference masses (counterweights) are added to the pan on the opposite end until balance is achieved. The force of gravity is supposed to be acting equally on both sides of the arm. Therefore, elementary physics tells us that the system, though it is using the force of gravity, is *canceling* this force and directly comparing two bodies of "mass," which is considered to be an inherent property of any object.

The cancellation concept seems to hold, because precision laboratory scales consistently measure mass without ambiguity. However, it might not be wise to say that this is unconditionally true, because we are unaware that it has ever been exhaustively tested. For instance, if the object being weighed and the counterweight were composed of completely different materials, might the cancellation be incomplete, and might we find some fluctuation of the balance point? Still more interesting, if the balance arm is sufficiently long, and if it is aligned parallel with the path of a celestial body as it transits overhead, perhaps the mass at one end of the arm would be influenced sooner than the mass at the other end, disturbing the balance point for a noticeable duration. But in general, force cancellation is the reason for stating that the fluctuations must be observed with a weight scale, and not a mass balance.

VERIFYING THE DISCOVERIES

With patience and care, you can easily verify all the basic aspects of G-wave actions. You can see continuous variations in the G-wave "background" and watch for recurrences from one day to the next. Also, you will be able to identify some of the major variations with known cosmic structures—planets, novae, galaxy center, eclipses, and so on. The most pronounced G-wave fluctuations are easy to verify without any electronics whatsoever. All you need is a good quality bathroom scale, a heavy weight, and persistence!

You must use one of the *spring type* scales. The fancier balance type scales (which use a counterweight) are not suitable for the reason just discussed. Some of the electronic scales (not to be confused with Hodowanec's all-electronic G-wave detectors) may be alright, if they use the functional equivalent of a spring as the means of weight sensing. These scales *will not do* to observe the more subtle short-duration changes, since they are *electronically compensated* against these.

In addition to the scale, a good source of fixed weight is needed. Since small percentage weight variances are the most frequent, the greater the weight, the easier it will be to see results within the scale's limited resolution. Most scales have marks for single pounds. Finer readings can be interpolated from these. A good source for weights is common 8" × 8" × 16" concrete blocks. The "regular weight" ones are about 37 pounds and cost less than a dollar each. Six of these piled on top of each other will give about 222 pounds. A ½% change will then show up as one pound. Twenty five bucks will buy the weights and scale for your basic G-wave experiment.

More advanced experiments with good quality small postal scales can observe subtle changes. Hodowanec uses several of these with weights of a few ounces to double-check readings from electronic G-wave devices. He documents one of his postal-scale observations, and describes an alternative "scale" constructed from conductive foam, in the second part of this article.

You might object to this whole procedure on the grounds that these scales are inherently inaccurate. Yes they are! Certainly they have mechanical problems, and certainly they respond to some degree to temperature and perhaps other environmental factors. Such problems severely limit the usefulness of mechanical scales for these experiments, and make the all-electronic methods of detection developed by Hodowanec much more attractive.

The point we want to emphasize, however, is that if you diligently pursue the reasons for the fluctuations in these scales, you'll find it impossible to attribute all of them to mundane causes. If you load a scale down with weights and leave it sitting in this condition, isolating it if possible from temperature variations and vibrations, you will nevertheless find the weight readings varying with time. This in itself does not prove the fluctuations have anything but local causes. But how can one

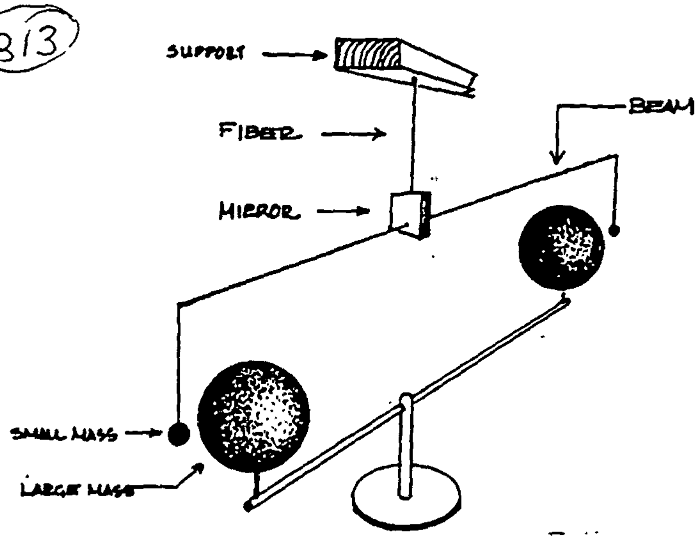

Fig. 1. Cavendish torsion balance measures gravitational attraction between masses.

trivially dismiss fluctuations with the same patterns day after day, or patterns running about four minutes earlier each day, throughout the year? It is simply not reasonable to suppose that even the most predictable of local environmental factors proceed with this kind of clockwork accuracy.

You can read the scale values and record them (keep a log!) according to some schedule, or whenever the spirit moves. Some people are very sensitive to the influences of very small environmental changes such as temperature, humidity, barometric pressure, air ion content, *or gravity*. A good schedule for these folks might be to check readings whenever they feel (sense) that something has changed. The results might be surprising!

By regularly taking weight measurements, you will soon be observing tiny changes, and you will get an idea of what sort of activity to expect. However, it may take several weeks, months, or even longer to observe the more profound weight variances. Since the actual sources of the G-wave actions behind these are not yet fully known, predictions of when to observe can't be made. Good candidates are unusual planetary and other celestial alignments, in which case the exact time will differ for each observer's location.

PROFESSIONAL GRAVITY INSTRUMENTATION

If fluctuations in the force of gravity are so common-place, we should be able to turn to the mainstream literature and see what professionals in the field have to say. First, we must examine the type of instruments that professionals have to work with.

Gravitation-measuring instruments are basically used in two professional settings: first, in the laboratory, most often for a one-time-only run to find some supposedly "constant" gravitational value; and second, out in the field, in geophysical work, where the instruments check the relative gravity of the surrounding terrain.

Instruments of interest to theoretical physics are comparatively rare and specialized. The physicist might employ a version of the Cavendish torsion balance (Fig. 1), which measures the tiny attraction of a pair of large masses for a corresponding pair suspended on the balance. Note that this has nothing whatever to do with measuring the earth's gravity; it merely measures the mutual gravitational interaction between two bodies despite the earth's influence. (The Cavendish balance is commonly found in college-level physics labs.) The physicist may also be interested in measuring the *absolute* value of gravity at the laboratory's particular location. Timing of free-fall or pendulum swings usually serves the purpose.

On the other hand, instruments for relative measurement of the earth's gravity are in widespread use in applied science—namely the field of geophysics, which is kept alive by practical application to prospecting for oil, natural gas, and other resources. *Relative* refers to measurements of gravity at one point compared with that a short distance away, or compared with a non-gravity reference force.

Three principal relative methods have been used. The Eötvös torsion balance (Fig. 2) is similar to the Cavendish method, except that the local mass of the earth substitutes for the pair of Cavendish masses. The Eötvös torsion balance measures spacial variations in gravity, and typically the suspended masses are at different elevations on the ends of the beam.

While the torsion balance compares the force of gravity at two different points, the two other relative methods compare the force of gravity against a reference force of mechanical origin. In the swinging pendulum method, the inertia of the moving mass provides this reference force (dynamic measurement). In the static gravity meter (also called a *gravimeter*), the reference force comes from the elasticity of a spring member. ~~The gravimeter is~~ identical in principle with the spring scale, but actually constructed quite differently to accurately show small *deviations* of force, instead of the total amount of force as with the scale. The spring gravimeter is the method most widely used by practicing geophysicists.

FLUCTUATIONS IN DYNAMIC MEASUREMENTS

We may now summarize the gravity fluctuation situation as follows. (1) Fluctuations over time are universally observed and generally treated as experimental error or attributed to some undesired effect, often temperature transients. (2) Some past workers have correlated fluctuations with celestial activity, with weather conditions, or with earth activity. (3) Fluctuations are largely eliminated from modern instruments by a variety of compensating techniques, and those that slip through into the data are statistically averaged out.

Fluctuations could be studied under carefully controlled conditions in the laboratory. However, only the gravitational attraction between two masses is generally considered—measuring the local gravitational attraction of the earth in the lab is of no particular interest, and there would have to be some specific reason for setting out to do so. Nonetheless, several workers have done this, and it actually provides the richest source of gravity-transient information. One of the most methodical investigators was Dr. Erwin J. Saxl. He was also one of the few able to convince editors of the most snobbish peer-reviewed journals to publish his work, but the papers are quite brief. We now examine his "1970 Solar Eclipse as 'Seen' by a Torsion Pendulum," published in *Physical Review D*, February 15, 1971, pp. 823-825.

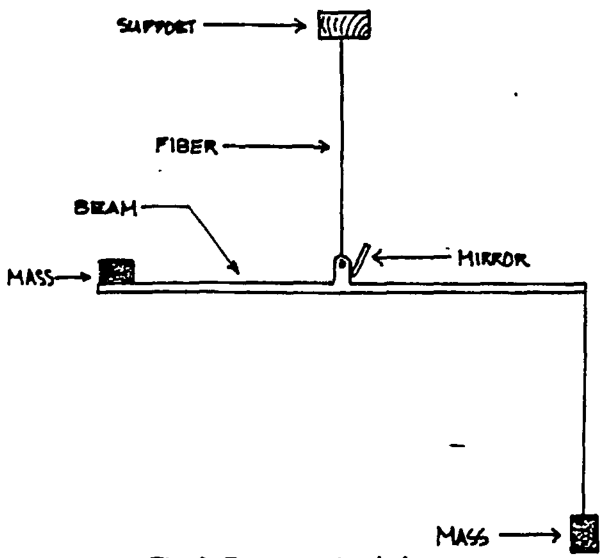

Fig. 2. Eötvös torsion balance measures gravity variations from local terrain.

Saxl's work was based on accurately timing the period of a pendulum set into motion throughout the course of a day. He found that the exact period of the pendulum would fluctuate even under precisely controlled environmental conditions, and he correlated the fluctuations with celestial events. In the paper being considered, he found the period increased during the solar eclipse of March 7, 1970 and stayed at the new value even afterward. When translated from terms of period-of-motion, this represents a substantial increase in pendulum bob weight.

The type of pendulum employed was not the familiar bob swinging back and forth, but rather a *torsion pendulum* whose bob has a twisting motion. (This is different from the torsion *balance* of Fig. 2 in that the balance has a *pair* of masses, and either its period of motion or its static torsional displacement may be put to use.)

Let us quote from that part of Saxl's paper where he compares pendulum twist-times measured during the hour preceding the eclipse with twist-times measured two weeks later, at the same time of day. The readings on both occasions periodically fluctuate in similar manner, and the fluctuation centers about an average twist-time which is larger (longer in duration) at the later date. "On that occasion the sun and moon were on the opposite sides of the earth, whereas during the eclipse they were in conjunction on the same side. This difference in relative position might well explain an increase in the observed times. These times are known to increase with increase in tension on the wire and therefore with gravitational attraction. Thus the moon pulling in the same direction as the earth could be expected to increase the observed times.

"The difficulty is that this *relative* increase of about 2.7×10^{-4} recorded here would require an increase in tension of 1.2 kg.... This is 5% of the total weight of the pendulum bob, 23.4 kg (51.5 lb), and is far greater than classical theories of gravitation can explain. Results of this order of magnitude have been consistently observed in Harvard over a period of 17 years." Comparing the maximum variation in local gravity calculated by conventional theory, "*...our results are about 10^5 times as great.*"

The period of the fluctuations reported in Saxl's data were about one half hour. There were other (faster) fluctuations, but he statistically averaged them in groups of five to give a smoother curve. Whether any of these fluctuations exceeded the maximum average we cannot tell from the data as shown.

Saxl also states that fluctuations have not been observed using "quasistationary experiments underlying [classical gravitational] theory (e.g., spring-operated gravimeters, seismographs, and interferometer devices)." Evidently he was relying on textbook "anecdotal evidence" and did not try these methods himself. Notice that he observed effects around the time of the eclipse peak with his pendulum method, whereas Hodowanec finds maximum effect at the time the eclipsing bodies cross the meridian, regardless of whether this occurs at eclipse peak. If Saxl did run the "quasistationary" tests himself, perhaps he was merely looking for effects at the wrong time.

The eclipse work shows, once again, how differently these effects behave from conventional concepts of gravitation. For, gravitationally speaking, there is no discernable difference between the combined pull of sun and moon in their position just before the eclipse compared with their position when the moon is directly in front of the sun. Nevertheless, the moon passing in front of the sun has a pronounced effect on gravity-measuring instruments in the laboratory.

Somehow, the precise lineup of the heavens with the observer's location on earth plays an important role, and it could be that observed G-wave transients lasting seconds or fractions of a second are caused by "micro-eclipses," as the moon or sun or other planets momentarily eclipse the infinite stellar field. During solar eclipses, at least, it is tempting to think in terms of the moon partially "shielding" the sun's gravity; but none of us really know the answer.

Findings similar to those of Saxl, but using a traditional swinging Foucault-style pendulum suspended from the laboratory ceiling, were published by Professor Maurice F.C. Allais in *Aero/Space Engineering* (September 1959 pp. 46-52; October 1959 pp. 51-55; and November 1959 p. 55) under the title "Should the Laws of Gravitation be Reconsidered?" These carefully-controlled experiments displayed wide variation in pendulum swing time, not the least of which was a cyclic average of 25 hours and disturbance during a solar eclipse. The last paper is an account of simultaneous observations of two pendulums in laboratories in two entirely different cities showing identical average cyclic variation.

The implications are too extensive for us to review here. Suffice it to say that the author was shocked to learn of the sparsity of Foucault experimental data in the literature. "To my knowledge, *the motion of the Foucault pendulum never was observed continuously, day and night, over a period of time of about a month.* The only series I was able to find were fragmentary, but they *all include substantial abnormalities,* which are generally ascribed to defects in the support. They do give a Foucault effect, *but only on an average.* Finally, and to such an extent as might be possible on the strength of the information currently available, nobody ever achieved a perfect $-\omega\sin\lambda$ rotation other than on averages derived from numerous series of observations. All the numerical series of observations now available—and, incidentally, there is a very small number of them—reveal, on the contrary, some variations in the rate of rotation as a function of time." (Author's emphasis.)

Let's turn next to the torsion balance, which in the Eötvös version was once used for gravity measurements in the field. If disturbed, the torsion beam will oscillate, and must be allowed time to come to rest. It is not unusual for a torsion balance of this type to oscillate with a frequency of only one cycle in twenty minutes! You can see that such an instrument is incapable of monitoring gravity transients swifter than this. Even for transients of duration in the neighborhood of the balance's period, it fails to provide much insight into what is actually happening. How, exactly, should a continuous oscillation be interpreted? Does it indicate a slow resonant disturbance, or some type of continuous one?

We happened recently to see an interesting case in the *American Journal of Physics* (April 1988, pp. 348-351). It seems that a Cavendish torsion balance being used in an undergraduate lab (University of Southern Maine) for determining the gravitational constant would sometimes oscillate for no apparent reason. Somehow it was serving double-duty and detecting more than just the attraction between Cavendish masses. Extensive work was done over several years to try and isolate the cause, but at the time of writing, the authors were still stumped. All they can tell us is that a certain ventilating fan supplying the laboratory has to be turned on for the effects to occur. However, the fan neither couples electromagnetically nor vibrationally, and although they try to build a convincing case in favor of temperature effects, an unaccounted weather factor makes the explanation implausible. The motion of the fan does have an effect though, and this sounds similar to a motional effect reported by Gregory Hodowanec, which we will examine in a future installment.

The authors relate, "The basement 'floating' mounting for our gravitation balance is an iron-free cast concrete pedestal that was designed during building planning to be an isolated vibration-free structure. The success of the design was proven when a pneumatic hammer opening the floor 20 ft away failed to disturb the balance."

The experimental record is marred "by anomalous periodically increasing deflections, evidently 'beats.' The balance oscillation period is approximately 10 min, and beat periods commonly are about four times longer. The beats were noticed first in 1977 by a sharp-eyed student during his work to determine *G*, and they have been observed consistently since then. Their discovery happened at a time when there were unusual weather conditions and high tides in a small shallow bay approximately a half mile away. Since the concrete support had proven its ability to isolate the exceedingly sensitive balance, the appearance of periodically increasing deflections was totally unexpected and identification of the energy source became the intriguing new purpose of experimentation." The beats are said to be enhanced in cold weather.

The probable answer is that a conventionally understood coupling mechanism is not at work. It is significant that the oscillations were first noticed during unusual weather. More than likely, they had found the true connection right at the beginning, but dismissed it! As is so typical in modern science, massive amounts of data were accumulated in looking for an "acceptable" cause, while the exact date and conditions of the weather (storm?) are not even reported.

Interestingly, the Cavendish type of experiments, in which the so-called "constant" of gravitation *(G)* is measured between two masses, has yielded fluctuating data at the professional level. Conventional literature impresses us with the precision of this value, but when the original documents are consulted, precision is hardly evident. It is extremely time-consuming to have to scrutinize respected scientific data, so we will give just one example.

Heyl's 1930 experimental determination of *G* was long regarded the most accurate attained (see *U.S. Bureau of Standards Journal of Research*, vol. 5, p. 1243). When we consult his data, we find sixteen measurements taken using three different suspended masses: gold, platinum, and glass. The discrepancy between largest and smallest values found for *G* amounts to ¼%! Statistical methods are very adept at smoothing out the variances. Actually the gold masses gave a worse performance than this, but Heyl doctored the data on the grounds that the 49 gram gold masses had absorbed mercury from the vacuum apparatus and had gained 0.1379 g over five months. This is entirely possible, but the data correction procedure is extremely uncertain. Also of interest, the average *G* value arrived at for glass is 0.15% higher than that for platinum. Errors are attributed to the limitation of the torsion balance method, itself! Incidentally, Heyl was using the Cavendish balance in "dynamic mode," which is to say measuring the period of oscillation of the balance (25-35 minutes) as it is affected by the proximity of attracting masses.

The trouble with dynamic measurements is that they must always be clocked against some reference time-piece, be it a mechanical movement or an electronic (e.g. quartz crystal) oscillator. This time-piece, it should be obvious, is subject to the same fluctuations in its period as the test pendulum, yet we have never seen this factor mentioned by any of the experimenters! Dynamic measurements are intriguing, and offer a different "view" of the fluctuation phenomenon, or maybe a different phenomenon altogether. But unless some way is found around the fluctuating time-piece problem, we run the risk of the fluctuating measurements partially canceling themselves out.

FLUCTUATIONS IN STATIC MEASUREMENTS

By contrast with laboratory researchers, practicing geophysicists out in the field are in a perfect position to observe slow changes in gravity, but *they never leave their instruments set up in one place long enough to notice.* In practice, field-workers have a certain amount of land area to survey according to a tight schedule. They arrive at a survey point, set up the instrument, wait for it to settle (thereby ignoring short-term effects), take a reading, and immediately pack-up and move on to the next location. If a slow fluctuation in local gravity happened to be taking place at the time of the reading, the geophysicist would never know it. It is simply *assumed* to represent a variance in the local geology.

It is important to realize that although commercial mechanical gravimeters are extremely sensitive to long-term or static conditions, they are *highly damped* to limit or prevent them from responding to "transient events," which are otherwise impossibly troublesome to data-taking. Their very design renders them incapable of reporting short-duration changes.

Sensitivity is itself a hinderance to transient detection. Geophysical surveyors desire a gravimeter with as great a sensitivity as possible. This affects the system's oscillatory response: sensitivity to the precise value of gravity is proportional

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to the square of the period of oscillation. Therefore, we have an instance of the instruments being *so accurate* for showing the precise value of gravity, that they are *insensitive* to large, brief fluctuations in this gravity!

Keep in mind too that gravity fluctuations with time are of no practical interest to the geophysicist, and because such things are not supposed to happen, when they *do* they are regarded as "bad data" and the measurement is run again to ascertain the "correct" value. For this reason there has been little earnest study of the phenomenon as it relates to celestial events, although we can get a taste of it by reading accounts of how the "bad data" manifest.

The *Encyclopedia Britannica,* naturally rather coy on the subject, tells us: "Any instrumental system sensitive to minute changes in gravity is liable to be displaced by small forces which may arise internally from imperfect elastic behaviour of the materials used or from external causes such as varying temperature and pressure or shocks experienced during transport. Most gravity meters, when kept at a fixed point, show a time-variation of scale reading which is called the drift. Occasionally, abrupt changes (jumps or tares) occur, which may exceed the small gravity differences being measured.... All vibrational modes of the moving system should be as nearly aperiodic as possible, consistent with sensitivity." In short, large transients are known to occur, so sensitivity to transient response is *designed out* of these instruments! Even if transients occur, the gravimeter will often not detect them.

What's more, it is rather difficult to isolate a gravimeter from local vibration (earth movement) of extremely low frequency. This leads one to wonder whether at least some of the transients may be the result of some type of slow vertical movement either induced in the apparatus or coupled there via the earth. Similarly, might some of the brief "microseismic disturbances" widely observed on seismographs be gravity transients instead of earth tremors?

Again, the *Encyclopedia* reveals that the two are indistinguishable. "...the gravity meter and the seismograph are both acceleration-sensitive devices and moreover the sensitivity criterion of both instruments is a long period. ...it is necessary to incorporate a very-low-frequency filter between the moving system and the indicating mechanism of a sensitive gravity meter. In most devices this is wholly impractical and in any type the best that has been done is the elimination of high-frequency microseismic disturbances with some suppression of the long-period (10-20 sec) earthquake waves. Thus no gravity meter has yet been designed that permits operation during earthquake disturbances, and for this reason field operations may be effectively shut down for periods of many hours during which these transient accelerations far exceed the required reading accuracy. ...during periods of outstanding earthquake activity the gravity meter may be utilized for studying the earth's behaviour. Following the Chilean earthquake of May 22, 1960, remarkable confirmation of the periods of free oscillation of the earth as a whole was obtained on analyzing the daily charts taken from a sensitive recording gravity meter operated in Los Angeles, Calif."

One further possibility should be mentioned. Commercial gravimeters are designed to compensate or cancel problems attributed to temperature, pressure, elastic hysteresis, and so on. Very likely, in the process of compensating these parameters, sensitivity to gravity transients is also compensated out. It could even be that the very existence of one of these parameters is what makes gravity-transient detection possible, for transients are

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certainly unusual in some respects. This is strictly speculative at the moment; we cannot be sure of the degree to which commercial gravimeters respond to gravity transients because of the unreliable way in which "bad data" are reported in the literature.

Percy Roope, in a 1927 doctoral dissertation, describes his attempts by various methods to measure the gravitational influence of the passing sun and moon. The project was a complete failure with all the methods tried either because of inadequate sensitivity or troubling fluctuations.

One apparatus consisted of "a mass attached to the end of a flat steel spring which was bent almost to its elastic limit and adjusted so that the mass could move in a vertical direction. The mass, in the form of a brass disk 10.2 cm in diameter, was directly under a similar but stationary disk." Collectively the two disks formed a capacitor, and an electronic circuit measured variations in the capacity, corresponding to minute variations in the position of the mass. The capacitor unit was "enclosed in a constant temperature compartment resting on a massive pier in the basement of the laboratory. The apparatus was tested by means of a second mass placed below the moving mass and was found to be sufficiently sensitive for the purpose. Because of earth tremors of local and possibly distant origin no reliable curves were obtained."

As an alternative, "a long spiral spring with a mass and condenser [capacitor] plate attached to its lower end may be suspended from a rigid framework. If the stationary condenser plate is on a platform which is suspended from the same point as the spring, horizontal vibrations including the deviation from the vertical, will be largely eliminated. The apparatus may be further shielded by supporting the framework on thin inflated rubber bags. In any case, suspension from a balloon would completely eliminate vibrations." Regrettably, this experiment was not actually carried out. (At least, the results were not reported.)

"Next, an experiment was made on the east-west force. A double suspension pendulum consisting of steel wires 52 feet long and bob weighing 28 pounds was suspended from a bracket fastened to the top of the two foot brick wall of the building, the pendulum passing down thru the elevator shaft to the basement. It was found necessary to damp the pendulum by a small vane immersed in medium heavy oil. Cross-hairs were mounted on the bob and its motion was measured by observing the cross-hairs thru a high power microscope. The bob and microscope were enclosed in a box, the elevator door was sealed, and the microscope was read thru a window in the door. A calculation showed the effect sought to be within range of the microscope but smooth curves could be obtained only over short intervals of time. It appeared that a change in temperature caused a tension in the brick [wall] which was relieved by sudden rapid expansions or contractions taking place at fairly uniform intervals. Furthermore, vibrations caused by trolley cars and trucks were sufficient to destroy the continuity of the curve."

"Experiments were then continued on the east-west force but with apparatus which was more easily controlled. A double suspension pendulum 10 feet long and with a bob weighing 18 kg was set up in a steel framework so that it could move in an east-west direction. The framework rested on a pier in a fairly constant temperature room in the basement of the laboratory and was further protected from temperature variations by shielding with fiberboard and a thick layer of papers. Thermo-electric couples were placed at various positions within the enclosure to

THE VARIATION OF TERRESTRIAL GRAVITY

by Edward F. Greene

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Since the discovery of gravitational force by Galileo and Sir Isaac Newton, this force has been generally regarded as an unvarying quantity, although in the eighteenth century mathematical calculations estimated that owing to the compensating effect of centrifugal force the gravitational power should be $\frac{1}{384}$ th less at the Equator that at the Poles. In the year 1798 two expeditions were despatched by the British Government, one under Captain Foster, R.N., and the other under Captain Sabine, R.N., for the express purpose of determining the difference betwixt the rate of swing of previously adjusted pendulums at various spots on the earth's surface. The expedition under Captain Foster started from the South Shetlands, and that of Captain Sabine from Spitsbergen, and it was arranged that the two expeditions should meet at Maranham, on the Equator. The results of their numerous observations are recorded in the Philosophical Transactions of the Royal Society of 1798.

To put the facts briefly, the rates of swing of the pendulum were found to vary so considerably at different places that the proposed object of the expedition was a complete failure, but other and unexpected results were arrived at. For instance, the pendulum at South Shetlands varied so in its rates of swing from day to day that it was seriously suggested that a spider must have spun a web in the support of the pendulum. The South Shetlands are of volcanic nature. The general conclusion by Captain Sabine was that gravitational force varied *pari passu* with the specific gravity of the soil on which the pendulum was swung; but although this is quite true, yet it by no means covers the ground of the whole subject, as the results of experiments by myself will presently show.

Somewhere about the year 1880, as a lad, I was very much impressed by an instrument exhibited at the South Kensington loan collection of scientific instruments by Mr. Siemens. It was called a "bathometer," and consisted of a glass tube horizontally placed in a tank of water with open ends. The tube contained a bubble of air, and was so sensitive to gravitational attraction that the mere fact of two or three persons moving from one side of the tank to the other caused a corresponding movement of the air-bubble. About the year 1906, being employed as a surgeon at sea, I commenced constructing instruments, with a view to ascertaining the depth of water under a ship's bottom by the variation of the gravitational force. My general idea was to construct a form of tank with a flexible diaphragm on which was placed a suitable load of shot, mercury, or other substance. The tank, being filled with fluid, registered the rise and fall of the diaphragm on a fine capillary tube.

There were many technical difficulties in constructing the instrument, and some half-a-dozen of various design were constructed. Some were too sensitive, others not sensitive enough. The general was, however, that the specific object desired to be achieved was a failure, for reasons which I will proceed to describe. The instrument would not give an accurate depth reading in fathoms, although it would give a general indication as to the depth within certain limits. I have taken the instruments with me in voyages across the Atlantic to the West Indies and on numerous voyages down the coast of West Africa. So far as the Canary Islands the readings are more or less constant; at the Canary Islands a great diminution of gravitational force is observed; but on approaching the coast of Africa, south of Dakkar, an immediate and sudden increase occurs, which is at its maximum in the neighbourhood of Free Town, Sierra Leone. This variation is constant, and I have observed the same on numerous voyages. Across the Atlantic to the West Indies the readings were fairly constant.

Another point, however, which has caused me great interest, lies in the fact of a diurnal variation. When my instrument is located ashore variations are observed which appear to be related to the variations of the barometer, but which anticipate the rise and fall of the barometer by some hours; and the variations are always in a direction opposed to the barometric variation. That is, when the barometer is about to rise my instrument will fall, and *vice versâ*. On one occasion, while showing my instrument to a medical friend who was on a visit to me on a certain Saturday, I noticed a very great rise. I remarked to my friend that I thought a storm was coming. My friend had occasion to write to me on the Sunday, and remarked incidentally that my storm had not arrived. Before his letter reached me on the Sunday night one of the worst storms ever experienced on the east coast had taken place, and a large number of fishing-boats had been lost. My friend was Sir T. Openshaw, F.R.C.S., C.M.G.

The hypothesis which I have formed on the behaviour of the instrument, briefly stated, is that the interior of the earth is of a fluid nature, and that this internal fluid is affected by solar attraction; that it shifts its position relatively to the earth's diameter; that, when it is displaced, terrestrial gravitation increases over the earth's surface at the points immediately superimposed. The atmospheric envelope being likewise, but more intensely, affected, a violent rush of air is caused, and at the opposed point a huge mass of superincumbent atmosphere causes the barometric rise, which on the more or less rapid subsidence of the internal fluid causes violent winds in the opposite directions. When violent earthquakes take place, they are almost invariably preceded by atmospheric changes of a marked character.

For obvious reasons, I have not been in a position to incur more than a limited expense on the construction of the various instruments necessary for carrying out my observations, but possibly my suggestions may lead to further investigation on the subject. □

record any change in temperature which might occur.

"It was at this time that electrical apparatus was first used for measuring the displacement of the pendulum. The displacements of the bob were so large that the full sensitivity of the amplifying apparatus could not be taken advantage of.... The curves of deflection of the bob were of much greater amplitude than those calculated from the [gravitational] potential of the sun and moon and in general bore no apparent relation to the calculated curves. It is probable that the experimental curves were the resultant effect of the forces of the sun and moon, the tilt of the surface of the earth due to ocean and earth tides, local disturbances such as caused by trolley cars and automobiles, the variation and distribution of atmospheric pressure, and the structure of the earth. Even if we had complete data regarding these conditions it would be very difficult, if not impossible, to make a sufficiently accurate calculation of the deviation from the vertical."

While we fully appreciate Roope's difficulty in the experiment and do not doubt the problem of local traffic, he offered absolutely no report of his data, and he apparently made no attempt to actually trace his speculated sources of trouble one-by-one. This is a doctoral dissertation, remember, but it scarcely offers any advancement to the state of the science. We should mention that the dissertation is titled *A Method of Measuring the Velocity of Gravitation*—an extremely important and ignored topic. Unfortunately, the proposed method of velocity measurement is so badly flawed theoretically (see *Science* January 7, 1927 p. 15 for brief explanation) that it is rather embarrassing to learn it was supervised, recommended and signed by none other than Dr. R.H. Goddard!

Further corroborative evidence of gravity fluctuations dates from earlier eras, before scientific findings were as censored and sterilized as they are today. An example of a particularly fertile report is that of Greene, reprinted in its entirety on the facing page. No diagrams accompanied the article, but Siemens' bathometer sounds something like a mason's level, only using additional fluid—lots of it—in the surrounding container.

THE BINDING METER

Finally, we turn to the esoteric literature. In the wake of blossoming UFO reports following World War II, respected radio engineer Wilbert B. Smith proposed an investigative project to the Canadian government which, when implemented, became known as Project Magnet. So began a personal interest in possible "other world" contact which ended only because of his untimely death from cancer in 1962.

One of the more unconventional aspects of the research involved the employment of psychic mediums to "channel" information from spiritual realms where the UFO entities supposedly exist. Much of the information was of a metaphysical nature, but one technical tidbit of particular interest to us here concerned what was called *binding forces*.

According to the philosophy of the spiritual entities, to freely give out technical information was in no way beneficial to helping mankind develop and advance itself. Only technical hints were disclosed to Mr. Smith, and if he was able to put them to practical use, so much the better. In the case of the binding forces, he constructed and tested an elementary *binding meter*, and reported the result to the Ottawa New Sciences Club.

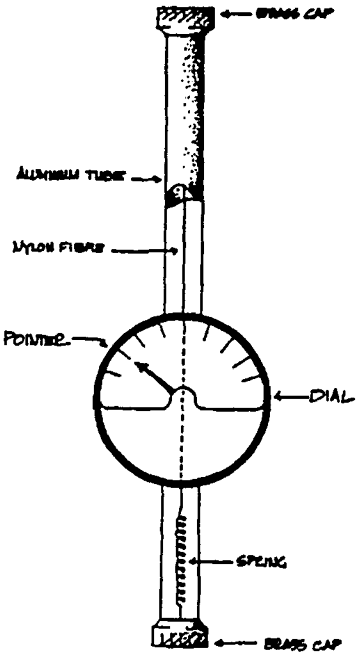


Fig. 3. Wilbert Smith's binding meter resembles a hand-held gravimeter for either vertical or non-vertical forces.

The background of the binding force information goes something as follows. A number of troublesome airplane crashes had occurred in Canada, and the UFO entities were asked through mediums what might be the cause. The answer was that (at least some of) the planes had flown through areas of reduced binding forces, and the planes' structures, unable to withstand this, had torn apart. Binding forces were said to be what hold matter together, and, as we understand the concept, are a physical property of each spatial location—a property heretofore unknown to man. Nuclear explosions were cited as creating a pair of "binding force vortices" with each explosion.

What we find so interesting is the striking similarity of Smith's binding meter (Fig. 3) to the gravimeters we have been examining. Here is his account.

"The principle is quite simple: all matter is held together by the relative configurations of the three basic fields of nature, tempic, electric and magnetic. These configurations are characteristic of what we call the molecular structure, and the interactions of these fields is nonlinear. Therefore, since the fields interacting are the sums of the local fields, and the background fields, such interaction can be used to indicate certain characteristics of the background, through this very nonlinearity.

"Structurally the binding meter consists of a nylon fiber which is stressed close to its elastic limit (after having been over-stressed to establish stability) pulling against a steel spring which is stressed well below its elastic limit. The nylon fiber is wound around a spindle which carries a pointer so that any longitudinal movement of the fiber will cause the spindle to turn and the pointer to move across an arbitrary scale. In setting up the instrument nylon fishing leader was used and pre-stressed to the breaking point and this point noted. The instrument was then threaded and one end fastened to the spring and the other placed under tension to 75% of the previously noted breaking stress, and the end clamped under a friction washer which was somewhat softer than the nylon to grip it solidly without deforming the nylon. The whole instrument was then set aside for a few days to make sure that it was stable, after which the pointer was slipped to mid scale and the instrument was considered ready for service.

"By making the body of the instrument of aluminum tubing about ½" diameter and 10" long, the combination gives very good temperature compensation, and a range of temperature of 100°F makes less than ½ division on an arbitrary scale of 12. There is no perceptible change over the complete range of humidity and no barometric sensitivity was observed. Dimensions apparently are not critical, and successful instruments have been made with quite a variety of parameters. Unfortunately we have no way of calibrating these instruments at the present time, and the best we can do is use them for qualitative indication.

"My colleagues and I have investigated the general areas through which aircraft have flown just prior to unexplained crashes and we have found several regions of reduced binding, the meters showing several scale divisions' change. These regions seem to be roughly circular and about 1000 ft in diameter, and probably extend upward quite a distance. A few have been detected by air when planes have flown through them, but fortunately in these cases the craft were strong enough to remain intact.

"Whether this is generally true or not we cannot say, but it does appear that things are somewhat stronger in the northern latitudes than they are farther south, and certain areas seem to be permanently afflicted with reduced binding. We do not know if the regions of reduced binding move about or just fade away, but we do know that when we looked for several of them after three or four months we could find no trace of them.

"It would therefore appear that this business of reduced binding would stand quite a bit of further serious investigation. Unfortunately, because of the unorthodox source of this information, efforts so far to obtain official recognition have resulted only in more letters being added to the 'crank file.'" □

Constructing and Using Simple Gravity Meters

Part 2

by Gregory Hodowanec

Gravity meters (also called gravimeters) are devices used to measure the relative acceleration of the force of gravity at some particular location. Such instrumentation is best known for its use in detecting localized variations in the earth's gravity field which may be due to buried masses. These mass density variations could indicate the presence of oil or mineral deposits and thus gravity meters are used in prospecting. Most meters are but very sensitive spring-scale systems in which changes in the weight of a fixed mass are measured. Unfortunately, they are also very sensitive to other local disturbances including vibrations, temperature changes, and air currents. To minimize spurious non-gravity responses, they are generally fabricated with complex suspension systems, and are much too costly for general experimentation.

Described here, however, are a number of simple approaches to gravity meters—both mechanical and electronic in design—which are easily and inexpensively constructed. While the units are sensitive enough for prospecting purposes, you may be more interested in using them to observe gravity variations believed to be due to extraterrestrial effects. A number of repeatable variations are described and possible sources for these variations are given. Moreover, a number of other applications for the gravity meters are also described which should interest the experimenter.

Unlike mechanical designs, the all-electronic gravity meter developed by the author is both very sensitive, and relatively free from local disturbances such as vibrations. Thus it can be constructed into a rugged portable unit, and with its high sensitivity to "local" variations in the gravity field, it could be used by the amateur prospector in the search for oil and mineral deposits. It could also be used as an effective supplementary device by the professionals in this area.

GRAVITY BASICS

The force of gravity is unique in that while it is a matter of common experience, its true nature remains as quite an enigma. It is related to an object's mass, resulting in "weight" which can be measured by scale systems. Just how gravity interacts with mass remains very much a mystery even though many theories have been advanced to explain the effect. Foremost among these are the relations developed by Newton and Einstein, but they really only "describe the effect" and do not explain the true nature of gravitation. Yet such explanations are useful in providing a basis for a study of the earth's gravity.

The effect where bodies apparently "attract" each other is quantitatively summed up in the Law of Universal Gravitation as developed by Newton. Here the force of attraction between two bodies, m_1 and m_2, separated by a distance r is given by:

$$F = \frac{Gm_1m_2}{r^2}$$

Where G is the so-called gravitational constant and has a value of about 6.67×10^{-8} if the centimeter-gram-second system of units is used. The gravitational field at any point is given by the force exerted on a unit mass at that point. The field intensity at a distance r from a point mass is thus Gm/r^2 and acts toward m. The gravitational potential V at that point is the work done in moving a unit mass from infinity to that point against the field. Therefore, $V=-Gm/r$ and it is a scalar quantity measured in ergs per gram when the cgs units are used.

While Newtonian gravity is describable as an "attraction" between two masses as in Fig. 1a, Einstein gravity is visualized as a curvature or warping of space and time around a massive body and is usually depicted as in Fig. 1b. However, here we will be more concerned with the earth's gravity as defined by the "weight" of an object.

In its simplest terms, weight is generally defined as the force with which a test body is attracted toward the center of the earth. In terms of Newton's Law this becomes:

$$\text{Force} = \text{Weight} = W = \frac{GmM}{R^2}$$

where: m is the test mass,
M is the mass of the earth,
R is the radius of the earth, and
G is the gravitational constant.

This weight will be in poundals (using English units) or dynes (using metric units). The above equation may be simplified to:

$$W = mg, \quad \text{where } g = \frac{MG}{R^2}$$

The value of g is a measure of the acceleration of the earth's gravity field (free fall) near the surface, and is generally considered to be constant at a particular location. Thus this relation is similar to the familiar $F=ma$ seen in mechanics. The value of g is approximately 32 ft/sec^2 or 980 cm/sec^2. Since weight depends both on the amount of mass and the acceleration of gravity, a definition of a standard weight would require the fixation of both this mass amount and the location on earth where this weight was determined. By international convention, the standard of mass is the International Prototype Kilogramme, represented by a platinum-iridium cylinder preserved near Paris, France. Other secondary standards, based upon this primary standard, are located in other countries as well.

DEPENDENCY OF WEIGHT ON LOCATION

Since a body's weight is dependent upon the earth's mass, the earth's radius, and the gravitational constant, if the mass of the earth is constant and if the gravitational constant is *assumed* constant, then the earth radius is the only variable. Its value depends upon one's latitude position and height with respect to the center of the earth. The radius of the earth is computed to be about 15 miles less at the poles than at the equator.

In addition, centrifugal forces due to the earth's rotation can reduce the "pull" of gravity, being greatest at the equator and zero at the poles. Therefore, when consideration is taken of these factors, a ton weight (2000 lbs) that is first measured at sea-level at the north pole will be found to weigh about 7 lbs less at sea-level at the equator. With these factors incorporated into the value of g, it can be seen that the exact value depends on one's geographic location. For example, the value of g at Paris, is 32.184 ft/sec^2, while at New Orleans it would be 32.129 ft/sec^2, or about 0.17% less.

While the overall mass of the earth is assumed to be constant, there may be *localized* variations in earth density which can and do affect the value of g locally and thus the weight. For example, the presence of a salt dome (which can signify oil deposits) may reduce the value of g above the deposit, and "heavy ore" deposits may significantly increase the value. The presence laterally of dense rocks, as from nearby mountains, can also have an effect.

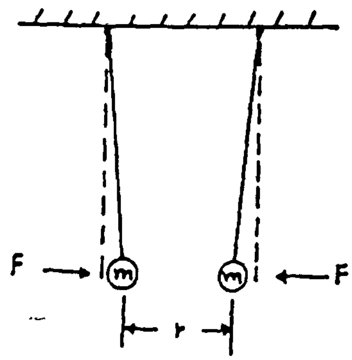
While the true nature of gravity is as yet unclear, it will be considered as a "force field" for the purposes of this article. We will be concerned mainly with the earth's gravitational field, how we can measure it, and how we can use these measurements in specific applications. We will do this with devices which may be called gravity meters, or gravimeters.

It will be shown later that the gravitational constant, G, may not really be constant in that it can be affected by certain "cosmological events," as very short term, as well as somewhat longer term effects. Thus the accelerating factor, g, will vary with time even at a fixed location, and such variations may actually be measured with gravity meters.

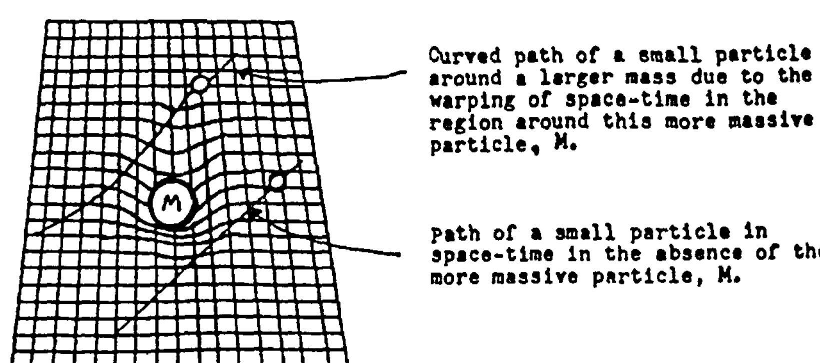
MECHANICAL GRAVITY METERS

Mechanical gravity meters presently in use fall into two general classes: the pendulum type, and the sensitive spring-scale type.

The pendulum gravity meter provides the most accurate determination of g at a particular location. It is shown in its simplest form in Fig. 2a. Here a small bob (weight) is suspended from a point by a light-weight, inextensible fiber or thread. The



(a)



(b)

Fig. 1. The phenomenon of gravitation according to the views of (a) Newton and (b) Einstein.

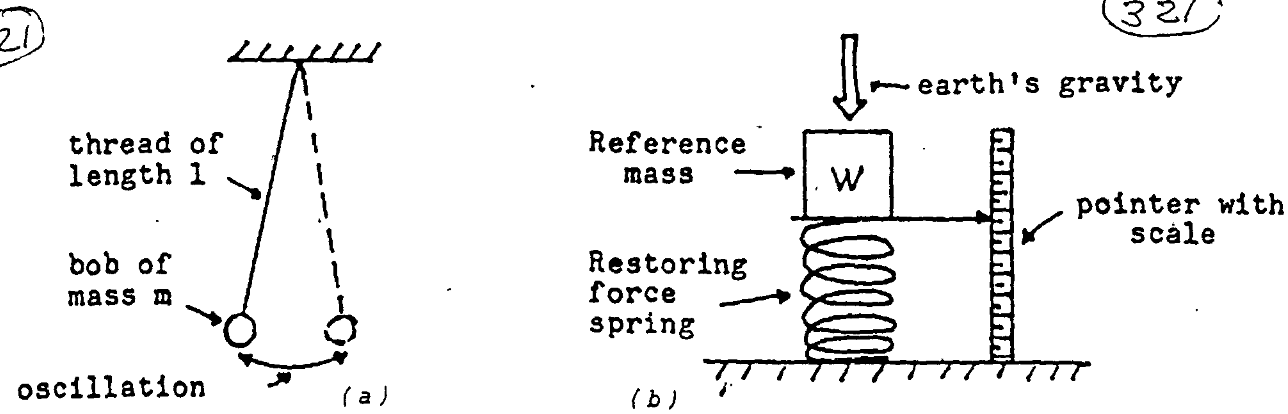


Fig. 2. Basic principles behind conventional mechanical gravity meters: (a) the pendulum type and (b) the spring-scale type.

period of oscillation for small amplitude swings is determined by the formula:

$$T=2\pi\sqrt{\frac{l}{g}}, \quad \text{or} \quad g=\frac{4\pi^2 l}{T^2}$$

where: l is the length of the suspension.

Thus g is easily determined for any particular location. The most accurate measurements are made with specially protected torsion-type pendulums, as have been used in the many Cavendish type experiments in the past.

The other class of gravity meter is, in effect, simply a very sensitive spring scale in which the change in weight of a static mass is measured. It is shown in schematic form in Fig. 2b, where a compression arrangement is illustrated, although the mass may also be suspended from the spring. The restoring force of the spring impedes the downward acceleration imparted by gravity to the mass. The resultant change in position of the mass is indicated by a pointer and calibrated scale. The pointer position is usually amplified by a system of levers. To accurately monitor small weight variations, the system must obey Hooke's Law such that the restoring force constant of the spring is linear. In other words, the distance that the spring compresses must correspond linearly with the amount of force applied. If it does, the relationship $W=mg$ holds, and since the mass is kept constant, any weight change would imply a proportional change in g.

A somewhat practical form of this type of gravity meter is provided by a well-made postal scale which reads but a maximum of 8 ounces and can be resolved to the nearest 0.01 ounce. That such a scale is a valid gravity meter system is seen in Fig. 3, where the unit responded to a major cosmic mass structure which always appears in the Leo Region of the celestial sphere. Note the diurnal repeatability as seen with this simple device; more on this later. Some digital electronic scales (based upon Hooke's Law, i.e., springs) may also serve as simple gravity meters.

Practical mechanical gravity meters should respond only to the actual vertical variations in the value of g. Commercial units are constructed so as to not only limit lateral movements due to vibration, wind, and temperature variations, but also to provide an electrical output so that data can be automatically recorded. Consequently, they are quite complicated and expensive, and

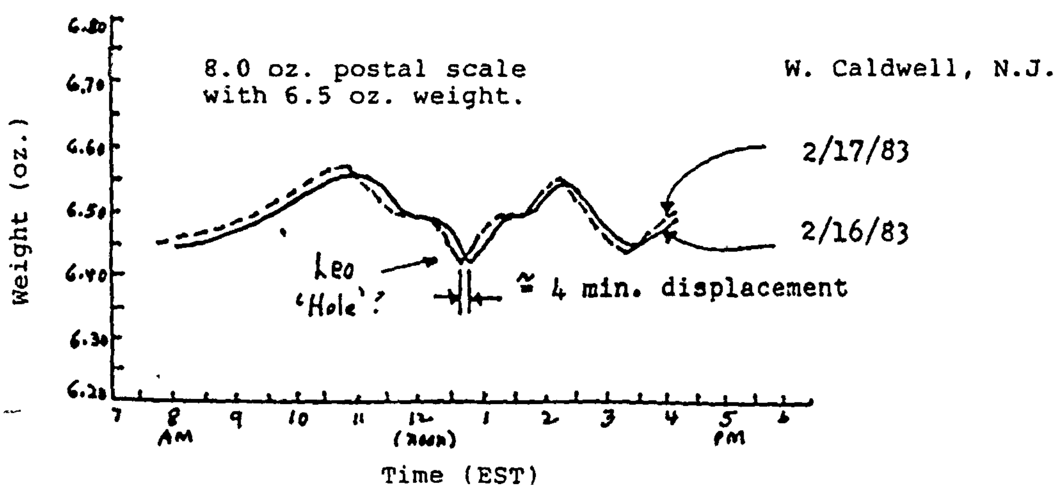


Fig. 3. Fluctuations observed with a postal scale under fixed load.

beyond the means of the average experimenter. A depiction of a possible unit of this type is given in Fig. 4.

A very simple mechanical gravity meter for basic experiments is shown in simplest form in Fig. 5a. This is a typical spring system, but the "spring" is a piece of *conductive* compressible foam material, as is used to package electronic components which are sensitive to damage from static electricity. As this foam is compressed, more of the conductive carbon particles impregnating it come into contact, and its electrical resistance decreases. Hence, the weight of the apparatus in Fig. 5a will compress the foam, and any variations in this weight will appear as variations in the resistivity of the foam. The resistance can be directly measured with a digital ohmmeter, or converted to a voltage, amplified, and fed to a chart recorder.

Again, this device forms a viable gravity meter for elementary experiments. Fig. 5b shows the response of the prototype to what may have been a supernova-type event in the celestial sphere. You may wish to try various sizes of foam and various masses for different sensitivity to gravity events. However, the mass must remain within the elastic limits of the foam material; in other words, if you crush the foam with excessive weight, it will perform poorly. Several varieties of black conductive foam are available. Some are extremely porous, and will crumble or become permanently deformed when squeezed. Avoid these, and instead choose the kind that will bounce back immediately after being compressed without leaving any "crush marks."

Based on the above principles, many types of mechanical gravity meters can be designed. Such mechanical systems are quite sensitive since the earth's gravity field interacts with the great many atoms (ions?) to be found in the mass of the reference weight. For example, in the author's test of the system shown in Fig. 5a, the unit responded *noticeably* to the movements of a person located directly two floors above the location of this test unit!

However, such devices are also highly susceptible to other disturbances including vibrations, air currents, and temperature differentials. An effective gravity meter must be guarded against these unwanted effects, or compensated for the effects, making it complex and expensive. It is interesting that most designers of mechanical gravity meters fail to realize the effects of cosmic gravity "events" on their systems. Such cosmic effects may be circumvented to some extent in gravity meters which balance one mass against another (the typical old-fashioned balance scale), but the vibration, air currents, and temperature problems would still remain. A more practical solution to these problems is given by the electronic-type gravity meter as developed by the author.

ELECTRONIC GRAVITY METERS

Over the past 20 years or so, the author has developed many electronic gravity meters. Besides simplicity, the units have the advantage of ruggedness and freedom from many external influences such as vibrations, temperature effects, and electrical disturbances, and respond only to purely gravitational effects. Typical units have been described in some other publications in the past, but two of the basic low-cost designs will be described here.

The circuit shown in Fig. 6a is extremely simple, but it contains the three elements of the electronic gravity meters as developed by the author. These are: (1) a detector section; (2) a low-pass filter section; and (3) the output meter. The detector section has been designed around a readily available, low-cost integrated circuit, namely the TLC271, a programmable, low-power CMOS operational amplifier.

This particular op amp has extremely high input impedance and low input bias and offset currents. It is operated with the non-inverting input off-set to approximately the midpoint of the battery supply, primarily to enable the output voltage to remain near the center of the 0-10 volt meter scale. Some limited positioning of this operating point is provided by the CALIBRATION control R_3 so as to set a reference point for any series of measurements.

The detector section, based on IC_1, is operated as a current-to-voltage converter of very high gain thanks to the use of a very large feedback resistance R_F. Newtonian-type gravity impulses which are superimposed upon the earth's averaged gravity field will develop small currents from the 470 µF electrolytic input

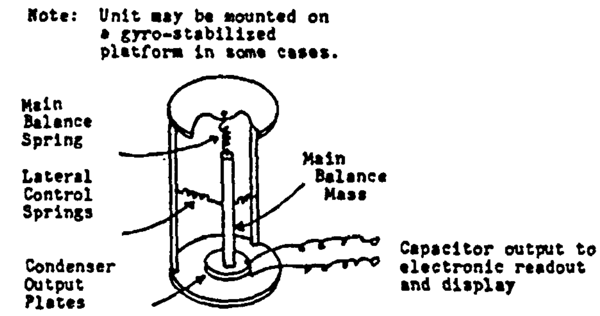


Fig. 4. Possible commercial gravity meter suggested by the author.

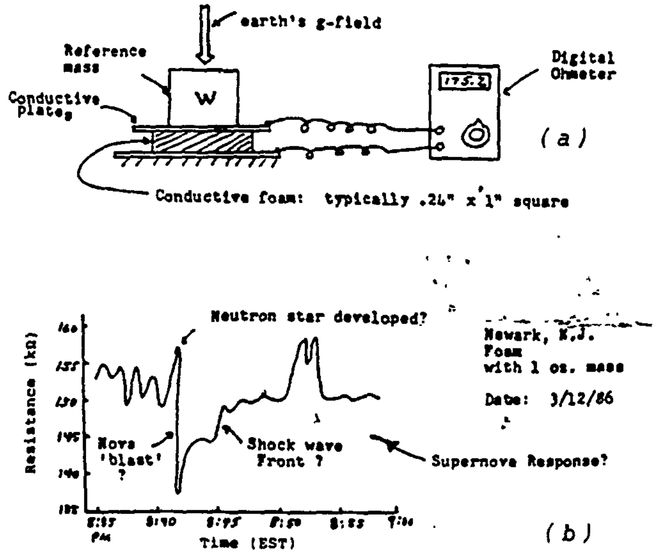


Fig. 5. The novel arrangement in (a) uses conductive foam as a low-cost gravimeter. The resistance of the foam fluctuates under fixed load (b).

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capacitor C_1 via a gravity-induced "polarization process" in the dielectric material of the capacitor. The more rapid current variations may be due to such factors as cosmic novae and supernovae, but the longer term variations are largely due to a "modulation process" of the earth gravity field which are caused by the presence of large density variations in certain masses which may be in line with the detector capacitor and the earth's gravity field.

In other words, when such dense masses are located on the detector's *meridian* position (i.e., the great circle on the celestial sphere which runs on a north-south line through the zenith), the density variations are superimposed upon the earth's gravity flux and thus are detectable with this device as changes in the dc output levels. Density variations of nearby masses are detectable as well as extremely dense remote masses such as astronomically distant "black hole" structures. Thus this electronic-type gravity meter has extreme sensitivity without the problems of most mechanical type units.

For use as a g-factor measuring device (which is the role we are considering here), the output of the circuit is heavily filtered by the low-pass filter made up of resistor R_4 and capacitor C_2. The value of capacitor C_2 has recently been scaled down from the 0.1 farad shown in the schematic to 0.033 farad. The particular capacitor used here is physically quite small considering its capacity, and was primarily intended for use as a keep-alive voltage-retention unit for short term power supply failures for CMOS computer circuits. Thus this gravity meter will respond only to the very slowly changing variations in the earth's gravity field.

For a somewhat faster response to some gravity level variations, you may want to reduce the value of the output filter capacitor (C_2) still further. Perhaps a second 0.033 farad capacitor could be connected in series with the one shown in Fig. 6a. A spst switch can be connected across one of the capacitors to short it out if the longer time-constant filter is desired. In this way, two levels of output integration will be available, i.e. with 0.033 farad in the filter circuit, or with half that value (0.016 farad) in the filter circuit. Remember that due to the very long time-constant of the output filter, any changes made in positioning the meter's offset point (with CALIBRATION control R_3) will take a long time to stabilize. So don't try changing control positions in the middle of any measurement!

Offset operation enables the unit to respond to very slow variations in the g-factor as well as the averaged dc component. While there is an ac component due to certain cosmic gravity impulses and variable terrestrial events, the dc component largely reflects the earth's basic gravitational field, i.e., the acceleration factor *g*. In order to smooth out (filter or integrate) ac variations without jeopardizing the dc output levels, the detector output is passed through a very low cutoff low-pass filter. It may not be possible to remove all ac components in this process, since there exist in the cosmic radiation field some very-large-amplitude, but very-low-frequency, components. However, the averaged earth gravitational field can be made sufficiently stabilized so that the unit will respond to such factors as the presence of either dense man-made masses or hidden mass anomalies in the earth's structure, which are in line with the earth's gravity field. The averaged output level will closely follow the earth's gravity field variations and thus this unit is truly a gravity meter or gravimeter.

The unit operates with about 1 mA of current from a single 9-volt self-contained battery supply. Although current drain is low, an on/off switch is provided to conserve battery power during non-use periods. It must be remembered that because of the long time-constant of the output filter, the unit must be allowed several minutes to stabilize after turn-on. While the unit is best constructed within a metal enclosure to avoid possible radio frequency interference (RFI), the author found that the presence of the input protective networks within the op amp tended to suppress such RFI responses. Thus the prototype unit was constructed in a plastic box and no RFI problems were experienced.

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To summarize the circuit in Fig. 6a: Capacitor element C_1 is an almost ideal current generator (excited by the earth's gravity flux) which is coupled to an operational amplifier configured as a current-to-voltage converter. This is an almost lossless current measuring scheme where the output voltage is proportional to the product of the input current and the feedback resistance. Thus the output voltage can be made reasonably high even with the *very low* picoampere currents developed by gravity flux in the input capacitor detection element. Linearity is assured as the open circuit of the capacitor maintains the op amp input terminal voltage near virtual ground, but slightly current-biased by the gravity induced polarization. The output voltage is read on the built-in voltmeter, but may also be coupled out to an external meter or a recording device such as a computer or strip chart recorder by means of jack J_1.

If you are primarily interested in the value of the highly averaged earth's gravity field, it is recommended that you begin by constructing the simplest electronic gravity meter shown in Fig. 6a. This may be handy, for example, for the amateur prospector. However, some experimenters might also wish to explore the many gravitational impulse signals which "ride" on top of the earth's gravity field by constructing the more sensitive version shown in Fig. 6b. This unit has an extra gain stage which will better emphasize the variations on a display meter or a strip chart recorder unit. Also, the output filter has a higher cutoff frequency than for the circuit in Fig. 6a, allowing moderately fast impulses to pass through.

The enhanced unit of Fig. 6b is based around the dual version of the TLC271 op amp. The prototype of an earlier form of this unit was constructed in a 5" × 3" × 2" aluminum box as shown in Fig. 6c, with its own self-contained battery supply. However, you have much leeway in construction and none of the component values are critical. The use of a CMOS op amp means a long battery life. Also the op amp's very high input resistance enables the use of a relatively small value of gravity sensing input capacitor C_1, which will still keep any possible input resonances at 1 Hz or lower. A bipolar op amp could also be used, but C_1 would have to be increased to at least 1000 μF, and battery drain would increase substantially.

Self-contained voltmeter *M* is used to visually monitor the gravity response. Output jack J_1 lets you optionally use external filters or data recording devices. With switch SW_2 set at ×10, the unit's gain is such that it responds gravimeter-style mostly to the earth's g-field. With the gain at ×100, the meter will also display "cosmic" *g* variations. The GAIN potentiometer provides fine adjustment of system sensitivity, and the SET control positions the quiescent point on the meter at a convenient level, typically mid-scale.

ELECTRONIC GRAVITY METER PERFORMANCE

While good performance as gravity meters may be obtainable from properly constructed and operated mechanical-type devices, their sensitivity to external effects such as local vibrations or

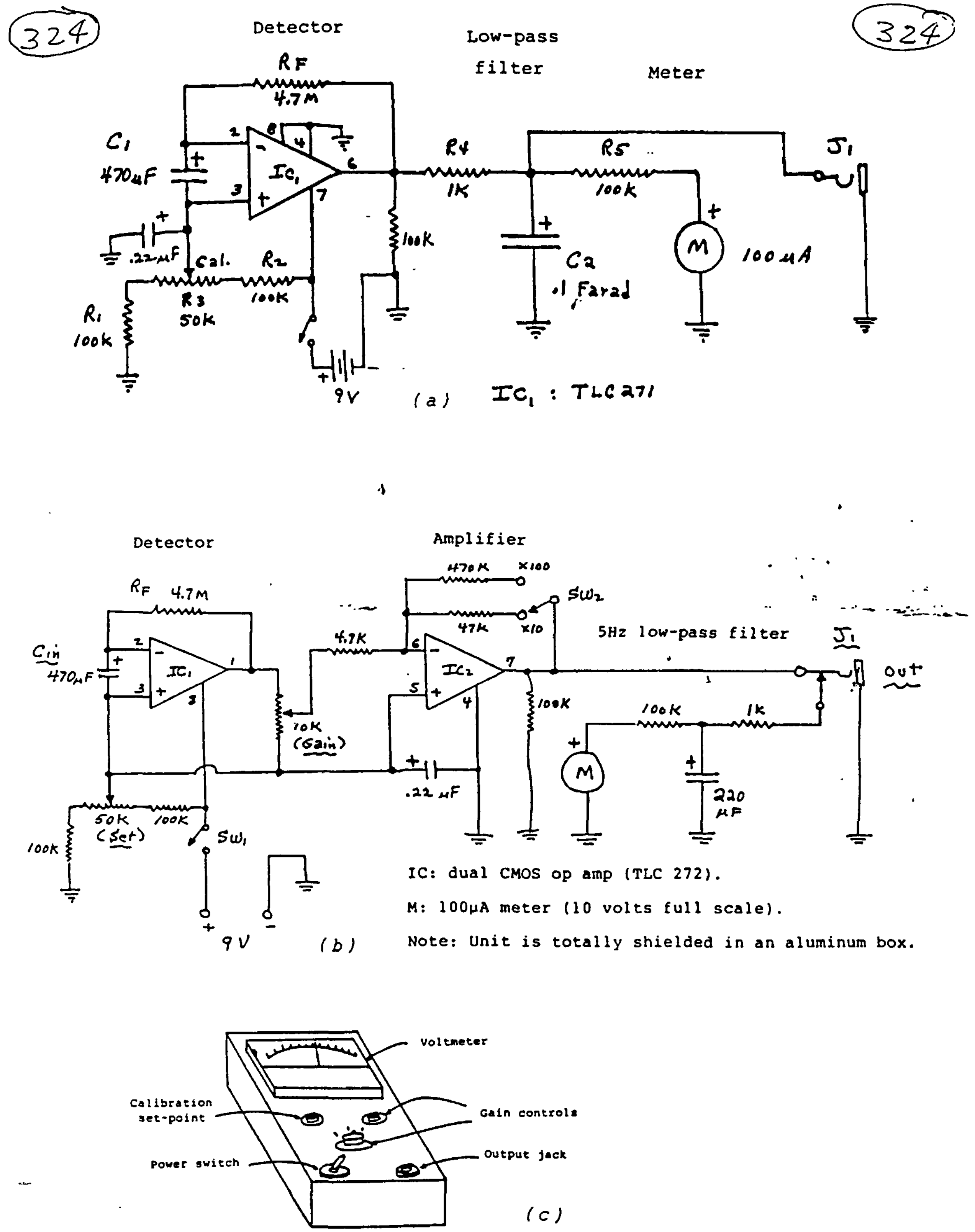

Fig. 6. Two all-electronic gravity meter designs: basic (a) and enhanced (b) version. Panel layout for the prototype of the enhanced version appears in (c).

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other movements will generally limit their use to your lab area unless proper safeguards are used. The all-electronic gravity meter, however, does not suffer from any of these limitations and can be used anywhere, especially if a good grade of well-damped output meter is used.

A typical diurnal variation in the measured g-factor using a system similar to that shown in Fig. 6b is seen in Fig. 7. At the time of this scan, the earth's gravity flux varied about ±2% over a 24 hour period, as you can see. These variations have been noted on *all* gravity meters built by the author (including mechanical-type units) and have been related by him to the masses represented by two very large structures in our universe. One is the bulk of the Milky Way galaxy, our home galaxy, which is also optically visible to the unaided eye. The other structure, which was originally but a conjecture in the mind of the author, has since been consistently confirmed with many gravity meters. This is apparently a gigantic super-galaxy system which forms the main body of our universe. It appears to have a spiral structure quite similar to the Milky Way.

As the earth rotates on its axis, the response of the detector varies as different sections of the sky are "scanned" across the meridian with this rotation. Additionally, the gravity meter "sees" these views of the meridian through a very small aperture, or "beam." The scanning beam size here is essentially equal to the volume of the active portion of the dielectric in the detection capacitor element C_1. Thus the gravity meter has extreme resolution.

The presence of dense masses *in-line* with the detector-meridian position (that is, vertical) will "modulate" the g-factor levels, very much like a translucent or opaque object can modulate the transmission of light beams in its path. A gravity meter using a heavily filtered (integrated) output is thus able to follow the slow changes in earth gravity levels resulting from "shadows" introduced by our own galaxy masses (due to their close proximity), and also the slow changes caused by the super-galaxy masses (due to the overriding concentration of masses). If the variation due to our galaxy is removed from this response, the response from the super-galaxy is made much more apparent as shown by the dotted line response in Fig. 7.

Since the dense structures in the universe are "seen" on a daily basis, the response in Fig. 7 is shown extended for a 48 hour period in Fig. 8. Plotted this way, the response illustrates a cosine-type variation which also correlates very well with a cosine-type variation in the microwave background radiation levels which have been determined by a number of experimental astrophysicists in the past. These evaluations strongly suggest that the so-called microwave background radiation is but the heating manifestation of the gravitational impulse background in the universe and thus the two are one and the same. Thus this may be an alternate explanation for the background radiation rather than the so-called big-bang theory.

APPLICATIONS OF GRAVITY METERS

You may by now be asking the question: but of what use are these gravity meters? The answer is that there are a great many applications, once you have a firm understanding of the earth's gravity and how it is affected.

One very common application has already been mentioned. That is its use in mineral and oil exploration—prospecting. Generally, very expensive mechanical-type gravimeters are used by professionals, but the amateur prospector should be able to use this electronic gravimeter effectively in such an application. It has sufficient sensitivity to respond to earth gravity changes introduced by bending one's own body over the unit! Allowing for the long time-constant of the unit, a reduction in g-factor in the order of 1% can be observed! Based upon this observation, it should be possible for a submerged submarine to determine the presence of a surface vessel directly above it by purely passive methods, and thus of some use in the military.

Another possible use for the gravity meter device—especially the more sensitive and fast-responding units—is as a navigational aid device. For there are fixed dense masses in the universe, such as the galaxy centers shown in Fig. 7, and many, many others which will appear on the gravity meter's meridian position on a daily basis. Thus the longitudinal position of, say, a submerged submarine, can be determined by this gravitational method. The celestial sphere does not have to be observed visually, and the depth of the sea waters has no effect on this response.

Also important to consider is that the gravity levels on earth may have a direct effect on the upper atmosphere *jet stream* patterns and thus could affect our weather patterns. The gravity flux variations on earth, as shown in Fig. 7, are about ±2% daily. Prior to about December 5, 1986, the gravity flux variations were only about ±1%! [Editor's note: Since this article was first drafted in 1989, the daily variations have increased to the neighborhood of ±3.5%. The author's forecast of possible earth effects was briefly touched upon in our last issue. Since that time we have seen severe distortions in the jet stream and the accompanying effects on the weather in this country. Professionals are at last beginning to admit that they are puzzled as to the reason, and this is a good sign; perhaps we will now see serious consideration of alternate views.]

Gravity flux changes due to a Milky Way galaxy-center "event" noted on December 6, 1986 (where a possible supernova-type event had generated a *new* very deep "black hole?" and accretion ring structure there) and a possible super-galaxy-center "event" on March 14, 1988 (which also appeared to increase the depth of the "black hole?" there) may have been responsible for the increase in variations from 1% to 2%. These increased variations in the levels of the earth's gravity are believed to be (in part) responsible for much of the most unusual weather conditions seen world-wide in recent months and years, as well as an increased potential for earthquakes in unstable regions of the earth.

Another use for such gravity meters has been in the detection of the many supernovae events occurring in this universe. These events are best detected with reduced filtering in the output of the detector units. Presently, the author is concerned with the possible demise of the star Betelguese in the constellation of Orion. The galaxy center event of December 6, 1986 apparently "triggered off" another *very strong* supernova event which appears to lie on the same meridian as Betelguese. Since gravitational impulses are essentially "instantaneous," the optical (i.e. electromagnetic) effects from a possible demise of Betelguese will not reach us for about 300 years, since this star is about 300 light years away. However, if such an event did indeed occur, then we are in for a spectacular visual display at that time!

One particularly interesting application for the electronic gravity meter is to provide a correction signal to ordinary scales based on Hooke's Law mechanisms, that is, springs. These errors are introduced by the earth gravity flux variations as seen in Fig. 7 and appear on most such scale systems, including most common digital-type bathroom scales. Many consumers

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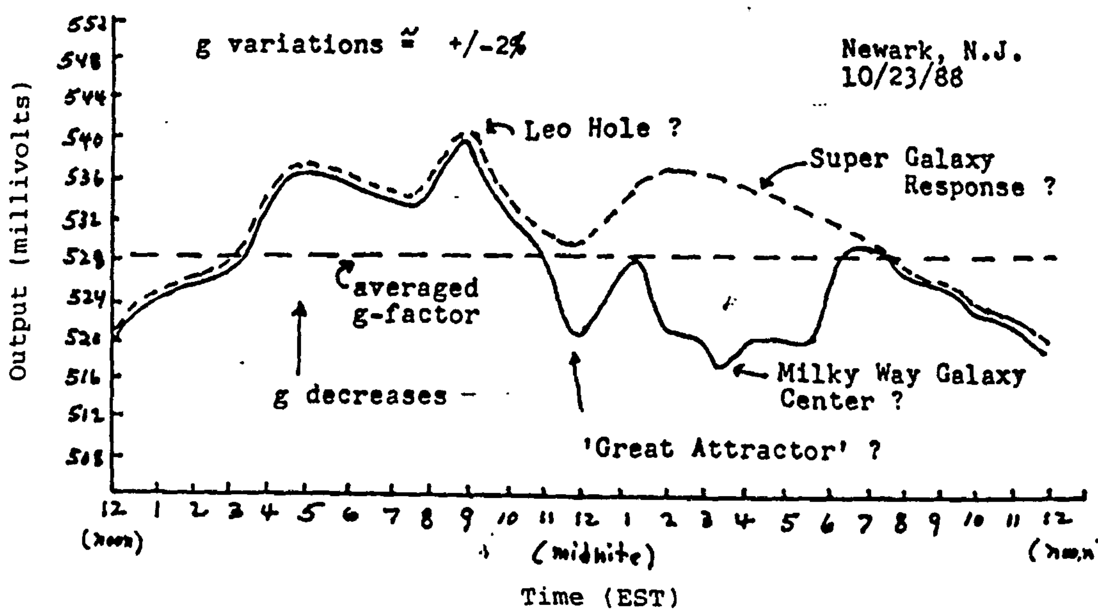

Fig. 7. Typical diurnal variation of the earth's gravity as measured with the unit of Fig. 6b.

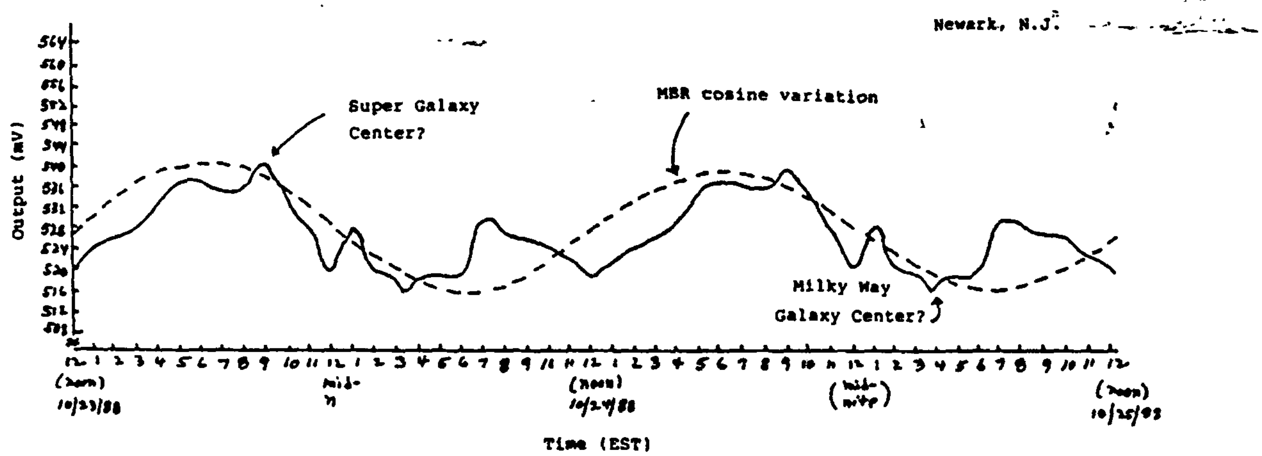

Fig. 8. If the previous plot is continued over a two-day period, a cosine variation becomes visible, showing a possible correlation with the microwave background radiation.

complain of the weight variations they see on such scales—they are real variations, but do not imply that one's body mass is changing that rapidly! The author has demonstrated that such scale errors are correctable with electronic gravity detectors fed back to the electrical readout of such units. However, these "errors" should bring home the reality of the variations.

There are a great many other applications for inexpensive gravimeters, especially the electronic versions, which will not be discussed here, but will come to you with increased understanding of the earth's gravity as well as gravitation in general.

This article is an attempt to introduce to the serious experimenter and the amateur scientist (and hopefully to the professional scientist as well) a new approach to the field of gravitation, especially the earth's gravity field. The electronic gravimeters described here are very simple and low in cost, and may be used in any location. (The author works in a basement area of his home.)

The electronic device is very sensitive, more so than any commercial mechanical-type gravity meters, which must be highly damped to limit their response to spurious measurements. It is hoped that sufficient details and data were provided here to encourage you to enter into this fascinating and largely yet unexplored field of electronic (and mechanical) gravity field monitoring. The rewards in personal satisfaction as well as increased knowledge of our universe are there for the taking! There is much to be discovered yet! □

NOTE: NO LONGER IN BUSINESS. (327)

VOLUME 1 NUMBER 4

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Letters, News & Notes

EARTHQUAKE FORECASTING...

You did an outstanding job on the earthquake article (summer issue). I did not think through all the possibilities when I sent you the article, but you added important things, especially the need for a calibration circuit with transducer to standardize the units.

The forecaster is still alive and well. When I returned on August 31st after an absence of a week, both of my units had a "6" reading on the meters. We had three big quakes in Northern California as you might know on September 1st. Since I was gone, I don't know exactly when the signals were picked up—but prior to the quakes. Often, the meters will read a "2" (I guess this is background noise?).

—*John Hayes, Orange, CA*

...AND EARTHQUAKE REPORTING

Great job on your summer 1994 issue! Your editorial was a masterpiece. You mirror my sentiments exactly but write it much better than I could ever do it.

—*Vernon Brown, Editor, Photonics*

It so happened that after publishing the editorial, another quake reported as magnitude 8.2 struck on October 5th, this one northeast of Japan. From the limited reports I've seen, ground motion was strongly felt over a wide area, but scientists cannot understand why damage was so minor. At the other extreme, the unfortunate inhabitants of Kobe, Japan were devastated by a mere 7.2 quake that shouldn't have done anywhere near this amount of damage by official estimates.

There is something badly wrong with earthquake data reporting and possibly measurement, I contend. The only clue to what it might be comes from futurist Gordon-Michael Scallion, who has acquired a copy of the data from the January 1994 Northridge (California) quake. According to him, reported magnitudes are an *average* taken from sensors over a large area, and the Northridge quake, in truth, had a 9.1 magnitude at the epicenter! Averaged with measurements from surrounding areas, this drops to the official 6.8. Scallion has feeds from the major news services, and states that a lot more earth activity occurs than is broadcast to the public. *The Earth Changes Report* (Box 336, Chesterfield, NH 03443) is a monthly tabulation of such facts, plus predictions based on his vivid psychic visions of dramatic earth events. His approach is serious and track record impressive; $5 brings a sample issue.

—*Ernst Knoll*

TANTALIZING RUMORS

A reader informs us that Tom Valentine told (on his *Radio Free America* program) of two fellows on the east coast who power an electric car from four flashlight batteries alternately in pairs, one pair recharging the other in turn. If anyone has concrete information, please let us know so we can pass it along.

Also on the subject of "free energy" sources, the KeelyNet computer bulletin board has been posting information on experiments run by Joel McClain and Norman Wootan supposedly demonstrating more energy out than is put in. Though their circuit is extremely simple, they say it is based on the complex principles originated in the last century by John Keely. They name their design MRA, for magnetic resonance amplifier.

The circuit consists of a piezoelectric transducer in series with the primary of a hand-wound transformer, driven from a sinewave signal generator operating at ultrasonic frequencies. The load to be powered is wired across the transformer secondary. Energy calculations were made from measurements taken *without* the benefit of either *energy*- or *power*-measuring instrumentation. Even if the energy doesn't pan out, peculiar effects are reported which merit investigation.

At this writing, the information we have still lacks some details, so we'll wait until more facts are in to publish a story. Thanks to Don Kelly and Bill Ramsay for hard-copies of the material. □

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A SIMPLE LOW-COST RADAR SIGNAL DETECTOR

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ABSTRACT

A simple, low cost radar-type signal detector is readily constructable by the electronic experimenter. The small size and portability of this unit should allow for many other uses other than just the detection of road-radar systems.

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Introduction

Most electronic experimenters would ordinarily consider that a sensitive radar signal detector, which covers all signal ranges, would be a complicated and expensive piece of equipment. It normally is, but a simple and effective radar-type signal detector can be built into a small plastic cigarette case for less than ten dollars (using new parts), and probably much less than that since many experimenters would already have the necessary components in their 'junk' box. This detector is a version of the author's gravitational-wave detector (see R-E, Oct., 1985) which can be made to respond to radar-type signals in the 50Mhz to 500Ghz frequency range.

How It Works

The schematic circuit for this radar-type signal detector is shown in Figure (1). As can be seen here, it contains but two low cost IC's, a small speaker, and just a few resistors and capacitors. The type 1458 dual operational amplifier is used in the detector section and as a buffer amplifier stage, while the type 386 unit drives the speaker. The 1458 is operated as a single supply ac amplifier, using an off-set voltage for the positive inputs, while the 386 is used as a simple x20 amplifier stage. This way, a single nine volt battery can supply power for this unit.

The detector unit is basically the author's gravitational-wave signal detector. The GW signals will always be present and cannot be eliminated, but the sensitivity control of this unit, R_2, can be set to a low level so that these GW signals are just audible in the background, and thus also provide evidence of proper circuit operation. The radar-type signals, which are very much stronger signals, will dominate this circuit when they are intercepted, and thus will override the GW signals.

331 The detector should be operated without any electrical shielding so that electromagnetic signals (EM waves) can be intercepted by the 'transmission line' circuit formed by the input capacitor, C_1 . This input circuit intercepts both the electric and magnetic components of the radar signals, and while this is a low Q circuit, ie., it is very broadband, the response may be further optimized by cutting the capacitor lead lengths as shown in Figure (2). This is for the typical printed circuit type capacitor which has long radial lead lengths.

The detector is of the 'ringing' type and has a resonance in the order of 400-600 cycles per second for the component values shown. The feedback resistor, R_1 , may be adjusted in value for another frequency 'ring' if desired. The circuit is basically a current-to-voltage converter where the input currents are now generated by the intercepted EM wave signals in the input capacitor circuit. The buffer stage has a gain of about twenty and serves to isolate the detector from the power amplifier stage as well as provide sufficient gain to properly drive this output stage. The audio output level is adjusted by R_5 for a suitable sound level. The speaker may be any small 8 ohm to 100 ohm unit available. A small shielded unit is preferable since it is possible to feed back magnetic (and gravitational) energy from the speaker to the input and thus result in an unwanted feedback loop and possible instabilities. The radar signals, which are short pulses of EM wave energy, will 'ring' this circuit in response to the interception of these signals. All that is required is that the signals be of the pulsed type; the signals can be very low level since the gain of the detector stage is so very high. The detector will respond to extremely short pulses and ring for some milliseconds. The circuit will not respond to CW signals except for the start and end of such transmissions. The experimenter will soon be able to recognize various types of signals from their 'signature' or characteristics. Microwave towers, in general, will drive this detector 'nuts'.

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Construction Hints

Since this detector has so few components, it can very well be constructed in a plastic cigarette case and contained in a shirt pocket. However, care must be taken that feedback be limited to the feedback resistance, R_1 only. Since the current gain of the detector stage is so high, any unwanted feedback can 'spill' the essentially 'open loop' gain of the input stage into a continous oscillation, rather than the desired 'ringing' oscillation which decays in time. Perfboard construction rather than printed circuit is preferable as having reduced wiring capacitance and improved input signal response since no ground plane is involved. Should unwanted feedback become a problem, a small capacitance of .005-.01 uF across resistor, R_4 , may help, as may a 200-500 uF capacitor across the nine volt power supply.

The circuit may also be constructed with normal +/- supply voltages for the op-amp, thus eliminating the bias network of R_6, R_7, and C_4. Since the input circuit will now be operating at the full nine volts, sensitivity will be increased, but the additional nine volt battery would now require a larger case size. Of course, the twelve volt car battery could also be used for mobile operation, with the unit plugged into the cigarette lighter. For typical road radar systems, the input capacitor lead lengths should be in the order of .5-.6 inches long. Keep this input capacitor as far away from the speaker as feasible. The sensitivity control, R_2 , may be an internal trimpot, but the sound level control, R_5 , should be an externally adjustable unit.

Testing The Unit

Normally, with careful circuit layout, the detector unit will perform properly right off. Gravitational wave signals should be heard and the resonant frequency of the 'ringing' determined. Some minor adjustment of R_1 may be required to enable ringing at a pleasant frequency in the audio range of 400-600 cycles. Adjust the sensitivity control, R_2 , so that the GW signals are just above the 1/f noise background, and then adjust R_5 for a desired audio sound level.

The detector may be tested on the workbench by generating a millimeter wave microwave signal by arcing a small inductor, say 500 mh, across a nine volt battery. Experiment with different size inductors at different distances from the detector. A properly made detector should 'ring' loudly with the 500 mh inductor arced at about fifty feet away from the detector. Such a unit should be a viable radar signal detector in the field.

Conclusions

This simple radar-type signal detector may be used for other purposes than the normally considered road radar detection. It may may be used to detect hidden radio transmitters provided they are pulsed systems. It may also be used to determine the extent of the leakage fields at microwave towers. It may also be used to detect arcings in home power lines as well as outside power transmission lines. The experimenter should be able to find many more uses for this simple radar-type signal detector.

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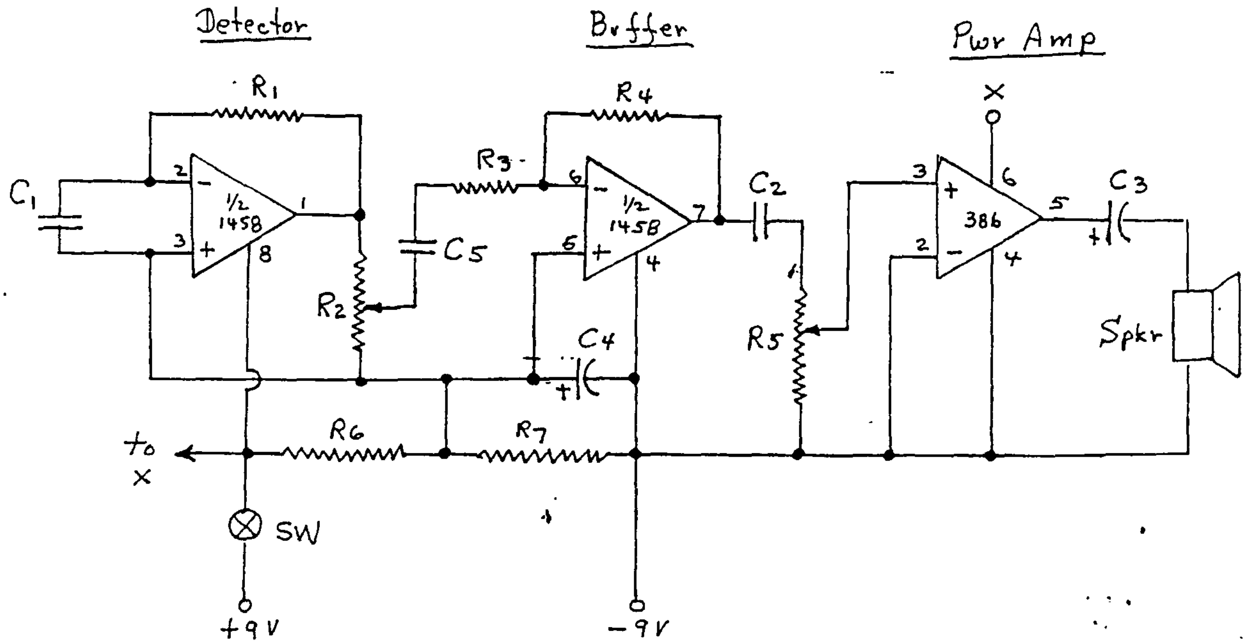
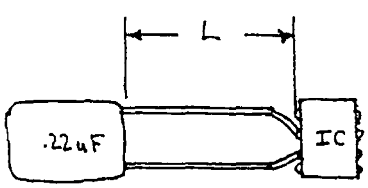
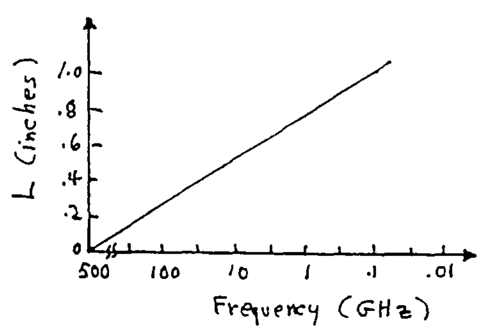


Figure (1) - Basic circuit for Radar Signal Detector



(a) Capacitor Mounting



(b) Frequency Range

Figure (2) - Rough lengths for capacitor leads as a function of detected frequencies.

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Parts List

C_1 - .22 uF, PC type capacitor (long leads)

C_2, C_5 - .05 uF, ceramic capacitor

C_3 - 220 uF, 10v, electrolytic capacitor

C_4 - 10 uF, 6v, electrolytic capacitor

R_1 - 2.2M, 1/4w, resistor

R_2 - 10k trimpot resistor

R_3 - 4.7k, 1/4w, resistor

R_4, R_6, R_7 - 100k, 1/4w, resistors

R_5 - 25k miniature potentiometer

SW - SP3T miniature switch

1458 - IC, dual operational amplifier

386 - IC, power amplifier

Spkr - 8-100 ohm miniature speaker

Battery - nine volt type

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A SIMPLE NOVEL ELECTRONIC MOTION DETECTOR SYSTEM

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Abstract

A simple op-amp circuit serves as an efficient detector of relative movement of objects moving in an RF field provided by strong FM radio stations. Where sufficient RF flux is unavailable, a very low power oscillator can supply this flux field. The unit has a wide range of sensitivity for a number of 'intrusion' alarm applications.

BACKGROUND

The effects to be described here were first discovered serendipitously in 1975 during the course of the author's early gravitational experiments.[1] According to the author's theory of cosmology[2], a sharp movement of mass near a capacitor would 'perturbate' loosely bound electrons in the capacitor, sufficiently to create a very small current impulse in the capacitor. The small current impulse could then be highly amplified and changed to a voltage pulse using an operational amplifier configured as a current-to-voltage converter. To insure that a sufficient number of electrons would be 'disturbed', the author used a large 21,000 uF computer-type capacitor connected to the op-amp circuit by a pair of 10-inch insulated clip leads. The op-amp output was connected to a plus/minus 50 mV analog voltmeter. This general arrangement is shown schematically in Figure (1).

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Initial test results in the author's basement location were highly dramatic. The meter would wildly fluctuate (or peg) with any personal movement in the basement location or anywhere in the house. A movement of an arm at a distance of only 10 feet away would drive the meter movement off-scale. The unit responded to the flick of a finger at a distance of 2 feet away as well as the motions of some boys playing basketball at a distance of 300 feet away! Since this response was much too good for the expected gravitational responses, the author suspected an RF field was probably responsible for these effects, especially since it was known that a 2 kW FM radio station, operating at a frequency of 89.5 MHz, was located about 1 mile away. When a standing wave pattern, with a half wavelength of about 5.5 feet, corresponding to this station's frequency, was found, this effect was then attributed to the radiated field of this station. This was further confirmed when the FM station went off the air one Sunday morning and the effect was found to have largely disappeared. Some slighter effects were still seen which could, in part, be the sought-for gravitational effects, but more likely were RF effects due to fields of more remote and thus weaker FM stations operating in this area. Electrical shielding of the circuitry also confirmed that EM waves were responsible for these effects. The pronounced effects in these early tests was due to the fortuitous 'tuning' of the improvised detector circuit to the FM band, as will be shown in the section on the simplest circuit.

HOW IT WORKS

In essence, the motion detector circuit is still another version of the author's gravity-wave detector and radar-type signal detector. (See R-E, April 1986). In the radar-type signal detectors, the input 'transmission-line' and capacitive loading of this line were chosen so as to enhance signal detection in the microwave frequency range, with 'ringing' taking place at about the 400-600 cycle rate. For optimum motion detection, however, the transmission-line dimensions and capacitive loading were adjusted for a broad resonance in the FM band with possible 'ringing' limited to about 1 cycle per second or much less. This was done so that the detector unit could respond to slow movements, such as a person moving or walking. The frequency of the continuous RF field (which could be of very low-level due to the sensitivity of the detector) is not overly critical (it does affect transmission-line length) and could range anywhere in the VHF to UHF frequency range. The FM radio band was chosen (as continuous wave (cw) signals have the least effect on FM signals) and populated areas have at least one high-powered station within a few miles of the detector location which could provide the necessary RF flux for this system to work. In the more remote areas, a small very low-power oscillator unit (order of 5 mW) may be required to supply a localized RF flux (over about a 100 foot range) for the motion detector use without interfering with FM reception, especially if a frequency is chosen which is in a dead region of the local area FM band. (See section on remote areas).

The motion detector operates, as its name implies, because of the relative motion of an object in its detectable RF flux field. While this is akin to a Doppler-type detector, it is not a Doppler effect, but operates due to the flux field motion across the detector transmission-line input. Therefore, the detector will respond to any material movement which can 'disturb' the flux field in the neighborhood of this detector. This could be conducting or non-conducting objects. Of course, conducting objects, especially the metals, will have the greatest disturbance effects on this RF field, ie., it will create the most efficient flux movement due to an efficient reflection of the RF field.

SIMPLEST CIRCUIT

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The simplest circuit is essentially the original as shown in Figure (1). An improved version is shown in Figure (2). The transmission-line input is optimized for the center frequency of the FM band, the feedback resistance is made variable to serve as a sensitivity control, while the +/- millivoltmeter is also made adjustable in range to better follow the wide sensitivity of this unit. The simple arrangement of Figure (1) may be used to determine if sufficient commercial FM flux signal is available at the experimenters' location. If sufficient flux is present, the experimenter should be able to verify some of the simple tests described in the background section of this article. Otherwise, it may be necessary to create the small flux field locally and/or construct the more sensitive detector of Figure (3).

The transmission-line length is determined as follows: A parallel-wire transmission-line having the dimensions shown in Figure (2) has a characteristic impedance in the order of 400 ohms, fairly close to the impedance of free space. The line itself is essentially a shorted quarter-wave line section which is fore-shortened both by the capacitive loading of this line and also by the dielectric loading factor[4] (DLF) of the resinous cotton covered wire used for this line. A quarter wavelength at the center frequency of 98 MHz in the FM band is about 30 inches. From transmission-line theory, the capacitive loading used foreshortens this length to about 45% of its free space length, or to about 13.5 inches. The DLF of the wire, in the order of .6, further reduces this length to about 8.1 inches. Therefore, the transmission-line length, from the capacitor posts to the integrated circuit terminals were made in the order of 8 inches. Tests with a signal generator confirmed the transmission-line to be broadly resonant about a center frequency of about 100 MHz.

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PRACTICAL CIRCUIT

Shown in Figure (3) is a more practical motion detector circuit which could also serve as a possible intrusion alarm system. IC1, the type 1458 device, is a dual op-amp unit. Section a serves as the detector proper, while section b is a variable (1-10x) DC amplifier for added sensitivity. IC2 is the type 741 op-amp which serves as a threshhold alarm circuit for the positive-going output pulses. Ordinarily, both negative and positive pulses are present depending upon the direction of the relative motion of the intruder with respect to the detector and the flux field.

The input detector circuit is similar to that of Figure (2) and the feedback resistance, R_1 , is retained variable to serve as a sensitivity control. This resistance also affects the possible 'ringing' frequency and thus should not be made too low. When the unit is first turned on, the control may be temporarily turned down (to a shorted position) to discharge any residual charge which may be on the input capacitor. The DC amplifier is included to improve performance in weak signal areas, as well as to allow use of a reduced sensitivity voltmeter. An oscilloscope could also be used in the meter jack, J_1 , to observe motion pulses over a time base.

The alarm circuit shown is typical of those used in the simple radar-type detectors but also includes an output jack to fire a remotely located relay or piezo alarm unit (for security reasons). The simplicity of the circuits enables the experimenter to develop only those options needed at his particular location. For example, the DC amplifier is not really needed at the author's location.

OPERATION IN REMOTE AREAS

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For operation in areas very remote from strong FM stations, it may be necessary to generate a very low-level RF flux field locally for this system to operate. For the practical detector circuit shown in Figure (3), the RF flux developed by a 2-5 mW oscillator circuit should be adequate. The simpler circuits may require a 5-10 mW level oscillator. These signals are all well within FCC Part 15 requirements. Small RF microphones which operate in the FM band and which have FCC Type Approval might possibly be used with this system. The author was unable to evaluate these units due to the presence of the strong local FM station about a mile away.

The signal level from this station out-leveled the local oscillator level and thus the operation of the local oscillator in the FM band could not be directly determined. However, the author constructed an oscillator to operate at about 350 MHz at about a 5 mW output level and confirmed the operation of this system over about a 50 to 75 foot radius. A simple suitable oscillator circuit for this application is shown in Figure (4). This oscillator, when fabricated as shown, will cover only the FM frequency range of 88MHz to 108MHz, and can develop only about 3 to 5 mW of RF power.

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The circuit, as shown in Figure (4b), is a novel negative-resistance type oscillator which uses discrete complementary FET's in a configuration called a lambda diode when made in monolithic form.[3] The FET's can be placed back-to-back (using standard plastic case units) and directly wired as shown in Figure (4a) to make a compact lambda diode unit. The I-V characteristic for the FET's used in the prototype is given in Figure (4c). As with all negative-resistance devices, all that is required is the proper L-C tank circuit and the biasing of the diode in its negative resistance region. It should be noted that such a unit can oscillate at more than one frequency. For example, inclusion of an audio frequency tank circuit at point x will change this circuit to an audio amplitude modulated RF oscillator. The potentiometer, R , is used to set the operating point of the diode to the center region of its particular negative resistance range. The unit may be assembled in a small experimenter's box and run for many months with a 6-volt lantern battery.

While the oscillator shown is very low power, the experimenter is cautioned to use it only in truly remote locations where possible interference with FM reception is at a minimum. Most areas, except such areas as metallic buildings, will probably have sufficient commer-