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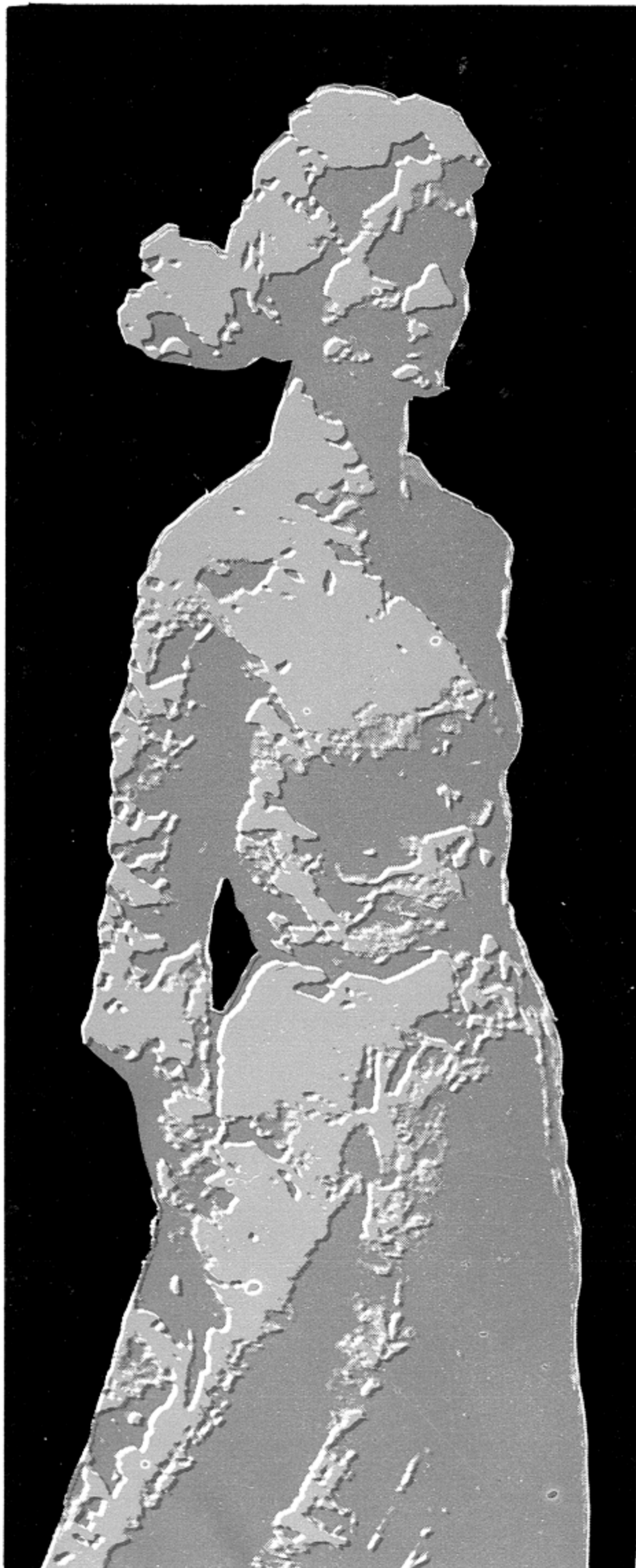
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SUMMER 1970 BRIGHAM YOUNG UNIVERSITY

Cover: "New Mormon," a sculpting by Dennis Smith.
See p. 419.

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Calorimetry and Metal Binding in Biology*

JAMES J. CHRISTENSEN**

President Wilkinson, honored guests, fellow faculty members, ladies and gentlemen: Dr. Izatt and I first wish to express our appreciation of the honor given us in being invited to present the Seventh Annual Faculty Lecture. It may appear strange to many of you that both of us were chosen to deliver this lecture. However, those of you who are familiar with our work know that we have collaborated for over 13 years in our research effort and that we are both involved in all areas of our research. We also find, in reviewing our work, that it is extremely difficult, if not impossible, to say that a given idea was due to one or the other of us. So we can see that the Annual Faculty Lecture Committee must have also had some difficulties, and although I have not verified this theory with the committee, I would surmise that they probably just threw up their hands when they came to our names and said, "Let's kill two birds with one stone." So here we are.

We would also like to acknowledge that most of our research would have been impossible to do if it were not for the many fine undergraduate, graduate and post doctoral students that have worked with us in the past years. They are also being honored here tonight.

We have divided the lecture into two parts: Calorimetry, about which I will talk, and Metal Binding in Biology which

*Given as the first part of the Seventh Annual Faculty Lecture at Brigham Young University, April 8, 1970.

**Dr. Christensen has been on the Brigham Young University faculty since 1957 and is presently professor of chemical engineering. He holds a Research Career Development Award from the U.S. Public Health Service (1967-1972).

Dr. Izatt will discuss. In both our talks we have three central themes that we will be emphasizing. These are: our research activities, the scientific method of investigation, and the importance of metals in biology and specifically the human body.

I would like to tell you four short stories. See if you can determine what they have in common.

The first story concerns a farmer and his fruit orchard. In this western peach orchard the fruit trees were stunted and produced only a sparse crop of scrawny fruit until one year the farmer installed a galvanized fence around the orchard. That year, and in succeeding years, the yield of fruit was large and the fruit was of top quality.

The second story concerns a group of young track athletes from a high school in Los Angeles that won most of their home games, but *always* lost when bussed to a distant school for a track meet.

The third story concerns an experiment in which two groups of rats lived in wooden cages. One group breathed purified air and ate organic-grown, sterilized food, while the other group breathed normal air and ate normal food. After several months, 90 percent of the rats breathing the purified air and eating the specially prepared food were alive while only 43 percent of their brother rats in the other group were alive.

The fourth story concerns four companies of the second dragoons who arrived at Fort Randall on the banks of the Missouri River in Nebraska in 1856. About ten days later, most of the horses in the company experienced running at the nose, distemper, and loss of hoofs, manes and tails, followed by death after weeks or months. A similar experience was reported by Marco Polo in 1295. He noted that in the mountains of western China the most excellent kind of rhubarb was produced, but that merchants coming to bring it out could not allow their beasts of burden to graze in the surrounding mountains because the beasts would lose their hoofs.

The common thread running through these four stories is that each incident is related to the effects of metals on plants, animals or people.

In the first story, the ground was deficient in zinc causing the trees to have fewer and poorer fruit than normal. The galvanized fence was made of steel coated with zinc and

through the action of rain and of leaching by the soil enough zinc was transferred from the fence to the ground to meet the needs of the trees and to restore normal production.

In the second story, every time the track athletes were bussed along the busy freeways in Los Angeles, they breathed in larger than normal amounts of carbon monoxide. This carbon monoxide reacted with the iron in the hemoglobin in their blood to form carboxyhemoglobin. Every hemoglobin molecule that reacted with the carbon monoxide meant one less hemoglobin available to carry oxygen in the body. Consequently, the athletes were hampered by the reduced amount of oxygen supplied to the body and performed below their capabilities.

In the third story it is believed the lower death rate of the group of rats breathing purified air and eating specially prepared food was due to the absence of lead in the filtered air and food. From tree stumps it has been calculated that the lead concentration in the air today is 24 times the concentration of 100 years ago and a hundred times more than 1,000 years ago. This is not at all unbelievable if one realizes that 700 million pounds of lead is consumed every year in gasoline sales. An interesting theory has been proposed to explain the decline and fall of the Roman Empire based on the premise that the nobles and leaders were victims of lead poisoning. It was the custom of the time for the more well-to-do to have their wine sweetened by heating and storing it in lead pots. Lead was also used for cooking ware and for drinking cups. It is proposed that under these conditions enough lead was consumed to cause increased sterility in both men and women and to cause a larger than normal proportion of the children to be born with physical and mental defects. The leading class was therefore slowly reduced in numbers and leadership capabilities. Analysis of corpses from that time show an abnormally high lead content. (*Reader's Digest*, 1966; *Today's Health*, March 1966 and *C. & E. News*, March 9, 1970, p. 42.)

In the fourth story the animals were all suffering from selenium poisoning. The metal selenium occurs in high concentration in some soils and can be further concentrated by grains or grass. Even in fairly low concentrations, plants such as Woody Aster, Gray's Vetch and Astragalus concentrate selenium to several thousand parts per million part plant or up to 1 percent of the plant's weight can be selenium. In 1907-

1908 in a region north of Medicine Bow, Wyoming, 15,000 sheep died from selenium poisoning.

From these four stories it is possible to gain a glimpse of how important metals can be in the operation of living systems. Now not all metals are harmful, in fact, many metals are necessary for the correct operation of biological systems. Iron is just one example in the human body.

To understand the effects metals cause, it is necessary to know how metals interact with various systems. This is essentially what we are doing in our research in that we deal with the interactions in solution of metals with other molecules. The metals can be such things as Fe^{2+} , Na^+ , Ca^{2+} , K^+ , Zn^{2+} , Cu^{2+} , Hg^{2+} , and Mg^{2+} , where the number following the metal formulas indicates the charge on the metal. A plus charge represents how many electrons have been removed from the metal. When a metal has a charge it is referred to as a metal ion. The molecules with which the metal ions interact can be such simple things as water (H_2O) and ammonia (NH_3), or complex molecules such as adenine or even very complex molecules such as enzymes, proteins, and nucleic acids. Dr. Izatt will give specific examples of the types of interactions we are presently investigating with respect to biological molecules. How do we get a solution containing metal ions? A simple example is to dissolve salt in water to obtain Na^+ ions and Cl^- ions in the water solution. Similarly, other metal ions can be obtained by dissolving the proper metal salt. Metals or metal ions are brought into the body through the water we drink (Ca), the food we eat, (Fe), and the air we breathe (Pb). A common misconception is that metal ions float around in solutions or body fluids without being attached to any other molecule. This is not true as metal ions are always attached to one or more molecules. If no other molecules are present, the metal will be attached to water molecules.

Our interest in the interaction of metals with various molecules is to determine two basic properties, the quantities present when the solution is at equilibrium (this property is called the Equilibrium Constant), and the strength of the chemical bonds between the metal and the molecules (this property is called the Heat of Reaction). These two properties are basic in understanding how metals react with molecules. The extent of a reaction can be visualized by looking at the reaction between

hemoglobin and oxygen (Figure 1). I have written the reaction using two different nomenclatures to show how hemoglobin in the blood combines with oxygen in the lungs and carries this oxygen to other parts of the body. (Remember story number 2 about the track athletes.) Hemoglobin contains iron and it is the iron that reacts with oxygen. A solution of hemoglobin and oxygen can be described by an equilibrium constant, K

$$K = \frac{(\text{Amount Hemoglobin - Fe - O}_2)}{(\text{Amount Hemoglobin - Fe}) (\text{Amount O}_2)}.$$

If hemoglobin and oxygen are mixed some of the hemoglobin reacts with the oxygen while some does not. The equilibrium constant is the ratio of the amount of the (hemoglobin-Fe-O₂) to the amounts of the (hemoglobin-Fe) and (O₂). At equilibrium all three of these molecules will be present.

By knowing the value of the equilibrium constant, we can predict how much of the hemoglobin will react with oxygen for any situation. For example, in the case of the athletes breathing carbon monoxide, if the equilibrium constants for the reaction of oxygen and carbon monoxide with hemoglobin are known, it is possible to calculate how much of the hemoglobin is combined with oxygen and how much is combined with carbon monoxide.

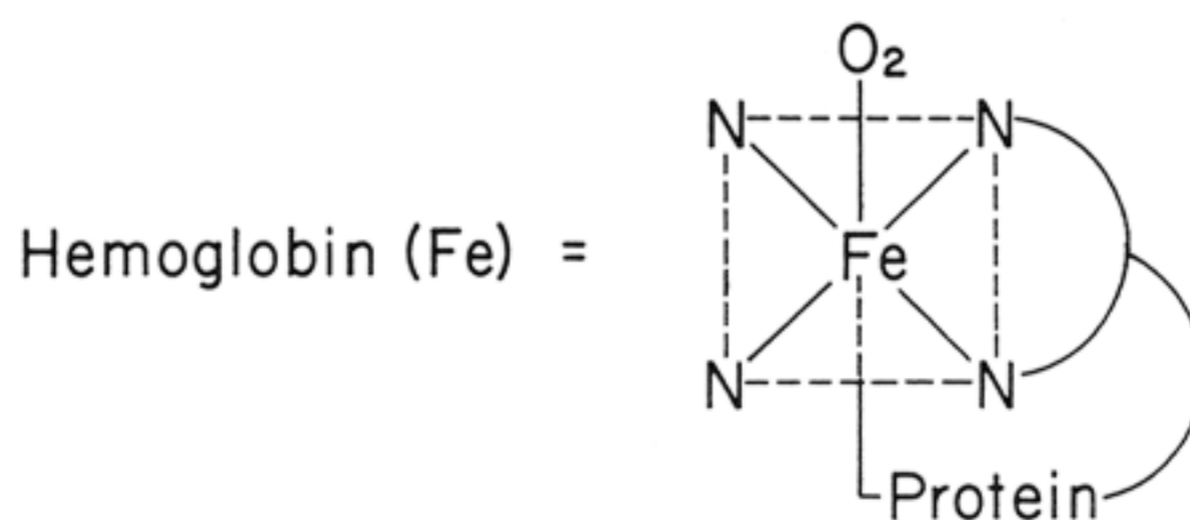
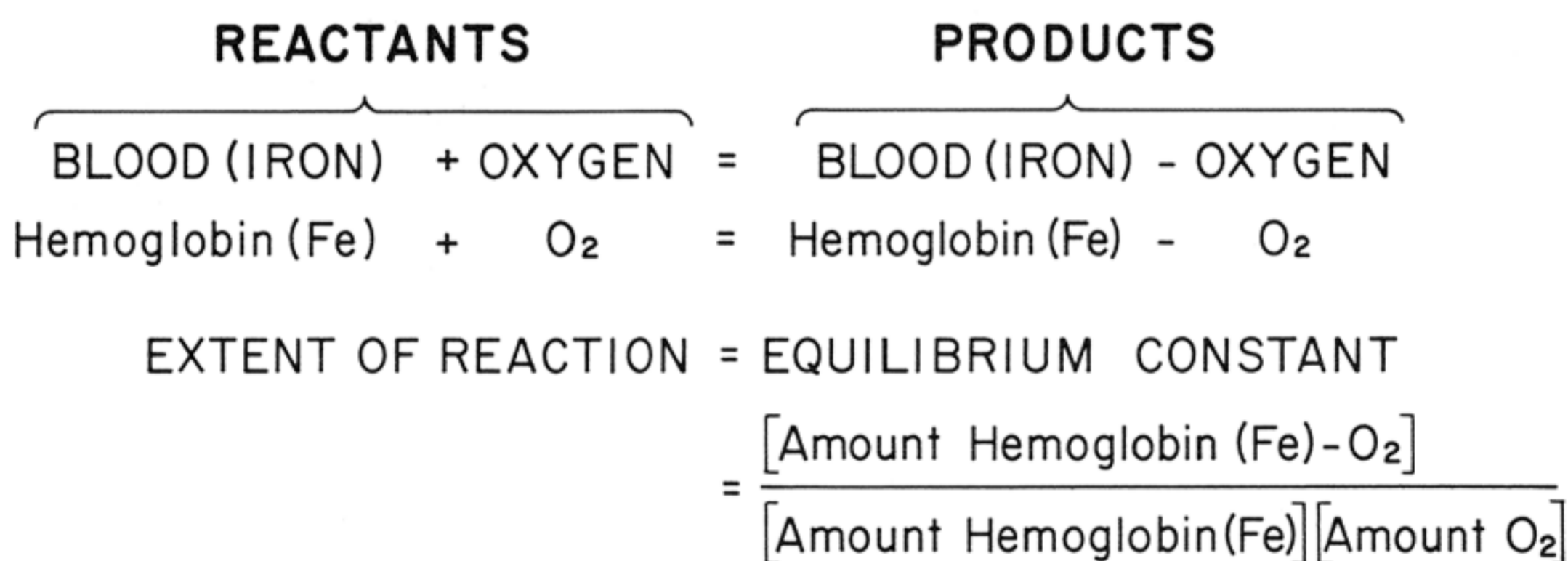
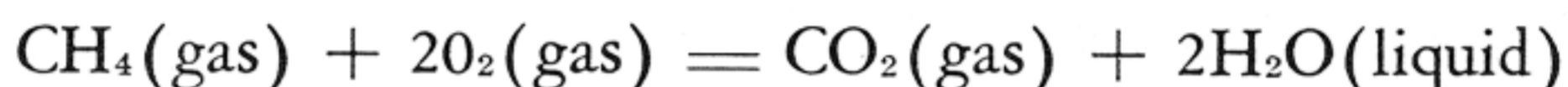
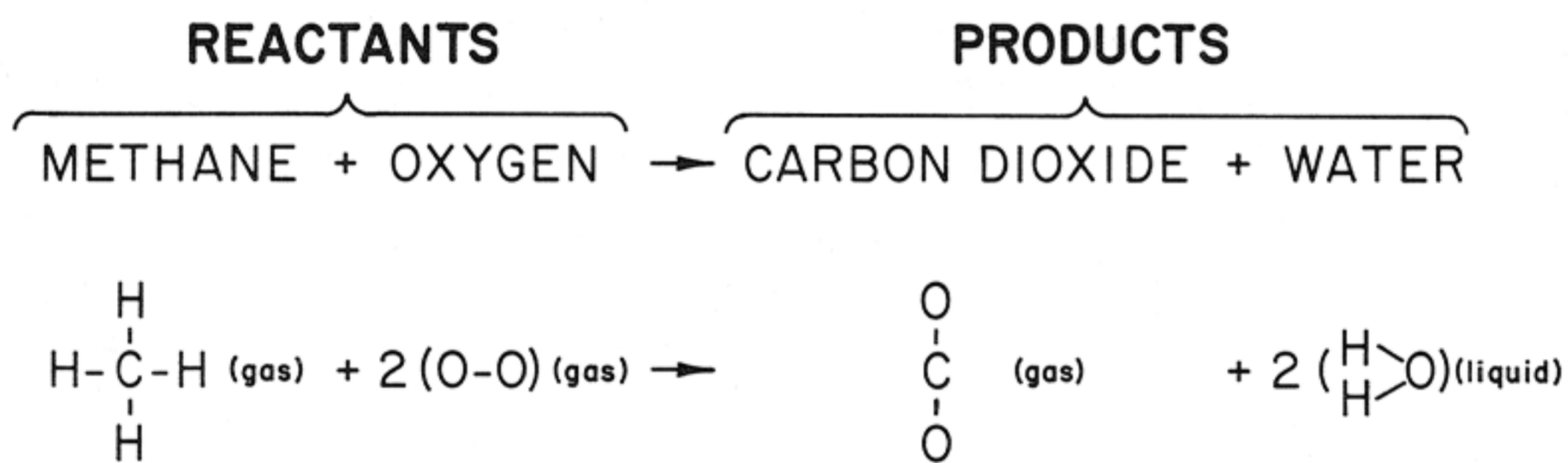


Figure 1

The other basic property we wish to know is the heat of reaction. When a molecule is formed, chemical bonds are made, or when a molecule breaks apart, chemical bonds are broken. The strength of chemical bonds tells us much about the type of bonding between the atoms in the molecule and the energy released or absorbed when changes occur. One example of breaking bonds is when natural gas is burned in a furnace (Figure 2). The following reaction occurs:



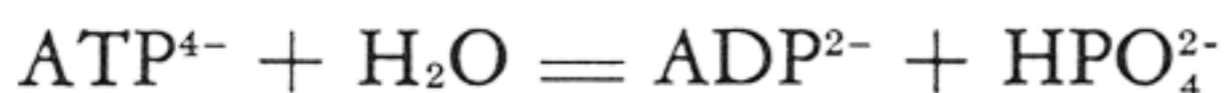
resulting in the breaking of six bonds (4 for CH_4 and 2 for 2O_2) and the making of 6 bonds (2 for CO_2 and 2 for $2\text{H}_2\text{O}$)



HEAT RELEASED = 212,800 calories /
16 grams methane

Figure 2

and the liberation of 212,800 calories of heat per 16 gm. of methane burned. This 212,800 calories is the heat of reaction. This example shows that chemical bonds are not equal in that the same number were made as were broken, but energy was released. In combustion, this energy heats up the CO_2 and H_2O to give the hot flames we all observe and the warm houses we all enjoy. A calorie as used here is defined as the energy required to raise the temperature of 1 gm. of water 1°C . They are 1/1000 the calories used in nutrition and by calorie counters. An example of the extent and chemical energy of reaction is the reaction of adenosine triphosphate with water to release energy.

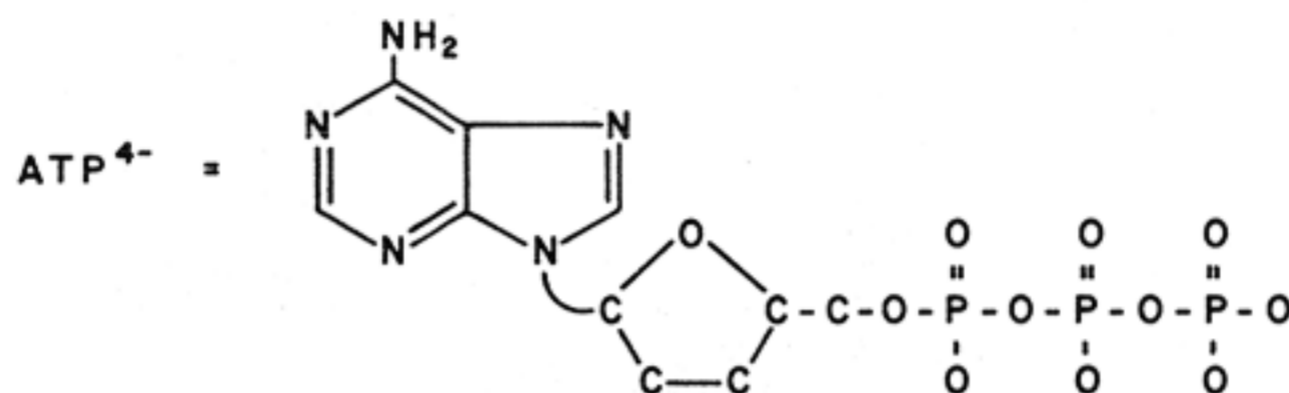


Adenosine triphosphate (ATP) is the molecule shown in Figure 3. It is in this molecule that the body stores energy that will be

ADENOSINE TRIPHOSPHATE + WATER = ADENOSINE DIPHOSPHATE + MONOHYDROGEN PHOSPHATE



HEAT RELEASED = 7,000 calories



14.6 calories = 174 followed by 19 zeros molecules

Figure 3

used for many of the energy consuming processes taking place in the body. The net energy release in breaking and making bonds by this reaction is 7,000 calories per 450 grams ATP. This energy is available for other reactions. One example of this is the energy used in muscle contraction which is derived from ATP bond breaking (*Scientific American*, April 1970). In lifting a 15 lb. child three feet a parent does

$$15 \text{ lb. (3ft)} = 45 \text{ ft. lb.} \frac{(0.324 \text{ cal.})}{\text{ft. lb.}} = 14.6 \text{ calories work}$$

This requires the breaking of

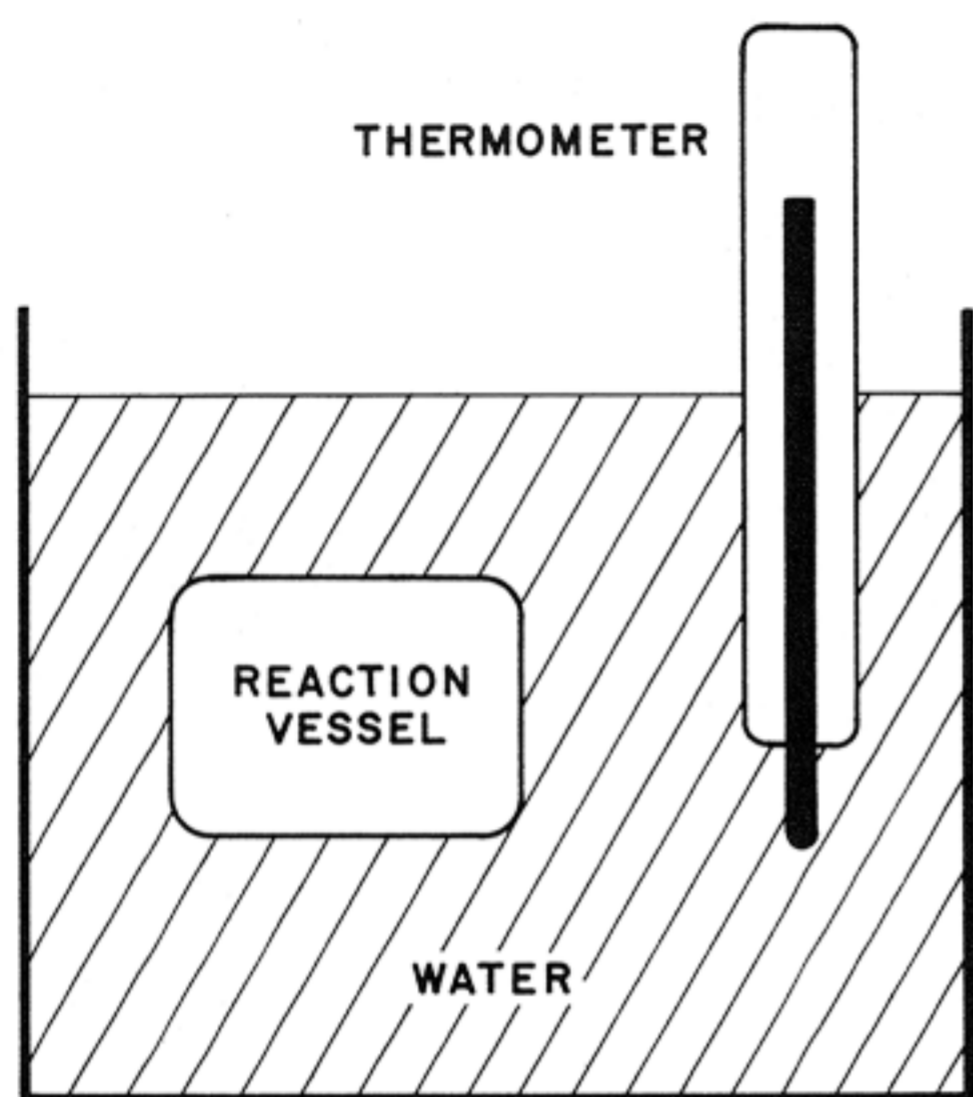
$$\frac{6.023 \times 10^{23} \text{ bonds (14.6 cal.)}}{7,000 \text{ calories}} = 1.74 \times 10^{21} \text{ bonds or molecules}$$

of ATP which is the number 174 followed by 19 zeros. The equilibrium constant tells us how much ATP is present for any condition and the heat reaction indicates the energy released or absorbed when a change takes place.

To understand the interactions of metals and molecules in solution, it is necessary to know values for the equilibrium constant and the heat of reaction. Quantities of heat and, therefore, heats of reaction can be measured experimentally in calorimeters. We have found that by the use of certain novel and sophisticated equipment and procedures developed in our laboratories, that equilibrium constants, as well as heats of reaction, can be measured calorimetrically. Thus, one experi-

ment can yield all the necessary data, resulting in a great savings in time and effort.

Let us now look at some calorimeters in which heats of re-



REACTION



Figure 4

actions can be measured. A conceptual diagram of a calorimeter for measuring heats of combustion is shown in Figure 4. The main components of the calorimeter illustrated here are the *reaction vessel*, where the reaction occurs, the *surrounding water* and the *thermometer*. The heat generated in the reaction vessel flows into the surrounding water, heating it, and causing its temperature to rise. An experimental run consists of initiating a reaction in the reaction vessel and measuring the temperature rise of the water. A similar experiment where a reaction releases a known amount of heat serves to calibrate the calorimeter in that the amount of heat required to produce a given temperature increase is determined. A calorimeter of this type would be used to calculate the heat released for the reaction



It is interesting to note that the name calorimeter is derived from a combination of the words calorie and meter. The name calorie is derived from the Latin word calor, meaning heat. Up to the early 1800's it was believed that heat was a fluid called caloric and that caloric was contained in materials much as water can be contained in a water pitcher. Caloric was defined as being an elastic fluid of great subtlety, the particles of which repel one another, but are attracted by all other bodies. The force of attraction was directly related to the temperature difference between the two bodies. We now know, thanks initially to the work of Count Rumford (Benjamin Thompson, 1753-1814) in cannon-boring experiments carried out in the Munich Arsenal in 1790 (Figure 5), that heat is not a fluid

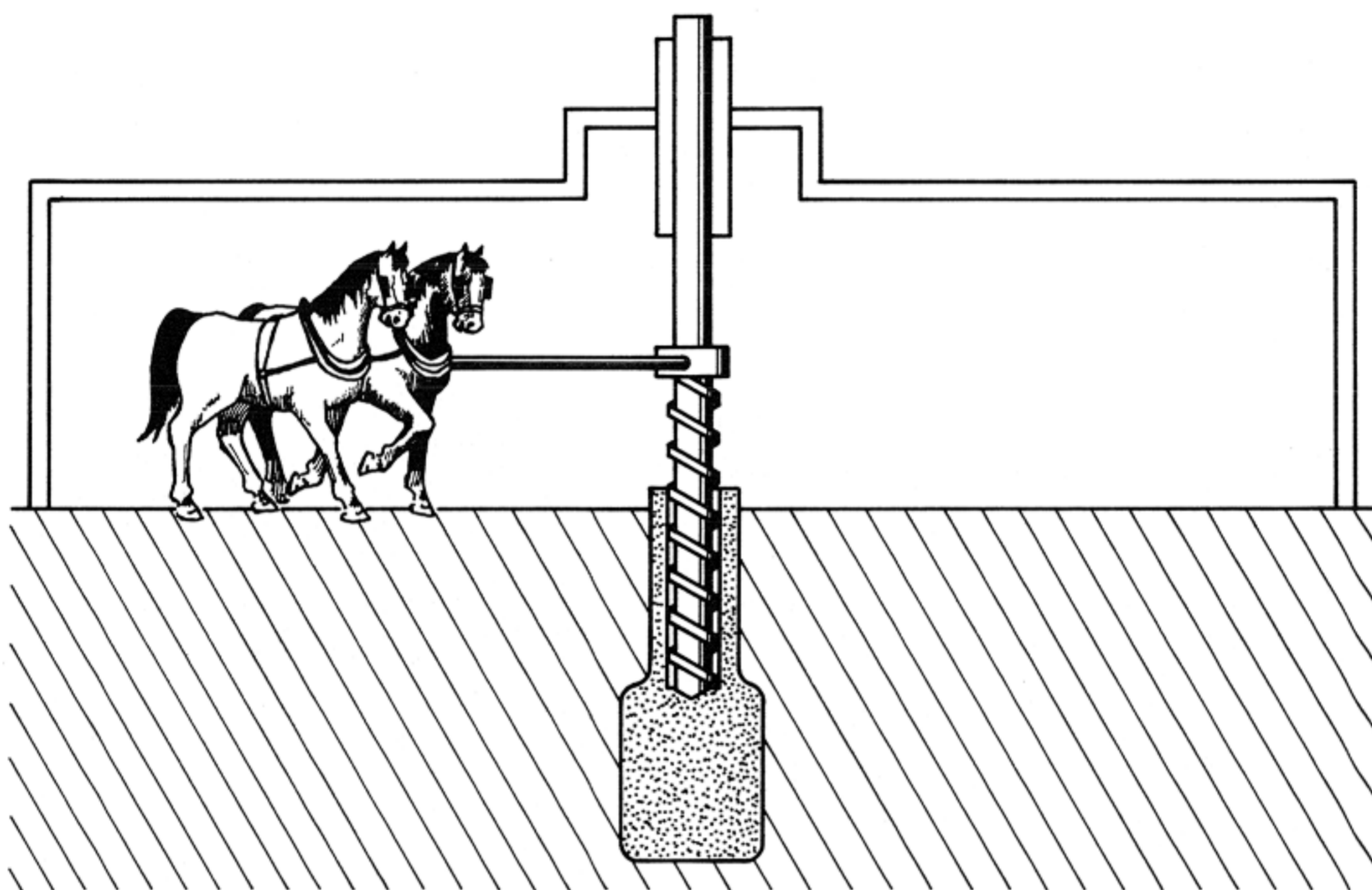


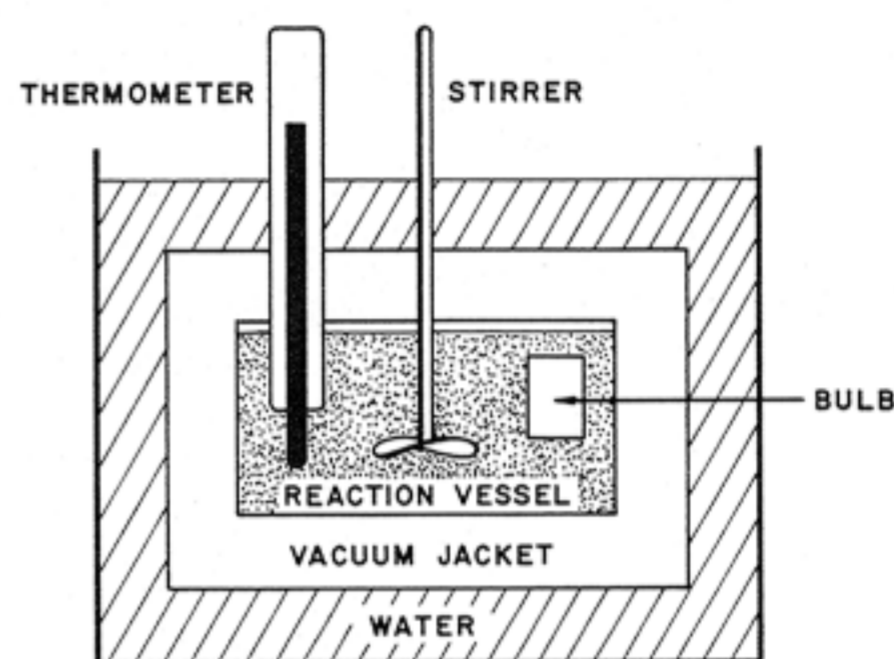
Figure 5

but is energy and is stored in molecules and atoms in the form of bond energies and molecular motion. Rumford showed in his experiments that heat could be produced without limit and thus cannot possibly be a material substance. The situation would be like pouring water without ceasing from the pitcher which is impossible if water is a material substance. However, Rumford's results have also brought some discomfort to teachers of thermodynamics. They frequently describe in class Rumford's cannon-boring experiment in which he employed a team of horses to turn the drill bit in the cannon muzzle. Those who pose the question, "Now what quantity is produced without limit in this experiment?" always receive the shouted answer, "Horse manure."

It is precisely by this method of calorimetry that the calorie content for foods is determined. The body takes food through a series of reactions involving many bond breaking and bond making steps and ultimately reduces the food to the same product as would result from the reaction of the food with oxygen in the calorimeter i.e., CO_2 and H_2O , and liberating energy in the process. So, in a sense when you eat you are not eating calories, but chemical bonds. Fat is just an efficient way of storing the bonds that are not broken.

Reactions occurring in the solution usually have much

smaller energy changes than those for the combustion of gases. A conceptual diagram of a conventional solution calorimeter for measuring heats of reaction in solution is shown in Figure 6. The main components of the calorimeter illustrated here are the reaction vessel containing a bulb, a thermometer and a stirrer; the vacuum jacket on the reaction vessel and the surrounding water. This calorimeter differs from the previous one in that a vacuum jacket reduces the flow of heat from the vessel to the water. If the heat of reaction were allowed to heat the surrounding water, very little temperature rise would be noted due to the small heats involved. Therefore, the heat is contained and the temperature rise of the solution in the reaction vessel is measured.



REACTION

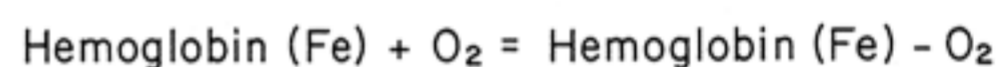
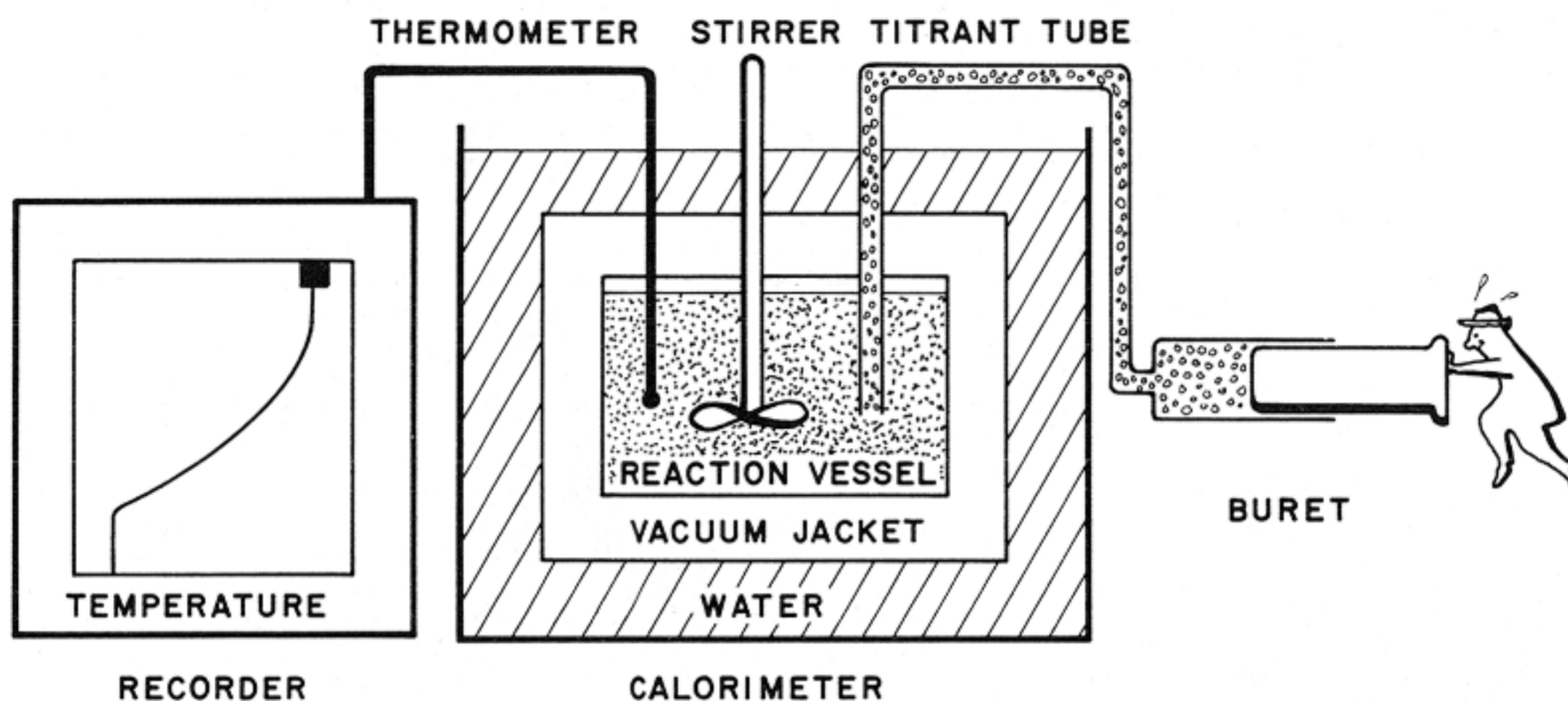


Figure 6

The materials to be reacted are kept separated by placing one in the bulb contained in the reaction vessel while the other one is in the solution surrounding the bulb. The operation of this calorimeter can be illustrated by considering the formation of a complex between hemoglobin and oxygen. The hemoglobin is in a diluted solution in the reaction vessel and the oxygen is contained in the bulb. The bulb is broken and the solutions mixed with a resulting temperature rise, measured by the thermometer in the solution. A similar experiment using a substance with a known heat of reaction will give the heat required to produce a given temperature increase.

Now, as I said previously, we have developed novel equipment and calculation procedures to where we are able to calculate both equilibrium constants and reaction energies from calorimetric data. The technique we use is called titration calorimetry and involves the addition of one of the reactants over a period of time to the reaction vessel containing the other reactant. A conceptual diagram of a titration calorimeter is shown in Figure 7. The main components of the calorimeter illustrated here are the reaction vessel containing a thermometer, stirrer, and titrant tube; a vacuum jacket on the reacting



REACTION

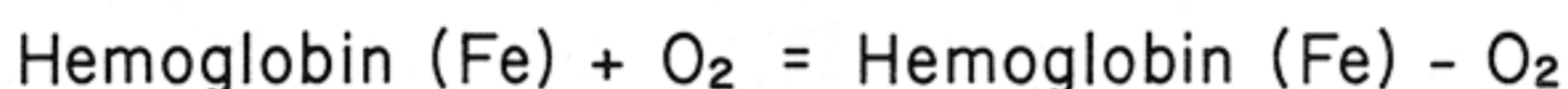


Figure 7

vessel; the surrounding water bath; recorder and buret. The temperature is sensed by a rapid reading thermistor and recorded on a strip chart recorder. This calorimeter differs from the other previously shown in that one of the reactants is introduced continuously over a predetermined length of time and the temperature is recorded. The chemical system hemoglobin-oxygen can again be used to illustrate the operation of the equipment. With this calorimeter, however, it is possible to calculate not only a heat of reaction but an equilibrium constant as well. This reaction would be carried out by placing a hemoglobin solution in the reaction vessel and titrating with oxygen gas. It should be noted that by titrating with oxygen the reaction can be stretched out over any chosen time length in contrast to the method of breaking a bulb containing the oxygen in which the reaction takes place immediately. Each small addition of titrant is thus equivalent to a separate experiment using the bulb breaking method. Also, the shape of the temperature curve is determined by both the heat of reaction and the extent of reaction. From one experiment by certain techniques, many of which were developed here at BYU, the equilibrium constant and the heat of reaction for the hemoglobin-oxygen reaction can be determined.

Equipment of the type visualized here and based on concepts developed at BYU is currently being manufactured in the Provo-Orem area by Tronac, Inc. A picture of this com-

mercial unit is shown in Figure 8. This equipment retails for the price of 9 to 12 Maverik automobiles (\$18,000-24,000) but considering how much more it can do than a Maverik it is a real bargain at this price.

Equilibrium constant and heat of reaction values represent a window through which one can see and interpret metal-molecule interactions. These numbers can be used to aid in the solution of problems in such widely diversified fields as Saline water conversion and the recovery of minerals from the sea to nerve impulses and the operation of the brain.

In these and other areas it is important to know how much of the metal ion is reacted with the other molecules and how much energy is released or absorbed when reaction occurs. We can see how calorimetry can be a powerful tool for solving problems concerning metal binding in biology.



Figure 8

Now we have spent some time describing how certain measurements are made and it would perhaps be well to ask what metals occur in biological systems and in what form and concentration. A few of the more common metals and where they occur are: calcium, bone; iron, hemoglobin; cobalt, vitamin B12; magnesium, chlorophyll and sodium, human blood. A very large number of metals is present in even a single strand of human hair (*viz.*, silver, iron, copper, zinc, manganese, strontium, boron, cobalt, lead, aluminum, magnesium, calcium, silicon, titanium, nickel and chromium. In fact, probably every metal known to exist is present in the body—some at a much higher concentration than others. Metals, specifically sodium and potassium take part of the chemistry of nerves and supply the electrical charges necessary for the transmission of impulses along nerves. Metals are also connected with enzymes—those molecules that make reactions occur in living systems. However, I am now getting into an area of describing how metals take part in biological phenomena. I would therefore at this time like to turn the lecture over to Dr. Izatt who will describe in detail the work in which we are currently engaged in the field of the transport of metal ions across membranes, and the chemistry of nerve action.

Metal Binding in Biology*

REED M. IZATT**

Dr. Christensen has very effectively described the main experimental technique we have used in our metal binding studies. I now propose to outline some of the work we have been doing in this field. A major objective of our research effort is to understand on a molecular level the role metals play in three key activities in living organisms. These activities are: first, how metals operate in enzyme catalysis; second, the role of metals in the normal functioning of RNA and DNA which are substances determining the hereditary characteristics of living organisms as well as being involved in protein synthesis; and third, the role of metals in the transfer of information within the organism. I will discuss only the last of these, namely information transfer. This choice should be a good one since most of us are involved daily in information transfer in our chosen field of education, and all of us are, or have been, involved in learning processes which require considerable thought and practice. The fact, of which most of us are probably not aware, is that information transfer of all kinds in our bodies including learning, thinking, muscle action and related processes is possible only because the metals sodium and potassium move across cell membranes in response to particular stimuli. We can find counterparts in our own bodies for the most modern communication systems and usually our counterpart is much less likely to break down or to need repair. Just as it is necessary for a mechanic to know an automobile thoroughly in order to keep it functioning, so a complete understanding of our nervous system is desirable

*Given as the second part of the Seventh Annual Faculty Lecture at Brigham Young University, April 8, 1970.

**Dr. Izatt has been on the Brigham Young University faculty since 1956 and is presently professor of chemistry. He holds a Research Career Development Award from the U.S. Public Health Service (1967-1972).

in order to maintain it at top efficiency and treat or prevent the diseases which sometimes affect its operation.

The research in which we are involved doesn't make use of any living material except ourselves and our students. You might reasonably ask how one can learn about living systems without using them in the study. Scientists accomplish this by studying what are called "model" systems. "Model" systems are used when for one reason or another the scientist cannot investigate the actual system. This is the way many research scientists work and the basis for much of the material which is taught in chemistry, physics and biology courses in secondary schools and universities. Since I plan in a few minutes to describe a model for one aspect of nerve action which we use in our study I would like to take just a moment to illustrate the use of models with an example which will be familiar to many of you. If someone were to ask any of us the question, "What is an atom?" we would probably have some stock answer which would likely satisfy the questioner, such as, "an atom is a very small particle which consists of electrons orbiting a nucleus which contains protons and neutrons." Actually, what I have just stated is a crude description of one model of an atom. We will probably never know exactly what an atom is since its very small size prevents any direct observation and we must rely on the answers our instruments provide to the questions that we are clever enough to ask. From these answers we formulate models of what the atom must be in order to have the properties our experiments tell us it has.

These models, of course, are subject to change as our experiments improve and our knowledge increases. The first modern model of an atom was that proposed by John Dalton in 1803.¹ This model, based on the experimental work to that date, proposed that an atom could be likened to a hard ball as shown in Figure 1. Scientists took that concept and began asking which known properties of matter could and

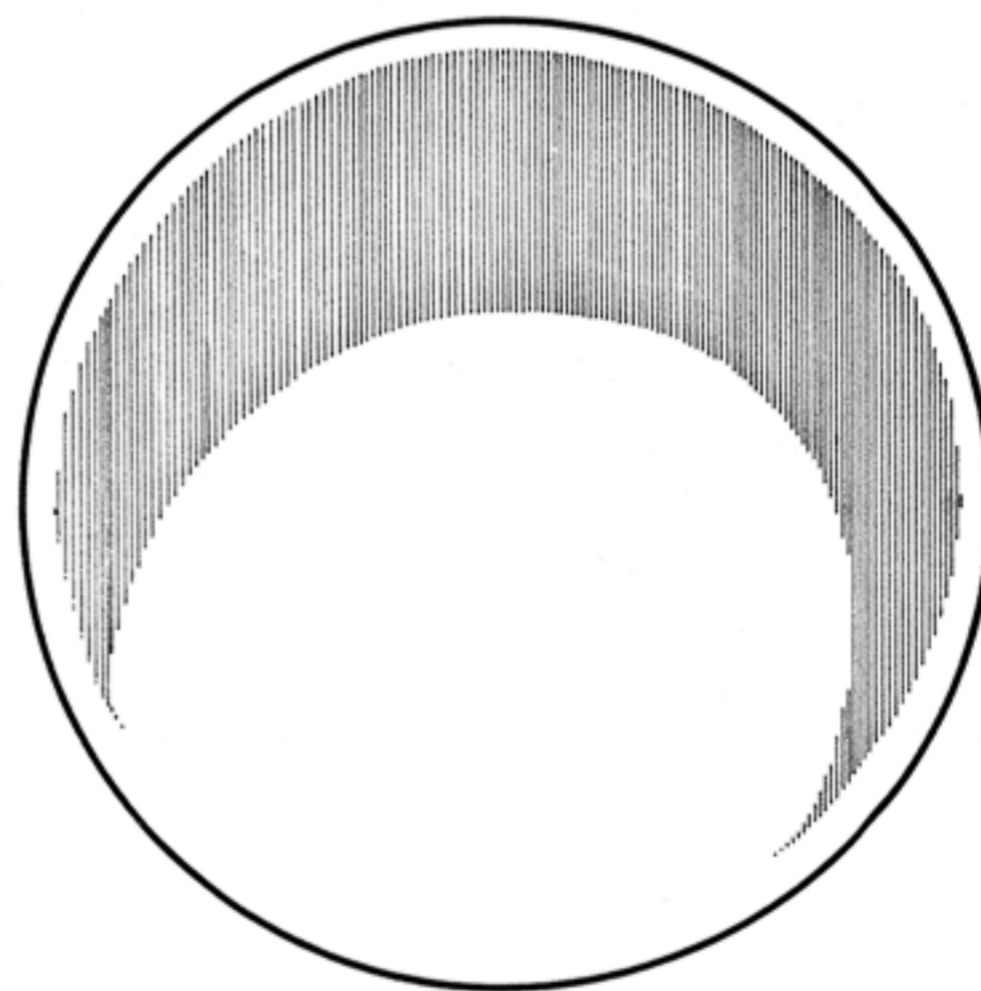


Figure 1

which could not be understood if atoms were considered to be like hard balls. The discovery of radioactivity nearly one hundred years later necessitated a sudden and drastic revision of the hard ball model. Actually, this revision was overdue anyway because it had been learned in the mid-19th century by Michael Faraday and others that matter and electrical charge were in some way related. The model shown in Figure 2 was proposed about 1900. In this model there were positive and negative charges embedded in the hard ball matrix; some called it the rasin-in-the-bun model. However, within about a decade experiments had been carried out that could only be rationalized by removing the electron from the rest of the atom and postulating a very



Figure 2

tiny nucleus containing all of the positive charge and nearly all of the mass of the atom.

Now it is obvious to all of us at this point that our model making had gotten us into a real dilemma. Our experience is that positive and negative charges attract each other, yet we have in this model positive and negative charges separated from each other with no reason why they should not combine. We have abundant evidence, including our own existence, that this recombination does not occur so the model had to be revised to agree more nearly with the known laws governing the behavior of electrical charges. The first change in the model is shown in Figure 3. This involved setting the electron in rotation around the nucleus with a velocity just sufficient to exactly counteract the pull of the positive charge, much like a satellite in orbit around the earth. Even though this model was very appealing and until

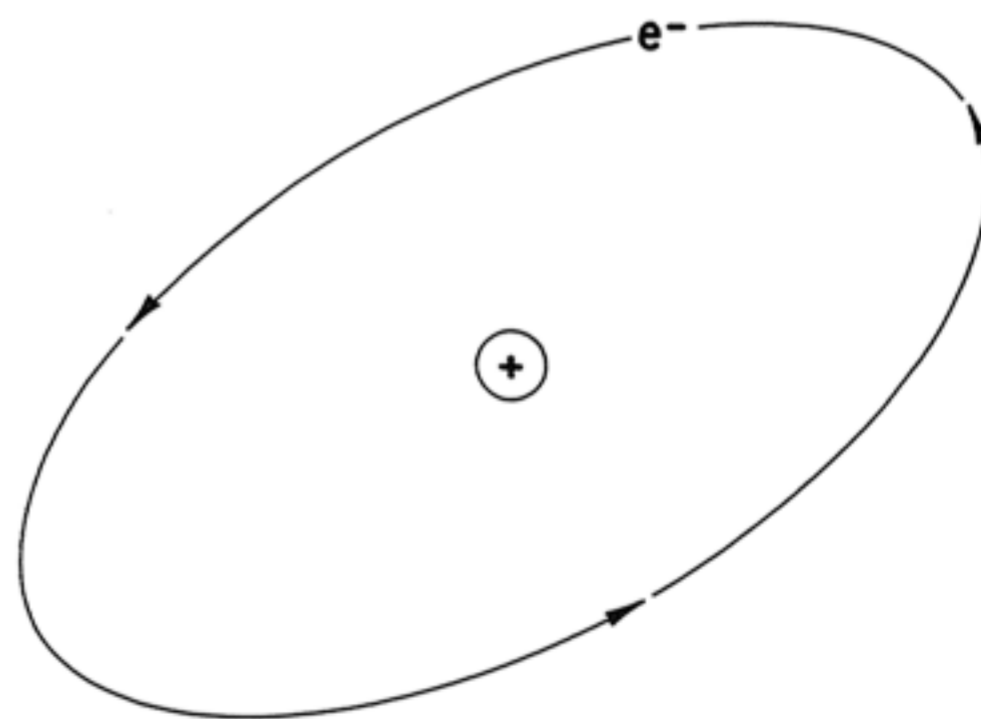


Figure 3

just a few years ago was taught in nearly every high school chemistry course, it was early shown to be incorrect in many significant details and has undergone several important modifications since it was proposed in 1913. One representation

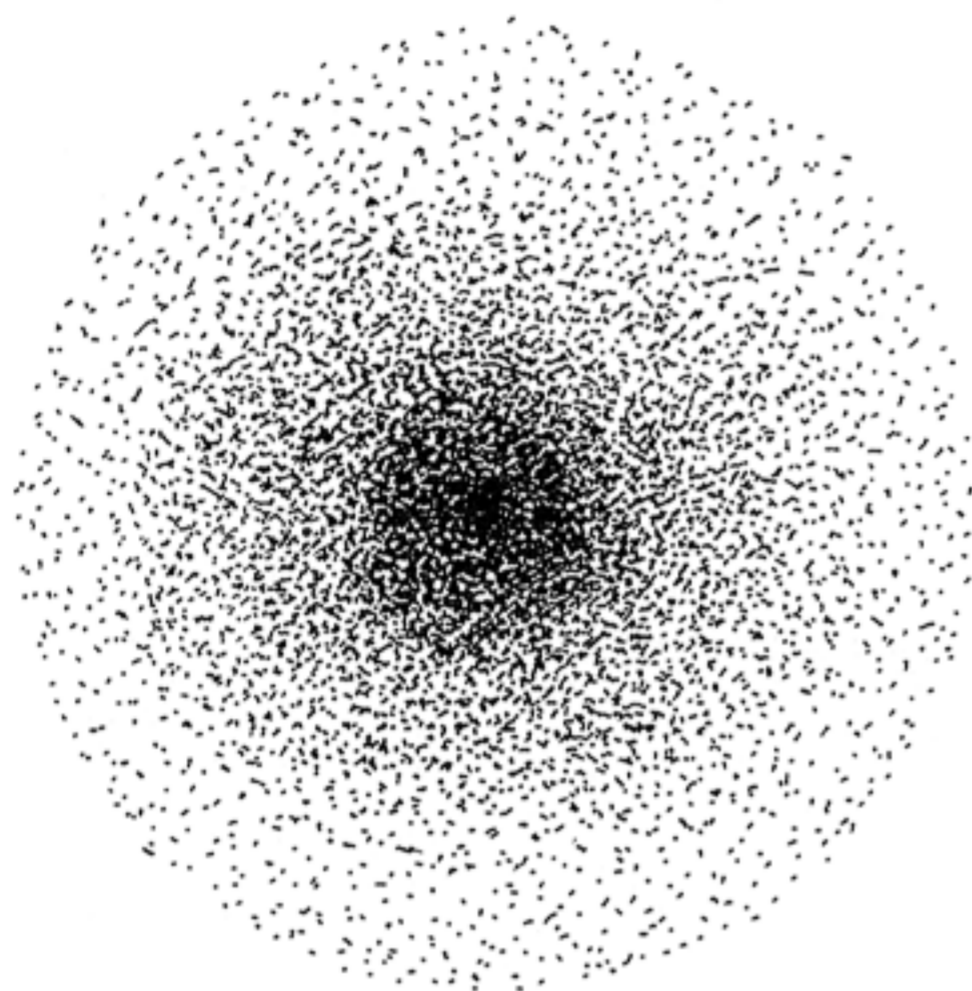


Figure 4

of the hydrogen atom as we view it in 1970 is shown in Figure 4.² If you can't see why one of these models is any better than any other you might profit from a semester of freshman chemistry! This process of refinement has resulted in a much better understanding of what an atom is or, in other words, a model of atomic structure which is much more consistent with known facts about matter than were previous models. In a similar way our know-

ledge of many natural phenomena has been greatly increased. Taken cumulatively, the work of many people during the past 150 years, each contributing certain knowledge or ideas, has provided the basis for our remarkable scientific and technological progress.

I will now describe what I mean by information transfer since this is undoubtedly one of the most important processes which takes place in our body. I will also provide some background information so you can better appreciate why we feel that our research in this area may lead to results of some significance. We are all familiar with the rapid transfer of information from the affected part to our brain when we have a toothache or touch a hot object. We also realize that this transfer can be stopped by the use of a local anesthetic such as novocaine. The transfer of this information takes place through our nervous system which plays an extremely important role in our welfare. Two of the most significant factors in our survival are our ability to respond to stimuli from external sources and to regulate our own internal environment. These abilities are all the more remarkable because they are largely automatic and require little or no conscious effort on our part. We possess sense organs which are specialized to

literally tune in on certain information about the environment.³ The essential elements of these sense organs are receptor cells, which respond to physical and chemical disturbances and transmit information about them to the central nervous system, thereby allowing either us or our bodies to react as necessary.

Each type of receptor is in general very specific in the stimulus to which it responds. I have listed a number of receptors and stimuli in Table I. There are different receptor cells which gain information about the external environment and the internal environment. Among the external type are photo receptors located in the retina which are sensitive to light, chemoreceptors which receive taste and smell stimuli located on the tongue and nose, mechanoreceptors which

TABLE 1

Receptors	Stimuli
Photoreceptors	Light
Chemoreceptors	Taste, Smell Oxygen Pressure pH
Mechanoreceptors	Sound, Pain Balance, Position
Thermoreceptors	Heat, Cold

receive sound, pain, and touch stimuli and thermoreceptors which respond to heat and cold. Among the internal receptors there are cells located in the walls of our arteries to respond to blood oxygen pressure and in the respiratory center of the brain stem to respond to blood carbon dioxide pressure; mechanoreceptors such as those in the inner ear which record movement and position; and even a receptor to keep track of the pH changes in the body fluids which cannot be allowed to vary without serious consequences to our health. Furthermore the exterior receptor cells can often give a great deal of information concerning the object in contact with them with respect to weight, temperature and patterns of movement as in the case of a bug walking across our hand.

Nerve fibre terminals are scattered over the whole surface as well as throughout the interior of the body, and the stimuli

from the receptor cells are received either by free nerve endings or by specialized sensory endings. All receptor cells have an important function in common. They are transducers, that is they convert one form of energy into another. For example, the sense organs in the skin convert mechanical and thermal energy into the electrical energy which is necessary to trigger nerve impulses through the nerve endings with which they are in contact. Of course, the process is very complex, but several specific steps are involved. First, a stimulus is received by internal or external receptor cells. Second, the energy received from its original mechanical, thermal, chemical or other receptor is changed to electrical energy and third, when the stimulus reaches a critical level, the electrical impulse is moved suddenly and rapidly to the appropriate part of the central nervous system so that the necessary conscious or unconscious action can be taken. A surprisingly large number of our body functions which we take for granted are triggered by the electrical energy produced within our nervous system. This system is involved either consciously or unconsciously on our part in heart action, sensations of pleasure and pain, memory, learning of all kinds, limb movements, etc.³⁻⁵ It is especially interesting how by our conscious effort we can refine this control mechanism to produce marvelous effects both mental and physical such as are seen in the coordinated efforts of the practiced athlete, or musician, the knowledge and ability of the scholar, etc. The following passage, often quoted by Heber J. Grant,⁶ describes rather well the effect practice has on accomplishment: "That which we persist in doing becomes easier for us to do; not that the nature of the thing itself is changed, but that our power to do is increased." Perhaps the nervous system reaches the ultimate in marvelous perfection in our own brain.

Paul Weiss, professor emeritus at Rockefeller University has given us an interesting view of the human brain.⁷ He points out that our brain contains more than ten billion nerve cells, each of which averages about ten thousand complex macromolecules, not only in constant agitation but being renewed about ten thousand times in a lifespan. Thus, looking at it from the worm's-eye view of the macromolecule, brain action must deal in a lifetime with at least 10^{22} or 10,000 billion billion macromolecular entities in various degrees of

instability and impermanence. Also, as Dr. Weiss notes, there is a fact that the individual molecule, of course, cannot know but which our integral brain cannot help but ponder and this is that throughout all that churning and changing of a population of molecules, which is ten thousand billion times as large as the human population on earth, we retain intact our sense of individual unity and identity, our habits and our memories. The next time you are required to recall some bit of information, consider how like a computer your brain is as it searches through its stored information to find the answer to the question.

I will next discuss how metals are involved in the functioning of the nervous system and how their action can be understood.^{3-5,8} I have already indicated that the nervous impulse is electrical in nature. The role of metals is to generate this impulse, and the metals involved are sodium and potassium in the ionic form. Normally, the nerve cell contains much more potassium and much less sodium than the cell fluid in which it is located. This is shown in Figure 5 where in the upper part we see a representation of the movement of sodium represented by Na^+ and potassium represented by K^+ across a red blood cell membrane. Studies of the giant axon of the squid which is merely a very large nerve fiber, being about 1 mm (or 0.02 inch) in diameter show that in the intact nerve fiber there is an electrical potential of about 50 millivolts. When appropriately stimulated the cell wall of this fiber suddenly becomes very permeable. Sodium ions rush into the cell as seen in the lower part of Figure 5, the electrical potential drops and this triggers a cascading effect in the direction of the brain center. Over a period of time much longer than the impulse but relatively short in seconds the sodium is pumped back out of the nerve cell, the electrical potential is restored and the nerve cell is ready for another impulse. Since these impulses cannot be generated continuously without loss of sensitivity the nerve can become deadened by repeated impulses. In this connection, we are all familiar with the fact that we can become numb to pain. Now the origin of the electrical current lies in the fact that the sodium and potassium exist as ions or charged particles in the fluid, so when the sodium is pumped out of the cell after a nerve impulse this is equivalent to charging a battery and energy is

ACTIVE ION TRANSPORT

Red Blood Cell

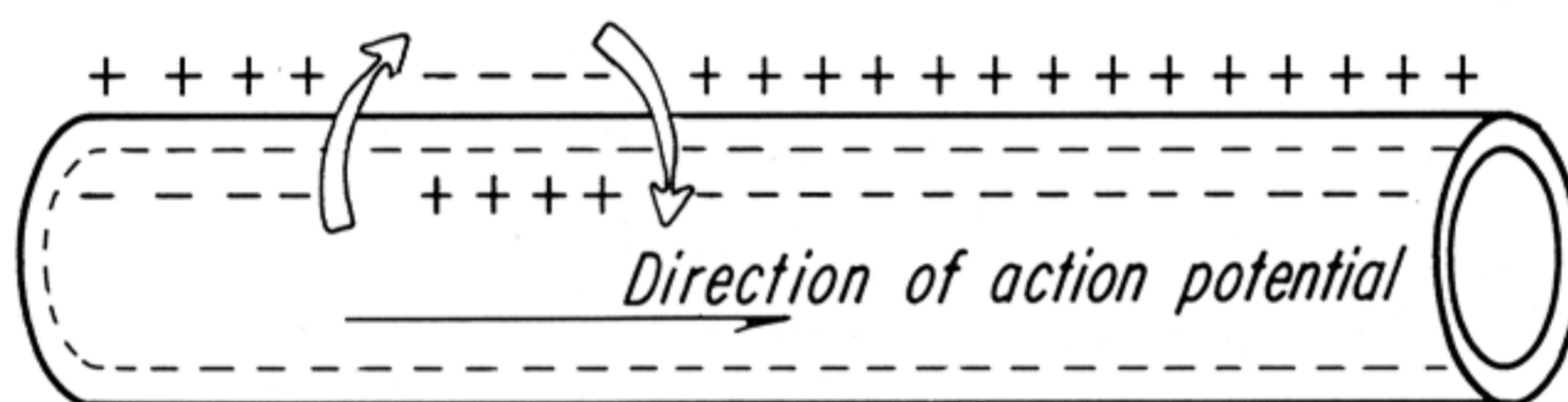
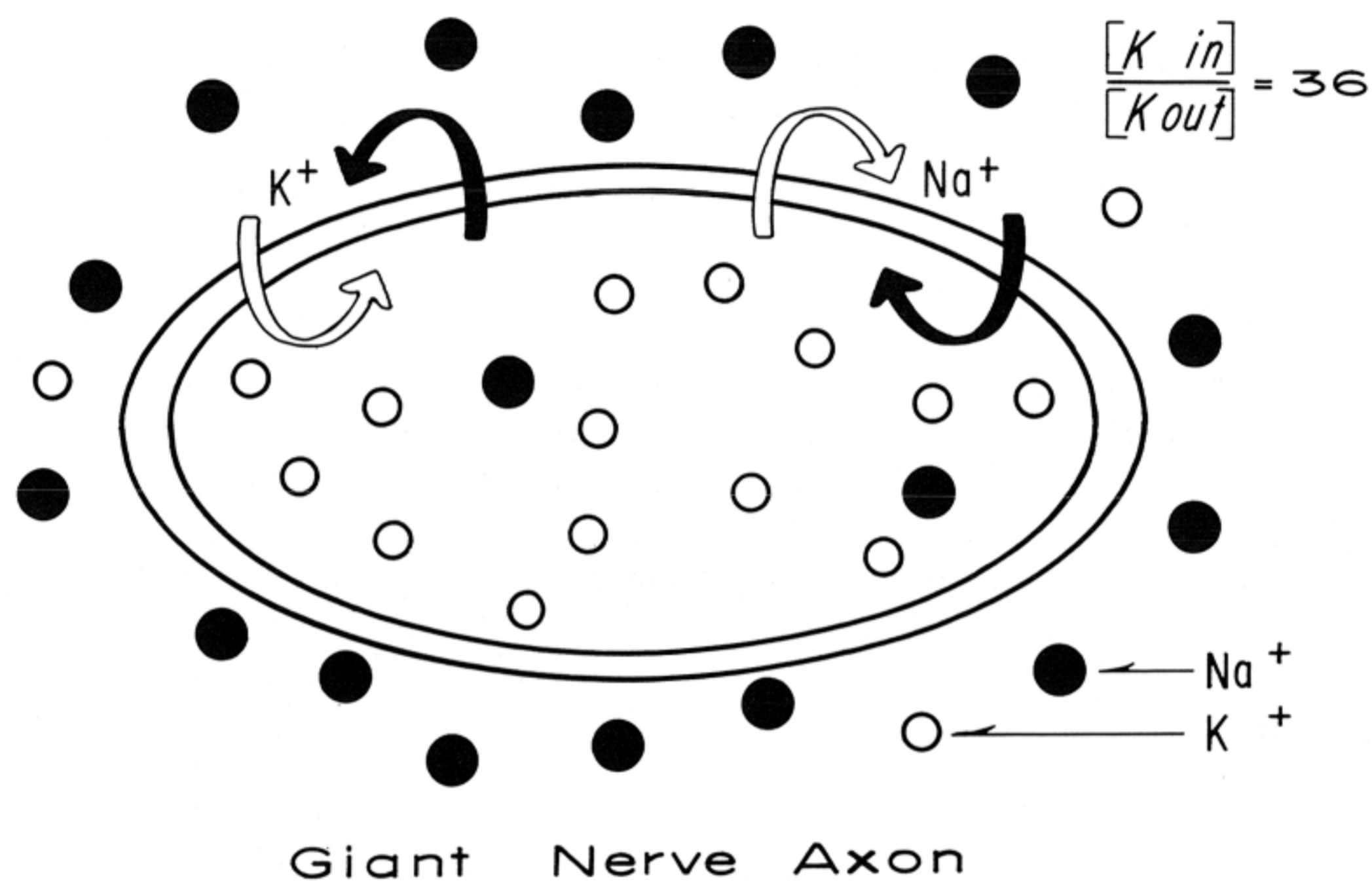


Figure 5

required. The process of pumping the sodium out of the cell has been likened to cocking a gun in readiness for firing it. Receipt of the pain, pleasure or whatever signal from the receptor is then like pulling the trigger with an immediate result in both the gun and the nerve. Here now is the problem for which we are seeking answers—what is the mechanism by which the sodium is pumped out of the cell and why is potassium relatively unaffected by the pumping procedure?

Before answering these questions let me digress to relate an interesting true story involving a naturally occurring substance which has the interesting property of interfering with the conduction of the nervous impulse in a dramatic and often fatal way.⁹ On September 8, 1774, His Majesty's sloop *Resolution* under command of Captain James Cook lay at anchor

off the South Pacific island of New Caledonia discovered by Cook only a few days earlier. That afternoon the ship's clerk traded with a native for a fish. Captain Cook asked to have the fish prepared for a supper he was to share with the expedition's two naturalists, J. R. Forster and his son Georg. Later Cook recorded in his journal:

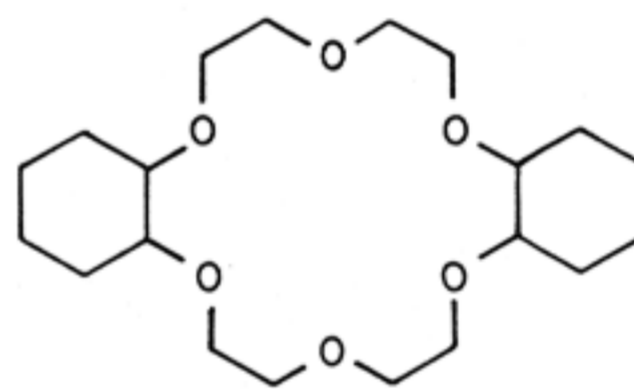
"The operation of describing and drawing took up so much time till it was too late so that only the Liver and Roe was dressed of which the two Mr. Forsters and myself did but taste. About 3 or 4 o'clock in the morning we were seized with an extraordinary weakness in all our limbs attended with a numbness or sensation like to that caused by exposing ones hands or feet to a fire after having been pinched by frost. I had almost lost the source of feeling nor could I distinguish between light and heavy bodies, a quart pot full of water and a feather was the same in my hand. . . . In (the morning) one of the pigs which had eat(en) the entrails was found dead."

These events were a mystery to Captain Cook, but we now know that the puffer fish which he received from the natives contains a chemical substance, tetrodotoxin, which in extremely small amounts is deadly because it blocks the nervous impulse pathway. This chemical is also found in the California Newt which is a type of salamander. It is about as potent as rattlesnake venom and in lethal amounts it is reputed to stop the heart between beats. Actually, the puffer fish is a delicacy in Japan where if proper care is taken to dispose of the liver where the majority of the tetrodotoxin is found it can be safely eaten. It may be some reflection on the quality of the cooks in that country that in 1957, 176 cases of puffer fish poisoning were reported, 90 of them being fatal.

Now, back to the question: How is the sodium ion pumped out of the cell? At the present time the structure of the cell membrane is open to considerable question and the nature of the substance which transports the sodium out of the cell is completely unknown. The thickness of the cell membrane is less than 10^{-6} cm. This is approximately 100 times too small to be seen by our best light microscopes, but it is still 100 times larger than the sodium or potassium which moves across it. The membrane contains fat and protein macromolecules which are very large and whose composition is only imperfectly understood. It is probable that some component of

these large molecules is the sodium carrier. However, for our experiments it seemed impractical to attempt to use the natural material. Therefore, we have resorted to a study of model compounds which mimic the behavior of the actual biological system in which we are interested. The two specific properties of the biological system which we are investigating are: first, the ability to carry metals across membranes (especially sodium and/or potassium) and second, the ability to interact with sodium or potassium, but not with the other. Once we have such compounds we would extend the study to other metals in an attempt to learn why the compounds have the unusual properties they show.

Through the study of others¹⁰ we have learned that certain members of a class of compounds called cyclicpolyethers show different affinities for sodium and potassium. An example of a cyclicpolyether is shown in Figure 6. Actually, these compounds are unusual in several ways and are presently being actively studied by workers in many laboratories throughout the world. Certain of these cyclicpolyethers have been found by others to transport potassium, but not sodium across artificial membranes under the influence of an electric current.¹¹ We have found in our calorimetric determinations that in water solutions one of



2,5,8,15,18,21-Hexaoxatricyclo(20.4.0.0^{9,14})-hexacosane

(Dibenzo-18-Crown 6)

Figure 6

them interacts very strongly with potassium and not at all with sodium.^{12,13} Thus they fill two criteria, they are selective toward metal ions and they do transport ions across membranes. Unfortunately, they don't have the property of reacting specifically with sodium as the actual carrier molecule does, but the behavior we have observed lead us to some further experiments. These cyclicpolyethers are unusual in having a large central cavity ringed with oxygen atoms which are well known for their ability to bind metals. In Figure 7 is shown a model of a cyclic polyether-metal complex. The red balls represent six oxygen atoms and the ball in the center represents a metal ion. You can see that the fit is quite good. Some of the cyclic polyethers we have studied are very unusual among

chemical compounds in interacting very strongly with potassium, but not at all with sodium.

Having learned these things, we now have two further objectives in mind: first, we would like to find a compound of this general type which reacts strongly with sodium, but not at all with potassium; and second, we would like to understand why these compounds are selective toward sodium and potassium in the first place. Looking at the compound in Figure 7 it is tempting to say that it is just a matter

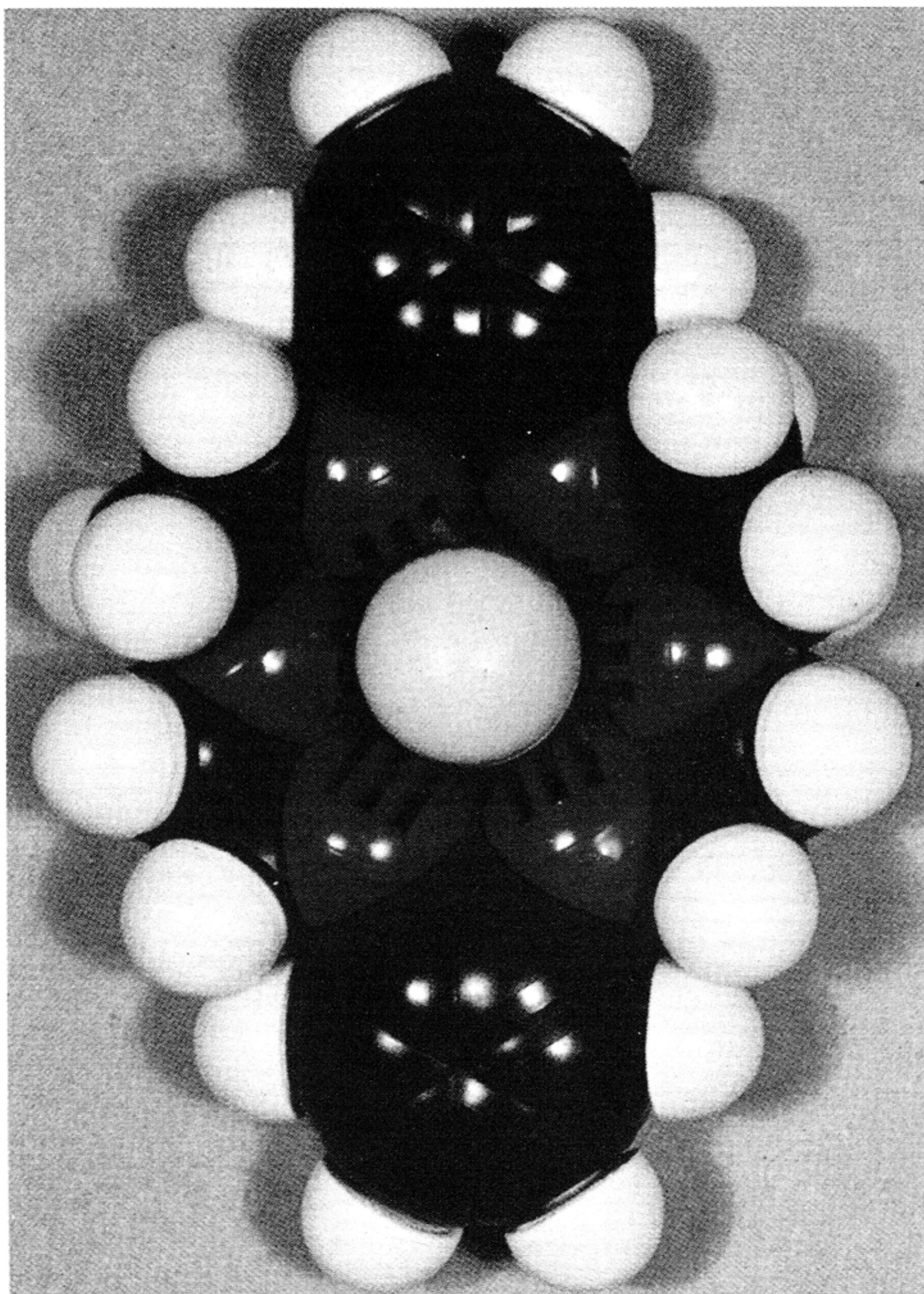


Figure 7. Model of Dibenzo-18-crown-6 shows complex with metal ion

of size—potassium will fit and sodium which is much smaller will not. We have learned, however, that this simple idea is only partly true. There are a number of other factors which must be considered. I have shown in Figure 8 several compounds which illustrate some of these factors. We are presently studying the effect on metal selectivity of replacing part or all of the oxygen atoms (represented by O) by sulfur atoms (represented by S) as seen in the structures on the lower right.

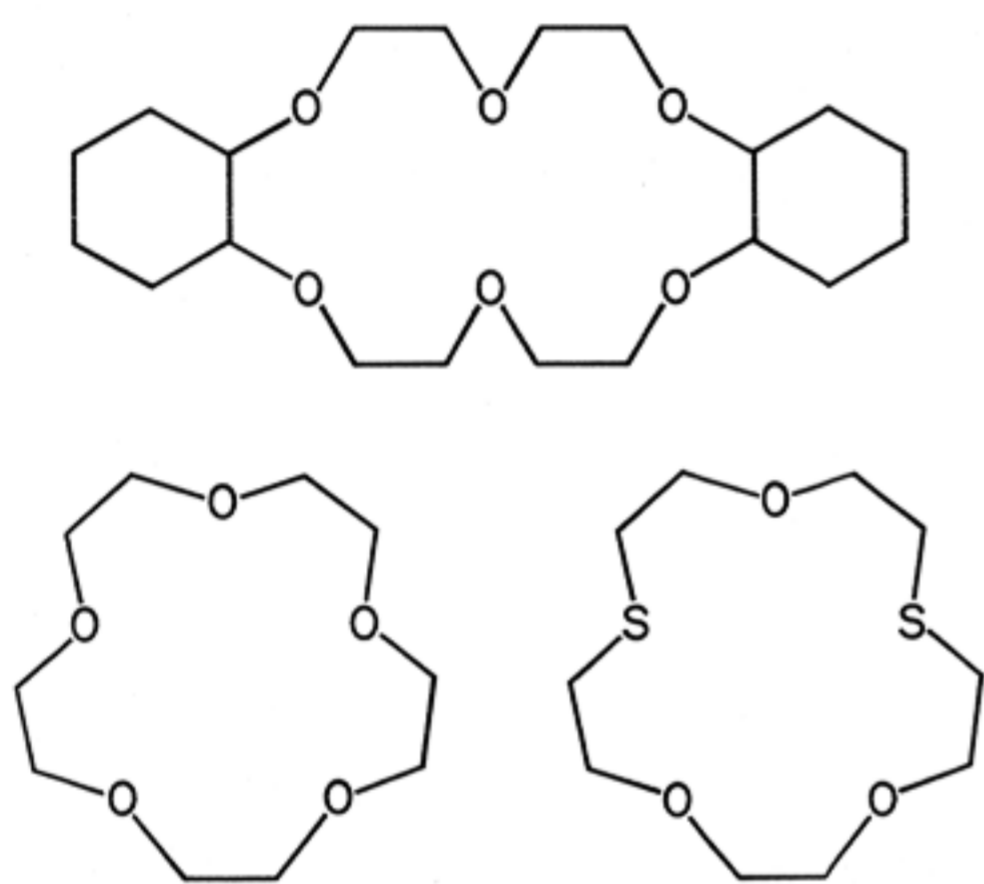


Figure 8

We are also studying the effect of using a different size ring and of placing other atoms or groups at various places on the molecule, or of making the calorimetric measurements in solvents other than water. In addition we are cooperating with Dr. Kent Dalley of the Chemistry Department in an X-ray study designed to learn where the metal is located relative to the ring atoms in the solid metal complex. We have learned one interesting thing so far in this study. An X-ray study made in Great Britain showed that rubidium was in the center of, but slightly above, the plane of ring atoms.¹⁴ We have looked at the potassium compound and found the potassium to be in the center of the plane of atoms which is consistent with the fact that potassium is a somewhat smaller atom than rubidium and also with our calorimetric determination of the extent of binding of the two with the cyclicpolyether, potassium being bound about twice as tightly as rubidium.^{12, 13}

We suspect that there are structural similarities between our model compounds and the actual substances which carry sodium across the membrane, and that the ring structure is a very important part of the natural carrier molecule. We have found that exactly similar compounds which do not have the ends connected to form a ring do not have any affinity for either sodium or potassium. The formation of the ring is necessary, at least in water solutions, for the metal complex to exist. These cyclicpolyether compounds resemble structurally several classes of cyclic antibiotics which show the same

sodium potassium differentiation and also transport metals across membranes under the influence of an electric current. Examples of these antibiotics as given in Figure 9 are valinomycin and nonactin, which have ring structures and inwardly directed oxygen atoms. As I indicated earlier, proteins are important structural constituents of membranes. It is not difficult to visualize how protein molecules or certain parts of them could behave toward sodium and potassium in a way similar to that we see in the cyclic polyethers and antibiotics.

There are several areas in which we anticipate that our experiments will have some value. First, since we are working with compounds which behave in a similar way to the as yet unknown carrier substances in membranes, we hope to be able by varying the experimental conditions to find specific compounds which exactly mimic these substances. We can then by judicious experimentation learn the factors which cause these cyclicpolyether compounds to have their observed selectivities and hopefully suggest reasons why this selectivity is shown in the intact nerve cell. Second, the results of our experiments will provide us and others with information which could lead to improved theories of cell membrane structure and give a better idea of what to look for in the way of carrier molecules. Third, we hope to learn more about the general process of transport across cell membranes. This transport is not limited to metals or to nerve cells. All materials used by living organisms in their life processes pass through membranes since this is the only way they or their breakdown products can enter the

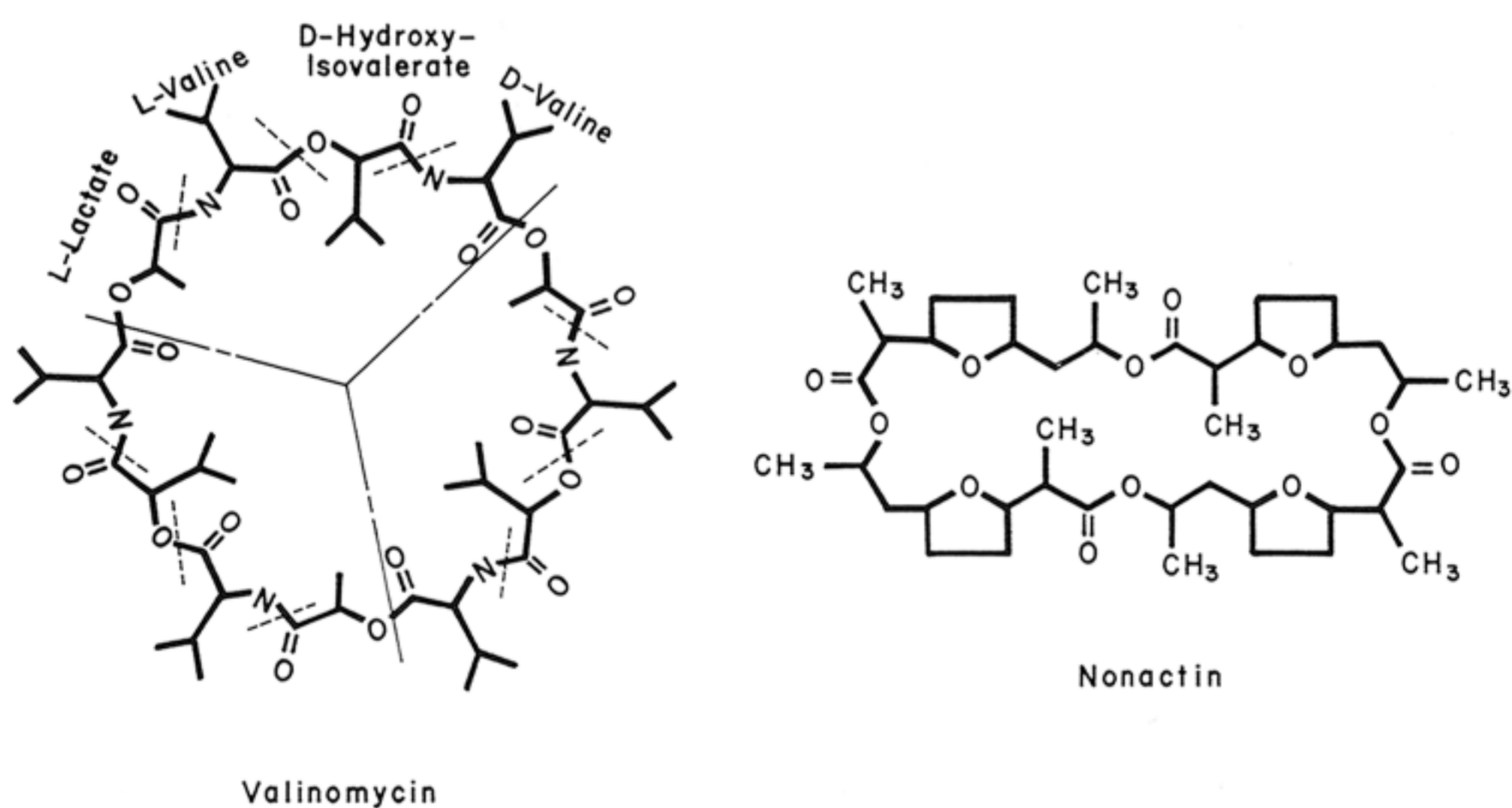


Figure 9

cell where transformation into materials which can be used by the organism takes place.

In addition, many cells have the remarkable property of being able to concentrate certain metal ions or other substances. This concentration process amounts to a transport of the metal involved against a concentration gradient, that is, the metal moves from a region of low concentration to one of high concentration. The driving force for this movement is not well understood. One example of this is the transport of sodium out of the cell after a nerve impulse. Another example is the concentration of the element chromium by a nucleoprotein in beef liver by a factor of 20,000 over the amount in the surrounding medium. A third example is to be found in the normally highly acid condition of our stomach. The amount of acid in the stomach is maintained approximately one million times higher than the amount in the fluid from which it comes, which is just on the other side of the stomach membrane. We would hope that the results of our research will shed light on how the cells in living organisms can do these remarkable things.

Fourth, there are many potential industrial applications for effective ion separation procedures. Our work could lead to the design of effective artificial membranes or ion exchange materials with the property of distinguishing between very similar metals, such as sodium and potassium or calcium and magnesium. This type of membrane or ion exchange material would be welcome news to many industries such as those involved in the petroleum and chemical businesses where unwanted metals frequently contaminate the main product or where it is desired to recover the metals economically. Another possible application of this type would be in saline water conversion where it is desired to effectively remove metals such as sodium, calcium and magnesium to make water suitable for drinking or for industrial processes.

Last, many serious diseases involve the central nervous system or other parts of the nerve network. Increased understanding of the normal and abnormal operation of this system is therefore of obvious importance in the treatment or prevention of such diseases. We would hope that the basic information obtained in our study concerning the reaction of metals with cyclicpolyethers will provide this increased understanding

of this most important life process. Recently at the annual meeting of the 12th Annual Science Writers Seminar of the American Cancer Society a report was made that the division of body cells is controlled precisely by the amounts of sodium and potassium on either side of the cell membrane.^{15, 16} Mr. Clarence D. Cone, Jr., head of NASA's molecular biophysics laboratory at Langley Field, Virginia, reported that cells having large negative membrane voltages seldom if ever divide, whereas cells with small negative electrical potentials divide at maximum rates. Since malignancy is related to uncontrolled cell growth, the interest in this idea is obvious.

In summary, then, our research program involves primarily the application of calorimetry to the measurement of those energy changes which occur when metals interact with substances of biological interest. Specifically, we are interested in understanding better the processes by which living organisms transport metals in nerve conduction and how they are able to remove and concentrate metals from their environment. Knowledge obtained about these processes should be useful in a wide variety of applications. Again, Dr. Christensen and I express our appreciation for this honor. Thank you.

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NEW MORMON

Dennis Smith

Dennis Smith is a young Mormon artist who was born and reared in Alpine, Utah. His graduate work at Brigham Young University was interrupted by a commission which he accepted at the Royal Academy of Art at Copenhagen, where he studied until 1968 when he returned to Alpine to continue with his sculpturing.

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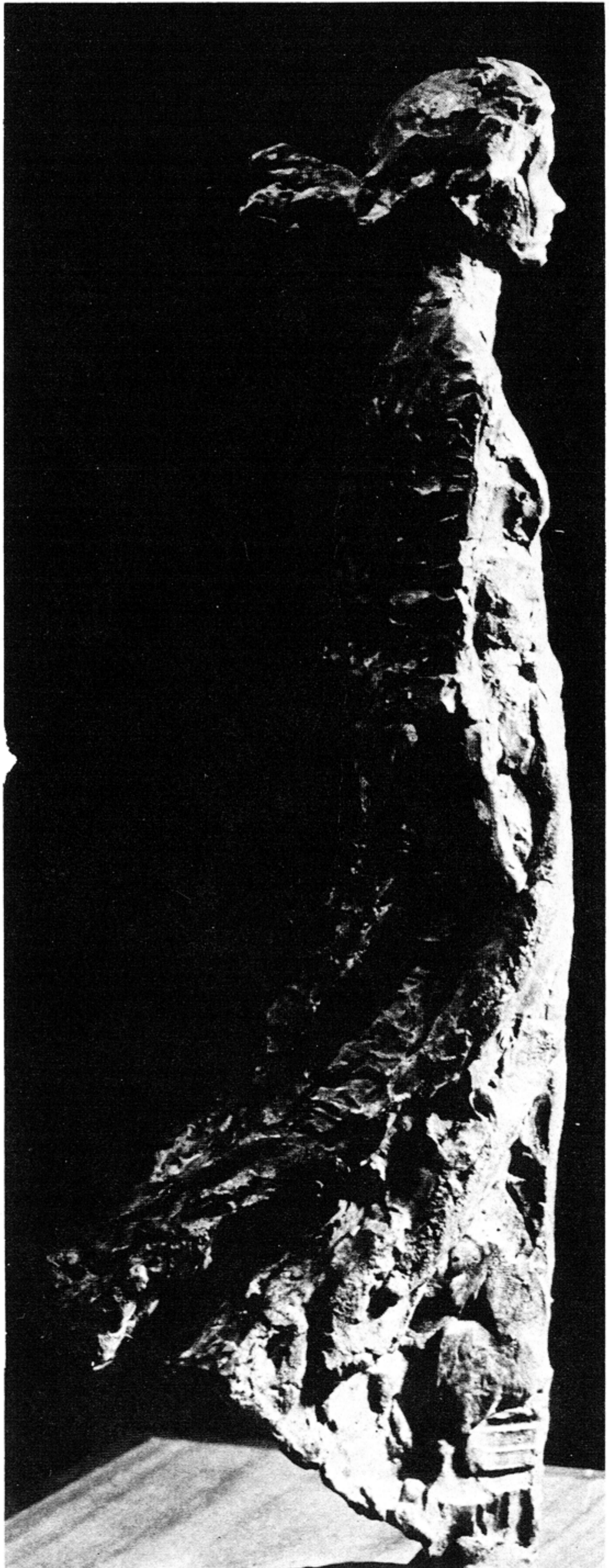
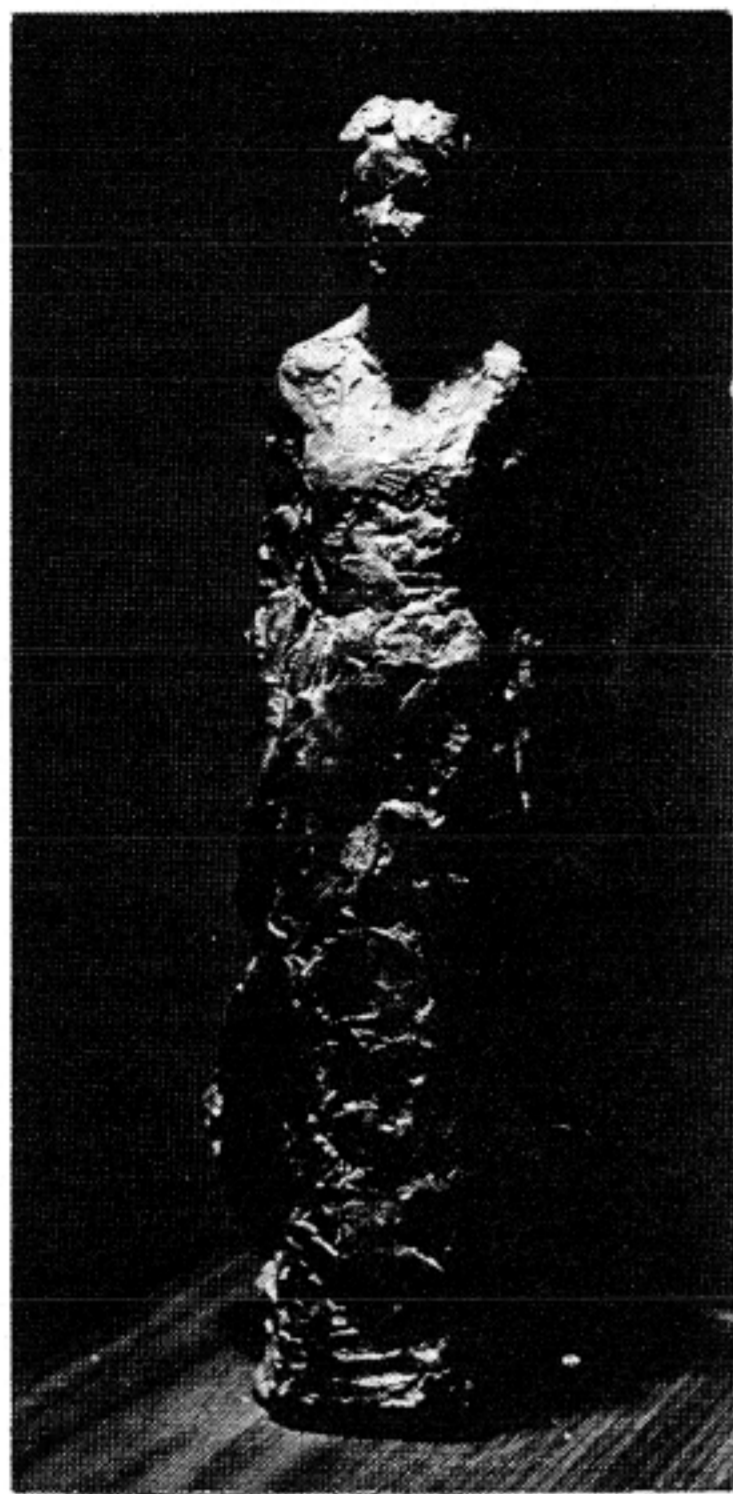


Photo credit: Photographs by Eldon Linschoten



Kristina was
Dennis Smith's
Danish Grandmother
who after joining
the Church was filled
with the spirit of
emigrating to Zion.
This sculpting depicts
Dennis's imagining
her standing
on the beach
looking out over
the western sea with
the sea-wind blowing
her hair and clothes.



Higher Up*

Dennis Smith

To get up here
is quite a climb,
because the branches
on the way
are often far apart
and big around.
So big around, in fact,
that I can't grip them
but must almost
hug them up in places.
However,
bigger limbs
mean bigger trees,
and once past all the bigger limbs,
the smaller limbs feel better,
even though you're higher up.

And higher up
is better too,
because
it gives more view.

*From Dennis Smith's *Star-Counter* (Trilogy Art Publications, 1970), reprinted by permission of the author.

It's funny
how the people
all down there
don't know
that I'm up here.
That makes me feel
like I know something
they don't know——
that I'm up here, that is.

There's George McDaniel
driving through his orchard
with a trailer
full of ladders
on behind his tractor
in the orchard grass.

I wonder
if he realizes
that the neighbor boy
is in his tallest poplar?

I doubt it or he'd look.

Why, even if
he put his ladder
to the tallest apple tree
he'd be
so far below
that I'd be looking down
to watch him pick.
And all the while I think,
the wind slides
through the leaves
in rustles
and the limb
to which I cling
sways from back
to forth again.

He'd never see.

And Billy Devey's wife
just stepped outside
to cuss her kid.
She doesn't know
that I'm up here,
for if she did
she wouldn't have to worry
what her kid was doing.
I've been watching
since her kid came out
a while ago,
and even though
he looked up once or twice,
he never saw.

And Maud Beck,
Owen's widow,
on her way home
from the store,
walked past
and little dreamt
a boy clung grinning
in the poplar
by the road she walked along.

I even coughed
as she went by
and wasn't heard.

I may be
awfully high
here in my poplar tree.
Still I wonder
if there isn't someone
higher up than I am
in another poplar
looking down at me.

Ideals of Mormons and Gentiles In Utah and other States

VIRGIL B. SMITH*

It has been reported by Bishop Pike (1967) that the percentage of U.S. population affiliated with a church has changed recently from an increasing trend to a decreasing trend. He claimed that during this same period there has been an increase in the sale of books about religious topics.¹ One possible interpretation of these two findings is that there may be differences in the values which are held by church members and others.

How may such values be measured? One way is that used by Christie and Merton (1958) to measure the values of medical students.² Using a similar technique, I attempted to measure some values of college students by having them anonymously mark semantic differential scales (Osgood, 1957) to describe what the phrase "ideal people" meant to them.³ The adjectives used at opposite ends of the seven step scales were: careless/accurate, foolish/wise, restrictive/democratic, negative/positive, boring/interesting, selfish/unselfish, changeable/stable, dishonest/honest, inefficient/efficient, unfair/fair, illogical/logical, and worthless/valuable. These scales were marked first by 254 students at a public Utah college, 76 percent of whom were Mormons. Because The Church of Jesus Christ of Latter-day Saints has not decreased in size but has continued a steady growth, it was assumed that the Mormon sample's average

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¹James A. Pike, unpublished speech at Central Washington State College, Ellensburg, Washington, 1967.

²Richard Christie and Robert K. Merton, *Procedures for the Sociological Study of the Values Climate of Medical Schools*, *Journal of Medical Education*, Vol. 33 (10) Part 2, pp. 125-153.

³Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, *The Measurement of Meaning* (Urbana: University of Illinois Press, 1957), p. 342.

scores on the scales would represent values of people relatively satisfied with their church membership, and that the non-Mormon scores would represent values of people who were not so satisfied.

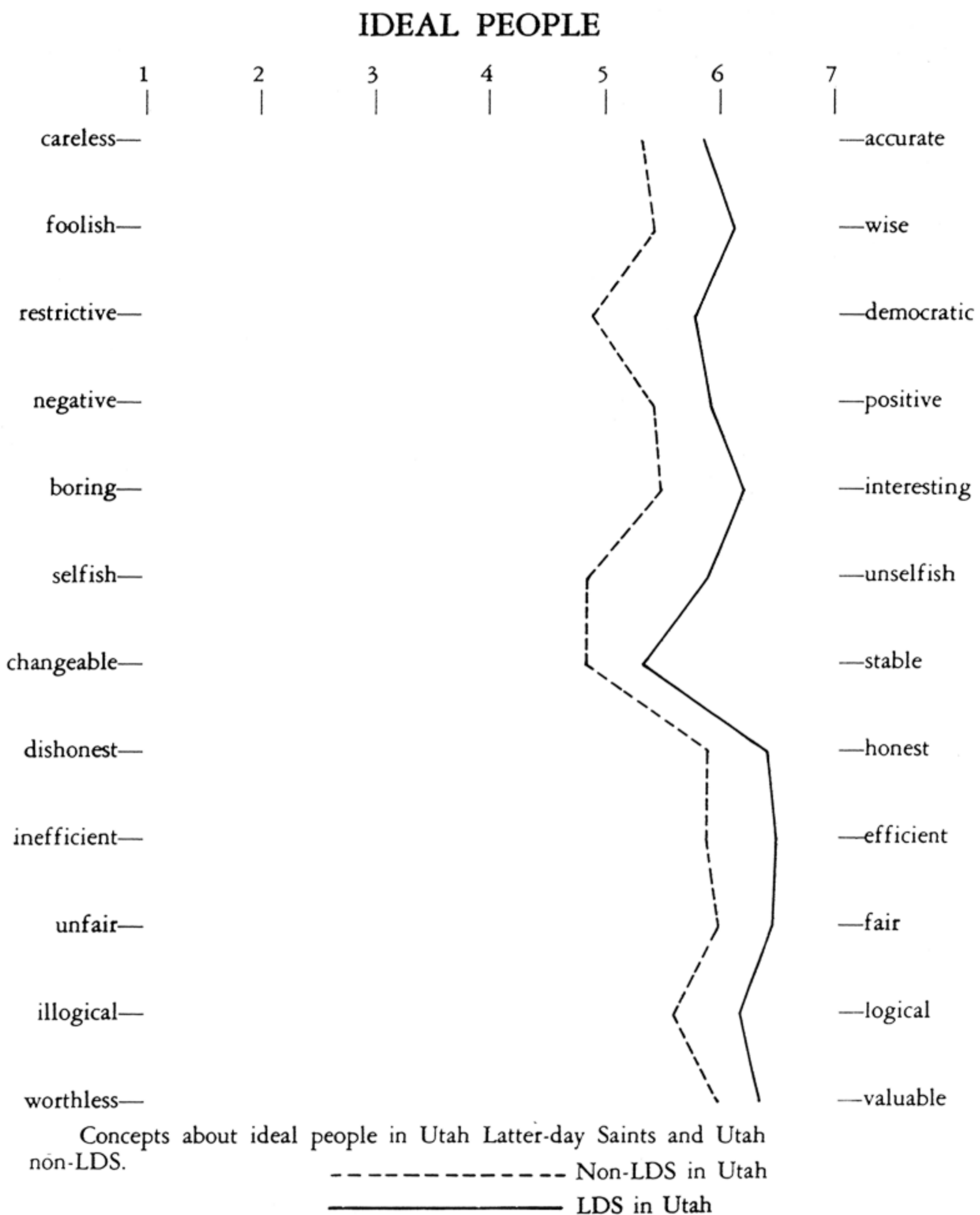
In this exploratory study it was found that the average mark of the Mormon students was closer to the idealistic end of all of these scales, compared to the average mark of the other students (see figure 1). The mean scores of both groups were on the more "ideal" half of the scales, but the Mormon scores indicated the Mormons placed the higher value on being accurate, wise, democratic, positive, unselfish, stable, honest, efficient, fair, and logical, and that ideal people were more interesting and valuable. On 11 of these 12 scales this difference was statistically significant because it was too large to attribute to chance. The scale showing an insignificant amount of difference was the "changeable/stable" scale. Are these differences to be found with Gentiles in other states too?

To check on this, the scales were given to Gentiles in three other states, and the Utah Mormon sample was compared with these other non-Mormon samples (of about 200 students each) in public colleges of Washington, Louisiana, and Ohio. In all three of these comparisons, the results contradicted the findings within Utah. For example, the average responses of Washington and Louisiana Gentiles were essentially the same as Utah Mormons, and in contrast to the 11 significant differences found between the Mormons and the Utah Gentiles, only three significant differences were found between Ohio Gentiles and Utah Mormons. I interpreted these three later comparisons to mean that the differences between the two Utah responses could not be explained on the basis of Mormon affiliation alone.

What could explain them then? One possible explanation is implicit in an assertion by Marden and Meyer (1962) that dominant group members share a common value system, different from the minority group which they dominate.⁴ To investigate the dominant-minority difference further, the scales were given to about 70 Negro public college students in Louisiana. When their average responses were compared with those of the Louisiana white students, five significant differences

⁴Charles F. Marden and Gladys Meyer, *Minorities in American Society*, 2nd ed. (New York: American Book Co., 1962), 497 pp.

were found. When the average Negro responses were compared with those of the Utah Mormons, the Mormon scores were also found to be significantly different on five scales. This was almost identical with the Louisiana white differences. On four of these scales, the Mormon sample differed significantly from both the Negro sample and Utah Gentile sample: honest, fair, positive, efficient. And on these same four scales the Mormon responses were the same as those of the other two non-Catholic dominant groups. On three of these scales the Catholic dominant group was the same as the Mormons. To this extent the dominant group members *did* share values. The



two minority groups shared three values on which they were significantly different from all the dominant groups: "unselfish," "fair," and "logical."

Although such evidence lends support to a dominant-minority explanation of differences, other evidence does not. For example, on five scales the Mormon scores were similar to all the non-Utah scores, including the Negro scores. In other words, only the Utah Gentiles responded differently in these cases. It would seem that the five groups who share these values have a better chance for successful communication and mutual acceptance than do the two Utah groups.

Without more information, it is not clear why there are so many differences between the Utah samples. Perhaps the differences in the values studied here, combined with other values not studied here (on caffeine, tobacco, alcohol, etc.), are magnified and multiplied by closer contact between these two groups.

Abraham in Egypt: A Collation of Evidence for the Case of the Missing Wife

THOMAS W. MACKAY*

Commentators have always been bothered by the morality of Abraham's action while in Egypt, for the patriarch claimed to be his wife's brother, not her husband. Expressions have varied from blatant condemnation ("He was guilty of prevarication and deceit, he lost his perfect trust in God's guardianship; and he endangered his wife's chastity and honour in selfish care for his own safety."¹) to Augustine's uncomfortable dismissal "he silenced a little bit of truth, he didn't say anything false."² One minister called it "unquestionable" that Abraham suffered from his "sinful agreement" with Sarah,³ and a contemporary scholar deplores the action as being a "cynical, utilitarian consideration."⁴ Calvin applauds the end sought (his life); however, he cannot fully excuse the means employed (the lie).⁵ Luther, himself hard pressed to justify the lie, remarks that the scripture is difficult for exegetes to explain:

There have never been any theologians or other readers whom the passage before us would not have offended, even

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¹Rev. William J. Deane, *Men and the Bible: Abraham: His Life and Times* (New York: Auson D. F. Randolph & Co., [n.d.]) p. 51.

²Augustine *contra Faustum* 22. 34: (PL, 42 422) "indicavit sororem, non negavit uxorem; tacuit aliquid veri, non dixit aliquid falsi."

³Samuel Crothers, *The Life of Abraham the First Missionary* (Chillicothe, Ohio: Ely & Allen, 1847), pp. 67-73.

⁴Gerhard von Rad, *Genesis*, 2nd ed. rev., trans. John H. Marks (London: S.C.M. Press Ltd., 1963), p. 222.

⁵John Calvin, *Commentaries on the First Book of Moses Called Genesis* (Edinburgh: Calvin Translation Soc., 1847), p. 360; see pp. 339-65.

among the Jews. It is so amazing, so full of questions and offenses, especially if it is correctly understood; for here offenses both of faith and of morals reveal themselves. . . . The Jews, like those sevenfold asses, the Stoics, interpret this action quite harshly and accuse Abraham of a sin so great that they maintain it was punished among his descendants by the Egyptian captivity.⁶

Skinner,⁷ still uneasy after making every explanation possible, states "lastly, it is assumed that in the circumstances lying is excusable." The gravity of the problem is seen in the implications noted by the Jerusalem Bible:

The purpose of this narrative . . . is to commemorate the beauty of the ancestress of the race, the astuteness of its patriarch, the protection that God afforded them. The story reflects a stage of moral development when a lie was still considered lawful under certain circumstances and when the husband's life meant more than his wife's honour. God was leading man to an appreciation of the moral law but this appreciation was gradual.

This all sounds so very familiar—the utter helplessness of rabbinical, patristic, and contemporary writers to understand Abraham. Every phase of the motifs of sacrifice and obedience represents a stumbling block. In fact, there is no moral or ethical justification for Abraham's actions, despite all the casuistries and sophistries conjured up by learned minds. All the protestations, all the confusion, all the embarrassment only demonstrates the bankruptcy of the world: the story of Abraham has dumbfounded learned commentators for centuries. Now people are beginning to look to Abraham, not Moses, for the origin of the covenant, but their efforts still leave them baffled and only emphasize their discomfort. The Book of Abraham gives us the new material needed for reevaluation leading to understanding.

Whenever confronting a problem, we should first scrutinize the ancient evidence and ascertain just what the limits are to the evidence proper. Frequently this gives us a fresh approach and shows possible weaknesses in our analysis. Also, we often discover that we have somehow failed to consider some very obvious possibilities which are clear in the evidence, but ob-

⁶Martin Luther, *Luther's Works*, Vol. 2: *Lectures on Genesis*, ed. Jaroslav Pelikan and Daniel E. Poellot (St. Louis: Concordia Publishing House, 1960) pp. 288, 292.

⁷John Skinner, *International Critical Commentary: A Critical and Exegetical Commentary on Genesis*, 2nd ed. (Edinburgh; T. & T. Clark, 1956), p. 249.

scured by presuppositions. We propose here to go back and study the story of Abraham accounts in Genesis, Jubilees, Jasher, Genesis Apocryphon,⁸ and the Book of Abraham.

Genesis and the Book of Jubilees (c. third century B. C.) provide the most abbreviated accounts. In fact, according to Dupont-Sommer, the author of Jubilees takes great care to compress the narrative, as though to suppress everything which might question the loyalty and character of Abraham.⁹ The Book of Jasher (which is purported to be the book mentioned in Joshua 10:13 and 2 Samuel 1:18) and the Genesis Apocryphon embellish the story with details drawn from Jewish lore¹⁰ and consequently present more expanded versions. Although the Book of Abraham devotes only a small portion of our present text to the sojourn in Egypt, it would seem, to judge from Facsimile No. 3, that Abraham, after recording his revelation of the creation (Chapters 3-5), probably continued his personal narrative. However, the few verses which do remain offer one very interesting point stated by no other source, namely that God *commanded* Abraham to use the "brother-sister" device (Abraham 2:25).

The text of these five accounts is given in parallel columns. A comparison of the sources raises several questions of which the following will be briefly considered: (1) the antiquity of the Book of Abraham; (2) God's intervention and Abraham's "lie"; (3) Abraham's healing Pharaoh; (4) Abraham on Pharaoh's throne; and (5) the wife-sister motif.

THE ANTIQUITY OF THE BOOK OF ABRAHAM

Dupont-Sommer assents to the affinities of the Genesis Apocryphon with Jubilees, although he is somewhat reluctant

⁸Nahman Avigad and Yigael Yadin, eds., *A Genesis Apocryphon. A Scroll from the Wilderness of Judaea* (Jerusalem: The Magnes Press of the Hebrew University, 1956); Geza Vermes, *The Dead Seas Scrolls in English*, rev. (Baltimore: Penguin Books, 1965); Theodor Gaster, *The Dead Sea Scriptures*, rev. and enlarged ed. (Garden City, N. Y.: Doubleday, 1964). For a fairly complete bibliography, see Christoph Burchard, *Bibliographie zu den Handschriften vom Toten Meer* (BZAW, 76 [1957] and 89 [1965]). Jubilees is included in R. H. Charles, *The Apocrypha and Pseudepigrapha of the Old Testament*, 2 Vols. (N.Y.: Oxford U. P., 1963). An old translation of Jasher has been recently reprinted: *The Book of Jasher* (Salt Lake City: J. H. Parry & Co., 1887).

⁹A. Dupont-Sommer, *Essene Writings from Qumran* (Cleveland & N. Y.: World Publishing Co., 1962), p. 285, n. 4.

¹⁰Many of the stories may be found in Louis Ginzberg, *The Legends of the Jews*, 5 Vols., trans. Henrietta Szold (Philadelphia: The Jewish Publication Society of America, 1913).

to accept the opinion of Avigad and Yadin (in the *editio princeps*) that "the scroll may have served as a source for a number of stories told more concisely" in the Book of Enoch and the Book of Jubilees.¹¹ These last two books may be attributed to the fourth, third, or second centuries B. C.;¹² consequently the *composition* of the Genesis Apocryphon would antedate those, even though the scroll itself, "the earliest Aramaic example of pseudoepigraphic literature that has come down to us,"¹³ is dated between 50 B. C. and 70 A. D.¹⁴ It should be obvious that the date of any given manuscript of ancient literature is hardly ever the date of *composition*, and that the date of composition will not always be the origin of any particular element. The Homeric question should be sufficient to warn us about that! To cite merely one specific example of how an ancient account can be preserved for centuries without leaving any written trace, even among literate people, the story of the two pieces of the coat of Joseph, related by the Book of Mormon and by Tha'labi (an Arab writing in the eleventh century A. D.),¹⁵ must have been passed

¹¹Avigad and Yadin, p. 38 (italics theirs).

¹²Cf. W. F. Albright, *From the Stone Age to Christianity*, 2nd ed. (Baltimore: Johns Hopkins Press, 1946), pp. 266-67.

¹³Avigad and Yadin, p. 39; cf. Manfred H. Lehmann, "1 Q Genesis Apocryphon in the Light of the Targumim and Midrashim," *Revue de Qumran*, 1 (1958-59), p. 251.

¹⁴Avigad and Yadin, p. 38; Geza Vermes, *Studia Post-Biblica*, Vol. 4: *Scripture and Tradition in Judaism. Haggadic Studies* [Leiden: E. J. Brill, 1961], p. 96, n. 2) prefers the second century B. C., as does H. H. Rowley ("Notes on the Aramaic of the Genesis Apocryphon," *Hebrew and Semitic Studies Presented to Godfrey Rolles Driver*, ed. D. W. Thomas and W. D. McHardy [N. Y.: Oxford U. P., 1963], pp. 116-29), but H. E. Del Medico (*The Riddle of the Scrolls* [London: Burke, 1957], p. 178) had tried to date it to the second century A. D. See also E. Y. Kutscher, "Dating the Language of the Genesis Apocryphon," *JBL*, Vol. 76 (1957), pp. 288-92; P. Winter, "Das aramäische Genesis-Apocryphon," *TLZ*, Vol. 82 (1957), pp. 257-62; E. Y. Kutscher, *Scripta Hierosolymitana*, Vol. 4: "The Language of the 'Genesis Apocryphon.' A Preliminary Study," *Aspects of the Dead Sea Scrolls*, ed. C. Rabin and Y. Yadin (Jerusalem: The Magnes of the Hebrew University, 1958), pp. 283-96 (reviewed by G. Molin, *Revue de Qumran*, Vol. 1 [1958-59], pp. 284-85). J. W. Doeve ("Lamech's Achterdocht in 1 Q Genesis Apocryphon," *Nederlands Theologisch Tijdschrift*, Vol. 15 [1960-61], p. 414) asserts that "1 Q Gen. Ap. is een essense midrasj." Matthew Black (*The Scrolls and Christian Origins* [N. Y.: Charles Scribner's Sons, 1961], p. 193) calls attention to the anthropomorphic god of G. A. 22. 27 (cf. Gen. 15:1; n.b. Acts 7: 2) as differing from the targums, which eschew anthropomorphism.

¹⁵Hugh Nibley, *An Approach to the Book of Mormon*, 2nd ed. (Salt Lake City: Deseret Book Co., 1964), pp. 177-80. The Testament of Zebulon Vol. 4. 10 (cf. Marc Philonenko, "Les Interpolations chrétiennes des Testaments des Douze Patriarches et les Manuscrits de Qoumrân," *Revue d'Histoire et de Philosophie Religieuses*, vol. 39 [1959], p. 33) is not relevant.

on for more than sixteen centuries in the Near East, and even longer if it remounts historically to the actual event! As to the Abraham story, Vermes assures us that "Genesis Apocryphon is securely established within the current of tradition whose origins, inherited eventually by targumic and midrashic literature, must derive from *an earlier age*."¹⁶

Naturally this does not mean that everything in the Genesis Apocryphon is factual or even that all of it antedates the fourth century B. C. Nevertheless, there are some considerations that ought to be made. First, the earlier portion of the Genesis Apocryphon account is related in the first person. Second, the earlier part of the narrative is "rich with haggadic amplifications."¹⁷ Third, the later portion is told in the third person, and, fourth, it adheres much more strictly to the biblical text. It seems, therefore, to be a conflation of biblical narrative and extra-biblical stories. This indicates that Genesis Apocryphon, as we know it, was probably composed some two to four centuries before our extant copy was made, and it includes some old accounts not in Genesis. But it is not necessary to suppose that if one source gives a fuller story than another the longer version *perforce* is a more recent expansion of the shorter account.¹⁸ Where Genesis Apocryphon does not follow the strict biblical narrative on Abraham, it relates a lengthy first person story from old Jewish lore.

The Book of Abraham employs the first person, as does Genesis Apocryphon, and the nature of the history and especially the creation ritual are so sacred that the Pearl of Great Price Abraham might not have been circulated as widely as other, possibly abridged, versions. Yet, both the Book of Abraham and Genesis Apocryphon agree in employing the first person *and* in narrating an instance of God's intervention to protect the righteous. The nature of the differences and similarities of the Pearl of Great Price (PGP) account to our

¹⁶Vermes, p. 123 (italics ours); cf. J. T. Milik, *Studies in Biblical Theology*, No. 26: *Ten Years of Discovery in the Wilderness of Judaea*, trans. J. Strugnell (Naperville, Ill.: Alec R. Allenson, 1959), p. 31: "The Genesis Apocryphon . . . , even if it contains sections translated verbatim from the Hebrew of Genesis, is no true Targum nor Midrash. Rather it is an ambitious compilation of traditional lore concerning the Patriarchs. . . ." n. b. Lehmann, p. 249.

¹⁷Vermes, p. 96.

¹⁸Cf. *infra*, pp. 8, 9. See Hugh Nibley, "The Unknown Abraham," *Improvement Era*, Vol. 72, No. 1 (Jan., 1969), pp. 26-27.

other sources would therefore indicate that (quite apart from the palaeographical date of the papyrus Joseph Smith used and not worrying about *how* he used it) the *story* antedates these other sources.

GOD'S INTERVENTION AND ABRAHAM'S "LIE"

The revelation and commandment to Abraham to claim that Sarah was his sister is related in varying—thought not contradictory—terms by the PGP (commandment by the Lord's voice) and Genesis Apocryphon (a dream interpreted by Abraham). Dreams were a regular means of divine communication in the Old Testament, and so Genesis Apocryphon does not need to specify that this one came from God. Rather it leaves the *interpretation* to Abraham. Since the identification of Abraham and Sarah with the cedar and the palm is an established part of the tradition,¹⁹ this aspect of the dream presents no difficulty. Still, it is left to Abraham's ingenuity to devise the "she is my sister" trick. In contrast to all other sources, the PGP specifies that God told Abraham what he was to do. He was therefore acting by commandment, and to do otherwise would have been just as much a sin as for Nephi to have failed to kill Laban.²⁰

To understand the internal conflict this divine injunction may have caused Abraham, we need only to recollect his statement at the beginning of the PGP account:

And, finding there was greater happiness and peace and rest for me, I sought for the blessings of the fathers, and the right whereunto I should be ordained to administer the same; having been myself a follower of righteousness, desiring also to be one who possessed great knowledge, and to be a greater follower of righteousness, and to possess a greater knowledge, and to be a father of many nations, a prince of peace, and desiring to receive instructions, and to keep the commandments of God, I became a rightful heir, a High Priest, holding the right belonging to the fathers. (Abraham 1:2)

So here we have a righteous man who desires perfection and who has just received the promise of land, a righteous, numerous posterity, etc.²¹ Now the Lord tests Abraham—and Sarah!

¹⁹Avigad and Yadin, pp. 23-24; Lehmann, p. 257; cf. Ps. 42-3; Vermes, p. 112.

²⁰1 Nephi 4:5-19, 34.

²¹Abraham 2:6-11.

It is strange that the one thing which would have averted the need of "covering up" for the great patriarch of the House of Israel should have dropped out of later tradition and should appear only in modified form in Genesis Apocryphon. At any rate we do have here an instance of an account, given by revelation through Joseph Smith, being corroborated in a certain measure by one of the Dead Sea Scrolls. It would indicate that at the time of composition of Genesis Apocryphon, the story of God's intervention *before* Abraham entered Egypt had not yet altogether been lost from the tradition. The importance of establishing the concept that Abraham was acting under God's directive cannot be overstated. (1) It vindicates the patriarch of an action where his righteousness is seriously questioned. (2) It pictures the patriarch deeply grieved not at his own mistake (as many would have it) but at what has happened *despite* his following explicitly what God had commanded. We can now understand that (3) Abraham's sojourn in Egypt was a period of severe trial where he adhered strictly to what God had directed, and (4) that Abraham continued to trust in God even in times of serious adversity when it seemed as though the covenant would never be fulfilled. Hence, instead of viewing Abraham as jeopardizing the covenant, we rather see him relying on God when *God* seems to be effectively terminating the covenant. Or, to put it more bluntly, Abraham's trial when ordered to sacrifice Isaac was preceded by at least one other similar instance when, *because* he was doing what God had instructed him to do, his covenant seemed doomed to extinction while he was in Egypt. *Both* times he chose to honor and obey God. *Both* times he proved that his loyalty to God and his confidence in God's knowledge and power were stronger than any impulse to turn against God in time of crisis. By faith he retained the covenant, recovered Sarah, and returned with great wealth to his promised land. He had been tested, tried, and proven worthy of his blessings. His trial in Egypt prepared him for the time when God instructed him to sacrifice his son, and Abraham, it will be remembered, had nearly been sacrificed himself.²² One other aspect of the trial must not be overlooked. The

²²Abraham 1:5-20; cf. fac. 1; see also Hugh Nibley's discussion of human sacrifice and the pharaonic cult in the *Improvement Era*, Vol. 72 (Feb-Sept, 1969).

sojourn in Egypt was to prove *Sarah's* willingness to obey her husband in his righteous obedience, and she too showed herself faithful. Abraham's covenant was not for himself alone but in conjunction with Sarah. Hence both Abraham and Sarah were tested in Egypt.

ABRAHAM'S HEALING PHARAOH

Genesis Apocryphon recounts a healing by the laying on of hands, and we can substantiate from other sources that this was well within Abraham's right and power. Hence the healing scene may well be an authentic story antedating the introduction of the Mosaic Law. In Galatians 3:8 Paul affirms that the gospel was taught to Abraham,²³ and we know that Melchizedek ordained Abraham.²⁴ The order of the Priesthood Abraham held—sufficient for exaltation²⁵—includes the keys of such spiritual blessings as the healing of the sick.²⁶ So it was within Abraham's right to perform such a miracle—provided that he had already received the Priesthood prior to entering Egypt. The Book of Abraham intimates that he did, but when and from whom? What, then, did he receive from Melchizedek? Was it the keys of presidency (which seems to be the most important aspect of the birthright he transmitted) in a patriarchal order?

Dupont-Sommer observes that the Old Testament prophets imposed their hands for many purposes—but not for healing.²⁷ This is understandable since the O. T. is almost entirely the record of the House of Israel under the Law of Moses, that is, without the Melchizedek Priesthood.²⁸ Yet even so there was some knowledge of healing, for Josephus informs us that the Essenes healed the sick,²⁹ and in Jubilees x. 12-14,³⁰ angels teach Noah about medicines to combat sickness sent by evil spirits. Dupont-Sommer also cites the Prayer of Na-

²³Cf. Joseph Fielding Smith, ed., *Teachings of the Prophet Joseph Smith* [cited TPJS] (Salt Lake City: Deseret Book Co., 1959), p. 60.

²⁴D&C 84:14; TPJS, pp. 322-23; cf. Gen. 14:18-20.

²⁵D&C 132:29.

²⁶Jas. 5:13-15; D&C 42:43-44; cf. D&C 66:9; 84:68.

²⁷A. Dupont-Sommer, "Exorcismes et Guérisons dans les Ecrits de Qoum-rân," *Supplements to Vetus Testamentum*, 7, Congress volume, Oxford, 1959 (Leiden: E. J. Brill, 1960), p. 251 and n. 1.

²⁸TPJS, p. 181; D&C 84:19-27.

²⁹Jos. *Bell. lud.* Vol. 2, p. 136.

³⁰Vermes (p. 124) identifies Jubilees as an Essene recension.

bonid, fragments recovered from Qumran cave IV,³¹ as an example of exorcism and healing. His assertion is that the therapeutic stories are rather late—Essene—accretions to the legends. There are, to be sure, very definite affinities with New Testament miracles: (1) sickness is associated with and caused by sin; (2) healing includes exorcism of the evil spirit and therefore a forgiveness of sins preceding the healing; (3) prayer is often offered before the ordinance of the laying on of hands; (4) the healing is effected through the authoritative laying on of the hands.³²

These are precisely such similarities as we would expect to find in a full dispensation. And in the parallel story related in Gen. 20, Abraham is instrumental in healing Abimelech (Gen. 20:17-18). Certainly *this* account is not Essene. So there is an ancient tradition which appears in a different form in different sources intimating that Abraham did heal at least one person of royal station. Genesis Apocryphon may well be recording an early account of some historical event when it has Abraham tell how he healed Pharaoh. In light of our other evidence, we need not assume that Dupont-Sommer has correctly identified the origin of the story. Certainly an amplified version need not always be presumed to be more recent than the simple one, especially when dealing with historical material;³³ the Book of Mormon offers familiar evidence which confutes that assumption.

With our new collation of sources, we can reevaluate the evidence. For example, scholars have regularly condemned Josephus and Eupolemus for claiming that Abraham taught

³¹Dupont-Sommer, pp. 253 ff; cf. J. T. Milik, " 'Prière de Nabonide' et autres Ecrits d'un Cycle de Daniel. Fragments Araméens de Qumrân 4," *Revue Biblique*, Vol. 63 (1956), pp. 407-411.

³²Dupont-Sommer, pp. 252, 261; see also D. Flusser, "Healing through the Laying-on of Hands in a Dead Sea Scroll," *Israel Exploration Journal*, Vol. 7 (1957), pp. 107-108; W. H. Brownlee, *The Meaning of the Qumrân Scrolls for the Bible* (N. Y.: Oxford U. P., 1964), pp. 120-21; H. Nibley, "Qumran and 'The Companions of the Cave,'" *Revue de Qumran*, Vol. 5 (1965), pp. 195-96; Geza Vermes, "Essenes-Therapeutai-Qumran," *Durham University Journal*, n.s. Vol. 21 (1959-60), pp. 97-115; Geza Vermes, "The Etymology of 'Essenes,'" *Revue de Qumran*, Vol. 2 (1959-60), pp. 427-43; J.-P. Audet, "Qumrân et la Notice de Pline sur les Esséniens," *Revue Biblique*, Vol. 68 (1961), pp. 346-87; H. G. Schönfeld, "Zum Begriff 'Therapeutai' bei Philo von Alexandria," *Revue de Qumran*, Vol. 3 (1961-62), pp. 219-40; Geza Vermes, "Essenes and Therapeutai," *Revue de Qumran*, Vol. 3 (1961-62), pp. 495-504.

³³For instance, the account related in Gen. 18 appears "to belong to a longer and more personal story of Abraham" (James Barr, "Theophany and Anthropomorphism in the Old Testament," *Supp. to V. T.* [cited *supra*, n. 27], Vol. 7 (1959), p. 38.

the Egyptians astronomy.³⁴ Nevertheless the cosmology of the PGP indicates just such a possibility, particularly since Abraham interrupts the Egypt sojourn account to relate how, through the Urim and Thummin (Abraham 3:1) and the "records of the fathers" (Abraham 1:31), he learned of the universe and the creation. We may assume that after concluding the creation account and possibly a brief sketch of the earlier dispensations he continued his personal history. One other thing is relevant: Facsimile No. 3 notes that Abraham is sitting on Pharaoh's throne with the consent of Pharaoh teaching the Egyptians astronomy!³⁵

But the fact that he is represented as sitting on the throne is indeed strange, for that was the prerogative only of Pharaoh. In the May 1956 *Improvement Era*, Hugh Nibley applied to Facsimile No. 3 Helck's study of Egyptian royal succession, a process of adoption.³⁶ Some of the striking features are (1) the Pharaoh and his son are represented as women, since (2) coronation scenes always include two women (goddesses) to effect the transmission of authority; (3) the scene takes place in Egypt, (4) on Pharaoh's throne; (5) Abraham is wearing the sacred Atef crown and (6) holding the "Heqat-scepter . . . 'the Scepter of justice and judgement.'"³⁷

Was Pharaoh trying to make some sort of agreement with Abraham to share the rule of Egypt with him if he would share the Priesthood? Does the coronation scene help explain the extensive presents and great wealth which Abraham received from Pharaoh? Also, what is the significance of Pharaoh bestowing *purple* (regal) clothing to Sarah? Is this, too, relevant? We must remember, Cyrus H. Gordon informs us,³⁸ that Abraham was a *basileus*, or king, of the Homeric type, and that he was quite at ease in the company of kings. And so, when he left Egypt, Pharaoh provided a royal escort.

³⁴Jos. *Ant. Lud.* Vol. 1, p. 167; Eupolemus is paraphrased by Alexander Polyhistor whom Eusebius quotes (Euseb. *Praep. Ev.* Vol. 9, 17 [PG, p. 21, 708C-709A]).

³⁵*Times and Seasons*, Vol. 3, No. 14 (Whole Number 50; May 16, 1842), pp. 783-84.

³⁶W. Helck, "R'p't auf dem thron des Gb," *Orientalia*, n.s. Vol. 19 (1950), pp. 416-34.

³⁷Hugh Nibley, "There Were Jaredites," *Improvement Era*, Vol. 59 (1956), p. 310.

³⁸Cyrus H. Gordon, "Abraham of Ur," *Hebrew and Semitic Studies*. . . [cited *supra*, n. 14]. esp. pp. 78, 82.

THE WIFE-SISTER MOTIF

E. A. Speiser³⁹ concludes that the wife-sister motif is very ancient and, in fact, remounts to the Patriarchal Age. It is therefore relevant to consider extra-biblical evidence, and in so doing, Gordon notes a striking parallel in the three Genesis accounts of the "disposable-wife" (Gen. 12:10-20; 20:1-18; 26:6-11), Helen-Menelaus-Paris, and the Kret epic. Incidentally, on the basis of literary criticism, the PGP presents elements of the Abraham story even more explicitly and accurately than Genesis in the Patriarchal Narratives, elements which Gordon dates to the thirteenth or fourteenth century B. C.⁴⁰

Speiser has written concerning a special legal adoption process among the Hurrians whereby one's wife "could have simultaneously the status of sister."⁴¹ After examining the evidence of the cuneiform sources, Speiser applies the custom to our biblical narrative and concludes that "Sarah was Terah's daughter by adoption, which is why the relationship was not duly recorded in Genesis 11. At all events, Sarah had adequate credentials to qualify, in one way or another, as Abraham's sister in the broader sense of the term."⁴² Yet all this is but a weak apology, a dodge. The ambiguity of the dual usage of "sister" was used to disguise the situation to Pharaoh, for he was duped as Abraham and Sarah and the Lord knew he would be.

There are many other things which need to be considered, and those who want to dispose of the Book of Abraham are doing justice neither to themselves nor the ancient evidence. Abraham's account is essentially a dialogue on priesthood—authority from God—vs. authority through Nimrod. The disappearance of this history caused later compilers to confuse and change the story to such a point that it no longer portrays

³⁹E. A. Speiser, "The Wife-Sister Motif in the Patriarchal Narratives," *Biblical and Other Studies*, ed. A. Altmann (Cambridge: Harvard U. P., 1963), pp. 15-28.

⁴⁰Cyrus H. Gordon, *The Common Background of Greek and Hebrew Civilizations* (N. Y.: W. W. Norton, 1965), pp. 131-55, 228, n. 1; cf. T. B. L. Webster, *From Mycenae to Homer* (N. Y.: W. W. Norton, 1964), pp. 64-90, with other references at n. 2, p. 64. See also Cyrus H. Gordon, "The Patriarchal Age," *Journal of Bible and Religion*, Vol. 21 (1953), pp. 238-43; Cyrus H. Gordon, "The Patriarchal Narratives," *J.N.E.S.*, Vol. 13 (1954), pp. 56-59; cf. Leonard Wolley, *Abraham: Recent Discoveries and Hebrew Origins* (N. Y.: Charles Scribner's Sons, 1936).

⁴¹Speiser, p. 17.

⁴²*Ibid.*, p. 26; cf. Abraham 2:2; Genesis 20:12.

clearly the extent of God's approval and direction of Abraham's life; witness the difference between Sarah giving Hagar to Abraham (Gen. 16:1-3) and the Lord commanding it:

God commanded Abraham, and Sarah gave Hagar to Abraham to wife. And why did she do it? Because this was the law; and from Hagar sprang many people. This, therefore, was fulfilling, among other things, the promises.

Was Abraham, therefore, under condemnation? Verily I say unto you Nay; for I, the Lord, commanded it.

(D. & C. 132:34-35)

CONCLUSION

In summary, we find that by collating our ancient sources, the evidence leads us to several conclusions:

(1) The story told in the Pearl of Great Price appears to be much older than the others.

(2) There is strong literary evidence that the 'disposable wife' motif was well-known in the second millenium B. C.

(3) Genesis Apocryphon seems to present a simplified form of the PGP account to which other, probably later, embellishments were added.

(4) One of the early elements of the Abraham tradition was God's intervention to instruct Abraham to disguise being Sarah's husband.

Other elements we may well suspect to be early are (5) the healing of Pharaoh and (6) the subsequent coronation of Abraham.

(7) Also, one other very common idea is consequently brought into question: the evolutionary development of morality in the biblical world.

There are indeed, many aspects of the life of Abraham which cry for clarification, and it seems a shame that there are so few LDS scholars willing to examine intelligently the myriad of problems. However slothful *we* may be in the study of the ancient world, Joseph Smith did not hesitate to bring forth new evidence about antiquity, evidence which remains new and virtually untouched after so many years. We are amazed both at Joseph Smith's lack of trepidation and at his accuracy in giving us long-lost information about that great Patriarch, Abraham.

Five Accounts of Abraham

Book of Abraham Chapter 2:21-25	Genesis Chapter 12:9-20, 13:1-2	Book of Jubilees Chapter 13:10-11, 13-15	A Genesis Apocryphon Column XIX, 9-27 Column XX, 2-34	The Book of Jasher Chapter XV, 1-33
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Abraham Journeys South

21. And I, Abraham, journeyed, going on still towards the south;

9. And Abram journeyed going on still toward the south.

I went away . . . and I travelled towards the south . . . until I came to Hebron (at the time) of the building of Hebron. And I dwelt [there two] years.

Famine

and there was a continuation of a famine in the land;

10. . . . and there was a famine in all this land

10. And there was a famine in the land:

1. And in that year there was a heavy famine throughout the land of Canaan, and the inhabitants of the land could not remain on account of the famine for it was very grievous

Abraham Decides to Go South

and I, Abraham, concluded to go down into Egypt, to sojourn there, for the famine became very grievous.

and Abram went down into Egypt to sojourn there; for the famine was grievous in the land.

and hearing [there was] prosperity in Egypt I went . . . to the land of Egypt . . . I [came] to the river Karmona which is one of the branches of the River . . . now we . . . our land. [I crossed] the seven branches of the river which . . . Now we travelled across our land and entered into the land of the sons of Ham, into the land of Egypt.

2. And Abram and all belonging to him rose and went down to Egypt on account of the famine, and when they were at the brook Mitzraim they remained there some time to rest from *the fatigue* of the road.

The Lord Warns Abraham

22. And it came to pass when I was come near to enter into Egypt, the Lord said unto me: Behold, Sarai, thy wife, is a very fair woman to look upon:

23. Therefore it shall come to pass, when the Egyptians shall see her, they will say—She is his wife; and they will kill you, but they will save her alive; therefore see that ye do on this wise:

24. Let her say unto the Egyptians, she is thy sister, and thy soul shall live.

During the night of our entry into Egypt I, Abram, dreamt a dream. And behold, I saw in my dream a cedar and a palm tree . . . men came and sought to cut down the cedar, and to pull up its roots, and to leave the palm tree (standing) alone. The palm tree cried out saying: Do not cut down this cedar tree, for cursed be the man [who shall pull up its roots.] And the cedar was spared because of the palm tree, and was not [cut down.]

25. And it came to pass that I, Abraham told Sarai, my wife, all that the Lord has said unto me—Therefore say unto them, I pray thee, thou art my sister, that it may be well with me for thy sake, and my soul shall live because of thee.

11. And it came to pass when he was come near to enter into Egypt, that he said unto Sarai his wife, Behold now, I know that thou art a fair woman to look upon:

12. Therefore it shall come to pass, when the Egyptians shall see thee, that they shall say, This is his wife: and they will kill me, but they will save thee alive.

I woke from my dream during the night and said to Sarai my wife: I have dreamt a dream . . . [I am] afraid [because of] this dream. She said to me: Tell me your dream and I shall know. So I began to tell her this dream . . . that they will seek to kill me and will spare you. On that day all prosperity . . . in all things . . . Say to them concerning me, "He is my brother", and I shall live because of you, and my soul shall be saved because of you . . . of me and to kill me. Sarai wept that night because of my words.

Abraham Warns Sarai and Others in Company

3. And Abram and Sarai were walking at the border of the brook Mitzarim, and Abram beheld his wife Sarai that she was very beautiful.

4. And Abram said to his wife Sarai, Since God has created thee with such a beautiful countenance, I am afraid of the Egyptians lest they should slay me and take thee away, for the fear of God is not in these places.

5. Surely then thou shalt do this, Say thou art my sister to all that may ask thee, in order that I may be well with me, and that we may

live and not be put to death.
 6. And Abram commanded *the same* to all those that came with him to Egypt on account of the famine; also his nephew Lot he commanded, saying, If the Egyptians ask thee concerning Sarai say she is the sister of Abram.
 7. And yet with all these orders Abram did not put confidence in them but he took Sarai and placed her in a chest and concealed it amongst their vessels, for Abram was greatly concerned about Sarai on account of the wickedness of the Egyptians.

8. And Abram and all belonging to him rose up from the brook of Mizraim and came to Egypt; and they had *scarcely* entered the gates of the city when the guards stood up to them saying, Give tithe to the king from what you have, and then you may come into the town; and Abram and those that were with him did so.
 9. And Abram with the people that were with him came to Egypt, and when they came they brought the chest in which Sarai was concealed and the Egyptians saw the chest
 10. And the king's servants approached Abram, saying, what hast

13. Say, I pray thee, thou art my sister: that it may be well with me for thy sake; and my soul shall live because of thee.

They Enter Egypt

14. And it came to pass, that, when Abram was come into Egypt,
 11. And Abram went into Egypt in the third year of the week,
 [Then we journeyed onward, I and] Sarai, towards Zoan. . . . in her soul that no man would see her . . .

thou here in this chest which we have not seen? Now open thou the chest and give tithe to the king of all that it contains.

11. And Abram said, this chest I will not open, but all you demand upon it I will give. And Pharaoh's officers answered Abram, saying, It is a chest of precious stones, give us the tenth *thereof*.

12. Abram said, all that you desire I will give, but you must not open the chest.

Egyptians Discover Sarai's Beauty

the Egyptians beheld the woman that she was very fair.

After these five years . . . three men, princes of Egypt . . . Pharaoh of Zoan concerning [me] and concerning my wife, and they gave . . . goodness, wisdom, and truth. And I cried out before them . . . my words . . . in the famine which . . . not . . . and they came to the place as far as . . . to her . . . my words . . . much food and drink . . . wine.

13. And the king's officers pressed Abram, and they reached the chest and opened it with force, and they saw and beheld a beautiful woman was in the chest.

14. And when the officers of the king beheld Sarai they were struck with admiration at her beauty, and all the princes and servants of Pharaoh assembled to see Sarai, for she was very beautiful.

Servants Tell Pharaoh of Sarai

15. The princes also of Pharaoh saw her, and commanded her before Pharaoh:

. . . how . . . and beautiful is her face! How . . . fine are the hairs of her head! How lovely are her eyes! How desirable her nose and all the brilliance of her countenance . . . How fair are her breasts and

And the king's officers ran and told Pharaoh all that they had seen and they praised Sarai to the king;

how beautiful all her whiteness!
 How pleasing are her arms and how
 perfect her hands, and how desirable
 all the appearance of her hands!
 How long and slender are their
 fingers! How comely are her feet,
 how perfect are her thighs! Neither
 the virgin, nor the bride led into
 the marriage chamber, is more beau-
 tiful than she. She is fairer than all
 other women. Truly, her beauty is
 greater than theirs. Yet with all this
 grace she possesses also abundant
 wisdom so that whatever is in her
 hands is perfect.

Pharaoh Takes Sarai

and the woman was taken
 into Pharaoh's house.

And he dwelt in Egypt
 five years before his
 wife was taken away
 from him.

When the king heard the words of
 Harkenosh and of his two compan-
 ions, for all three spoke as with one
 mouth, he desired her greatly, and
 he sent out at once that she be
 taken. Seeing her, he was amazed
 by all her beauty, and he took her
 to be his wife and sought to kill
 me. Sarai said to the king, "He is
 my brother", that I might be spared
 because of her. And I, Abram, was
 spared because of her and I was
 not slain.

Abraham Prays to the Lord

And I, Abram, wept aloud that
 night, I and my nephew Lot, be-

and Pharaoh ordered her to be
 brought, and the woman came before
 the king.

15. And Pharaoh beheld Sarai and
 she pleased him exceedingly, and he
 was struck with her beauty, and the
 king rejoiced greatly on her account
 and made presents to those who
 brought him the tidings concerning
 her.

16. And the woman was then
 brought to Pharaoh's house,

and Abram grieved to the Lord to de-
 liver her from the hands of Pharaoh.

cause Sarai had been taken from me by force. I prayed that night. I begged and implored and I said in my sorrow, while my tears ran down: Blessed art Thou, O God Most High, Master of all the worlds. Thou art Lord and King of all things and Thou rulest over all the kings of the earth and Thou judgest them all. I cry now before Thee my Lord, against Pharaoh of Zoan the king of Egypt, because of my wife who is taken from me by force. Judge him for me, and I shall see Thy mighty hand lifted against him and against all his household, that he may not defile my wife this night (separating her) from me. And they shall know Thee, my Lord, that Thou art the Lord of all the kings of the earth. I wept and was sorrowful.

Sarai Prays

17. And Sarai also prayed at that time and said, O Lord God thou didst tell my Lord Abram to go from his land and from his father's house to the land of Canaan, and thou didst promise to do well with him if he would perform thy commands; now behold we have done that which thou didst command us and we left our land and our families, and we went to a strange land and

to a people whom we have not known before.

18. And we came to this land to avoid the famine, and this evil accident has befallen me; now therefore, O Lord God, deliver us and save us from the hand of this oppressor, and do well with me for the sake of thy mercy.

The Lord Protects Sarai

19. And the Lord hearkened to the voice of Sarai and the Lord sent an angel to deliver Sarai from the power of Pharaoh.

20. And the king came and sat before Sarai and beheld an Angel of the Lord was standing over them, and he appeared to Sarai and said to her, Do not fear for the Lord has heard thy prayer.

21. And the king approached Sarai and said to her what is that man to thee who brought thee hither? And she said, "He is my brother."

Abraham Receives Gifts from Pharaoh

16. And he entreated Abraham well for her sake: and he had sheep, and oxen, and he asses, and maid men servants, and maid servants, and she asses, and camels.

22. And the king said, It is *incumbent* upon us to make him great, to elevate him and to do unto him all the good which thou shalt command us; and at that time the king sent to Abram silver and gold and precious stones in abundance together

with cattle, men servants and maid servants; and the king ordered Abram to be brought and he sat in the court of the king's house and the king greatly exalted Abram on that night.

Plagues

17. And the Lord plagued Pharaoh and his house with great plagues because of Sarai Abram's wife.

13. And it came to pass when Pharaoh seized Sarai the wife of Abram, that the Lord plagued Pharaoh and his house with great plagues because of Sarai, Abram's wife.

And on that night the Most High God sent a spirit of affliction, an evil spirit, to afflict both him and his house. He was afflicted and all his household, and he could not approach her and he knew her not. He was with her for two years, and at the end of those two years the plagues and afflictions became greater and more grievous upon him and all his household. Therefore he sent for all the sages of Egypt, all the magicians, and all the healers of Egypt, that they might cure him and all his household of this plague. But not one single healer nor magician nor sage could come to cure him, for the afflicting spirit had afflicted them also, and they fled.

23. And the king approached to speak to Sarai, and he reached out his hand to touch her, when the angel smote him heavily, and he was terrified and he refrained from reaching to her.

24. And when the king came near to Sarai, the angel smote him to the ground, and acted thus to him the whole night, and the king was terrified.

25. And the angel on that night smote heavily all the servants of the king and his whole household, on account of Sarai, and there was a great lamentation that night amongst the people of Pharaoh's house.

Pharaoh Discovers that Sarai Is Abraham's Wife

26. And Pharaoh, seeing the evil that befell him, said, Surely on account of this woman has this thing happened to me and he removed

himself at some distance from her and spoke pleasing words to her.

27. And the king said to Sarai, Tell me I pray thee concerning the man with whom thou camest here; and Sarai said, This man is my husband and I said to thee that he was my brother for I was afraid, lest thou shouldst put him to death through wickedness.

28. And the king kept away from Sarai and the plagues of the angel of the Lord ceased from him and his household; and Pharaoh knew that he was smitten on account of Sarai and the king was greatly astonished at this.

Pharaoh Summons Abraham

18. And Pharaoh called Abram, and said, What is this that thou hast done unto me? Why didst thou not tell me that she was thy wife?

19. Why saidst thou, She is my sister? so I might have taken her to me to wife:

Then came Harkenosh to me, beseeching me to go to pray for the king and to lay my hands upon him that he might live, for [the king had dreamt] a dream. Lot said to him: Abram my uncle cannot pray for the king while Sarai his wife is with him. Go therefore, and tell the king to send back to her husband the woman who is his wife. Then he will pray for him and he will live. When Harkenosh heard the words of Lot, he went to the king and said: All these plagues and afflictions with which my lord the king is smitten and afflicted are be-

29. And in the morning the king called for Abram and said *to him* What is this thou has done to me? Why didst thou say, She is my sister, *owing to which* I took her unto me for a wife, and this heavy plague has *therefore* come upon me and my household.

cause of Sarai the wife of Abram. Let Sarai be restored to Abram her husband, and this scourge and the spirit of festering shall depart from you. He called me and said to me: What have you done to me with regard to Sarai? You told me "She is my sister", whereas she is your wife. And I took her to be my wife.

Pharaoh Gives Back Sarai

now therefore behold thy wife, take her, and go thy way.

Behold your wife who is with me. Depart, and go hence from all the land of Egypt.

30. Now therefore here is thy wife, take her and go from our land lest we all die on her account.

Abraham Heals Pharaoh

And now pray for me and my household that this evil spirit may depart from me. I prayed for him, and I laid my hand upon his head, and the plague went from him, and the evil spirit departed from him, and he lived.

Pharaoh Bestows Gifts

14. And Abram was very glorious by reason of possessions in sheep and cattle, and asses and horses and camels and men servants, and maid servants, and in
The king rose up to tell me . . . and the king swore to me an oath that . . . and the king gave to her much [silver and gold], and much raiment of fine linen and purple . . . before her, and Hagar also . . . and he appointed men to lead me

And Pharaoh took more-cattle, men servants and maid servants and silver and gold, to give to Abram and he returned unto him Sarai his wife.
31. And the king took a maiden who he begat by his concubines,

silver and gold exceedingly. And Lot also his brother's son, was wealthy.

15. And Pharaoh gave back Sarai, the wife of Abram

out of [all the land of Egypt.]

and he gave her to Sarai for a handmaid.

32. And the king said to his daughter, It is better for thee my daughter to be a handmaid in this man's house than to be a mistress in my house, after we have beheld the evil that befell us on account of this woman.

Pharaoh Has Abraham and Sarai Escorted to the Border

20. And Pharaoh commanded his men concerning him: and they sent him away, and his wife, and all that he had.

1. And Abram went up out of Egypt, he, and his wife, and all that he had, and Lot with him, into the south.

2. And Abram *was* very rich in cattle, in silver, and in gold.

and he sent him out of the land of Egypt. . . .
And I, Abram, went away with great flocks and with silver and gold, and I went out of Egypt together with my nephew Lot. Lot also had great flocks, and he took a wife to himself from [among the daughters of Egypt.]

33. And Abram arose, and he and all belonging to him went away from Egypt; and Pharaoh ordered some of his men to accompany him and all that went with him.

Reality

Naomi-Ruth*

Some will look
At the crudeness of life
And say—this is reality.

Some will look
At the refinement of life
And say—this is reality.

The uniquely, beautiful crude
And the almost common,
Untextured refinement —

Nothing is life but life itself—
This is reality.

*Naomi-Ruth Peterson lives and writes in Provo.

PROVO TEMPLE SITE, 1968

An Oil Painting

by

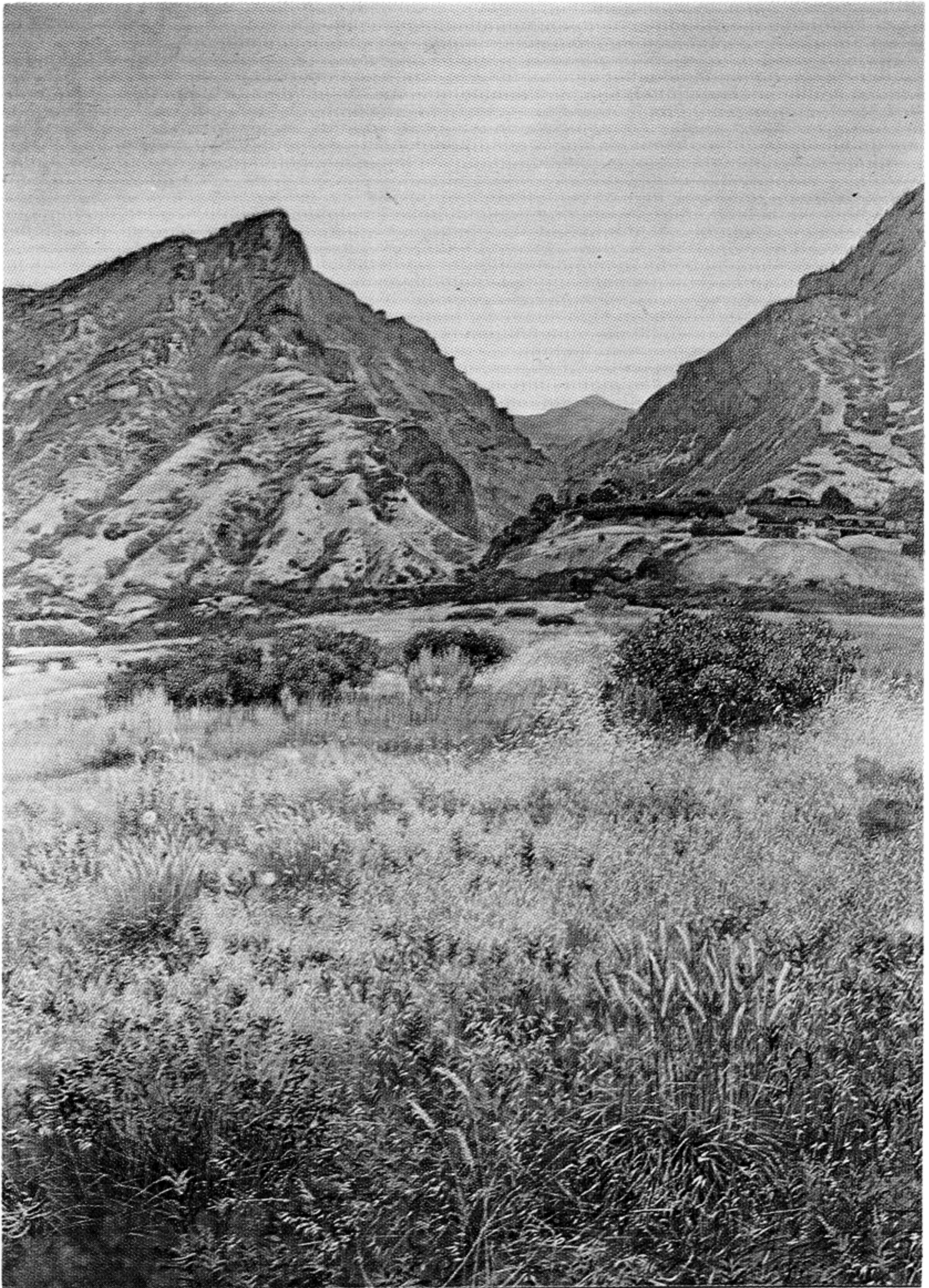
Dale T. Fletcher

A NOTE ON "PROVO TEMPLE SITE, 1968"

Dale T. Fletcher*

PROVO TEMPLE SITE, 1968 because they kept asking me for an example of Mormon art. I waited for a day and a half out there, looking for the temple through an empty picture frame without ever touching my large white canvas. Silly, sitting among sego lilies, waiting for angels to come and pose. Faithless and impatient, I gave up and tried to paint what I saw and failed—light descending from heaven, cleaving the mountain, hallowing, redeeming grass, baptizing unto newness of leaf, working atonement, eternal marriage, achieving godhood, with all the winged beings hymning in the wild wheat.

*Mr. Fletcher is an instructor of art at Brigham Young University.



Metallic Documents of Antiquity

H. CURTIS WRIGHT*

While preparing the general exams for the Ph.D. at Case Western Reserve University I noticed recurring references to metallic documents in the literature that pertains, in one way or another, to ancient records and libraries. Most of the references were obscure and casual—like the merest mention of “various metals” in a discussion of ancient book materials,¹ or a sourceless seriation including “The Nicean creed[!], Chinese books with leaves of gold,” and the “Telugu plate” as exemplars of writing on metal.² Such references, while interesting enough in their own right, invariably pose a number of unanswered questions, especially if the reader is interested in the sensory data of written communications: Which metals have been used for the reception of writing in antiquity? What is the Telugu plate? How can descriptions of the metallic media of the Nicene Creed and specific gold-leaf manuscripts of Chinese books be located?

References to metallic documents are also found in ancient classical literature. Plutarch, for example, mentions a Lycian spring on the outskirts of the city of Xanthus which on one occasion boiled up of its own accord and overflowed in the presence of Alexander the Great, depositing a bronze writing tablet [*delton chalken*] at his feet. The tablet was inscribed with ancient writings indicating that the kingdom of the

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¹Bruce M. Metzger, *The text of the New Testament; its transmission, corruption, and restoration* (2d ed.; New York: Oxford University Press, 1968), p. 3. There is, typically, no further mention of the subject in the entire book.

²F. Thelma Eaton, *The history of the book; an outline and a reading list . . .* (4th ed.; Champaign, Ill.: The Illini Bookstore, 1959), p. 12.

Persians would be overthrown by the Greeks. Alexander, therefore, encouraged by the metallic document, proceeded forthwith to reduce the coastal areas instead of then and there waging an all out war with Darius.³ There are similar notices elsewhere in Plutarch and in Pausanias,⁴ and they doubtless occur in other ancient authors.

Descriptions of metallic documents are relatively easy to locate if they are properly referenced in citations. An example of such referencing is the use by Friedrich Blass of the oldest Greek letter extant in order to illustrate certain linguistic phenomena in a discussion of the so-called epistolary aorist tense.⁵ The letter is identified as a leaden tablet from the 4th century B.C., and appropriate references are provided. Blass, of course, is more interested in the linguistic information provided by the document than in its material. His only concern is "der Aorist im Briefstil"—the fact that the aorist is inscribed in lead is unimportant. But his references nevertheless lead to important discussions of the tablet, including translations and photographic plates.⁶

Most published accounts of metallic documents, at least in classical sources, have been effectively removed from the layman's view by a simple convention of scholarship. The implications of this convention first came to my attention upon perusing a basic paleographical treatment of ancient writing materials.

Of the various materials which have been used . . . to receive writing, there are three, viz. papyrus, vellum and paper, which . . . have . . . displaced all others. But of the other materials several, including some which at first sight seem of a most unpromising character, have been largely used. If the ordinary material fail, they [the ancients] must extemporize a substitute. If something more durable is wanted, metal or stone may take the place of vellum or paper.

³Plutarch, *Life of Alexander* 17. 4-5.

⁴*De genio Socratis* 577E-F; Pausanias, *Descriptio Graecae* 4. 26, 6-8.

⁵Friedrich Blass, *Grammatik des neutestamentlichen Griechisch*, bearbeitet von Albert Debrunner (11. Aufl.; Göttingen: Vandenhoeck u. Ruprecht, 1961), 206.

⁶Adolf Deissmann, *Licht vom Osten; Das Neue Testament und die neuentdeckten Texte der hellenistisch-nömischen Welt* (2. u. 3. verb. u. verm. Aufl.; Tübingen: J. C. B. Mohr [Paul Siebeck], 1909), pp. 103-104; also the English translation, *Light from the Ancient East . . .* (New York: George H. Doran, 1927), pp. 150-52. For discussion see S. Witkowski, *Epistulae privatae Graecae quae in papyris aetatis Lagidarum servantur* (Editio altera auctior; Lipsiae: 1911), appendix no. 1, and A. Wilhelm, "Der älteste griechische Brief," *Jahreshefte des Oesterr. Archaeol. Institut* 7 (1904), 94-105.

But with *inscriptions on these harder materials* we have, in the present work, but little to do. *Such inscriptions generally fall under the head of epigraphy.* Here we have chiefly to consider the *softer materials* on which *handwriting, as distinct from monumental engraving,* has been wont to be inscribed. Still . . . there are certain exceptions; and to some extent we shall have to inquire into the employment of metals, clay, potsherds, and wood, as well as of leaves, bark, linen, wax, papyrus, vellum, and paper as materials for writing.⁷

It had never really occurred to me, prior to reading the above, that scholarly distinctions between documents/monuments,⁸ palaeography/papyrology/epigraphy,⁹ etc., tend to relegate the study of specific aspects of writing to specific categories within the highly fragmented study of writing.¹⁰ Once the bibliographical implications of such conventions are understood, however, the investigation of this or that phase of writing is greatly simplified. For the student of metallic documents this means that all sorts of inscriptions on metal are conventionally regarded by classicists as archaeological monuments, and that scholars therefore tend to describe them in epigraphical, rather than palaeographical or papyrological, publications. Thus an inscribed piece of metal may have much more in common with a sheet of paper than, say, with the Athenian tribute lists; but both are treated as epigraphs solely because each of them is hard.

The bibliography accompanying this paper attempts to assemble some of the scholarly materials which deal with the metallic documents of antiquity. Beginning with a know-

⁷Edward Maunde Thompson, *An introduction to Greek and Latin palaeography* (Oxford: Clarendon, 1912), p. 8. Italics ours. *Ibid.*, pp. 8-43, for the entire discussion of ancient writing materials and implements.

⁸Discussed by John Howland Rowe, "Archaeology as a career," *Archaeology* 14 (1961), 45-55.

⁹For the distinctions between palaeography, papyrology and epigraphy, with copious bibliographical coverage of ancient Greek and Latin writing in general, see Martin R. P. McGuire, *Introduction to classical scholarship; a syllabus and bibliographical guide* (Washington, D.C.: Catholic University of America Press, 1961), pp. 86-107. "Papyrology is confined by convention to the investigation of Greek and Latin writing on papyrus. . . . It should be noted that handbooks of Greek paleography give a large amount of space to papyrology, since the great majority of the earliest extant Greek documents written on perishable materials are papyri. . . . The formal separation of paleography and papyrology from epigraphy, however, has been mutually disadvantageous to these three disciplines," *ibid.*, p. 96.

¹⁰On the fragmented study of writing see our *Metagraphy and graphic priority; a discursus for catalogers* (unpublished Ph.D. dissertation, Case Western Reserve University, 1969), pp. 30-32.

ledge of the golden laminae of Pyrgi,¹¹ the copper scroll from Qumran, and a nucleus of sources from the writings of Hugh Nibley,¹² I began searching the epigraphical publications of classical literature. The result is a preliminary list which shows less success in Near and Far Eastern studies than in Classics, but nevertheless attempts to document the existence of at least one exemplar from most geographical areas of major importance in antiquity.

HOW MANY ANCIENT METALLIC DOCUMENTS

Probably no one knows precisely how many ancient metallic documents exist today, but Nibley's estimate of one hundred examples is certainly low, since the number of Roman military diplomas alone had already exceeded that figure in 1924.¹³ The metallic document appears very early in the history of writing and may be found even after the invention of printing. Lead, for example, has been used for writing in late medieval and early modern times, as "leaden plates inscribed with historical and diplomatic records . . . are still in existence, which belong to the fourteenth and fifteenth centuries."¹⁴ It is known also that large collections of metal documents have existed in antiquity, and that they were frequently reserved for writings of considerable importance.

The use of bronze by the Greeks and Romans, as a material upon which to engrave votive inscriptions, laws, treaties, and other official documents, is established by various authorities. The famous "Laws of the Twelve Tables" were engraved upon bronze, and were suspended outside the Capitol at Rome. They most probably perished in the fire

¹¹The Pyrgi plates were a lively topic of conversation among classicists when I became Classics Librarian at the University of Cincinnati in 1965, as one of the professors had recently seen them on display at the Villa Giulia in Italy.

¹²See especially his *Lehi in the desert and the world of the Jaredites* (Salt Lake City: Bookcraft, 1952); and *Since Cumorah . . .* (Salt Lake City: Deseret Book Co., 1967).

¹³Nibley, *Since Cumorah*, p. 251. "These tablets, of which only a few over a hundred examples are known, record the grant of Roman citizenship and the right of legal marriage (*connubium*) to discharged veterans of foreign birth," Helen McClees, "Inscriptions in the classical collection," *Bulletin of the Metropolitan Museum of Art* 19 (1924), 167. An earthenware vessel containing more than 400 small leaden plates was also discovered near Styra of Boeotia in 1860, E. S. Roberts, *An introduction to Greek epigraphy. Part I: the archaic inscriptions and the Greek alphabet* (Cambridge: University Press, 1887), p. 197.

¹⁴Henry Guppy, "Human records: a survey of their history from the beginning," *Bulletin of the John Rylands Library* 27 (1942-43), 197. The plates are connected with Venice and Bologna.

which took place in the reign of the Emperor Vespasian, consuming the Capitol and destroying three thousand tablets of bronze or brass containing the laws, treaties, and other important documents of the Roman Empire.¹⁵

How much information has been preserved on ancient metallic epigraphs? It is too early to attempt definitive answers to this question, as we know of no ancient treatises on metallic epigraphy, and modern treatments of the subject are widely scattered, highly specialized, and often difficult to obtain. My own studies have thus far been more search than research, followed by immense frustration over the impossibility of consulting many of the pertinent documents once their existence is known.¹⁶ Some preliminary observations on the contents of metallic documents can be made, however, although the materials in the following bibliography must await the careful collation and evaluation of competent scholars in many fields.

Most of the epigraphs listed bear relatively short inscriptions,¹⁷ although there is some evidence to suggest that the ancients also prepared lengthy metallic texts of which the Qumran copper scroll is a good example.¹⁸ Pausanias also claims to have seen in Boeotia a leaden book [*molubdon*] inscribed with Hesiod's *Works and days*, a literary opus of some thirty Oxford pages.¹⁹ The seven bronze tablets discovered

¹⁵*Ibid.*

¹⁶The study of metallic epigraphy as a subject is further complicated by bibliographical problems arising from the archaeological nature of the evidence, since specialization in archaeology "is necessarily by [geographical] area, as in the humanities, rather than by subject matter, as in the natural sciences," Rowe, "Archaeology as a career," 55. Cf. Sterling Dow, "Archaeological indexes; a review article," *American Journal of Archaeology* 54 (1950), 41-57.

¹⁷Cf. the two brief lines of a golden plate discovered in southern Italy in 1951, Silvio Ferri, "San Vito di Luzzi (Cosenza). Frammenti di laminetta auree inscrite," *Notizie degli Scavi di Antichità*, Ser. 8^a, 11 (1957), fig. 1, p. 181; the three lines of Greek and two of Egyptian on a gold foundation plate, Marcus N. Tod, "A bilingual dedication from Alexandria," *Journal of Egyptian Archaeology* 28 (1942), plate VI facing p. 56; and the golden trilingual plate of Darius with twenty-five lines, Gilbert Highet, "The wondrous survival of records," *Horizon*, vol. 5, no. 2 (Nov. 1962), 79.

¹⁸See John Marco Allegro, *The treasure of the copper scroll . . .* (Garden City, N.Y.: Doubleday, 1960), passim, and Matthew Black, *The scrolls and Christian origins* (New York: C. Scribner's Sons, 1961), pp. 3-12, and consult the bibliography for additional sources.

¹⁹Pausanias 9. 31, 4: "kai moi molubdon edeiknusan, entha he pege, ta polla hupo tou chronou lelumasmēnon eggegraptai de auto ta Erga." This passage is often discussed, e.g., by Guppy, "Human records," 196, L. H. Jeffery, *The local scripts of archaic Greece* (Oxford: Clarendon Press, 1961), p. 56, etc. "Lead was used in scroll form in the late Hittite empire, and this usage may possibly have spread to the Greeks. . . ," *ibid.* "For another example of books

in 1444 at Gubbio, Italy, the ancient Iguvium, seem to be larger than usual, ranging from 12x16 inches to 22x33 inches, and contain "the only extant records of any considerable extent in the Umbrian dialect; that is, in that language which, with Oscan, Latin, and several other dialects, makes up the Italic branch of the Indo-European family."²⁰ All of the tablets except III and IV are inscribed on both sides, and collectively contain more than 4,000 words, 54 long lines of which appear on the recto of tablet VII alone.²¹ These tablets deserve and receive close philological treatment in a full-blown scholarly monograph of 341 pages. Pausanias also informs us that the Thirty Years' Peace which terminated the so-called First Peloponnesian War was inscribed on a bronze monument [*stèle chalke*] and displayed at Elis.

In front of the image of Zeus there is a bronze stele containing the terms of a thirty years' peace between Lacedaemon and Athens. The Athenians made this treaty after they had subjugated Euboea for the second time. . . . The treaty specifically states that the Argives were not officially acknowledged as a party to the peace between Athens and Sparta, but that Athens and Argos might, if they desired, befriend one another in private. Such were the stipulations of the treaty.²²

A similar treaty on metal is known from ancient Anatolia.

It is worth recalling . . . , in this connection, that the contemporary Hittites of Asia Minor . . . had a certain predilection for inscriptions on metal. Not only are their inscribed signets often composed of bronze or precious metals, but the same usage was also applied to larger documents.

written on sheets of metal, see [Pausanias] 4. 26. 8. A good many inscribed rolls of lead have been found in tombs in Cyprus; but for the most part they contain either monetary accounts or else curses levelled at some enemy. See J. H. Middleton, *Illuminated manuscripts in classical and mediaeval times*, p. 2 sq., J. G. Frazer, *Pausanias' description of Greece, translated with a Commentary* (New York: Biblo and Tannen, 1965), 5:158.

²⁰James Whitney Poultney, *The bronze tablets of Iguvium* ("Philological monographs published by the American Philological Association," no. 18; n.p.: The American Philological Association, 1959), p. 1.

²¹*Ibid.*, p. 1 and plate VIIa following p. 333.

²²Pausanias 5. 23, 4. References to a bronze writing tablet [*pinakion chalkoun*] occur in at least two other contexts in Pausanias 5. 20, 7 and 5. 24, 11. Many accounts of the Thirty Years' Peace may be perused without the slightest hint that the treaty was ever inscribed on metal. The ancient accounts in Thucydides 1. 115 and Diodorus 12. 7 do not mention bronze at all, and modern commentators virtually never notice it. Why the silence? Could it be that metal was so commonly used for recording treaties and the like that it was seldom specified? Was "on metal" implied in statements like "the treaty was recorded," as "on paper" is in "the letter was written"?

Thus when the ambassadors of the great Hittite King Kheta-sira went to Egypt to make a treaty with Ramses II they bore with them a silver plate on which the Hittite text of the treaty was engraved in the native language and character.²³

The use of bronze for recording certain types of juristic literature was also popular in Italy during the Hellenistic period. "Exceptionally, *leges* and *senatusconsulta* were published on bronze tablets; *international treaties were always so published.*"²⁴ It should be observed that, whereas nineteenth century scholarship often boggled at these and similar metallic documents, a recent article has explained their peculiarities on the assumption that they were initially published in Rome and later taken to Italian and Greek towns where they were copied onto local tablets.²⁵ This meaty and important article fairly bristles with bibliographical information on the metallic juridical literature of Rome and deserves careful study. Mommsen and his contemporaries regarded the four bronze inscriptions from Tarentum, Veleia, Ateste and Heraclea as ingenious, poorly executed, and frequently unintelligible; some even declared them the products of bungling draftsmen who frequently altered the texts, etc.

The internal problems of these inscriptions are thus met by questioning their evidential value

In the following pages a fresh approach is ventured. . . . It seems better to start with the texts and the otherwise clear facts of Roman documentary processes; to consider how and by whom the bronzes were prepared; and thus to attempt, without circularity, to explain what has been rightly called their 'highly problematical form.'²⁶

Frederiksen breathes a new willingness to believe that Roman juristic literature was indeed published on metal and easily parries the objection that bronze archives and letter writing on bronze plates are simply unthinkable.

²³Arthur J. Evans, *Scripta Minoa; the written documents of Minoan Crete* . . . , Vol. 1 (Oxford: Clarendon, 1909), p. 107. Cf. William Wright, *The empire of the Hittites* . . . (London: James Nisbet, 1884), pp. 26-33, where the treaty in translation occupies over seven normal English pages and extends to 200 lines. See also Archibald H. Sayce, *The Hittites; the story of a forgotten empire* (London: Religious Tract Society, 1925), pp. 40-51, 117-18, 171.

²⁴Fritz Schulz, *History of Roman legal science* (Oxford: Clarendon Press, 1953), pp. 87-88. Italics ours, "*Edicta magistratum* were published on wooden boards (*alba*), which were destroyed at the end of the magistrate's term of office," *ibid.*, p. 88.

²⁵M. W. Frederiksen, "The Republican municipal laws: errors and drafts," *Journal of Roman Studies* 55 (1965), 183-98.

²⁶*Ibid.*, p. 183.

From earliest times until the age of Augustus *bronze was the usual form of publication in Italy*. Unlike Greece, Italy had few kinds of stone suited to the inscription of long texts, until the heavy Augustan exploitation of the Luna quarries; she had, however, again unlike Greece, good supplies of bronze—a fact which more than any other explains the relative epigraphic paucity of Greek and Republican Italy.²⁷

Frederiksen's conclusion is that the extant bronze epigraphs of the Republican period, if not the copies actually displayed at Rome, "were the work of local scribes instructed by local magistrates."²⁸

As the treaty with Cibyra or the Pirate Law suggests, a city might allowably choose another medium, and wooden tablets were not only permitted but common. . . . Nor should it be forgotten that most of Rome's allies, in Italy as well as abroad, possessed public archives of a systematic kind. Since 225 B.C. we must suppose the existence of *formulae togatorum* and hence of *ensoriae tabulae*, doubtless increasingly assimilated to Roman models. Such local machinery was, at very least, adequate to the demands that Rome might make of it, and it was not absurd for Roman legislators to rely upon allied initiative for the copying and preservation of laws that concerned them. Thus it was certainly with the municipal laws and charters of the Republic. We know them from the copies made in the towns themselves²⁹

A last example of extensive writing on metal cited here is a sophisticated document on four bronze plates bearing some of the laws regulating Roman mining operations in the provinces. Two of the plates were discovered at Aljustrel, Portugal, one in 1876, the other in 1907. Together their English translation requires three full pages of normal journal size [i.e., 8½x11 inches], an average of one such page per tablet side.³⁰ They were written by officials with firsthand experience at mining, "men who understood their subject thoroughly

²⁷*Ibid.*, p. 186. Italics ours. Cf. Theodor Mommsen, *Römisches Staatsrecht* ("Handbuch der Römischen Altertümer," Bd. 1; Graz: Akademische Druck- u. Verlagsanstalt, 1952-53), 1:256: "Bei dieser [internationalen] Publication wird wie bei jeder zu bleibendem Gedächtniss, das Document auf eine Kupfertafel geschrieben, wie bei transitorischer Publication auf eine Holztafel; Publication auf Stein ist der römischen Ordnung fremd."

²⁸Frederiksen, "Republican municipal laws," p. 187.

²⁹*Ibid.*

³⁰The three journal pages represent only three sides of the two tablets, since the first tablet bears the same inscription on both sides.

...³¹ The first tablet deals in a general way with provincial mining operations.

This is obviously not something put together by a local official to suit the place under his command, but something of a much wider application that had been developed over a long time and adapted to suit new conditions as they arose. It was a code leaving few loopholes, well understood and accepted by the parties concerned. It had been applied many times before and was just now being put into operation at Aljustrel and next year might well be initiated at a British mine.³²

The second tablet applies to a specific operation in a particular area and regulates, in addition to mining practices, the use of public baths, the cobbling of shoes, the cutting of hair, the fulling of cloth, and the exemption of schoolmasters from dues payable to the procurator.³³

RELIGIOUS METALLIC DOCUMENTS

Of the many religious documents on metal we notice here the Orphic plates of gold and the golden books of the Pyu. Eight small plates of gold discovered in Crete and Italy constitute "the main sources of evidence for the Orphic beliefs regarding the fate of the soul after death,"³⁴ and provide invaluable information on Orphic doctrine generally.

It comes from the side of epigraphy, since the information is contained in the writing found on some thin plates of gold which have been taken at different times from ancient graves. . . . These inscriptions have long been famous, and a whole literature has sprung up around them. The plates were found lying beside the skeleton, some near its hand, others folded up beside the skull. One (that at Petelia) had been rolled up and enclosed in a cylinder at-

³¹A. D. Cummings, W. R. Chalmers, and H. B. Mattingly, "A Roman mining document," *Mine and Quarry Engineering*, August 1956, p. 339.

³²*Ibid.*, p. 340.

³³*Ibid.*, pp. 341-42. It is interesting to note that women were charged twice as much as men for the baths and could use them only in the mornings while the men were occupied, probably because the baths did double duty as a laundry.

³⁴W. K. C. Guthrie, *Orpheus and Greek religion; a study of the Orphic movement* (New York: W. W. Norton, 1966), p. 182. The critical edition of the Orphic plates with Latin commentary and six drawings is Alexander Olivieri, *Lamellae aureae orphicae* (Bonn: A. Marcus and E. Weber's Verlag, 1915), passim. Also important is Jane Ellen Harrison, *Prolegomena to the study of Greek religion* (3d ed.; New York: Meridian Books, 1959), pp. 572-623, 659-73.

tached to a delicate gold chain, clearly in order that it might be worn as an amulet.³⁵

The inscriptions on the plates are extracts from a poem or book of poems which "must have been at least as early as the fifth century B.C."³⁶ That the customary use of such plates persisted for centuries may be inferred from the discovery of yet a ninth plate believed to have been found at Rome and belonging to the second or third century A.D.³⁷

The purpose of the plates is clear from their contents. The dead man is given those portions of his sacred literature which will instruct him how to behave when he finds himself on the road to the lower world. They tell him the way he is to go and the words he is to say. They also quote the favorable answer which he may expect from the powers of that world when he has duly reminded them of his claims on their benevolence.³⁸

Among the most important Pali inscriptions of the ancient Pyu are (1) two golden plates discovered at Maunggun, probably from the first centuries A.D., and (2) a gold-leaf book of twenty numbered pages found at Hmawza (Old Prome) in 1926 and dating from the fifth century A.D.³⁹ The Maunggun plates were found in a brick in 1898 by someone digging the foundation for a new pagoda.

Each of the two plates bears three lines of writing and is inscribed on one side only. The letters show through on the reverse. . . . The inscriptions consist of quotations from the Buddhist scriptures. They are in the Pali language and are written in characters which, it is believed, were in vogue in the first century A.D. when the kingdom of Prome (Siri-khettara) was in the zenith of its power. The alphabet corresponds to a large extent with that used in the inscriptions at Pagan of the fourth and fifth centuries. . . .⁴⁰

The gold-leaf book from Hmawza has been described as

³⁵Guthrie, *Orpheus and Greek religion*, 171 and plates 8-10.

³⁶*Ibid.*, pp. 171-72. The poem(s) may well be earlier than that, *ibid.*

³⁷*Ibid.*, p. 174.

³⁸*Ibid.*, p. 172. The plates are translated in *ibid.*, pp. 172-74, where their respective provenances are also given. "Many of the words on the plates are addressed to the dead man by people unknown to us, but whom the writers of the plates would know as they would be mentioned in the books from which they were quoting," *ibid.*, p. 176.

³⁹Discussed by G. H. Luce, "The ancient Pyu," *Journal of the Burma Research Society* 27 (1937), 247.

⁴⁰Maung Tun Nyein, "Maunggun gold plates," *Epigraphia Indica*, 5 (1898-99), 101.

"the most important record hitherto discovered of Pali Buddhism in Lower Burma."⁴¹ It is "a manuscript in every way similar to the palm-leaf manuscript so common in India and Burma but with leaves of gold, twenty in number, with writing incised on one side."⁴² The fact that the palm-leaf manuscript lies behind the form of this golden book is part of a familiar pattern, as ancient metallic documents often assume the forms of conventional documents. Wooden tablets, for example, served as models for the Idalion bronze plate from Cyprus and the metallic writings of The Hittites.⁴³ Excavators, of course, have little or no chance of retrieving such perishable inscriptions from antiquity, but they often hope to find metallic documents which reflect them.⁴⁴ It is not surprising, therefore, to discover in Burma "a book of twenty leaves of gold exactly of the nature of old palm-leaf manuscripts of India, each inscribed on one side, placed within two covers of the same metal."⁴⁵

These leaves, within their two gold covers, were found bound together by a thick gold wire with its end fastened to the covers by sealing wax and small glass beads. . . . There are two holes in each leaf and cover, through which the

⁴¹Nihar Ranjan Ray, *Journal of the Greater Indian Society* 7 (1939), 47, quoted in "The gold-leaf Pali manuscript of Old Prome," *Report of the Superintendent, Archaeological Survey of Burma, 1938-39*, 12. Cf. "Gold and silver plates with inscriptions," *Annual Report of the Archaeological Survey of India 1926-27*, 180: "From the paleographical point of view, this manuscript ranks among the most instructive finds yet made in Burma."

⁴²*Ibid.*, 179.

⁴³Helmuth T. Bossert, "Sie schrieben auf Holz," in *Minoica; Festschrift zum 80. Geburtstag von Johannes Sundwall*, hrsg. von Ernst Grumach ("Deutsche Akad. d. Wiss., Berlin. Schriften der Sektion für Altertumswiss.," 12; Berlin: Akademie-Verlag, 1958), 76-77: "Eine Holztafel diente auch der auf beiden Seiten beschriebenen Bronzetafel aus Idalion zum Vorbild. Sie enthält einen Vertrag und war im Athena-Tempel aufgehängt. . . . Ähnlich werden die Ausfertigungen auf Silber, Bronze oder Eisen der hethitischen Staatsverträge und anderer wichtiger historischer Texte ausgesehen haben. . . . Auch die Metalltafeln der Grossreichzeit waren Nachahmungen von Holztafeln, sofern sie zum Aufhängen in Tempeln oder Archiven bestimmt waren. Dass es im 2. Jahrtausend auch Metalltafeln ohne Aufhängevorrichtung gab, zeigen z.B. die Metallinschriften aus Byblos."

⁴⁴"Die Kreter scheinen ebenfalls schon früh Metalltafeln als Schreibstoff gekannt und benutzt zu haben. . . . Ist die Hoffnung auch recht gering, beschriftete Holztafeln in guter Erhaltung in Mesopotamien, Kleinasien oder im kretisch-mykenischen Raum zu finden, so kann uns doch das Ausgraberglück wie in Idalion and Byblos auch in anderen Bereichen beschriebene Metalltafeln bescheren," *ibid.*, p. 79. Cf. Evans, *Scripta Minoa*: Although no inscribed tablets of metal have been as yet discovered among the Minoan remains of Crete, this negative phenomenon proves little when we bear in mind how carefully the great Palaces seem to have been ransacked for metal objects at the time of their desertion and destruction."

⁴⁵"The gold-leaf Pali manuscript of Old Prome," p. 12, note 41.

gold wire was passed, to keep the whole in position and proper order. It was necessary to cut this wire in order to free the leaves. Each leaf measures $6\frac{1}{2}$ " in length and about $1\frac{1}{4}$ " in breadth, and contains three lines of writing. . . . The manuscript is made up of short extracts in Pali from the *Abbidhamma* and *Vinaya pitakas* It is well known that, among the Buddhists, there are four classes of objects of worship, viz., (1) the Buddha's corporeal relics, (2) the objects he personally used . . . , (3) trees . . . and other objects or places which have been made holy by the presence of the Master, and (4) the Law or Dhamma Preached by the Buddha as preserved in the *Tripitakas*. This is the reason why, in some cases and in the absence of other relics, manuscripts are enshrined in pagodas. This custom is responsible for the discovery of our manuscript among the other objects, as embodying the Dhamma.⁴⁶

The twenty leaves contain altogether eight extracts from various books of the Pali pitakas and include the twelve Nidanas or Paticca Samuppada, the seven kinds of Vipassana nana (contemplative knowledge), the thirty-seven bodhipakkhiya dhammas or Elements of Enlightenment, the classification of Buddha's four confidences, the fourteen kinds of knowledge possessed by Buddha, the categories of best things propounded by Buddha, the missionary march of Buddha and the three Kassapa brothers into the Rajagaha city, and the well-known praise of the Buddha known as the mirror of truth.⁴⁷ The existence of other metallic documents in Burma may also be safely assumed from another discovery of "small gold and silver plates with Pyu inscriptions punched on them in relief. There are 16 of them, but many are only fragments."⁴⁸

Closely allied to the above religious literature on metals are the magical texts and curse tablets which, like the Orphic gold plates, have inspired a large scholarly literature.⁴⁹ The Greek papyri have disclosed a large number of incantations, magician's handbooks, etc., directed toward bending the super-

⁴⁶"Gold and silver plates with inscriptions," *loc. cit.*, p. 179-80.

⁴⁷Details in "The gold-leaf Pali manuscript of Old Prome," *loc. cit.*, p. 13.

⁴⁸"Gold and silver plates with inscriptions," *loc. cit.*, p. 180.

⁴⁹"One needs to remember that our knowledge of ancient religion and society owes to such authorities as Dietrich, Wunsch, Preisendanz, Hopfner, Delatte, Audollent, and others, in order to treat a new magical text with anything approaching respect," H. C. Youtie and Campbell Bonner, "Two curse tablets from Beisan," *Transactions and Proceedings of the American Philological Association* 68 (1937), 43.

natural powers to the service of individuals. Metallic inscriptions figure prominently in spells and the like, which sometimes smack of modern huckstering, as in the following example:

'A magic formula that restrains anger, secures goodwill, success in the lawcourts, works even with kings; there is absolutely nothing better. Take a silver plate, inscribe on it with a bronze pencil the figure drawn below and the names, carry it in the folds of your dress and you will win' (then follow the names [*nomina magica*] and the actual formula).⁵⁰

Whereas magic formulae invoking benefit and protection were normally inscribed on gold and silver, those employed for curses and black magic are usually found on lead or tin—the epigraphical equivalents, more or less, of voodoo dolls and other forms of sorcery.⁵¹ Tablets of the latter variety are found, often in great quantities, all over the Mediterranean basin. "Evidently the method of this magical school had established itself fairly uniformly wherever Greek was understood."⁵²

The curses used in tablets of this sort conform in a general way to a fairly definite type. The writer usually says that he is *binding down* . . . or *devoting* . . . some enemy to the infernal powers. Often he not only names his enemy, but also specifies the bodily parts or mental

⁵⁰C. H. Roberts, "The Greek papyri," in S. R. K. Glanville, ed., *The legacy of Egypt* (Oxford: Clarendon Press, 1942), 281. For three magical texts on silver and one on gold see Alphons Barb, "Griechische Zaubertexte vom Gräberfelde westlich des [Carnuntiner] Lagers," *Der Römische Limes in Österreich* 16 (1926), 53-68 and Tafel 1, where other finds of magical texts on metal are also discussed.

⁵¹"So wie bekantlich für Verfluchungen und schwarze Magie Blei und Zinn das Hauptschreibmaterial bilden, so wird für den schützenden und wohltätigen Zauber neben Gold gerne Silber verwendet," *ibid.*, p. 55.

⁵²Youtie and Bonner, "Two curse tablets," p. 47. Though the maledictory tablets discussed here were found in Palestine, "Semitic elements figure in them to no larger extent than in the Graeco-Egyptian magical papyri, or in the curse tablets from other regions around the Mediterranean. . . . Our specimens, as far as their language, formulas, and the magical words are concerned, might have been written in Alexandria, Carthage, Rome or Marseilles as well as in Palestine," *ibid.* "It is probable that these non-Greek components of the curse tablets emanated from Alexandria and were carried to all parts of the Graeco-Roman world by practicing magicians," *ibid.*, p. 46. "The discovery of forty-five lead tablets in a well in the Athenian Agora was announced . . . in 1933. . . . Obviously the Athenians of the Roman period believed in the potency of the cryptic curse and used it extensively. The large number of the tablets may mean that the curse on lead originated in Attica, as Wunsch is inclined to believe," G. W. Elderkin, "An Athenian maledictory inscription on lead," *Hesperia* 5 (1936), 43.

faculties of his victim, which he wishes to cripple or make helpless. He may pray the deities whom he invokes to make his enemy powerless, to prevent further hostile action on his part, and to subject him to the will of the writer. This plan applies roughly to almost all the curse tablets that are known. Such variations as there are arise naturally from differences in the relations between the operator and his intended victim, according as their enmity proceeds from litigation, business quarrels, love, or sport—for many are directed against charioteers of the opposing circus faction.⁵³

Both curse tablets described by Youtie and Bonner involve squabbles over money. One is obscure and specifically mentions only a creditor and a law suit, but the other names Pancharia, the woman invoking the curse, who wants to render one man and two women powerless to harm her. She is afraid of them, probably because they may call her to account for some mismanaged stewardship or defraud her in some way. "Whether a loan, a partnership, or an inheritance is concerned does not appear."⁵⁴ The writer of another curse inscription consigns to the infernal powers some thief or thieves who stole something from him. He addresses the chthonians cautiously, fearing to annoy them but feeling that he must do so. He suspects the identity of the offender(s) who live(s) in a specific little house in town, and curses not only the actual perpetrator(s) of the deed, "but those as well, who, knowing something about the theft, deny that they have such knowledge."⁵⁵

Many of the lead tablets containing curses were rolled up and pierced with a nail; and it was a common practice to deposit them in graves, either as a convenient approach to the lower world, or, as sometimes happened, because the spirit of the dead person was adjured to serve as an agent of the operator. A considerable number have also been found in wells and cisterns which, like graves, were viewed as openings to the infernal regions, and were believed to be haunted by demons.⁵⁶

⁵³Youtie and Bonner, "Two curse tablets," p. 45.

⁵⁴*Ibid.*, p. 47.

⁵⁵G. W. Elderkin, "Two curse inscriptions," *Hesperia* 6 (1937), 392. "The thieves are to go down the dark ways as did the slaughtered suitors who fluttered like bats behind Hermes," *ibid.*, p. 394.

⁵⁶Youtie and Bonner, "Two curse tablets," p. 45. According to Homer's cosmology (*Iliad* 15. 187-193) the world was separated into three vertical tiers and apportioned to Zeus, Poseidon, and Hades, the three sons of Chronos and Rhea, who thus came respectively to have dominion above, upon, and beneath the surface of the earth. Poseidon's surface area, however, was restricted to

There are extant today more actual exemplars of ancient writing on metal than most people realize, and many of them go back to the very persons, places, times and events which they describe. Among the subjects not covered in this paper they comprise such things as military diplomas, dikasts' pinakia, intentionally sealed and buried documents, foundation deposits, letters, economic accounts, political propaganda, maps, dedications, enactments, prayers, and even mummy tickets—for all of which and more we respectfully request that the bibliography, limited as it is, be carefully studied. We hope to edit a substantial collection of writings on metallic epigraphy in the not-too-distant future. The subject is a fascinating one, and the metallic documents of antiquity may yet turn out to deserve more than a casual footnote in the history of written communications.

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THE FAR EAST.

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David Diringer, *The alphabet*, 1:68.

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F. Thelma Eaton, *The history of the book; an outline and a reading*

the earth's waters, as Olympus and the world's lands remained the common property of the brother-gods. The Greeks believed, though, that the continents were afloat, and thus greatly feared Poseidon, who caused many an earthquake in Greece by stirring up the oceans with his trident. But they feared Hades even more, as *all* Greeks, good and bad alike, went down into his nether regions when they died. It is therefore understandable that graves, wells, cisterns, and the like were regarded as entrances to the infernal realms, that curse tablets were usually thrown "eis phrear achrematiston," Elderkin, *Hesperia* 5 (1936), 43, and that the early Attic curse tablets "invoke the infernal deities well known in classical literature," whereas later invocations "are transformed by an influence which is in the main Oriental with some Egyptian elements," Youtie and Bonner, "Two curse tablets."

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roland you idiot

Michael F. Shands*

roland you idiot
you vain prideful idiot
you were not

summoned
like Beowulf
or wronged
like El Cid
or Siegfried

you wanted
to be a hero

and because
you would not
blow your horn
little boy blue
the sheep came back
to the meadow
too late

*Dr. Shands teaches English at Concordia College in Austin, Texas. A collection of his poems has been recently published.

The Historians Corner

(Published in Cooperation with the Mormon History Assn.)

JAMES B. ALLEN, *Editor*

One of the frustrating facts of history is that no matter how much is discovered and written on any subject, there is always more to find. Students of Mormon history are constantly uncovering choice items relating to almost every important event but which have been lodged in family memorabilia, resting in attics and basements, hidden in library collections all over the country, or tucked neatly away in the untouchable personal files of well-meaning historians who hope "someday" to work them into an article or a book. Many of these items are not of sufficient length to be worked into a major article, but yet have enough historical value that they should be printed. Some of them might even provide an enterprising scholar with an idea that will lead him to do more research and produce a major contribution to written Church history. It is the objective of "The Historians Corner" to provide a place where many of these short but significant items may be published. They will not only prove interesting to the serious historian and casual reader alike, but will also give added insight into many important phases of Church history.

"The Historian's Corner" is a joint effort of *BYU Studies* and the Mormon History Association. Published at least twice a year as a special section in *BYU Studies*, it will include such things as brief descriptions of little-known events in Church history; meaningful items from newly discovered documents, journals, etc.; historical sketches of important Church history sites; and brief vignettes of individuals, past or present, who have participated in significant activities of the Church. Readers who feel they have something worthwhile to contribute are invited to send their offerings to the editors for consideration.

No central theme will run through each corner except the general hope that the entire undertaking will be of meaningful assistance in the important process of gathering up our heritage, so that by understanding it a little better we might more fully understand ourselves.

JOSEPH SMITH'S OWN STORY OF A SERIOUS CHILDHOOD ILLNESS

Reed C. Durham, Jr.

The story of the Prophet Joseph Smith's serious childhood illness and subsequent harsh surgery by doctors upon his leg seems almost universally known by Latter-day Saints. Until recently the only source for the story has been the history written by Lucy Mack Smith, his mother.¹ This account, of course, is a third person account dictated about thirty-five years after the actual event occurred and therefore most certainly reflects anachronistically some of those years.

Fortunately, a first person account of this same childhood experience was recorded by Joseph Smith himself, and has recently been brought to light with the reexamination of his early history. It is a shorter account and was dictated by the Prophet some seven years before his mother's account was dictated.² Joseph Smith's account, as reproduced below, has apparently never before been published. These interesting passages present the Prophet's own recollection of the event. They also give new insight into the experiences of Joseph Smith as he moved from Vermont to New York, and shows that he was not completely recovered from his illness when this significant journey took place. This account should be compared with Lucy Mack Smith's history, chapters sixteen and seventeen.

¹Lucy Mack Smith, *Biographical Sketches of Joseph Smith the Prophet and His Progenitors for Many Generations* (Liverpool, 1853), pp. 62-66. Lucy Mack Smith dictated most of this in 1845. It was later revised and published as *History of Joseph Smith*.

²The document is found in Joseph Smith, "History," Book A-1, pp. 131-132, located in the LDS Church Historian's Office, Salt Lake City. It was dictated by Joseph Smith in 1838-1839. (See Dean C. Jesse, "The Early Accounts of Joseph Smith's First Vision," *BYU Studies*, Vol. IX, No. 3 [Spring, 1969], pp. 286-87.)

ACCOUNT BY THE PROPHET

When I was five years old or thereabouts I was attacked with the Typhus Fever, and at one time, during my sickness, my father despaired of my life. The doctors broke the fever, after which it settled under my shoulder, and Dr. Parker called it a sprained shoulder and anointed it with bone ointment, and freely applied the hot shovel, when it proved to be a swelling under the arm which was opened, and discharged freely, after which the disease removed and descended into my left leg and ankle and terminated in a fever sore of the worst kind, and I endured the most acute suffering for a long time under the care of Drs. Smith, Stone and Perkins, of Hanover. At one time eleven Doctors came from Dartmouth Medical College, at Hanover, New Hampshire, for the purpose of amputation, but, young as I was, I utterly refused to give my assent to the operation, but consented to their Trying an experiment by removing a large portion of the bone from my left leg, which they did, and fourteen additional peices of bone afterwards worked out before my leg healed, during which time I was reduced so very low that my mother could carry me with ease.

After I began to get about I went on crutches till I started for the State of New York where my father had gone for the purpose of preparing a place for the removal of his family, which he affected by sending a man after us by the name of Caleb Howard, who, after he had started on, the journey with my mother and family spent the money he had received of my father by drinking and gambling, etc.—We fell in with a family by the name of Gates who were travelling west, and Howard drove me from the waggon and made me travel in my weak state through the snow 40 miles per day for several days, during which time I suffered the most excruciating weariness and pain, and all this that Mr. Howard might enjoy the society of two of Mr. Gates daughters which he took on the wagon where I should have Rode, and thus he continued to do day day after day through the Journey and when my brothers remonstrated with Mr. Howard for his treatment to me, he would knock them down with the butt of his whipp.—When we arrived at Utica, N. York Howard threw the goods out of the waggon into the street and attempted to run away with the Horses and waggon, but my mother seized the horses by the reign, and calling witnesses forbid his taking them away as they were her propirity. On our way from Utica, I was left to ride on the last sleigh in the company, (the Gates family were in sleighs) but when that came up I was knocked down by the driver, one of Gate's Sons, and left to wollow in my blood until a stranger came along, picked me up, and carried me to the Town of Palmyra.—Howard having spent all our funds My Mother was compelled to pay our landlords bills from Utica to Palmyra in bits

of cloth, clothing, etc. the last payment being made with [drops?] taken from Sister Sophrona's [ears?], for that purpose. Although the snow was generally deep through the country during this Journey we performed the whole on wheels, except the first two days when we were accompanied by My Mother's mother, grandmother, Lydia Mack who was injured by the upsetting of the Sleigh, and not wishing to accompany her friends west, tarried by the way with her friends in Vermont, and we soon heard of her death suffering that she never recovered from the injury received by the overturn of the Sleigh.

MEMBERSHIP OF CERTAIN OF JOSEPH SMITH'S FAMILY IN THE WESTERN PRESBYTERIAN CHURCH OF PALMYRA

Milton V. Backman, Jr. and James B. Allen

When Joseph Smith wrote his personal history in 1838, he said that about the time of his first vision, in 1820, four members of his family had joined the Presbyterian faith: his mother, Lucy; his brothers, Hyrum and Samuel; and his sister Sophronia. Until recently Mormon historians have presented little corroborating evidence, but an examination of the Presbyterian Church records in Palmyra has shown that at least three of the Smiths were part of that congregation in 1828, although by that time they had become inactive.

There was only one meeting house in the village of Palmyra in 1820. This was a frame building occupied by the Western Presbyterian church and located near the cemetery where Alvin Smith was buried, a half-block north of the present Methodist church on the road leading to the Martin Harris farm house. At that time the Methodists were meeting in homes of settlers, in schools, or in the out-doors. A Methodist class had been organized in Palmyra. The Baptists had erected a meeting house about two miles west of Palmyra village and the Quakers had organized a class north of Palmyra. These four congregations were the only groups holding regular services near the village. We estimate that approximately 11 percent of the population of Palmyra "town" (an area six by twelve miles square) and Farmington "town" were

active church members in 1820. This was about the same as the national average.

The three documentary items presented below are taken from the "Records of the Session of the Presbyterian Church in Palmyra, Volume 2." They show that in March, 1830, Joseph's mother, Lucy, and two of his brothers, Hyrum and Samuel, were visited by a committee from the church because they had been inactive for at least eighteen months. This means that they had not actively involved themselves in the affairs of the Presbyterian church since September, 1828, which was just a year after Joseph had received the plates from which he translated the *Book of Mormon*. It is significant to note that they were charged only with inactivity and that no accusation was made even hinting of any dishonesty, lack of integrity, or undesirable moral character. The records show the ecclesiastical proceedings against the Smith family, and their final suspension from fellowship in the Presbyterian church.

March 10th 1830 Session met pursuant to notice—Opened with prayer

Present Revd Alfred E. Campbell Modr [Moderator]

Geo Beckwith	}	Elders
Henry Jessop		
Pelatih West		
Newton Foster		

The committee appointed to visit Hiram Smith Lucy Smith and Samuel Harrison Smith reported that they had visited them and received no satisfaction. They acknowledged that they had entirely neglected the ordinances of the church for the last eighteen months and that they did not wish to unite with us anymore.

Whereupon Resolved that they be cited to appear before the Session on the 24th day of March inst. at 2 Oclk P.M. at this Meeting House to answer the following charge to wit Neglect of public worship and the sacrament of the Lord's Supper for the last eighteen months.

Witnesses	Henry Jessup	James Robinson
	Harvey Shel	Robert W. Smith
	Levi Dagget	Fri U. Sheffield

Closed with prayer—Adjourned to 29th 2 Oclk P.M.

Records from the minutes of the moderator

[Signed] Geo N. Williams clk

March 24th 1830 Session met pursuant to adjournment

Opening prayer

Present the Revd Alfred E Campbell Modr

Henry Jessop	}	Elders
Geo Beckwith		
Pelatah West		
Newton Foster		
David White		

Hiram Smith Lucy Smith and Samuel Harrison Smith not appearing pursuant to the citation served upon them by P. West Resolved that they be again cited to appear before this session on Monday the 29th inst. at this place at 2 Oclk P.M.—and that P. West serve said citation.

Closed with prayer—Adjourned to 29th 2 Oclk P.M.

Records from the minutes of the Moderator

[Signed] Geo N. Williams clk

March 29th 1830 Session met pursuant to adjournment

Opened with prayer

Present Revd Alfred E. Campbell Modr

Geo Beckwith	}	Elders
Newton Foster		
Pelatah West		
Henry Jesson		

The persons before cited to wit. Hiram Smith Lucy Smith and Samuel Harrison Smith not appearing and the Session having satisfactory evidence that the citations were duly served Resolved that George Beckwith manage their defense. The charge in the above case being fully sustained by the testimony of Henry Jessup Harvy Shel Robert W. Smith and Frederick U. Sheffield (in minutes of testimony on file with the clerk) the Session after duly considering the matter were unanimously of opinion that Hiram Smith Lucy Smith and Samuel Harrison Smith be and they hereby are suspended from the Sacrament of the Lords Supper.

Closed with prayer—Adjourned

Records from the minutes of the Moderator

[Signed] Geo N. Williams clk

WILLIAM E. McLELLAN'S TESTIMONY OF THE BOOK OF MORMON

Larry C. Porter

In 1880 James T. Cobb, a graduate of Dartmouth and Amherst colleges and a resident of Salt Lake City, was making an attempt to establish the falsity of the *Book of Mormon* through an extensive examination of its origins. Among those to whom he directed letters of inquiry was William E. McLellan, whose close association with Joseph Smith and the witnesses of the *Book of Mormon* in the early years of the Church made him an appropriate subject for correspondence.

William E. McLellan joined the Church in 1831. Although he became an early critic of Joseph Smith and other Church leaders, he nevertheless progressed to top leadership positions and on February 15, 1835, he was ordained as one of the original members of the Quorum of the Twelve. He later wrote a letter criticizing the Prophet, was suspended from fellowship and then restored. He again lost confidence in Church leadership, not, apparently, from what he had seen but from what he had heard, and soon stopped praying and keeping the commandments. On May 11, 1838, he was excommunicated. Later he tried to start a church of his own, which failed, after which he took up the practice of medicine. He died in Missouri in 1883.¹

The following testimony was written in reply to James T. Cobb's inquiry. Its significance lies in the fact that even though McLellan was disillusioned with Joseph Smith and other Church leaders, as the letter makes clear, he nevertheless was unable to deny his conviction that the *Book of Mormon* was what it claimed to be. The original of this letter is located in the New York Public Library, New York City.

Independence Mo. Aug. 14th 1880.

Mr. J. T. Cobb.

Yours of Aug. 9th lies before me, and has been carefully read and considered. I did not answer your former letter

¹Andrew Jenson, *Latter-day Saint Biographical Encyclopedia* (Salt Lake City, 1901), Vol. I, pp. 82-83.

because I did not think I could do any good by it, and I now have doubts as to any good resulting, but I'll comply with your request.

I am "*opinionated*." When I thoroughly examine a subject and settle my mind, then higher evidence must be introduced before I change. I have set to my seal that the Book of Mormon is a true, divine record and it will require more evidence than I have ever seen to ever shake me relative to its purity. I have read many "Exposes." I have seen all their arguments. But my evidences are above them all!

I have no faith in Mormonism, as an ism, even from its start, neither have I in Latter day Saintism from its start—through all its developments. I have no confidence that the church organized by J. Smith and O. Cowdery was set up or established as it ought to have been. And the further its run its run still farther from the true way—farther from the plain simplicity of that Divine record, the Book of M. I don't know that I am surprised at a thinking man for rejecting L.D.S.ism at its now developed *in any* and *all* branches of what is called Mormonism. But when a man goes at the Book of M. he touches the apple of my eye. He fights against truth—against purity—against light—against the purist, or one of the truest, purist books on earth. I have more confidence in the Book of Mormon than any book of this wide earth! And its not because I don't know its contents, for I have probably read it through 20 times. I have read it carefully through within a year, and made many notes on it. It must be that a man does not love purity when he finds falt [sic] with the Book of Mormon!! Fight the wrongs of L.D.S.ism as much as you please, but let that unique, that inimitable book alone. I have but little confidence in the purity of a man's life or in his principles of action after becoming acquainted with that Book, and then fight or oppose its divine excellency! Hence, you may know what I think of your course!!

When I first joined the church in 1831, soon I became acquainted with all the Smith family and the Whitmer family, and I heard all their testimonies, which agreed in the main points; and I believed them then and I believe them yet. But I don't believe the many stories (contradictory) got up since, for I individually know many of them are false.

My advice to you is cease your opposition and strife against the Book, and fight against wrong doing in professors: for you might just as well fight against the rocky mountains as the Book!!

David Whitmer has lost his thumb on his right hand several years ago, and cannot write. And he would not be willing to write much to a man who fights the Book of M. which he knows to be *true*. I saw him June 1879, and heard him bear his solemn testimony to the truth of the book—as

sincerely and solemnly as when he bore it to me in Paris, Ill. in July 1831. I believed him then and still believe him. You seem to think he and I ought to come out and tell something—some darkness relative to that book. We should lie if we did, for we know *nothing* against its credibility or divine truth.

I can but hope you will alter your course and use your talents, energy and all your exertions in behalf of the truthfulness of that glorious volume!!

With profound respect for truth, purity & holiness I subscribe myself a lover of all that is true and wholesome.

I as ever.

W. E. McLelland M.D.

P.S. Like you I want to add a few words. I never had but one letter from you until this one. You seem to think S. Rigdon the bottom of all M.ism. Many people know better. He never heard of the work of Smith & Cowdery, until C. and P. P. Pratt brought the Book to him in Mentor, O. True enough, I have but little confidence in S. Rigdon, but I know he was more the tool of J. Smith than his teacher and director. He was docile in J. S. hands to my knowledge.

I left the church in Aug. 1836, not because I disbelieved the Book or the (then) doctrines preached or held by the Church, but because the *Leading men* to a great extent left their religion and run into and after speculation, pride, and popularity! Just like the Israelites and the Nephites often did. I quit because I could not uphold the Presidency as men of God; and I never united with Joseph and party afterward!! I have often examined all the reasons you assign, but they have but little bearing on my mind. I know a man can sit down and find crookedness in almost any thing by prying closely with it. In that light you are to work at the Book, and M.ism. Your life like all other *exposers* will be spent in vain, and worse than in vain. Then spend your time and energy at something more worthy of a lover of truth. Great events are just a little ahead of us. Great things are on hand today, but they will increase. Again I say I have no faith in any party or faction of L.D.S.ism any where in the world. I live alone outside all churches. I most firmly believe that the Lord will *establish* the *Church of Christ* shortly, and then if they will accept me, I'll unite with them!!! Thus I look for power from God to be displayed among his ministers. And then the Book of M. will be a kind of *standard* for faithful. But I'll close hoping you may yet come to see the truth.

Give my respects to J. F. Smith. W. E. M.

BRIGHAM YOUNG ON POLITICS AND PRIESTHOOD

J. Keith Melville

The drama begins in 1848, a presidential election year in America. It unfolds in three major centers: Kaneshville in western Iowa, Great Salt Lake City in Upper California, and Washington D.C. The star performers are elders and politicians.

The first scene of Act One opens in Kaneshville in March where the Mormon vote is solicited by representatives of the Whig Political party of Iowa. Similar overtures are made by the Democratic party. The Mormons are aware of their political power as a similar scene had been played once before—in Illinois! The Mormon leaders call a political caucus and decide to support the Whig ticket; the Whigs agree to help the Mormons in their migration to their new home in the Great Basin.

The next scene takes place in August at the polls in Kaneshville, where 491 Whig ballots are cast for state and congressional candidates out of a total of 523. A chain of bizarre events follow. The Kaneshville pollbooks are "lost" after they are delivered to the Monroe County clerk, which leaves the election of the first congressional candidate in doubt, which prompts Daniel Miller to challenge William Thompson's right to sit in Congress, which touches off a bitter partisan conflict in the House of Representatives, which results in a tie vote to be broken by the Speaker of the House, which initiates more parliamentary maneuvers to be ended only after the House declares the seat vacant! A special election follows in which Daniel Miller is elected to Congress again with the help of the Mormon vote, but this all takes place after the regular election in 1850 wherein Miller's successor has already been elected.¹

The third scene of this political drama is one in which the principals are all Mormons. Orson Hyde, who is one of the Twelve Apostles of the Church and the presiding officer over the Saints in Iowa, is the prime promoter of the Whig cause

¹More detailed accounts of this interesting political history are found in J. Keith Melville, *Highlights in Mormon Political History*, Charles E. Merrill Monograph Series, No. 2, May, 1967.

among the Mormons. Almon W. Babbitt, a Seventy in the Church and trustee for the disposal of Church property in Illinois, is a Democrat and opposed to Hyde's political activity. The partisan controversy between Hyde and Babbitt builds to a caustic climax when Babbitt charges Hyde with prostrating sacred human rights at the "shrine of religious despots." For this reason, Babbitt is disfellowshipped at a conference of the Seventies in the Log Tabernacle on November 19, 1848.

Act Two takes place in the Great Salt Lake Valley in the spring and summer of 1849. Almon W. Babbitt takes his case to Brigham Young, who restores him to his former position in the Church. Babbitt is elected as the delegate of the State of Deseret to go to Washington to assist Dr. John N. Bernhisel, the Mormon lobbyist at Washington, in obtaining one great objective—the admission of Deseret into the Union as a "sovereign state."

The political strategy of Brigham Young is to use as much political influence as possible and he believes that Babbitt has political influence among the Democrats. Bernhisel and Hyde are to work with President Zachary Taylor and the Whigs. In addition, Thomas L. Kane, a friend of the Mormons, and Oliver Cowdery, who recently returned to the Church, are urged to assist in the Mormon political objective. In this bipartisan strategy the First Presidency of the Church wants Orson Hyde to clearly understand the proper relationship of politics to the Priesthood:

Great Salt Lake City, July 20, 1849

Dear Brother Hyde: We learn that you have disfellowshipped Brother Babbitt, also that you have come to the wise conclusion to quit eating each other up. Now we do not care about your political differences, but wish to say confidentially to you, keep them up, outwardly for that may be good policy. But let it be distinctly understood between you and him as good brethren, that you are seeking to accomplish the same grand object namely admission into the Union as a free, and Independent State. Do not permit (trivial) matters to influence you in the least; and never, no never! no never!! again drag Priesthood into a Political gentile warfare.

Letters are also written to Oliver Cowdery, Wilford Woodruff, Thomas L. Kane and others to all unite and work for

the admission of Deseret into the Union. Two letters to Brothers Farnham and Nathaniel H. Felt at St. Louis are especially poignant.

July 24, 1849

Dear Brother Farnham: We have communications, papers, etc., from which we learn (much to our regret) of certain differences, dissensions, strifes, etc., in the branch in St. Louis. These things should not be. Especially in regard to political controversies. The Priesthood should never be dishonored by bringing to bear any of the power thereof in a mere Gentile political question. If there is not merit enough to furnish sufficient argument to sustain themselves let them fall. . . .

July 24, 1849

Dear Brother Felt: It is earnestly desired that all difficulties originating in political differences should be buried in eternal oblivion; never permit Gentile political warfare to enter into your private circles, to cause distrust, engender strife and division in your midst. Never, no, never disgrace the Holy and eternal priesthood of Almighty God by using or exerting that influence and power to further any such purposes, let them stand or fall by their own intrinsic merits.²

The final act unfolds in Washington, D.C., where the admission of Deseret becomes secondary to the more pressing issue of slavery. The grand design for Deseret is compromised. The territory of Utah is created out of a portion of Deseret, Brigham Young is appointed the first governor, and the ground work for a half-century of Federal-Mormon conflict is laid.

Epilogue: Mormon elders who dabble in politics should never forget the sage advice from the First Presidency.

²Letters on file in the Church Historian's Office.

Book Reviews

LEE W. FARNSWORTH and RICHARD B. GRAY, eds. *Security in a World of Change*. Belmont, California: Wadsworth Publishing Company, Inc., 1969. 426 pp. \$5.50, paperback.

(Reviewed by Robert E. Riggs, Director of the International Relations Center and professor of political science at the University of Minnesota.)

Books of readings are a widely adopted literary form whose popularity shows no signs of abating. Sometimes such multi-authored works represent previously unpublished scholarship. More commonly their redeeming social value must be sought in the skill and judgment with which the editor puts together a package that is useful in the classroom or on the reference shelf. Although a reader generally stands or falls on its success as a pedagogical tool, a particularly felicitous combination of selection and editing may sometimes produce a solid contribution to the development of a discipline. Such, certainly, has been the impact of the Rosenau Reader.¹ And such was the intent, if not the impact, of the multi-volumed collection of readings, *The Strategy of the World Order*, edited by Falk and Mendlovitz for the World Law Fund.² Whereas the Rosenau volume was a landmark in the empirical study of international relations, the Falk and Mendlovitz readers are part of a larger project to promote the study of world order, emphasizing the overhanging threat of nuclear destruction and the need of drastic change in the structure of the international system.

The Farnsworth and Gray volume falls in a more modest and thickly-populated category. It claims only the smallest contribution to original scholarship, and it is not intended—nor is it likely to have—any substantial impact on the development of international relations as an academic discipline. It postu-

¹James N. Rosenau, *International Politics and Foreign Policy* (New York: The Free Press, 1961). This reader, with nearly all new material, has gone into a second edition (1969), but the first edition remains in print.

²Richard A. Falk and Saul H. Mendlovitz, *The Strategy of World Order*, 4 vols. (New York: World Law Fund, 1966).

lates no special theoretical framework, other than the two concepts of "change" and "security" around which the book is organized. It has no concern with methodology. Indeed, it has not a single article that utilizes quantitative techniques. It is simply, in the editors' words, "a book of supplementary readings for the introductory course."

To produce a book of readings for the introductory international relations course may be a modest enough objective, but certainly not an unimportant one, and *Security in a World of Change* must be considered in that light. In format, the book consists of eighty-two edited selections organized in five chapters with brief introductory notes (consuming twenty-one pages in all) at the beginning of each chapter. The five chapter headings give a fairly accurate representation of the book's intellectual thrust: "Change and the basic concepts," "Contemporary patterns of foreign policy," "The struggle for power," "The struggle for international order," and "Peace in whose time?" These themes are clearly appropriate to the editors' objective, if not altogether original in concept. With eighty-two short selections averaging just under five pages each, the editors have obviously opted for breadth of coverage and viewpoint rather than depth. Four of the articles—authored, respectively, by Farnsworth and three of his colleagues at Brigham Young—are published here for the first time; the others have previously appeared elsewhere.

Although by no means devoid of empirical analysis (in the traditional sense), the pieces have been chosen primarily to present a point of view on significant international issues or foreign policy problems. This orientation led the editors to avoid the professional quarterlies specializing in the publication of research, and to draw instead from sources characterized by brief reporting of policy positions or social and political commentary. Thus, ten of the selections come from the *Saturday Review*, eight from *The World Today*, and seven from the *Department of State Bulletin*. Eight others are taken from newspapers, four from *Vital Speeches of the Day*, and nine others from speeches for which no previous published source is indicated. Of the eighty-two pieces, in fact, twenty-eight were originally delivered as speeches. Some of the better known contributors are Lyndon Johnson, Ho Chi Minh, L.I. Brezhnev, Charles W. Yost, Eugene J. McCarthy, Hubert Humphrey, Reinhold Niebuhr, Zbigniew Brzezinski, Dean Rusk, Otto Pass-

man, Pope John XXIII, George Kennan, and John F. Kennedy.

One may legitimately ask how this collection of speeches, commentary, and analysis hangs together as a supplementary reading package. The answer is, surprisingly well. The policy approach is particularly appropriate for the introductory course, and these pieces are discriminately chosen. Using a multitude of different selections could have presented a problem of diffuseness—the beginning student's approach to the field is likely to be fractionated enough without having to digest and synthesize so many bits and pieces along with the lecture, the basic text, or whatever other readings are used. Moreover, when the contributions range from columnist Russell Baker ("Ever hear of a two pants suit?") to Pope John XXIII (*Pacem in Terris*), with works of assorted scholars, journalists, politicians and public figures interspersed between, one might anticipate an almost indigestible melange. To the credit of the editors, however, this is not the case. The readings are generally well integrated to the few major topics through careful editing and arrangement. The selections within each chapter have an essential unity, and the materials overall are relevant to the central themes of change and security. The result is a surprisingly coherent, readable survey of basic issues in international affairs that ought to serve well in the classroom.

A. LEE FRITSCHLER. *Smoking and Politics: Policymaking in the Federal Bureaucracy*. New York: Appleton-Century-Crofts, 1969. 165 pp. \$1.95.

(Reviewed by William Clayton Kimball, a doctoral candidate in government at Harvard University and assistant professor of government at Bentley College in Waltham, Massachusetts.)

While the typical Latter-day Saint's interest might light up at the title of this little book, it is less about lighting up than about politics. In the author's own words, "the study illustrates generally the procedures and politics of bureaucratic policy formulation in contemporary American government." The vehicle of the study is the tangle of policy and politics which surrounded the passing of the Cigarette Labeling and Advertising Act of 1965. While this act (which required the warning label on the sides of cigarette packages) was billed by its proponents

as a public-regarding health measure, it was actually one of the most blatant power plays against the public interest in the past decade.

The principal villain in the play was the tobacco subgovernment. This group included not only the tobacco companies and growers, but also the tobacco bloc in Congress (in effect the entire Southern delegation), various elements of the bureaucracy involved in tobacco subsidy and production, representatives of the advertising and broadcasting industries, and large anti-any-governmental regulation forces. Its power was aided and abetted by public and legislative ignorance and indifference. The hero of the book (although not necessarily of the play) was the Federal Trade Commission (Ralph Nader take note!) which was supported by various health groups and aided (presumably) by the spirits of those who literally had the time of their lives smoking. In the best line in the book, Mr. Fritschler quotes David Cohen, then a lobbyist for the Americans for Democratic Action, who assessed the line-up as being "similar to a match between the Green Bay Packers and a high school football team." Unfortunately, the public interest was represented by the high school team.

This book appears at a time when the controversy over just what the government should do about smoking and health is heating up again. But its purpose is not merely to detail or document that controversy as much as to illustrate how policy is made by the federal bureaucracy. And to say that the account of that process is not very interesting is probably to say more about the process itself than about this book or Mr. Fritschler's style. For those who are interested in the politics of the controversy presented in a less academic manner they would be well-rewarded by looking up and reading two articles by Elizabeth Brenner Drew: the first, "The Quiet Victory of the Cigarette Lobby: How it found the best filter yet—Congress," *Atlantic Monthly*, September 1965; and the second, an article in the *New York Times Magazine* of May 4, 1969, which updates the earlier account. Mr. Fritschler leans heavily on Mrs. Drew's work, perhaps more than he is aware judging from his citations which are limited to direct quotations. The most interesting sections of his book are those influenced by Mrs. Drew's story.

His discussion of administrative policymaking procedures—of the differences and interrelations of rulemaking and ad-

judicatory authority—is very good. But it might leave the average reader confused, not because the description is not clear, but because it is a very complex process. Unfortunately, complex subjects are not always made less complex by the use of simple words. The choice of the cigarette controversy as a means to convey some of the complexity is a good one, however. Mr. Fritschler tells us that he chose this issue because the various positions were far less complex than usual. When compared with some of the classic case studies in public administration courses this is true. But the simplicity is confined to the bureaucratic action. The politics were very complex, and the study is deadened somewhat by its concentration on bureaucratic procedure. It is true that a book can only be about a few things and not about everything, but without lengthening the book too much, Mr. Fritschler might have made it more interesting by including more of the political complexity which surrounded the bureaucratic policymaking.

Throughout the book one finds excellent observations and insights concerning the administrative process and the practice of policymaking, but these are often buried in the midst of paragraphs which muffle the impact of the statements. The typical college student would miss many of these insights which are well worth his while. Mr. Fritschler's book gives evidence that many of our notions of representation and responsibility need urgent reconsideration.

One of the central problems in our country is just what relationship the governmental bureaucracy should have to the "private" or business sector. Can business be trusted or allowed to mind its own store? Can we believe that advertising abuses will be self-correcting, or that shoddy or harmful products will not be foisted on the public by producers? The record of rising consumer irritation in the past few years demonstrates that the most serious problems in our polity come not from aggressive governmental action but from private aggression and governmental inertia. Just in the area of air pollution—no matter whether you are referring to pollution of the air currents by industry (and smokers), or of the air waves by television and radio—it should be clear that a reliance on private action is no reliance at all.

Mr. Fritschler points out the problems which arise when an agency of the very bureaucracy which we curse daily seeks to represent the "public interest." The nature of our system

is such that this type of representation brings the agency into conflict with powerful economic interests whose basic concern is for profit and whose lack of concern for the public welfare is obvious. The example of the tobacco lobby which has sought to mislead the public for many years as to the nature and results of using their products is not an isolated case. Perhaps if more people were informed as to the way policymaking takes place in the national (or local) government, it might be far less easy for private interests to ignore the public interest.

Current conservative political writers, of which the Church has more than its fair share, do us a disservice by drawing our attention away from the realities of power politics. They seek to focus on nonissues which soothe their ideological itches, but which do nothing to improve the quality of life in our society. A study like *Smoking and Politics* gives us a glimpse of a complex and disturbing reality. The success of the tobacco lobby and the incredible social cost of this success in terms of human suffering and death should lead us all to question the theoretical labels we use. But we become so attached to them we'd too often rather fight than switch.

ROBERT J. MATTHEWS. *Joseph Smith's Revision of the Bible*. Provo, Utah: Brigham Young University Press, 1969, 86 pp. \$1.50.

(Reviewed by Sidney B. Sperry, professor of Old Testament languages and literature at Brigham Young University. The author of numerous books and articles, Dr. Sperry is one of the most widely known writers on the scriptures of the Church.)

Since the reviewer and his pupil, Merrill Y. Van Wagoner, made their limited studies on the "Inspired" revision of the Bible about thirty years ago, much useful labor on the same book has been accomplished by their younger successors. One needs only consult Page 86 of Dr. Matthews' present work to find the names of those responsible for scholarly investigations that have added much to our knowledge of the history of the Revision, its doctrines, and general value. I would especially call attention to the work of Calvin H. Bartholomew, James R. Clark, Reed C. Durham, and Robert J. Matthews

whose latest pamphlet, small as it is, should be a handy reference work for every earnest student of LDS scripture. It is unfortunate that Dr. Reed C. Durham's Ph.D. dissertation, "A History of Joseph Smith's Revision of the Bible" is not yet available in printed form.

In addition to his short introduction and "suggested readings" (p. 86), Dr. Matthews has divided his little book into seventeen chapters. In his introduction he says, "This pamphlet concerning the Inspired Revision deals with some of Joseph Smith's great contributions toward understanding and interpreting the Bible, and attempts to give an appreciation for this particular phase of the Prophet's divine mission."

Chapters 1-3, as also Chapter 7, may be said to deal with the mechanics of the Inspired Revision. Chapters 1-3 are especially valuable. Chapter 1 alone, dealing as it does with "A Chronological History of Joseph Smith's Labors in Making the Inspired Revision of the Bible," is worth the price of the pamphlet for reference purposes. Chapters 2 and 3 discuss "The Original Manuscripts of the Revision" and "The Reliability of the Printed Editions of the Inspired Revision" respectively. They are of great interest to the scholar and present many facts not found in most publications dealing with the Inspired Revision.

Most of the remaining chapters of the pamphlet (through Chapter 15) are of special interest in their handling of doctrinal issues by the Revision. Such interesting topics as the mission and power of Christ, the nature of God and the nature of man are treated, not to mention the important contributions the Revision makes to the lives and teachings of such men as Paul, Noah, Melchizedek, Abraham, Joseph, Moses and John the Baptist.

Dr. Matthews devotes Chapter 16 to quotations of the opinions of a number of the General Church Authorities, past and present, concerning the Inspired Revision. And in Chapter 17, he concludes by giving us a one-page estimation of his own concerning the significance of the Revision. His main conclusions will be perceived in the following quotations:

1. The Prophet's work of revision of the Bible . . . has contributed much to two of the Standard Works of the Church, as well as having influenced the thinking and doctrinal teaching of the Prophet himself.
2. The total value of the Revision extends beyond the Bible

itself and its fullest impact is felt in the Doctrine and Covenants, the Pearl of Great Price, and the multitude of revelatory experiences that came to the Prophet in the process.

3. There is much to be gained in understanding the Bible, through a study of the Inspired Revision . . . Although the work [the Revision] is very evidently unfinished, it has value as a guide and supplement to the King James Version.

The reviewer wishes that Dr. Matthews could have devoted a chapter to the problem of why the Prophet made so little revision in many important Old Testament books. Why, for example, did Joseph practically pass by the book of Hosea, the most textually corrupt book in the Old Testament? One hopes that someday Dr. Matthews or Dr. Durham (or both) will provide us with a full length book on the Inspired Revision.

NEIL J. FLINDERS. *Leadership and Human Relations*. Salt Lake City, Utah: Deseret Book Company, 1969. 254 pp. \$4.95.

(Reviewed by Norma Rohde, Assistant Director of the Counseling Center and associate professor of educational counseling at Brigham Young University. A specialist in the field of interpersonal communication, Dr. Rohde has also published in *SPATE*.)

Flinders has accomplished what must be the dream of most graduate students. He has published, in book form, his doctoral dissertation—written for the College of Education at Brigham Young University. It is an attempt “to combine the general knowledge about man that God has revealed to his prophets with the *specific* knowledge about man’s behavior that scientists have discovered.” The book is designed to serve as a handbook—a resource for information for parents, teachers, and executives. It is not light reading, nor is it entertaining. It is for the person who is interested in serious study, discussion, and further reading into the many references presented in the book. The author recognizes that this attempt is just a first step in bringing together this kind of resource material.

Chapters 2 and 3 present an image of man. They discuss his origin, the nature of his existence, some of the basic laws that govern him, his biological and emotional development, how he is motivated, how he thinks, learns, and responds to life. Chapters 5 through 8 discuss the interpersonal relationships—why and how an individual establishes, maintains, and dissolves his relationships with others, the influences upon the individual by the family, group dynamics, the principles that influence man's efforts to govern other men, and the author's summary of the essential ingredients for a healthy philosophy of leadership and human relationships. In each instance, Flinders presents both the research findings and the theological concepts. The intent has been to outline the principles and facts where both science and Latter-day Saint theology seem to be in essential harmony. It has not attempted to deal with those areas which are in disharmony. "The unique contribution of this work then, is its attempt to synthesize knowledge about leadership and human relations from both the teachings of the prophets and the research of scientists."

Interesting recommendations made by Flinders include (1) the need for a Church-sponsored Human Behavior Research and Development Center which could utilize the theology of the Church as a system of analysis and have among its operational goals the collection, utilization, and research of human behavior data and (2) the need for developing a training program in human relations, leadership, and administrative behavior for members of the LDS Church.

The author quite successfully demonstrates through his book that an estrangement does not have to exist between layman, theologian, and scientist. As is quoted from Elder John A. Widtsoe, ". . . science seeks truth, and the aim of religion is truth."

This book is an initial effort in meeting a need which has long existed in the Latter-day Saint Church—that of bringing together the teachings of its religion and the teachings of the social scientists and in presenting them in such a manner that they can have meaning to lay members. While the book is not designed for popular reading, for the serious person it contains many thoughtful principles of leadership and human relations. Its concise presentation of concepts and principles

along with its lack of illustrative examples may make for difficult reading for the lay person, but certainly for the individual with the desire to learn more about human relations as presented by both science and religion, the book offers many ideas to think about, discuss, and further investigate, as well as put into practice.

F. HENRY EDWARDS. *History of the Reorganized Church of Jesus Christ of Latter Day Saints*, Volume Five. Independence, Missouri: Herald House, 1969. 680 pp. \$10.95.

(Reviewed by Russell R. Rich, professor of history of religion at Brigham Young University. Dr. Rich is a specialist on the schismatic groups of the Restoration.)

In September 1969, the leaders of the Reorganized LDS Church published Volume Five of their Church history. The first four volumes included the history through the year 1890 and were authored principally by Heman C. Smith, who served as both Church Historian and one of the Twelve Apostles. Volume Five is a history of the Church from 1891 through 1902, compiled by F. Henry Edwards, long-time counselor in the First Presidency. Married to Alice Smith, great granddaughter of the Prophet Joseph Smith, he is highly revered by the membership of the Reorganized Church. He was called to be an Apostle in 1922, and in 1946, as a counselor to Israel A. Smith, third president of the RLDS Church. Then in April 1966, his function was changed to that of "writing and teaching." Relieved from his duties in the First Presidency, it was possible for him to have time to compile such work as Volume Five.

Close family ties and years of devoted Church service have earned Mr. Edwards the confidence of the Reorganized Church officials as well as complete access to Church documents and records and minutes of the meetings of the First Presidency and the Council of the Twelve Apostles. He has drawn heavily from *The Saints' Herald*, official organ of the Church, and is frank to admit in his preface that this volume is not an impartial record, as the material in the book was selected from a mass of material available, and that selected has been influenced by the author's "interests and prejudices." This is

a commendable recognition and should apply to all historians, although many may not be as frank in admitting it.

Volume Five follows the same format as the four earlier volumes, considering each year separately. Consequently, each year covers a multitude of topics, many of which are also covered in succeeding years, rendering Volume Five somewhat repetitious and tedious in places. However, the book was written principally for the membership of the Reorganized Church (which increased 92% in the twelve-year period covered) and for the benefit of "the local and general ministry and . . . the local and general administrative officers." For this reason also, Mr. Edwards devoted "considerable space" to legislative and administrative matters, including much detail in some cases and even some minutia which serve well the people for whom the book was written, but detract somewhat from interest for other readers.

Occasionally throughout the volume, Mr. Edwards relates an event from the history of the LDS Church. In some cases, the reason for including this material is not clear, as its only connection seems to be that it was chronologically contemporary. In other instances, the author's purpose is plain; but the material presented is hardly in agreement with the facts available to him. For example, in regard to the Kirtland Temple Lot Suit, Mr. Edwards states, "One of the major concerns of the Saints in 1890, now that they were confirmed in the possession of the Kirtland Temple. . ." (p. 55). This appears to be just a passing, incidental statement but is inserted for the purpose of continuing to promote the long claimed and much publicized fallacy that the Reorganized Church actually won this suit, when in reality they lost it, in spite of the fact that no one appeared against them to argue for the defense.¹

On May 6, 1942, Israel Smith, a lawyer in private life, wrote a letter to the County Recorder in Painesville, Ohio, in which he requested a copy of everything pertaining to the suit, stating, "This should include originals, summons, returns, substituted service, proof of publication, etc., and all entries, including final judgement and decree."

¹The reviewer has twice been to the courthouse in Painesville, Ohio, where he made photostat and typewritten copies of all of the material pertaining to this suit, including three letters from Israel Smith when he was a counselor in the First Presidency of the Reorganized Church.

Considering Mr. Edwards' close family ties, his intimate association with Israel Smith, and his being a student of Church history, it is difficult for one to understand how he could have failed to recognize that the Reorganized Church lost the suit. In the suit, the lawyer for the plaintiff put forth a set of statements as to what he desired the court to find; but, when the judge rendered his decision, he did so in these words:

And the court finds that said Smith had no title to said property except as the trustee of said Church and that no title hereto passed to the purchasers at said sale and that said parties in possession have no legal title to said property. And the court further finds that the legal title to said property is vested in the heirs of said Joseph Smith *in trust for the legal successor of said organized church* [italics are the reviewer's] and that the plaintiffs are not in possession thereof. *And thereupon the court finds as a matter of law that the plaintiff* [Reorganized Church] is not entitled to the relief prayed for in its petition. And thereupon it is ordered and adjudged that this action be dismissed as the costs of the plaintiff.²

Another example is found in his discussion of the Jackson County Temple Lot Suit. Mr. Edwards does not personally say that the doctrine of polygamy had no existence until after Joseph Smith's death; but he quotes newspaper articles that say so (page 240), which serve the purpose of promoting the idea. Yet, Mr. Edwards had full access to the private files in their Church Historian's Office which contain an abundance of evidence showing that plural marriage was introduced by Joseph Smith. One of these references is the *Latter Day Saints' Herald* for January 1860, volume 1, No. 1, in which articles appear that make it plain that it was Joseph Smith who introduced plural marriage. One of the articles, in speaking of Joseph Smith's repenting of his connection with polygamy ends with the statement that "If Abraham and Jacob, by repentance can obtain salvation so can Joseph Smith." Later referring to these articles (p. 412), he passes them off saying their "arguments had been met many times." However, Mr. Edwards is only following the policy of the Reorganized Church, whose officers are fully aware of the facts but have never been will-

²For an excellent analysis of the whole suit, read: Paul F. Reimann, *The Reorganized Church and the Civil Courts* (Salt Lake City, Utah: Utah Printing Co., 1961), 296 pages.

ing to admit to the general membership of their Church that Joseph Smith did introduce plural marriage. One can only wonder why. There are other places in the book where a vigorous defense for the "Reorganized" position is presented, and certainly this is to be expected; but one does wonder why it should be necessary to spend so much time defending their position if the leaders themselves are confident of it.

In discussing "Succession," Joseph Smith III is quoted (p. 361) as saying, "It makes me decidedly 'tired', to have men who think themselves to be possessed of ordinary good sense to ask me 'Did your father ordain you *to be* [italics are the reviewer's] his successor?' Where [sic] they know he was living and occupying the position himself? [sic] How could a successor be ordained to the office until it was vacant?" Yet, further on (page 456), Mr. Edwards states that James Whitehead "was present in Nauvoo in 1843 when Joseph Smith, Jr. blessed his eldest son, Joseph III, *to be* [italics mine] his successor in the prophetic office."

One point of particular interest to members of the LDS Church is an 1891 statement by President Joseph Smith III (p. 89) in which he said, "The attitude in which the Utah people now stand before the world calls for a judicious action on the part of the Reorganized Church. It is my conviction that there are men in those valleys who hold legitimate priesthood, and who will have to be recognized." This is in line with later statements (page 385, 490) made at joint meetings by representatives of the Reorganized Church and Church of Christ (Temple Lot) that there may be individuals in different factions who hold the priesthood.

Better preparing the reader to understand some of the administrative problems presented, Mr. Edwards explains that a "common understanding of their distinctive functions during this period" (1891-1892) was never fully achieved between the Presidency of the Church and the Twelve Apostles. However, the statement should have also applied to other administrative bodies, as quite often the reader is given the impression that other quorums were also confused over the problems of jurisdiction and responsibility, until a condition of what one might call "organized confusion" is presented—not in the book but among the administrative quorums of the Church. One must be aware, however, that this was a formative period in

the history of the RLDS Church, causing multiple problems to arise.

Adding considerably to its usefulness, the book contains a subject index and a biographical index, both of which appear to be quite thorough. The vocabulary is well chosen and expressive, leaving no doubt in the reader's mind as to what the author is trying to say. The project appears to cover thoroughly the history of the Reorganized Church for the period designated. Mr. Edwards has succeeded in accomplishing the purposes for which he wrote the book.

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