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THE HOWARD UNIVERSITY

Reviews of Science

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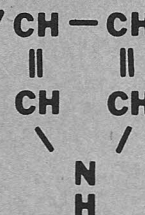
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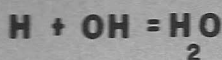


ZOOLOGY
BOTANY



Up to now those things which we have held to be sacred and paramount have begun to tumble. As an example, a man's right to any size of a family, the right to live, and the right to birth. Along with these our conception of law has become a mockery. At a time when we are undergoing many social changes social scientists are having great difficulty in attempting to define social science. The church, instead of giving spiritual guidance, now finds itself in a maze. The public wonders how much science should be supported by public funds. Everything looks in disarray. There appears to be no order. One thing is definite: we need a leader who will put everything in proper perspective. Whoever the leader is, he or she must have a background in the many fields affecting the nation's life.

CHEMISTRY



PHYSICS

$$E = MC^2$$

THE HOWARD UNIVERSITY

REVIEWS OF SCIENCE

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Washington, D. C.
20001

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Drop us a line on articles you would like us to attempt. The future of this journal depends on the participation of those interested in the furthering of knowledge for the purposes of a better world. If you would like to submit an article we would be more than happy to consider it.

EDITORIAL

BAD OMENS

by

Carl L. Shears

An experimental scientist upon entering his laboratory can sense the malfunctioning of his vacuum pump merely by listening to the pump noise. Without a word from his assistant he can be heard to utter, "Something is wrong. We have a leak." Immediately they will run to the system, look at the gauge, and then, perhaps, use a leak detector to try and find the leak which could result in days, weeks, or even months of work being lost.

I, the editor, use the above scene to parallel the malfunctioning of some of the most important institutions in our society today. Not that I agree in total with all of the doctrines of the churches, the schools, and the judicial system, however, I do wonder what life will be like in their absence, or when changes are made in their basic structures. In essence, I believe we are fast approaching a total breakdown in our society. The signs are all too clear. I wish that others could see it as I do, and thereby initiate some type of action to counter this movement, or whatever it may be called.

I believe that the knowledge we have learned in our various disciplines could possibly be used to avert a complete breakdown of the institutions in our land. What good is knowledge if it can not be used to better life? If the scientists and the so-called thinkers do not step forward, then perhaps all the monies spent on research and in the building of the universities in the land are and have been a waste.

More time, perhaps, should be spent grappling with problems down here on earth rather than out in the universe. These are times which are crucial to our very existence as institutions and as a society. Now, more than any other time in history, there is a need for men of thought and goodwill to work toward solutions to these most pressing problems. Simply locking oneself in the laboratory and hoping that things work themselves out is not enough. Perhaps on emerging from the lab one will find the ashes of a bygone age.

It is because of the above named reasons that Howard University is sponsoring a conference on science. It is entitled, The Black Symposium on Science. This is being done because, to our knowledge, this is a first by a black institution. We would like one and all to attend. We plan to have papers presented in many categories. Some are as follows:

1. Education in the future
2. Science in the future
3. Population
4. Government in the future
5. Business in the future
6. Marriage and Technology
7. Religion in the future
8. Health and Medical Care in the future

The conference will be held in early October 1972 at Howard University, Washington, D. C. If you would like to attend please contact us; for further particulars write:

Carl L. Shears
Black Symposium on Science
Physics Department
Howard University
Washington, D. C. 20001

If you would like to give a paper, let us know its title so that we can place it in one of the listed categories.

SICKLE-CELL ANEMIA

by
Loretta Lee

Loretta Lee is a Senior at Howard University, who is majoring in home economics

Sickle-cell anemia was first recognized in Chicago over sixty years ago by a physician named James Herrick. It was during the examination of the blood of a young West Indian student that Dr. Herrick observed many red blood cells to be elongated and pointed instead of round. He compared them to the blade of a sickle and coined the phrase sickle-cell anemia.

This particular type of anemia is one of the many hereditary blood diseases known today to be caused by an abnormal hemoglobin in the red blood cells. Hemoglobin is the iron-containing pigment in red blood cells which carries oxygen in the blood. Unlike the red blood cells of normal persons, which are bi-concave disc-shaped, those of patients with this disease assume a distorted sickle or crescent shape when the oxygen supply is low. It is from this unusual appearance of the red blood corpuscles that the disease and its abnormal hemoglobin derived their names, the hemoglobin being known as the sickle hemoglobin or hemoglobin S.

Heredity and the extent of the inheritance are the two factors that determine the occurrence of sickle-cell anemia. The sickle cell trait behaves as a Mendelian dominant and is transmitted equally by male and female. The pathological state of sickle-cell anemia is found in the homozygous individual who has inherited the hemoglobin S gene from both parents, whereas in the heterozygous individual, who has inherited from one parent only, the disease is latent; the only manifestation is the sickle cell trait, which may be transmitted to future offspring.

Sickle-cell anemia is the most common blood disease of Blacks and is largely, but not exclusively, confined to Blacks from northern and central Africa, and is found abundantly in persons from the lands adjacent to the Mediterranean. It is interesting to note that a heterozygous person is highly resistant to the type of malaria found in these regions. Persons with all normal adult hemoglobin are not resistant.

The heterozygous person (having one gene for normal hemoglobin and one for the sickle type) will have hemoglobin composed of both types. About 70 per cent will be normal (adult type) and 30 per cent will be the sickle type. This causes these individuals to have the sickle cell trait. They usually are not anemic, but there will be some sickling of the red blood cells, if they go to high altitudes where the oxygen supply is low.

In Western Nigeria, the incidence of the sickle cell trait has been reported as 23.7 per cent, and in some African tribes the incidence of sickle cell trait is as high as 40 per cent, however, remarkably, no sickle-cell anemia is found. It occurs in 0.3 to 1.3 per cent of the American Negro populations. Although it is peculiar to Blacks, it has also been found in Indians, in Syria and Lebanon, in Europeans of Greek and Italian origin, as well as Mexicans and white Americans. Whether these observations suggest that the S gene is not necessarily a pure negroid characteristic, but may in fact represent the old genetic connections between the two shores of the Mediterranean Sea, is not known.

Sickle-cell anemia was first described by Herrick (1910), but the sickle cell phenomenon has also been found in the animal kingdom, e.g. wild deer. The genetic concept of the disease was formulated by Neel (1949) and by Beet (1949) and almost simultaneously by Linus Pauling and his associates. They showed the sickling of red cells to be a consequence of an hemoglobin molecule of the genetic control of protein structure. In 1950 and 1951 Perutz and Mitchison demonstrated the crystallization under low oxygen tension of the abnormal S hemoglobin which is responsible for the features of the disease.

It has been found that the red blood cells with this abnormal content are destroyed more easily. Thus in normal persons the red blood corpuscles usually last about one hundred and twenty days, but cells of persons with this disease last for a considerably shorter length of time. This increased rate of blood destruction is responsible, at least in part, for the chronic anemia seen in these patients.

Occasionally, the bone marrow fails to produce red blood cells normally for a brief period. In such cases, an acute severe anemia is superimposed on the chronic anemia already present. Sickled cells also form plugs in small blood vessels causing obstruction to blood flow and consequent tissue damage in different parts of the body. Almost any organ can become involved, the most frequent ones being the liver, spleen, bones, kidney, and the brain. Therefore, depending on the parts of the body affected, a wide variety of symptoms are seen in sickle-cell anemia.

Although this is a hereditary disease, it is not apparent at birth. It usually manifests itself after the first few months of life. In a majority of cases symptoms are more commonly seen between the second and fourth year of life.

During infancy, symptoms of the disease are usually very bizarre, such as irritability or fussiness without apparent reason, colic, distention of the abdomen, repeated fever, poor appetite, vomiting, slow weight gain, pale complexion, and jaundice. Some children have symmetrical painful swelling of both hands and or feet together with fever and irritability.

In older children, periodic occurrence of acute symptoms known as a crisis is more readily recognized than in infants. Frequently, an infection such as a sore throat or cold precedes or accompanies a crisis. The interval between crisis varies, but it is usually several months. During these periods, patients may be quite well without any complaints, despite the presence of a moderate degree of anemia. Others will complain that they tire easily. The most frequent complaints are fever, weakness, loss of appetite, jaundice, increased pallor, and pain in the abdomen, arms or legs. The joints often are swollen, warm and very painful, resembling closely those seen in rheumatic fever. Headaches, drowsiness, convulsions, stiff neck, inability to speak, nosebleeds, bloody urine and shock are sometimes seen. Swollen lymph glands, enlarged liver, and spleen may or may not be noticed by the parents. On physical examination an enlarged heart with murmurs may be found among other things.

As a rule children with sickle-cell anemia weigh less and have a thinner body build. Unless a complication involving the brain occurs, the disease in itself does not cause mental retardation. The chronic ulcers in the legs of adults with sickle cell anemia are seldom seen in young children.

To diagnose sickle-cell anemia special blood tests have been devised. They are as follows:

1. *Sickle-Cell Preparation.* A special blood test devised to expose red blood cells to low oxygen tension which causes those cells with sickle hemoglobin to become distorted or sickled. A positive sickle cell preparation is seen in sickle-cell anemia. In persons who do not have sickle hemoglobin the test is negative.
2. *Hemoglobin Electrophoresis.* A large amount of blood is drawn from a vein, subjected to an electrical current, or a medium such as filter paper or gel. Under normal conditions hemoglobin has a negative charge and is attracted to the positive sickle-cell separates.
3. *Sickle Dex.* The sickle solution becomes cloudy when blood is introduced into a solution of buffered salt containing a chemical reducing agent.

Comprehensive Care Includes:

1. Mass screening and genetic counseling for carriers of the sickling trait.
2. Additional clinical facilities for victims of the active disease at local and state levels in clinics, etc.
3. Educational programs to inform the public at large about the nature and needs of patients afflicted with the disease.
4. Special schools for children handicapped neurologically, and orthopedically from complications of the disease.
5. Psychological and vocational counseling for families and patients.

In addition there is a need to set up centers at strategic locations in the United States where there is a high density of Black citizens. These centers could provide such services as:

1. Longitudinal studies on the clinic course and life history of the disease.
2. Treatments, educational and vocational guidance
3. Research
4. Postgraduate courses for physicians
5. Training for laboratory technicians and other paraprofessionals
6. Other miscellaneous community services.

Priority for the site and development of these centers should be given to physicians and institutions which have already shown interest in this disease and the needs of the victims. Wherever and whenever possible Black physicians, nurses, technicians and paraprofessionals should be given opportunities to gain experience, skill and expertise in caring for persons afflicted with this disease. This, of course, should also include the participation of white professionals and white institutions pooling their resources in a relevant endeavor to provide comprehensive professional care for the victims of sickle cell disease.

A Note On Schwarzschild Orbitals

Titus Pankey, Jr.

Department Of Physics And Astronomy
Howard University

The recent discovery of what appears to be matter that has undergone complete gravitational collapse^{1,2,3} makes orbital motion near the Schwarzschild barrier a physical probability and therefore the concern of physical theory. Thus the "equation of orbital motion within a Schwarzschild metric", i.e. the projection of the planet's trajectory onto the space described by the Schwarzschild metric,

$$(du/d\phi)^2 = 2R_g u^3 - u^2 + 2u/p \quad , \quad (1)$$

is a very timely consideration. In (1) R_g is the gravitational radius and p is $r^4 \phi^2 / GM$, the areal velocity parameter. The exact solution to (1) is rarely discussed in the literature because heretofore certain calculations explaining the precession of planetary perihelia have been commissural with physical experience^{4,5,6}.

An unambiguous linear mapping

$$u = 1/6R_g [1 + 12y] \quad (2)$$

carries (1) into the dimensionless Weierstrassian form^{7,8}

$$(dy/d\phi)^2 = 4y^3 - g_2 y - g_3 \quad , \quad (3)$$

where the invariants are

$$g_2 = 1/12 - R_g/p$$

$$g_3 = 1/216 [1 - 18R_g/p - 54R_g^2 C] \quad . \quad (4)$$

The exact solution to (3), and not merely an approximation, is the Weierstrass function

$$y = P(\phi) \quad . \quad (5)$$

Therefore the trajectory in terms of the Weierstrass function has the remarkably simple form

$$u = 1/6R_g [1 + 12P(\phi)] \quad , \quad (6)$$

which of course is the same functional form as the well known Newtonian ellipse

$$u = 1/p [1 + e \cos \phi] \quad . \quad (7)$$

But the main point of interest is not the similarity of these solutions, one approximate and the other exact, at best an exercise in the theory of functions. It attaches itself instead to equations (3) and (4). Important is the fact that from (7) the semi-latus rectum in Newtonian theory is $1/p$. But in the exact theory, the semi-latus rectum occurs when

$$d/dy \{ (dy/d\phi)^2 \} = 0 \quad . \quad (8)$$

A straight forward application of the differential calculus, using the negative root when necessary to ensure a maximum (Fig. 1), shows that the semi-latus rectum occurs when

$$u = 1/p \{ 1 + 3R_g/p + \dots \} \quad (9)$$

In our solar system, for example, the orbitals are actually less by an amount $3R_g$, or 4.5 kilometers, in radius than Newtonian predictions. This is an error of one part in ten million in the case of Mercury. Now relative distances in our solar system are inferred to eight or nine significant figures by use of Newtonian gravitation. It may be that a careful evaluation of our orbital elements will reveal a systematic error.

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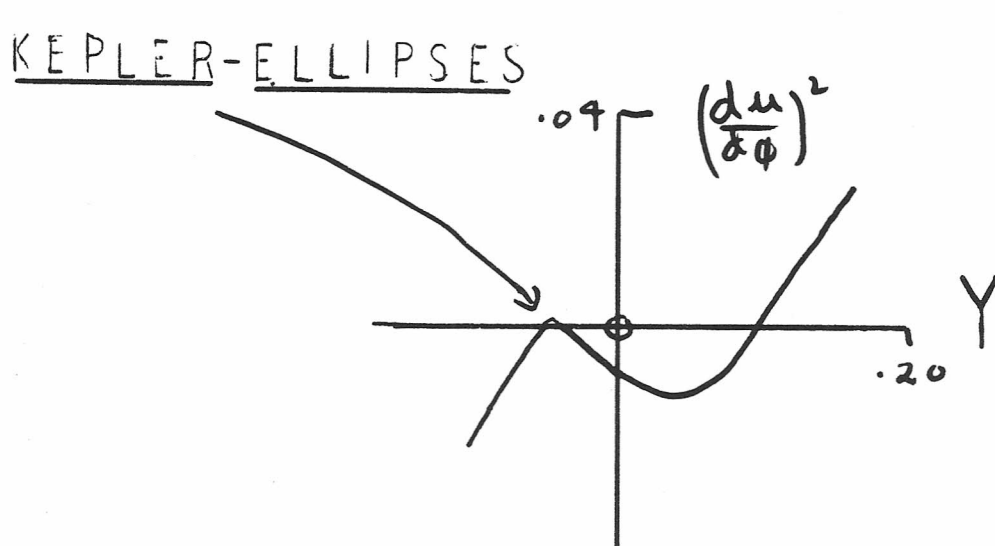


FIG. 1

THE PARAMEDIC

by

Joan M. Jennison

There appears to be a newly developing trend in the health field. It is in the process of being explored and defined. This article will try to answer several questions involving the reason for the new field, the people involved, the identification and role of the new people, the tasks involved in the operation of the new field, the legal aspects, and the evaluation of the program by members of the existing health team.

This can be accomplished by exploring national trends and statistics as well as viewing regional trends and statistics to observe just how relevant this new program might be to residents of the District of Columbia.

If there seems not to be a clearly defined title for this new program, it is because there is none. Therefore throughout the article, several titles used by the health field will be used to demonstrate how abstract and undeveloped the program is, at this time.

National research of recent years acknowledges an ever increasing shortage of physicians and the apparent inability of the present system to deliver quality health care to all socioeconomic levels. According to the National Center for Health Statistics, in 1967 there were 158 physicians per 100,000 population in the United States. This figure shows an inadequate supply of physicians, but it does not indicate the true extent of the shortage.¹

Several factors have been sighted as increasing the need for expansion of the health field. The most outstanding noted are:

- a. The uneven distribution of physicians indicates that the physician shortage is the worst in those areas that have the greatest need.
- b. The development of health personnel has not kept pace with advances in technology and research.
- c. Research and sophisticated concepts of medical care have brought about new specialties and have greatly increased the demand for existing specialties.
- d. Population has grown in size and in its demands on the medical profession. Greater utilization of medical personnel by business and industry will create even greater demands on physicians.
- e. Some medically trained manpower is not being used.
- f. The high cost of medical care must be held down.²

As a result of research demonstrating these and other factors, representatives of the highest levels of government have encouraged new programs to fill the gap in health care delivery.

In the twenty-year period from 1950-1970, the Washington metropolitan area's population growth rate of 3.1% exceeded the national average. A more significant fact is that patient days per 1,000 population here is slightly higher than the national figure. The health problems in the District are severe indeed in spite of a high ratio of physicians.³

What will this new member of the health team be called? Although the popular term is "paramedic", there are other titles in consideration and, in fact, others in use. Several experimental programs in various areas of the United States have given titles (individual to each program). For example, in the state of Washington,

the new member is said to be in the program called "MEDEX" (MEDicine EXtension). Various other readings have demonstrated suggested titles such as "doctor's assistant", "health service specialist", and the "physician's assistant". But, within the specialty areas, there are a variety of special titles, such as, "emergency medical technician", or "medical service associate".⁴

If this is a program to be implemented in the immediate future or experimentally today, who has the qualifications? One source is the newly discharged corpsman. More than 30,000 are discharged from the military each year. These are men who have been applying their medical knowledge daily on battle fields and hospitals. Many have as much as \$25,000 invested by the military in their training. These are men who have had to set aside this training because of an inability of placement for their talents.⁵

Another source readily available is the nursing profession. Nurses can be trained, as some states have already begun, to assist with many of the technical skills that enable the physician to be better utilized. All this can be done without the nurse having to change her role or identification.⁶

The purpose of the assistant, as agreed by most authorities, would be to spare the physician for those responsibilities needing the highest level of professional skill and allow him to provide care to more patients. The assistant would handle routine, uncomplicated medical tasks which are time-consuming and do not require the physician's immediate supervision. In the specialty areas, the role definition would differ with each, such as, the "emergency medical technician" giving vital life serving care.⁷ The assistant would be utilized in hospitals, private offices, clinics, and mobile emergency and routine care units.

Approximately thirty physician assistant programs are currently in the operational or planning stages in the United States. The length of training required varies from three years to four months and varies in the specialties taught. One such program is located at Duke University Medical Center which accepts motivated high school graduates with two years of college education (preferred but not required) and who have some experience in the health field. After two years of study the graduate receives a certificate. As a result of the program's success, it is being expanded to cover specialties such as radiology, pediatrics, and maternal and infant care.⁸

The legal aspect of these programs is still in the investigation stage. Several states have passed legislation providing for those in the "paramedical" field. Insurance companies have agreed to provide malpractice insurance in two ways: either through liability coverage of the assistant at one-half the physician rate, or through a special provision in the physician's insurance.⁹ (It is of interest to note that to this date, there have been no law suits involving these assistants). The legal aspect that is quite clear is that the physician's assistants cannot make final diagnoses, prescribe drugs, or perform major surgery.¹⁰

In the District of Columbia, however, the laws have not been modified to keep pace with changes in medical practice. The 1923 Healing Arts Act allows only licensed physicians to practice the healing art. Were a physician to delegate his functions to a technician, the technician would face up to \$500.00 fine and imprisonment of up to six months, and the physician could be liable as his accomplice. In actual practice, however, other members of the health team are utilized for the technical aspects of much of the physician's work. Therefore, there can be (and in fact already is) utilization of members of this new field.¹¹

The American Nurses Association is noted to be in opposition to this new program as it would hinder the nurse-physician relationship. The organization proposes a more coordinated program between the nurse and physician without the development of a new field to an already confused, poorly defined roles of members of the existing health team.¹²

Statistics showing the validity of this new field are not yet conclusive, but existing figures show a positive future. In the five years these programs have been developing there is evidence of positive staff and patient acceptance but there still exist a need for evaluation that would possibly begin during this year. One

example of evidence that is positive is that of Cleveland Clinic Hospital which had to close intensive care beds because of a shortage of nurses. With the new assistants, these beds could be again utilized making it clear that this new field or a program similar would enable more efficient use of facilities.^{1 3}

EVALUATION

As a new aspect of the health sciences, this field has possibilities of immeasurable results, at this time. But, this new field can be of value to the black man now. The "paramedic" field would allow many high school graduates who are now working as nurses aides or nursing assistants to enter the profession. These aides have many years of experience and knowledge which they can be utilizing to contribute to health care of blacks in various inner city communities. This field will also provide an avenue for increasing the family income.

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A BLACKMAN'S NOTES ON CHINA

by
Carl L. Shears

Recently much has been written about China. This has been a result of President Nixon's visit to the mainland during the period of February 17–28, 1972. Just a few years ago China was the Ruben in *Brave New World*, by Aldous Huxley. Then, over a few months ago, the President went to work and suddenly China became our long lost friend. This is not to say that China does not deserve to be our friend, but rather that from recent weeks of exposure we can see how our fickle minds can be turned off and on, and then reversed almost at the flick of a switch. Maybe, this is good. It shows that the mind of man is elastic and will snap back when a deforming force is removed.

The purpose of this article is to investigate, scientifically, the reports from China and to draw conclusions based upon this. Of course, we must be cognizant of the fact that not all information is available, but in the process of reading between lines and certain innuendos we can extrapolate. Also, I am investigating the recent China visit from a Blackman's reference point. I am attempting a political/economic experiment. The China visit is the experiment.

From the information which has been presented by the news media, we can see that China has indeed come a long way since 1945 when Chairman Mao and Chiang-Kai-Shek were fighting over control of the mainland of China. After Mao's defeat of Nationalists forces, China became, to our minds, Red China. Red China meant, a thing to be feared. It's primary aim was to destroy capitalism. At that time in history Red China was an ally to the Soviet Union. To our minds, since both country's ideology were antithetical to ours, they were a menace and would eventually have to be dealt with. Since the 1950's and the 1960's our government begun to realize that the planet earth is indeed a small place, and that it is very difficult to ignore a country which has a population approaching a billion people.

From my point of view, Chairman Mao Tse-tung and Premier Chou En-lai have brought China almost to modernity, but not yet to the modern world. In twenty-five years much has happened in China: great leaps forward, cultural revolutions, and the likes. However, now there is a question which must be answered: As I see it now, this cannot be answered in the affirmative. China needs America as much as America needs China.

America has the technical know-how which China needs desperately. Of course, China could struggle on alone, but it would take perhaps another thirty years, at least, for her to be where America is now. In that time span America would be thirty years further along. Technology knows no barriers. What we are seeing are the initial stages of an American–Chinese exchange. In other words, we will exchange American know-how for Chinese markets.

America needs the 800 million souls in China to pour her surplus goods on. In a sense, this would more than enough to supply a shot to our economy. There is the thought, also, that as the Chinese watch more and more television, ride motor cars and motor scooters around, dance to rock-and-roll music and eventually take the drugs, as our society has done, there will be little time left to think of hating Americans, but rather more time will be spent enjoying the finer things of life. In essence, as the bamboo curtain lifts there will be more dissent among the Chinese working classes. As the men who made the Long March become fewer and fewer, the grip on China will lessen.

In spite of what I have said above, America still has the upper hand. Our forces encircle China. We still have troops in Japan, Korea, Vietnam, Cambodia, and in many other Asian countries. In other words, America is taking no chances. To the north of China lies Russia. China faces a dilemma. She is forced to make a partial peace with one of her two enemies, either Russia or America, or she could do as many other countries are doing—play both sides.

As of now we can say that Chou En-lai, who seems to be running China, is a very astute politician and realizes that the world is changing. He also knows that if China's population continues to increase at a fast rate, then in order to become a world power China must industrialize as soon as possible. China cannot wait twenty-five more years. As of now the workers are well fed, but soon they will need refrigerators, cars and other consumer items. Only American know-how can provide these. China is not willing to wait; she wants to take her place at the "table of nations". But as America needs Chinese markets, so does Japan. It appears that Japan is making overtures to China. What could eventually evolve with Japan, China, North and South Korea, is an Asian Common Market.

The final question is: What happens when China has industrialized; My opinion is that then she will need more territory, and that can only be gotten through war.

ACUPUNCTURE: A CHINESE HEALING SYSTEM

by
Marilyn Inge

Acupuncture by definition is the insertion of needles into specified points of the body and through stimulating these points the functioning of internal organs can be affected. There are twelve main channels, or meridians running over the body close beneath the skin. Each of these is related to a specific organ, and so by stimulating certain points along these meridians, a sluggish organ can be stimulated or an overactive one can be pacified. The process is by no means simple, but rather operates according to exceedingly complex relationships between the various organs, (based on their respective elements) and in stimulating the vital life forces of *Chi*, or restoring a balance of *Yin* and *Yang*. Since disease arises out of a disequilibrium in the human organism, the basic cure is in restoring harmony. Acupuncture is one of the main techniques for doing this, and it is therefore used on a wide variety of maladies, including what we would consider mental disturbances.

Westerners generally regard acupuncture as the most bizarre branch of Chinese medicine, for existing physiological knowledge cannot explain its working. Moreover, the idea of sticking needles into the body often evokes emotion close to horror at what seems to be the epitome of the benighted practices of old, unscientific China. Certainly in the hands of the ignorant practitioners it can be frightening, especially because of their lack of knowledge about infection.

It should be noted however, that the needles are so fine as to do serious damage, and the points of insertion are carefully chosen to avoid vital organs. Moreover, it is thought unnecessary to insert the needles more than one millimeter. Although most Western medical specialists remain highly skeptical about the ancient art, it has won a few converts in the modern medical profession (especially in Europe), and even experts unmoved by its grandeur claims as a system of therapy admit the possibility of obtaining some specific neurological reactions through this procedure.

In China, there is presently established a Peking Acupuncture Institute. In 1956, three Soviet women physicians carried out several months of well-published study of acupuncture in Peking. Afterward the Russians opened clinics and research centers for acupuncture in Moscow, Leningrad, Gorki, and there was considerable discussion of the subject in Soviet Medical literature.

Acupuncturists have also been included as Technical aides sent to Algeria, Yemen, and Indonesia. More recently, China's newest friend in Asia, Pakistan has been privileged to exchange visiting teams of traditional doctors with China.

The central concept of Chinese cosmology since classical times has been the dual forces of *Yin* and *Yang*, whose continuous interaction lies behind all natural phenomena, including the constitution and functioning of the human body. These range from proper conduct and mental hygiene — adumbrations of psychotherapy, but also traces of religious concepts to dietary rules and acupuncture. Behind it all lies a stress on maintaining balance or harmony.

As the teachings of acupuncture claim, each internal organ is in close affinity with its own definite spots, or points, on the skin. There are 365 in all, and they are distributed all over the body, including the head and the limbs. The insertion of the needle in these respective points is said to exert either stimulating or an equalizing effect, thereby reinstating order and harmonious balance within the disturbed collaboration of the nerves, or of *Yin* and *Yang*, as the Chinese have it.

Most research scientist believe that this concept corresponds to the Western theory of the sympathetic and parasympathic nervous system. Until the turn of the century, acupuncture was practiced solely in the oriental

hemisphere and was completely unknown in other countries. Its application goes back to ancient times. It began to blossom during the Tang Dynasty (618 A. D.), the golden age of medicine, and gained wide popularity during the generally energetic and alert Sung Dynasty (960-1126). During the Tang Dynasty, an academic chair solely for the discipline of acupuncture was established.

The purpose of acupuncture:

Acupuncture is based on the following concept:

Certain channels or ducts – now usually called meridians extend internally (perhaps embedded in the muscles), throughout the body in a fixed network. The 365 points on the skin are the spots where those meridians emerge on the surface. Since skin points, meridians, and viscera are interrelated, and since all of them naturally harbour the ebb and flow of *Yin* and *Yang*, a cure is believed possible by treating one of the cutaneous “outlet” points.

The insertion of needles into these strategic points is designed to diminish an abundance (excess) or to replenish a deficiency, depending on the particular need of the diseased organ. It is assumed that the stagnated pneuma is drained, and young fresh pneuma is substituted. Hence, the puncture points may also be considered the gate-keepers of their affected meridians and organs. But in certain cases the points may also function indirectly as gate-keepers for other meridians.

After the doctor has made a precise diagnosis based on the syndromes of pulse and coloring and the other observations he has made, he will proceed to set the patient in the most comfortable position possible. Then he will ask the patient to cough and will use this moment of distraction to insert the needle swiftly. The depth of insertion and the type of needle to be used are as punctiliously prescribed as are the length of time during which the needle has to remain in situ, and other relevant particulars. Some diseases require that the needle be left in the body for five minutes, others require a quarter of an hour, and others, still longer.

Whether a puncture is to reduce a visceral plethora or whether it is to supplement a deficiency depends on the condition of the diseased organ.

The classical school of acupuncture distinguishes nine types of needles. Their various shapes are said to have been invented by Emperor Huang-ti. The earliest needles were made of flint, later they were made of iron, copper, gold, silver, and other metals. Today steel needles are predominantly used.

For the Chinese physician, it is an obvious principle that the needle may be applied only during certain time periods. Undoubtedly, it was the practice of long and thorough observations of patients that led Chinese physicians to connect atmospheric changes with the causes and courses of disease.

The science of acupuncture was introduced to Japan by the physician Jofku who came to this country from China. The law of *Yin* and *Yang* and the law of the Five Elements are the absolute and fundamental laws of Oriental philosophy and it is upon these laws that Oriental medicine is based.

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MARRIAGE IN THE TECHNOLOGICAL AGE

by
Adrian Paulette Green

Remember the time when a home was depicted by a woman in an apron standing over a hot stove making homemade soup, with four or five children tugging at her apron strings, a smile of charm and content on her face, and a husband resting in a comfortable armchair with his feet soaking in a large pail of hot water after a hard day's work? Did you say, "I don't remember"? Well, there is nothing wrong with you, because I don't remember either.

Among the major concerns faced by individuals who are planning to marry and to those who are already married is the future of marriage. The institution of marriage is no longer geared towards the blissful union of man and woman who eventually give birth to several children, conquer the problems of life, and live happily ever after. There are marriages today which retain the forenamed, however, they are becoming in the minority. Couples still get married, and couples still have children; the questions must now be asked, "Are couples content? Is marriage really fulfilling? And, last, is marriage a viable institution in the age of technology."

There must be a reason for the changing of an institution. Technology has affected all of the societal institutions. Technology is the principal scapegoat for the changing of connubial relationships. All of our necessities in life, and those things which we desire are provided for us by technology. Technology is applied science which affects everything and everybody.

Technology has brought change and new concepts of marriage to millions of married couples, and singles planning to marry simply by providing objects for human sustenance and comfort. Today couples fall in love, hopefully with each other, and they marry. The husband works, the wife works, they postpone having children, and they survive.

One of the most readily available examples of applied science at its best is in the area of planned parenthood. Contraceptives have made it possible for couples to have or not to have children, thus partially eliminating one function of marriage—procreation. Reasons given for having fewer children include the fact that the cost of raising them and educating them is becoming more expensive. Another reason given is that couples do not have the time to raise them. One last reason is that couples are simply not ready to start a family. These three reasons can be summarized as money, time, and immaturity resulting from being spoiled by technology. The shortage of money is a direct result of technology in that the cost of attaining technological devices and gadgets such as cars, automatic washers and dryers, dishwashers, air conditioners, second homes, etc. is a strain on the pocketbook. In the twentieth century we are a people not adapted to improvisations.

Technology has provided easy means of transportation, jobs with a minimum of effort and a maximum of output, household items to make cleaning as quick as a whip, the pill, trips to the moon, heart transplants, artificial inseminations, diet pills, computer select-a-mate, transovulation, Women's Lib., and "you name it".

Technology has cut the time in half for traveling, and for many of our everyday jobs. We should have more time left to do meaningful and fulfilling activities such as being with one's family. Instead more often than not the family is separated. Certain jobs require that the man be away from home. When he is at home there is not time to do anything except rest from fatigue. Therefore, we limit the number of children we have, or we decide not to have any because we cannot afford them, or we do not have the time for them.

Technology has affected another segment of marital life, namely that of roles. No longer are women restricted to the kitchen. Many women are in direct competition with their husbands on the job. When both come home there is the question of should the husband help the wife with her work in the home. More often than not the husband feels negativistic towards this suggestion, thus creating a conflict which is usually unresolved.

Today's young wife takes a birth control pill to control the size of her family, a diet pill to counteract the additional weight the birth control pill produces, a tranquilizer to counteract the sleeplessness produced by the amphetamines in the diet pills, and the nervousness produced by the diuretics, and a huge doctor's bill. The wife, as a result is cranky. The husband is cranky because he cannot understand why, with automatic washer and dryer, vacuum cleaner, dishwasher, electric gas range, no kids, an air-conditioned home, his and hers' cars, an automatic floor waxer, and a list of other essential-non-essentials, she cannot have dinner ready and the house cleaned when he comes home. The answer just might be, too many conveniences.

On the other hand, today's young husband is victimized by technology also. If he is in a job in which the work load has been minimized by technology, the chances are that he might be physically out of condition. His muscle tonus is probably weak, and as a result he might not feel up to doing his part in the home and marriage such as mowing the lawn, fixing or repairing broken articles in the house, and maybe taking his wife out for a night of leisure, once in awhile. Of course, if he is mentally overworked, he also might be cranky, and his solace might be a highball which just might put him out of service for the night.

The couples who have let all the conveniences take the pleasure out of married life after the novelty has worn off are in trouble. The consequences of technology are a people who are so educated until they are stupid, so sophisticated until they are naive, and so beautiful until they are plain. Technology has made life so content until life is overcontent, and finally until life is not content.

Young couples planning to marry should realize that technology is here to stay until something more technical replaces it. Technology has oversimplified many functions of life that years ago used to make a marriage. Today's young married couple might find themselves with more time on their hands than they know what to do with it. They might become bored with one another and seek interests outside of marriage to fill the gap. Of course, not all couples have this problem. There are some who have managed to manage technology. They have found time to still have a few children. If a few unwanted pounds accumulate, they still find time to exercise physically. This exercise stimulates them into other activities the couple might not ordinarily have participated in. As a result the young couple might be an asset not only to each other but to their communities and their nation. Instead of being doped and deluded, they have hope and a future.

The subject might now be changed to, are the individuals in the marriage viable, instead of is the marriage viable. The answer to this question is very simple. It is the individuals duty to see that they make the most of their marriage instead of becoming technological freaks.

Marriage is definitely changing. When it does, technology, as always, will be there with some additive. Eugenics, or the improving of hereditary qualities by social control of mating and reproduction might be used as an incentive for having children. For those women who want children genetically of themselves, but do not want to carry them themselves, there is transovulation possibility, whereas a women's fertilized egg is implanted in another women. For the man who wants to control childbirth himself there is the freezing of sperm for future uses and the vasectomy. For those whereas none of the above works, there is the future possibility of three year marriages by contractual agreement.

MODIFICATION OF TOISSON'S FLUID FOR SIMPLICITY OF TRYPANOSOME COUNTING AND MEASUREMENT

by

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SUMMARY

Toisson's fluid was modified to facilitate hemacytometer counts and measurement of trypanosomes. The modified fluid dissolved erythrocytes, leaving only leucocytes, platelets, and trypanosomes.

INTRODUCTION

Kolmer (1915) was the first researcher to devise a diluting fluid for dissolving erythrocytes in trypanosome counts. Ross and Thompson (1911) were the first to utilize a technique for removing hemoglobin from red blood cells. Their method merely consisted of washing blood smears under a gentle stream of water. This was followed by different dehemoglobinizing approaches by several researchers (Simons, 1938; Field, 1940).

Petana (1963) devised a method for counting trypanosomes utilizing Gram's iodine as a diluent. However, this diluting fluid did not permit lysis of the red blood cells. The present study was undertaken not only for the purpose of dissolving erythrocytes, but also in search of a diluent that did not require the use of phenol and separate mixing of chemicals.

MATERIALS AND METHODS

Six female albino rats (Sprague Dawley strain) were inoculated with 100 *Trypanosome lewisi* cells each by the method of Lincicome and Watkins (1963). After trypanosomes appeared in the peripheral blood, experimentation with a modified Toisson's fluid was started.

The original composition of the fluid in question is shown below:

Toisson's Fluid	
Sodium Chloride	1.0 gm
Sodium Sulfate	8.0 gm
Glycerine	30.0 ml
Crystal Violet	10-25 mg
Distilled Water	160.0 ml

The composition of the modified Toisson's fluid for this study was:

Sodium Carbonate	0.3 gm
Sodium Chloride	0.3 gm
Sodium Sulfate	8.0 gm
5% Glacial Acetic Acid	190.0 ml
Crystal Violet	22.0 mg

The number of trypanosomes per unit volume of blood were observed with a red blood cell pipet, hemacytometer, modified Toisson's fluid, with a constant dilution factor of 200X.

To prepare blood smears for measurement of trypanosomes, smears were flooded with modified Toisson's fluid for 15 minutes, rinsed with distilled water and stained with Wright's stain for 10 minutes. The smears were flooded with phosphate buffer (pH 6.4) for 15 minutes, rinsed with tap water and dried.

RESULTS

Fig. 1 shows an illustration of a hemacytometer field after the modified Toisson's fluid was used.

Fig. 2 shows an untreated smear with Wright's stain, and Fig. 3 shows a smear treated with modified Toisson's fluid. Measurements of trypanosomes on the untreated Wright's stained smear showed a mean length of 30.76 ± 2 and the modified Toisson's treated smear showed a mean length of 30.70 ± 2 . The differences in lengths were not statistically significant.

DISCUSSION

The results show that the modified Toisson's fluid may be used: (1) to dissolve the red blood cells prior to hemacytometer counting; and (2) deleting red blood cells from blood smears.

As can be observed from Figs. 1, 2, and 3, only leucocytes, platelets, and trypanosomes remain. These results were also noted by Kolmer (1915). Kolmer devised a diluting fluid utilizing 2cc of 40% formalin, 2cc of glacial acetic acid, and 2cc of Ziehl-Neelson's carbolfuchsin in 96cc of distilled water. However, this fluid entailed separate mixing of the chemicals. The present modification of Toisson's fluid is less cumbersome and also less hazardous because phenol was not included.

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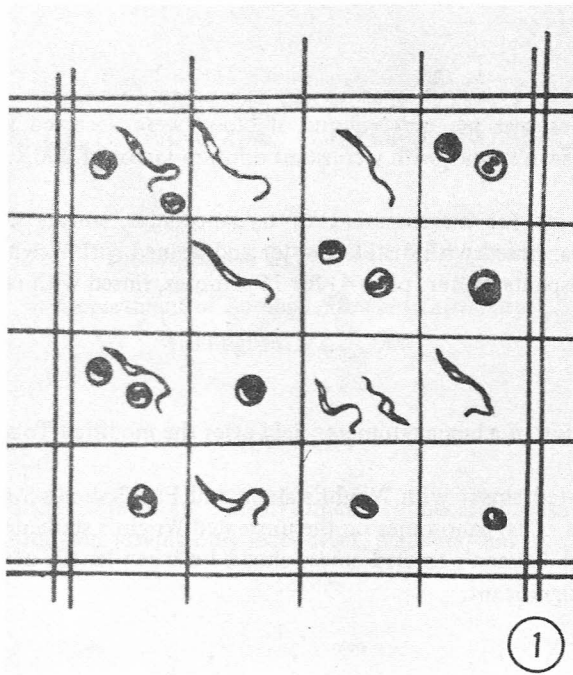


Fig. 1. A hemacytometer field showing leucocytes and trypanosomes.



Fig. 2. Photomicrograph of a Wright's stained smear showing erythrocytes, platelets, and trypanosomes. X4000.

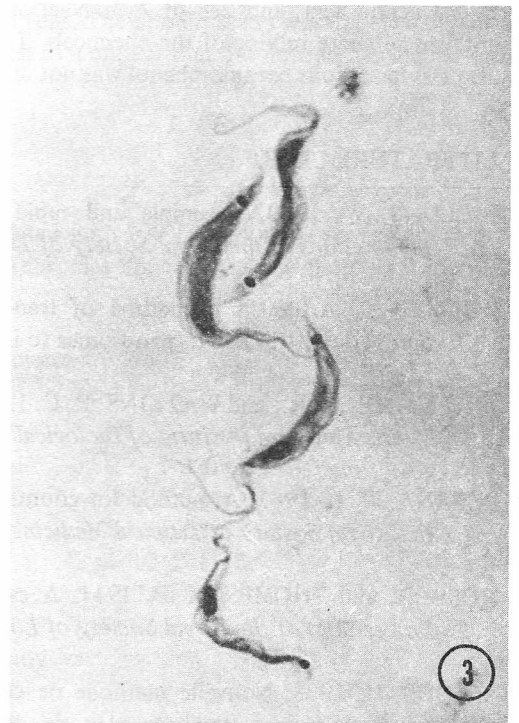


Fig. 3. Photomicrograph of a modified Toisson's fluid and Wright's stained smear. X4000.

COMMENTS

Dear Mr. Shears:

Sometime ago you kindly sent the College of Arts and Sciences, Dean's Office, a copy of the Howard University REVIEWS OF SCIENCE, Volume 1, Number 1, dated November, 1971. I have had the opportunity to read this first issue and wish to commend you and your staff for pursuing this arduous task and, furthermore, hope that this letter will serve as encouragement to continue with future issues. The reviews make it quite clear that you are not only talking about Science, but you are taking the initiative of covering eclectic areas in the disciplines of chemistry, physics, biological sciences, and engineering.

I hope you will include us in future mailings as you did in the initial one. Again, please accept our very best wishes for a successful future with your journal.

Cordially,

Harold Zallen
Assistant Dean and
Director of Research and
Graduate Studies
Oklahoma State University

Dear Mr. Shears:

I would like to express my appreciation for sending me a copy of the first issue of the Howard University Reviews of Science. It is indeed an excellent job and I would like you to know that I read it from cover to cover, which is difficult to do in these days when one receives so much in the mails.

With best wishes for your continued success,

Sincerely,

Martin A. Pomerantz
Bartol Research Foundation

THE PIONE FORM FACTOR

R. A. Watlington, Washington Technical Institute

and

R. E. Mickens, Fisk University

Introduction

The so-called elementary particles of nature have electromagnetic structure which may be studied by scattering electrons from these particles. A measure of this electromagnetic structure is the form factor.⁴ In classical physics, the charge form factor is defined as the Fourier transform of the charge distribution. In general, an elementary particle having spin J has $2J+1$ form factors. For example, the proton has spin one-half and thus has two form factors, one that is related to its charge distribution and the other that is related to its magnetic distribution.

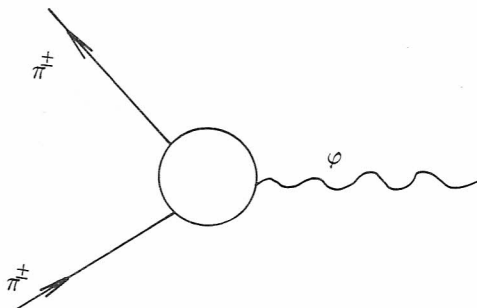
In this paper we consider the charge form factor of the pi-meson. Using unitarity,² dispersion relations² and certain approximations, we show that multi-particle states do not affect the prediction of the vector-meson dominance model (VDM) for the pion form factor.

The Pion

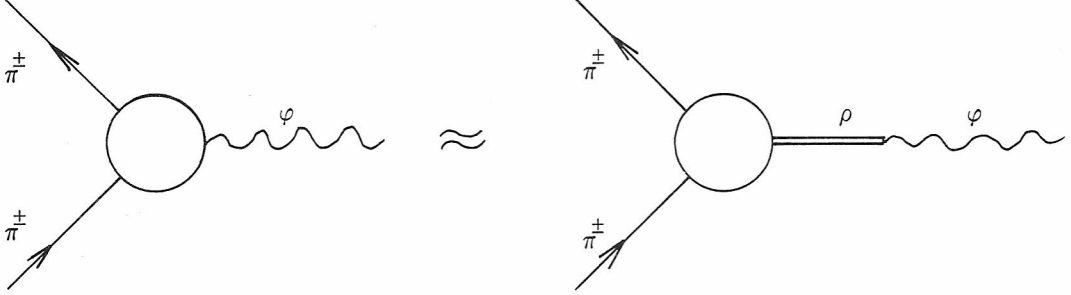
The pion (pi-meson) is the strongly interacting particle which was discovered in 1947, and contributed greatly to the confirmation of Yukawa's hypothesis that nuclear forces are mediated by heavy particles with baryon number zero.³ The pion has spin equal to zero, isospin equal to one, and negative parity. Its charged states (π^+ and π^-) have a mean lifetime of 2.55×10^{-8} sec., mass of approximately 140 MeV and each decays into a charged muon and a neutrino. The uncharged π^0 has a mass of approximately 135 MeV and a mean lifetime of 1.78×10^{-16} sec. Since the spin of the pion is zero, it has only one form factor, the charge form factor.

Vector-Meson Dominance Model (VDM)

According to the VDM,⁴ the interaction between strongly interacting particles (hadrons) and photons is mediated by vector-mesons, i.e., by hadrons with $J^{PC}=1^{--}$. The known vector-mesons are the rho, omega and phi, with isospin one, zero and zero, respectively. The pion form factor may be described by the following diagram:



The photon is not an eigenstate of isospin, i.e., it contains both isospins one and zero; thus, in principle, for the pion form factor all three vector-mesons could contribute. However, the phi-meson does not decay into two pions, and G-parity forbids any contribution from the omega meson.⁴ Consequently, only the rho-meson contributes to the pion form factor. Diagrammatically, we have,



The above diagram represents the following mathematical expression,

$$F_{\pi}(t) \approx \frac{g_e \pi \pi m_e^2}{g_e (m_e^2 - t)} \quad (1)$$

Here, m_e is the mass of the rho-meson, $g_e \pi \pi$ is the rho decay coupling constant and g_e^{-1} is the direct photon-rho coupling; t is the so-called Mandelstam variable. For $t = 0$ we have $F_{\pi}(0) = 1$. This follows from charge conservation, i.e., the charge of the π^{\pm} is (± 1) . This relation allows us to express the photon-rho coupling in terms of the rho decay constant, i.e.,

$$g_e \approx g_e \pi \pi \quad (2)$$

The rho coupling to two pions may be obtained from the expression,⁵

$$\Gamma = \frac{g_e^2 \pi \pi}{6\pi} \frac{k_{\pi}^3}{m_e^2} \quad (3)$$

where Γ is the decay rate.

Using this result, the VDM prediction for the form factor is,⁴

$$F_{\pi}(t) \cong \frac{m_e^2}{m_e^2 - t} \quad (4)$$

Dispersion Relations and the S-Matrix

Let F be a complex function of Z , analytic in the Z -plane except for $a \leq Z \leq \infty$, with a real. If in addition, $F(Z) = F^*(Z^*)$ and

$$\lim_{|Z| \rightarrow \infty} F(Z) = 0, \quad (5)$$

then $F(Z)$ has the following integral representation,

$$F(Z) = \frac{1}{\pi} \int_a^{\infty} \frac{\text{Im} F(y) dy}{y - Z}. \quad (6)$$

The relation given in Eq. (6) is sometimes called a dispersion-relation.⁵

The probability P_{fi} of a transition from a given initial state $|i\rangle$ to a final state $|f\rangle$, is defined in terms of the S-matrix as follows,

$$P_{fi} = |S_{fi}|^2 = |\langle f | S | i \rangle|^2. \quad (7)$$

The T-Matrix is related to the S-matrix by the relationship,

$$S = 1 + 2iT \quad (8)$$

Since the S-matrix is unitary, i.e., $S^\dagger S = 1$, the following result is easily obtained,

$$\text{Im} T = \frac{T - T^\dagger}{2i} = T^\dagger T. \quad (9)$$

The matrix elements of T may be written as $\langle A | T | B \rangle$, where A and B are any arbitrary two states. Thus, Eq. (9) may be written as,

$$\text{Im} \langle A | T | B \rangle = \langle A | T^\dagger T | B \rangle = \sum_N \langle A | T^\dagger | N \rangle \langle N | T | B \rangle, \quad (10)$$

where $|N\rangle \langle N|$ is the projection operator for an N -particle state.

If state A is the two pion state, i.e., $|A\rangle = |\pi^+ \pi^-\rangle$ and state B is the one-photon state, $|B\rangle = |\varphi\rangle$, then T is the transition operator between the two pion state and the photon. The pion charge form factor, $F_\pi(t)$, is defined as the following matrix element,

$$F_\pi(t) = \langle \pi^+ \pi^- | T | \varphi \rangle. \quad (11)$$

We now assume that the pion form factor is a function of the complex variable t and that, in addition, it satisfies the conditions necessary to obtain the result given in Eq. (6), i.e.,

$$F_{\pi}(t) = \frac{1}{\pi} \int_{t_0}^{\infty} \frac{\text{Im } F(y) dy}{y - t} \quad (12)$$

Consistent with Eq. (10), the imaginary part of $F_{\pi}(t)$ may be written as follows,

$$\text{Im } F_{\pi}(t) = \Sigma \langle \pi^+ \pi^- | T^+ | N \rangle \langle T | \varphi \rangle, \quad (13)$$

where $\langle C | T | N \rangle$ is the $J=1$ partial wave amplitude for the reaction $C \rightarrow N$. The other conserved quantum number of $C(N)$ are $I=1$, $B=S=0$. The lowest N in Eq. (13) is the two-pion state, thus t_0 is equal to $4m_{\pi}^2$.

Equations (12) and (13) will be the basis of our calculations, i.e., if we can obtain an estimate for $\text{Im } F_{\pi}(t)$ from Eq. (13), then by putting this estimate into Eq. (14), we can calculate the pion form factor.

The Model

If in Eq. (13), the particles in $|N\rangle$ are restricted so that $t \leq 1 \text{ (GeV)}^2$ then $\text{Im } F_{\pi}(t)$ may be written,

$$\begin{aligned} \text{Im } F_{\pi}(t) \cong & \langle \pi^+ \pi^- | T^+ | \pi^+ \pi^- \rangle \langle \pi^+ \pi^- | T | \varphi \rangle \\ & + \langle \pi^+ \pi^- | T^+ | K^+ K^- \rangle \langle K^+ K^- | T | \varphi \rangle \\ & + \langle \pi^+ \pi^- | T^+ | K^0 K^{-0} \rangle \langle K^0 K^{-0} | T | \varphi \rangle \\ & + \langle \pi^+ \pi^- | T^+ | K^+ K^- \pi^0 \rangle \langle K^+ K^- \pi^0 | T | \varphi \rangle \\ & + \langle \pi^+ \pi^- | T^+ | K^0 K^{-0} \pi^0 \rangle \langle K^0 K^{-0} \pi^0 | T | \varphi \rangle \\ & + \langle \pi^+ \pi^- | T | \pi^+ \pi^0 \pi^- \pi^0 \rangle \langle \pi^+ \pi^0 \pi^- \pi^0 | T | \varphi \rangle \end{aligned} \quad (14)$$

From experiment and unitarity it is known that the matrix elements $\langle \pi^+ \pi^- | T | \pi^+ \pi^- \rangle$, $\langle \pi^+ \pi^- | T | K^+ K^- \rangle$, and $\langle \pi^+ \pi^- | T | K^0 \bar{K}^0 \rangle$ are dominated at low energies the rho meson, i.e., for $t \leq 1 \text{ (GeV)}^2$. In the zero-width approximation, these matrix elements have the form^{4,5},

$$\langle A | T | B \rangle \approx \frac{g_{Ae} g_{Be}}{m_e^2 - t} \quad (15)$$

where $A = \pi\pi$ and $B = KK$ and $g_{Ae} g_{Be}$ is the coupling constant for the transition $e \rightarrow A(e \rightarrow B)$. This result, Eq. (15), also applies if A is either $e e$ or $\omega\pi^0$.

Since the rho meson decays into two pions and the matrix elements for rho decay into two kaons is non-zero, the three-and four-particle states may be represented approximately by the following two-particle states:

$$|K^+ K^- \pi \rangle \approx |e^0 \pi \rangle \quad (16a)$$

$$|K^0 \bar{K}^0 \pi \rangle \approx |e^0 \pi^0 \rangle \quad (16b)$$

$$|\pi^+ \pi^0 \pi^- \pi^0 \rangle \approx a |e^+ e^- \rangle + b |\omega \pi^0 \rangle \quad (16c)$$

Thus, we obtain the following results,

$$\langle \pi^+ \pi^- | T | K^+ K^- \pi \rangle = \langle \pi^+ \pi^- | T | K^0 \bar{K}^0 \pi^0 \rangle \approx \langle \pi^+ \pi^- | T | e^0 \pi^0 \rangle = 0 \quad (17)$$

and,

$$\langle \pi^+ \pi^- | T | \pi^+ \pi^- \pi^0 \pi^0 \rangle \approx a \langle \pi^+ \pi^- | T | e^+ e^- \rangle + b \langle \pi^+ \pi^- | T | \omega \pi^0 \rangle \quad (18)$$

Equation (14) is zero because the $|e^0 \pi^0 \rangle$ can not couple to $I=1$. The vector dominance theory permits the assumption that all isospin-1 form factors are proportional. This assumption leads to the following results.

$$\begin{aligned} F_\pi(t) &= \langle \pi^+ \pi^- | T | \varphi \rangle \propto \langle K^+ K^- | T | \varphi \rangle_{I=1} \\ &\propto \langle K^0 \bar{K}^0 | T | \varphi \rangle_{I=1} \\ &\propto \langle \omega \pi^0 | T | \varphi \rangle \end{aligned} \quad (19)$$

The results of Eq. (14) through (19) may now be put in Eq. (12), giving the following expression for the pion form factor,

$$F_{\pi}(t) \cong C \int \frac{\mu^2 dt'}{4m_{\pi}^2 (t' - t)(t' - m_e^2)} \quad (20)$$

where C is a constant and all form factors under the integral have been set equal to a constant. The upper infinite limit of integration in the dispersion integral has been replaced by the constant μ^2 which will have a value in the range $2-3(\text{GeV})^2$. This is a reasonable approximation because we have only considered multiparticle intermediate states with $t \leq 1 (\text{GeV})^2$.

Note the following facts concerning Eq. (20):¹ (a) $F_{\pi}(t)$ has a simple pole at $t = m_e^2$; (b) $F_{\pi}(t)$ has a branch point at $t = 4m_{\pi}^2$ (c) within the adopted approximation, there is a branch point at $t = \mu^2$. However, since μ^2 is relatively large, its contribution is small.

We now make the "pseudo-physical" assumption that poles dominate branch points. Thus, at least in the t -interval $|t| \leq 1 (\text{GeV})^2$ the form factor is dominated by the rho-meson pole, i.e, in normalized form the pion form factor is given by,

$$F_{\pi}(t) \approx \frac{m_e^2}{m_e^2 - t} \quad (21)$$

Note that this is the VDM result given earlier in Eq. (1).

Conclusion

Approximating multiparticle states by two-particle states and using the assumption of pole dominance, we found that the inclusion of multiparticle states in the unitarity relation for the imaginary part of $F_{\pi}(t)$ does not alter the result obtain in the VDM.

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NUCLEIC ACID AND HISTOMETRIC DETERMINATIONS OF RATS INFESTED WITH *TRYPANOSOMA LEWISI*

By

Robert Ray Calhoun

ABSTRACT

Growth was investigated by measuring total weight and nucleic acid levels in a series of tissues, organs and whole bodies of adult female rats infested with *Trypanosoma lewisi*, "L" strain. The weight per nucleus varies with cell size and/or proportion of intercellular material. The growth of adrenal, heart, kidney, liver, pancreas, spleen, thymus, and thyroid was investigated by the chemical determination of DNA, RNA, cell number and cell size. Histometric methods, and paper cut-out techniques and the line sampling methods, were applied to sections of liver, pancreas, and thymus to show measurements of extra parenchymal spaces and parenchymal cell size. The Schneider method for the determination of DNA was employed and a micromodification of this method was performed for application to small organs.

The mean DNA content of nuclei (6.2 ug DNA per 10^6 nuclei) remained approximately constant in all organs investigated except in the liver where the DNA content increased due to possible polyploid nuclei. The number of cells per organ increased only slightly in some organs. The mean tissue mass per nucleus, obtained from the ratio of organ mass to cell number per organ, remained relatively small in the adrenals, pancreas, and thymus. However, small increases occurred in the liver, pancreas, spleen, and thyroid. The proportion of whole organs occupied by the extraparenchymal tissues and their relative changes in organ growth were investigated by histometric methods. In the pancreas, the percentage of extraparenchymal tissue decreased slightly in experimentals. The volume occupied by the Islets of Langerhans (% of the total pancreas) remained the same in experimentals and controls.

In the liver there was an increase in the area occupied by extraparenchymal tissue. In the thymus, the fraction occupied by the medulla increased only slightly. The cell density in the cortex was greater than in the medulla. Cell densities did not change much between controls and experimentals. Photomicrographs of the individual organs clearly illustrated two patterns of organ growth. In the thymus of experimentals, the slight increase in weight was due mainly to increases in cell number. Cell size changed little in this organ. In the liver, pancreas, spleen and kidney, the weight increases were due to increases in both cell number and cell size.

It can be concluded that the cells of various organs increase in cell size and cell number due, possibly, to the presence of the parasite, *Trypanosoma lewisi*. This might suggest indirectly that the parasite provided some factors which adds to the metabolic economy of the sheltering host and stimulate cell cellular activity in the organs cited above.

PHOSPHATES AND DETERGENTS

Phosphates are the chemicals that make most detergents work. They serve as water-softeners and as dirt-suspenders. Today ecologists blame phosphates for destruction of our lakes.

Ecologists believe this because all still or sluggish waters support at least some colonies of algae. Like all plants, algae need water, CO₂ and sunlight to survive and grow. They also need small amounts of other nutrients, mainly phosphorus, nitrogen, potassium, sulfur, calcium, iron, and magnesium. Some of these nutrients are in short supply in most lakes. But given an abundance of nutrients and warm weather they multiply so fast that they form huge mats of green slime on the water's surface. When one or more nutrients is exhausted, the algae start to die. Bacteria, ever present, attack the moribund mats. The most immediate result is a vile smell. If the algae mats are widespread enough, the bacteria will exhaust more and more if the lake's oxygen is trying to deal with this. Phosphates are not poisons but are normal, vital, and components of all living things. It is part of every cell and fluid of the human body. Green plants use phosphates as a fertilizer. This is the problem.

Aging and death are normal processes for lakes; as millennia pass, they become choked with plant life and eventually turn back into dry land. Scientists call this process "eutrophication". Man has accelerated this process over the years. It has been estimated that Lake Erie has aged the equivalent of 15,000 years in the past 50 years.¹

Most detergents contain large amounts of Sodium Tripolyphosphate (STPP). This breaks down into phosphates which are the stimulants of the algae overgrowth. The phosphates are the wetting agents. By lowering surface tension, the wetting agent improves the penetrating power of water, thereby facilitating removal of stain and dirt. Phosphates soften water by complexing calcium and magnesium ions and elements such as iron or manganese that yellow or discolor laundered fabrics. Also, they help disperse dirt, emulsify grease, and produce a degree of alkalinity desirable for effective removal of soil, perspiration, or food residue and yet they do not irritate the skin or damage fibers. They are nontoxic and biodegradable.²

The answer to the problem concerning phosphates seems obvious enough; Eliminate the phosphates and substitute harmless substances. However, the solution is a problem because the substitutes can be dangerous.³

At a time nitrilotriacetic acid (NTA) looked good as a replacement for phosphates. Millions of dollars were spent testing NTA and building new plant equipment to handle it. The housewives agreed that it did a good job of washing.

The trouble began when in a feeding test, rats developed a degenerative disease of the kidneys, called nephrosis, after six months. Tests run by NIH showed that NTA in combination with certain heavy metals could cause birth defects. The worry was that pregnant women might drink water contaminated with both NTA and metals, and give birth to defective children. Although this had not yet happened, the detergent manufacturers agreed to discontinue using NTA.³

When the war on phosphates began, small manufacturers rushed into the detergent business claiming to have nonphosphate, nonnitrogen detergents. This turned out to be even more hazardous. In FDA laboratory

¹Marion Steinmann, "The Washday Question", *Life*, (May 21, 1971) p. 36.

²"Potential Substitute For Phosphates In Detergents", *Chemistry*, (July-August 1970) p. 42.

³"A Solution Becomes A Problem", *Science News*, (December 26, 1970) p. 475.

tests, two brands "Ecolo-G" and "Bohack's No-Phosphate"--same detergent, different name, created open sores on rats when applied within 24 hours. Eight days later the rats still bore the sores. In a separate test, the two detergents applied to the rabbits eyes caused severe irritation and permanent partial loss of sight. Both brands are now forced by FDA officials to carry a warning on their labels.⁴

For the housewife to go back to soap again would be a comedown and could cause serious problems. Soap does not work well in dishwashers, and cleanliness of clothes would depend on how soft the water is. In hard water, soap combines with the minerals to form an unattractive insoluble curd that makes clothes look dingy and colored clothes look dull. Also, the soap curd is trapped in the clothes with modern spin-driers.

The problem of phosphates in detergents is still with us. A Columbus, Ohio, group advocates a simple formula: presoak laundry in a solution of warm water with 4 tablespoons of old-fashioned washing soda. Then launder with 2 tablespoons of washing soda and any laundry product that contains 1 percent or less phosphate. Among the soap products to contain no phosphates at all were Ivory Snow, Lux, and Vel. Other products containing one percent or less phosphate include Fleecy, Whistle, Jet Spray, Lestoil, Downy, Pinesol, sal today, and borax.⁵

The real answer may lie in changing a way of life that puts too much emphasis on nonessentials. Tell-tale gray shirts are not lethal.

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THE BLACK MUSLIMS IN THE TECHNOTRONIC AGE

By

Ragib Esa

The topic of this paper is the Black Muslims in the Technotronic Age. We shall begin by stating a few technological accomplishments of the Western World because this is the setting of Black Muslims' progress. The twentieth century is an era in human development wherein the more advanced scientific-minded, the developed peoples of the Earth, have successfully released the tremendous power of the atom. They have designed and built various types of aircraft, some capable of travelling non-stop for thousands of miles. They have visited the moon and sent Earth vehicles to other planets--interplanetary travel is no longer just a dream but almost a reality. They have circumnavigated the earth underwater (in submersibles) as well as aerially (in aircrafts). They have made the telephone, the computer, and millions of other gadgets for making life less difficult for themselves. They have learned much about "mind control" and extrasensory perception. They have made much the knowledge of these and other things available to those who are interested through wide distribution of information. But what about the "Developing World"?

The Developing or Underdeveloped World is rising. It has a long way to go. But if the trends of the past five thousand years are signs of things to come, this world of the indigent will surely reclaim its hegemony and add significantly to what some might have mistakenly referred to as "the ultimate" in modern living. There are already signs of a rebirth among these long oppressed and mentally partially stimulated people.

Profound changes that were not yet recognized and accepted by many twentieth century Americans in early 1970's began occurring among the descendants of the African slaves who were psychologically bound to American institutions by some strange power which seemed to act as a form of post hypnotic suggestion. About 1913 the establishment of the Moorish Science Temple of America by Noble Drew Ali was a milestone in the rebirth of the freedmen. Ali advocated Islam as a way-of-life. He rejected the Christianity which was practiced in the Western World. He forbade his followers to practice the corrupt way of Western civilization. The members of the Moorish Science Temple were different (they were a changed people). They lived, for the most part, by the laws of the religion of Islam as they were interpreted by Drew Ali, who they considered a prophet. They were a proud and fearless people. They practiced punctuality and were committed to achieving success and the good things of this world. Other men who possessed a strong charisma arose in the years following Noble Drew Ali, who was well aware of the work of Booker T. Washington.

Soon after the death of that important educator Booker T. Washington in 1915, the misunderstood leader, Marcus Mosiah Garvey began to teach his doctrine to the Freedmen in America. He did much to initiate positive changes in them. But in less than ten years his opponents had effectively silenced and deported him. However, not before he made a positive contribution to the work which Ali and Washington had started. After Garvey's demise, his organization, the Universal Negro Improvement Association, gradually declined but the ideas which it nourished continued to gain adherents. In his last speech before incarceration in the Tombs Prison, New York City on 17 June 1923, Garvey stated, "The world is crazy and foolish if they think that they can destroy the principles, the ideas of the Universal Negro Improvement Association."

One person whose ideas bore considerable similarity to those of Washington, Ali, and Garvey was Master W. Fard Muhammad. He was the founder of the "Nation of Islam", (the Black Muslims) and the person, according to the honorable Elijah Muhammad, in whom Allah (the God) appeared in Detroit, Michigan for three and a half years beginning about 4 July 1930. This was the commencement of Islam in America as taught and practiced by citizens of the "Nation of Islam." Its teachings sound much like orthodox Islam, but there are some differences. However, since many people are aware of those variations, we will omit them and concentrate on some of the "Nation of Islam's" accomplishments.

Through the mass media, newspapers, radio, and television and mass meetings along with other methods of communicating, Elijah Muhammad and his followers have been successful in transmitting their message to millions of people around the world. People as far away from the United States as Egypt, Libya, Nigeria, China, France, Norway, Uzbek, as well as those in the Americas have heard of the "Nation of Islam" and its leader. So one of its foremost accomplishments was getting its message to the people. However, Mr. Muhammad has emphasized that his primary concern is the "uplift of the so-called Negro in America." Many of them have accepted his doctrine but a large majority of them have not (they have not formally joined the Nation of Islam). Many African-Americans have said that they do not have to join "because they are black, and all Black people are Muslims." But whether or not they join, the "Nation of Islam" has had a powerful influencing effect on many of them and their organizations.

In the year 1972 the Black Muslims had their own newspaper, *Muhammad Speaks*, the first volume having been published about eleven years ago. In this paper there were probably more national and international news than in any other Black newspaper which was published at that time. More copies of it were sold than other Black and some white papers. It was printed by their own press (which was probably bought through a cash transaction--they believe in paying cash for whatever they purchase).

When only a few local organizations (especially churches) were able to broadcast their areas about once per week, the "Nation of Islam" was transmitting its program to millions of people via radio stations in many states about seven days per week. Most of the major cities in America could receive the program "Muhammad Speaks" via radio. In some cities, the program was televised. The District of Columbia was one of those cities. The "Nation" communicated effectively, but that was not its only accomplishment.

The Black Muslims were successful in purchasing farm land on both sides of the Mason-Dixon line. They owned farms in Alabama and Michigan and probably in other states. These farms have supplied many of their food needs -- meat, dairy products, poultry, vegetables and some fruit. Some of them have said that their land was very productive and they expected it to continue to provide record yields. They consider this no accident but a favor from their God and hard work from their "laborers". However, the "Nation of Islam" uses some of the most modern equipment and methods in their agricultural pursuits. All of these factors contribute to their success in this area.

In several issues of their national organ, *Muhammad Speaks*, the "Nation of Islam" has advertized its need for aircraft pilots. There is evidence that the Black Muslims have purchased aircraft for use in their transportation system. They are already in possession of several large trucks that carry their farm and other merchandise to various American cities. This is not amazing. It is only a minute indication of what a downtrodden people could accomplish if they were properly organized, programmed, directed and motivated. These are the keys to success. We will say more about them later. But right now let us mention a few more achievements of Mr. Muhammad and his followers.

Most of the indigent people of America are totally dependent on the "master-class" for their daily needs. It was mentioned that the "Nation of Islam" possessed farms, this was only one of its positive steps toward relative independence. There have been many accomplishments. Another one of them is their successful clothing manufacturing company. Many of the clothing items worn by the Black Muslims are products of their own hands. They are encouraged to buy from their own people so their money can circulate longer in their community. This is only common sense, but they are making more use of the idea than any other organization of the underprivileged in America. They seem to have internalized the philosophies of Washington, Ali and Garvey with an added dose of Mr. Fard's medicine. They have much to thank Allah for. They have effective means of communication; they produce some of their own food; they have a transportation system for shipping their products to various points; they manufacture some of their clothing; but they have gone even farther.

Recently the honorable Elijah Muhammad and his followers have gone into the import business on a much larger scale than in past years. During the sixties some of them sold a few imported products. However, in the seventies, there was a substantial increase in their volume of imported merchandise. They have not only sold imported goods but also many domestically produced merchandise.

How can they achieve so much in such a short time. Well, they have been working on their plan for more than forty years. They have organized, programmed, directed, and motivated small cadres in urban and rural areas of the United States. For many years the basic method has been to go directly among the poor downtrodden Black people and emphasize in speeches the injustices of the white man, debunk his Christianity, damn his exploitive capitalistic system, prove that he is racist, show that he stole Black people's knowledge, land and minds, and call him the Devil. This method has won many Black Christians over to the "Nation of Islam". The Black Muslims were able to produce results that proved that they had something good.

After exposing the "white supremacist, Black Hating, Capitalist Devil", Elijah Muhammad and his followers offered Black people an alternative which was, their God, their life-style, and their fraternity. They advocated Islam as interpreted by their leader. They put great emphasis on self-help, "doing for self". They advocated racial solidarity, and cohesiveness among members of their group. One of their main goals was to teach the truth. And the first two that they learned (memorized) were (in the form of questions and answers):

1. Who is the original man?
The original man is the Asiatic
Black man, the maker, owner, cream
of the planet Earth, God of the Universe.
2. Who is the colored man?
The colored man is the caucasian
white man, yakrub' grafted devil,
skunk of planet Earth.

Much of what they do and say revolves around these two basic ideas. The belief that they are God serves as a motivator which gradually replaces the lethargy which was programmed into them by their oppressors. The Devil concept awakens in them a certain cautionary attitude toward the people they consider responsible for their poor, shameful condition. But there is still more to it than that.

The Muslims seem to attempt to re-program themselves for success. They seem to employ some methods of psycho-cybernetics to condition their minds and bodies to preserve and accomplish the "impossible". Of course nothing is impossible. They talk about the number of brain cells in the human being. They wonder how much could be accomplished if the brain was fully operative. They exercise their brains with problems from "the Problem Book". They compete with others in achieving certain goals. They realize that they are goal oriented beings, and they have set their goals very high. They put a great deal of emphasis on memory. Many of them feel that if one cannot remember what was studied, it was not learned. This is a key to their education system.

What makes the "Nation of Islam's" education system different from other ghetto school systems? It could be summed up in the words of the Washington, D.C. Minister, Lonnie Shabbazz of Mosque number four, who said that, "Our goal is to produce the superior being." This is not an overstatement of their desires. Mr. Muhammad stated in *Muhammad Speaks* that God was turning him (Elijah Muhammad) into Himself. So their concept of God-man or man-God is an important factor contributing to the difference in the two systems. Discipline is another factor contributing to their success in the teaching-learning experience. When many people were becoming more receptive to the "free school" idea, the "Nation of Islam" was advocating oldtime

discipline, with wonderful results. But the honorable Elijah Muhammad stated in his book *Message to the Blackman in America* that one of the most important lessons that one can learn is to "Know thyself". This is what the "Nation of Islam" purport to teach—the knowledge of self, God, the Devil, and the knowledge of the time in which we are living. Through learning this, they claim that the results will be, "money, good homes, and friendship in all walks of life." So education has also played a very important role in rise and Development.

The Black Muslims have prepared the way for many people. They are responsible for the acceptance of Islam by many people. They have motivated millions. They have mentally stimulated many Black people of America. The mission has been a success up to this point. They have accomplished much in forty years.

OUR FOOD

By

Joycelin Marshall

I hesitate to use the word, nutrition, right at the beginning of my article. It has been so much in the news today that you might just be turned off. However, there may well be something here for you to learn, so why not read on.

If there is one thing we should have all learnt by now, it is that we cannot evade the issue of nutrition any more than we can pollution, drug addiction, the threat of cancer or heart disease.

It would seem that as life becomes more complex, and one cannot seem to cope with all the situations that daily life presents, there is a tendency to become lax in some areas.

Rather, this whole business of eating is so important because to a large extent, we are what we eat. A person may take good health for granted until it's no longer there or somewhat diminished, and then the point is brought out most sharply--that all else flows on from there.

You might know that food is put into classes according to their function and in order to have an adequate diet, one should choose from a wide selection of foods. At the same time it is important to eat the correct quantity of foods within the various classes of food so as to at least fulfill the MDR--the Minimum Daily Requirement.

Instead of naming the classes of food as we know them, I will list foods in a group plan which one should keep daily in mind, so as to ensure good nutrition. They are:

MILK GROUP

Children - 3 to 4 cups

Teenagers - 4 or more cups

Adults - 2 or more cups

Cheese and ice cream can replace part of the milk.

MEAT GROUP

Two or more servings (2 or 3 ounces of lean cooked meat) - beef, veal, pork, lamb, poultry, fish, eggs, with dry beans and peas and nuts as alternates.

VEGETABLE - FRUIT GROUP

Four or more servings, including:

A dark green or deep yellow vegetable important for vitamin A, at least every other day.

A citrus fruit or other fruit or vegetable important for vitamin C, daily.

Other fruits and vegetables including potatoes.

BREAD AND CEREAL GROUP

Four or more servings - whole grain, enriched, restored.

This is a basic plan which might have to be stepped up here and there, so as to achieve one's total daily requirements of nutrients and calories.

Since proper selection and preparation go along with meal planning, in order to get the maximum benefit out of one's food, we'll be considering those factors later.

At this point, however, I would like to discuss some issues within nutrition, that is, dieting, control of fat and sodium.

Anything done in excess is not desirable and eating more than one needs to fulfil the standard requirement for good health, certainly falls into this category.

Dieting has been undergone by most people at some point or other in their lives, either because of illness or because of an obsession for a slim figure. In the case of illness diets may be fat, sodium, or sugar controlled. We shall consider the first two only.

There are some facts about fat and cholesterol that you should know.

All fat substances contain hydrogen in varying amounts. If the fat contains all of the hydrogen which it can hold, then it is called saturated fat. An un-saturated fat is one which can still absorb more hydrogen and falls into two categories: monosaturated and poly-unsaturated.

Saturated fats are animal fats and some vegetable fats, such as beef, pork, lamb, mutton, sausages, fat poultry, dairy products and chocolate.

The uses of un-saturated fat, especially poly-unsaturated fat, is indeed recommended. However, keep in mind that it will not lessen weight, as fat is fat, having the same number of calories.

Whereas, saturated fat is usually solid at room temperature, un-saturated fat is usually liquid, coconut being an exception. Examples of un-saturated fat are: oils of corn, cottonseed, peanut, safflower, sesame, soybean, margarine containing liquid corn oil, as well as fish and other sea foods.

Cholesterol is a fatty-like substance present in all animal products, especially in egg yoke.

There is some cholesterol in the body and in the blood, more in some than in others. If it accumulates along the walls of the blood vessels, it narrows them or closes them up completely, so that the heart, brain or other organs may get an insufficient supply of blood, or none at all.

The body also manufactures cholesterol from the fats consumed, so that one has to be very careful.

I want to emphasize that sporadic dieting does no good. Dieting must be a sustained effort throughout a person's life-time. All it means is eating what is good for us as far as we can determine.

Besides using more low-fat dairy products like skimmed milk, butter milk and cottage cheese, lean cuts of meat and poultry, preparation and cooking methods are also important. Trim fat off before cooking. Use methods of cooking as broiling, roasting and rotisserieing, all of which are fat reducing.

Also eat less calories than you burn up and exercise daily.

Sodium Control:

We must all learn to do without certain foods or articles of food preparation which we have come to think of as absolute necessities. It might seem difficult at first, but once one is over the initial experiences of meal planning and food preparation, it soon becomes apparent that all it takes is a little thought and imagination.

Now for facts about sodium - Most foods from animal sources are high in sodium (salt).

Sodium is added to most meat products in processing.

From a copy of the, Nutrition News, Oct. 1971, vol. 34, No. 3, a report entitled, "Observations on the Pathogenesis of Coronary Heart Disease," prepared by,

Ray H. Rosenman, M.D and
Meyer Friedman, M.D, Harold Brunn
Institute, Mount Zion Hospital and
Medical Center, San Francisco

it is stated that,

"Epidemiological studies show that the incidence of clinical coronary heart disease (CHD) is considerably higher in populations characterized by enriched diets, inadequate physical activity and modern industrialization."

"Also, the rate of occurrence of CHD is higher in groups of men who are overweight, heavy cigarette smokers, have diastolic hypertension, diabetes, increased blood levels of triglycerides, cholesterol and/or beta lipoproteins or have parental CHD history."

We sometimes tend to forget that modern life as we now know it is so complex and so varied with socio-economic pressures which are also accompanied by the psychological. Life is no longer a matter of just food, drink, shelter and plain survival.

Time and speed are of the essence, such that any individual who becomes ambitious, especially in America, must be prepared to be both positively aggressive and very competitive.

It certainly is telling on some of us, so, look to your health.

Frozen whole fish contains less sodium than when sliced.

In most cases, milk, butter and cheese contain more sodium than even meats. Of course, except in the case of low sodium or dialysed milk which is recommended. In eggs, most of the sodium is in the egg white or albumen.

Foods from a vegetable source are usually low in sodium content, with some exceptions.

Some exceptions are, artichokes, beets, carrots, celery.

Those low in sodium content are, really very few vegetables, since even many of the greens contain sodium. However, fruits are very low in sodium content, as well as nuts, grains, legumes, fresh or unprocessed.

Flour, except self rising, cereals, both ready-to-eat and cooked (many of them), are also low in sodium.

The Buyer of Food:

No-one can belie the importance of how to buy food.

The first point to consider is, what is available.

Under this heading, the housewife must remember that she can save more, if she buys more during peak production. This is where a family freezer becomes so important.

Since meat constitutes most of the expenditure in the food budget, I shall only touch on this topic.

Beef is available all through the year, but is heaviest in fall and winter. Thus it costs more in the summer.

Pork is cheapest in December, prices start rising early in the spring and increase in the summer.

Lamb is lowest priced in the mid-winter.

Poultry, supplies are greater in summer and early fall.

Turkey is best bought in the last four months of the year, November being the peak month.

Food Standards and Grades

It has become increasingly difficult to tell what goes into a product. Food legislations, therefore, act to help Americans to be sure of wholesome food. Such legislations are the Federal Food, Drug and Cosmetic Act, Meat Inspection and the Imported Meat Act, and the Poultry Products Inspection Act.

Basic standards for describing foods are those of identity, quality, quantity, container standards and grade standards.

There are both State and Federal Grading systems. Grading systems may take any of these forms:

Numbers, as U.S. No. I, or points (87 to 93)

Letters, as Grade A, B, or C.

Adjectives as Prime, Choice, Good.

Mixed numbers letters, and adjectives as Extra Fancy, No. I, Utility.

There are also seals, authorized by the U.S. Department of The Interior, which are proof of inspection.

Together with these pointers that I have given, I would just like to say further, that as shoppers of food, be careful to read and compare labels, compare unit prices and buy only what you need and not simply because something seems to be a good buy. With these things in mind, I trust that good nutrition will be yours and your family's.

THE TUSKEGEE EXPERIMENT

In 1932 600 black males from Tuskegee, Alabama were chosen to participate in a group of experiments to determine what were the effects of untreated syphilis. Two hundred of the group received no treatment while 200 did. This occurred prior to the development of penicillin which was used on a wide scale in the 1940's. Two hundred of this group did not have syphilis.

Before the development of penicillin syphilis was treated by the use of mercury, bismuth and arsenicals which were injected into the blood stream. This treatment was long and drawn out lasting from weeks to months. Because mercury, bismuth and the arsenicals are poisonous many patients died attempting the cure. Because of the deaths associated with the cure of syphilis it was decided to make a study of syphilis on the untreated body.

The subjects in the Tuskegee experiment were promised food, clothing, shelter and a burial for participating. They were never informed of the disease which they harbored in their bodies. This group of black males consisted of the poor and uneducated.

Those in charge of the experiment at the time saw nothing unethical or unscientific in carrying out their research. It must be remembered that these experiments occurred before the Nazis began carrying out their human experiments on European Jews. The Nazis, too, saw nothing unethical or unscientific in their experiments.

Dr. Rod Heller, who was chief of the Public Health Service VD division from 1943 to 1948 stated to the effect that there were no racial overtones associated with the experiments.

What is surprising is that when penicillin became available the untreated group was not given it.

Just three years ago 400 Mexican-American women were part of a government funded experiment studying the effects of birth control pills. It would probably be stated that no racial overtones were involved and that the two groups named above were homogeneous and easily accessible.

We know that syphilis is a highly contagious disease and can cause blindness, loss of hearing, damage to the teeth, bones and the central nervous system. Eventually it can lead to heart disease and insanity.

The Tuskegee experiments showed a total disregard for the health of black people in general. No group of poor whites in America were studied in the same manner. If a group of whites and blacks had been chosen then we could believe that no racial overtones were involved. Then the experiment's use of subjects would have been a moral one instead of a racial one.

The Tuskegee experiments give a good reason why black people in America should be well abreast in science. One can never give too many examples of the horrible things that can occur if a sizable portion of any population remains ignorant to the most important influence in life today. It is a fact that this is the technological age and that no amount of rationalizing can cover up the fact that a knowledge of science is a necessity in this day and age.

If we take a laissez-faire attitude to science and go chasing after rainbows then we shall find that we become easy targets for the most horrendous experiments that mankind can perform. In Tuskegee the black, the poor and the uninformed were used as subjects. This is equivalent to an animal farm used to breed human guinea pigs.

A last thought is that the Tuskegee experiment has been uncovered, but how many others like it have not?

THE PURPOSES OF THE HOWARD REVIEWS OF SCIENCE

One purpose of **The Howard Reviews of Science** is to give the general public a view of science which it has not been given. By doing thus it is possible that the layman will have a greater appreciation for science and realize that it is not a thing to be feared.

Another purpose is to illustrate how science can be applied to help solve the problems facing us as a people and as a nation. **The Reviews of Science's** goal is to bring science out into the open, from behind dark and dusty journals and out of dingy laboratories. Science must be brought out into the open. It should not be hoarded, but should be shared in order to better life. It should be open for an open society.

The Reviews of Science will attempt to bring about a better understanding in the various disciplines in science. By knowing problems in other fields, scientists in different fields will be able to share their ideas and offer assistance.

The Reviews of Science will study economic and political problems in the same way as it handles scientific ones. We believe in the unified approach.

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Science is Dead

*Last night as I lay in my bed
A man with square chin and pointed head
Approached and proclaimed
Science is dead!
It lay on some undecorated field,
Unattended by friend or foe,
Left alone unappreciated
for all of its accomplishments.
Round-faced children danced around in glee,
“Society does not need science;
We have our music and gadgetry!
Science has given us what we need,
And we no longer need it anymore;
We want only to be left alone,
And enjoy the things science has done.
No longer do we need E and mc^2 's
do,ra, mi, fa is enough
All the rest is for fools and squares.
Get pallbearers to carry it to its grave
Bury them also, we have had enough
We never understood η 's, λ 's, π 's
And all that stuff.”*