PURPOSE OF EATING

Eating should be a pleasure and an act associated with enjoyable social intercourse. On the other hand, the asthetic side of the repast should not be looked upon as one of the fundamental purposes of the procedure, but only as a result of being able to satisfy our basic needs in a manner conducive to good fellowship and savory satisfaction. Nor should it be looked upon mearly as a means of passing time though though leisure may be condusive to overeating as well as better assimilation. Though coldly practical, it xerves but one purpose-- that of supplying our metabolic needs. The asthetic side side though a to the soul and a stimulus to _____ only secondarily assures that the basic fuel requirements of the body will be met

As a fuel, food serves the three primary purposes of life (1) Locomotion (2) reproduction, and (3) the maintenance of bodily temperature. These three functions primarily constitute what we call life. The soul and its contact with the infinite is nought without the ability of the organism to carry out the basic three. Human intercourse is in reality a form of locomotion just as conception is placing into reactivity the forces of reproduction. Similarly our environmental comfort depends on the fact that the mamal is no longer a poikliotherm. With this in mind, let us briefly consider what these three factors mean to usfxxx

With this in mind let us briefly consider what these three factors mean to us and in greater detail how our bodily response to temperature tells us much about our metabolic adequacy .

Locomotion includes all forms of physicalwork conducted by the body. "Act or power of moving from place to place, progressive movement." (Websters. Internat. P 1450 G & C Merriam Co., Springfield, Mass, 1955.)

It is a property of all animals from the unicellular protoxoa to man xxxx that sets the animal apart from the more static plants.

Apparently man has from the earliest times been striving to reduce physical locomotion to a minimum. His use of the xxxxxxx leaver and the wheel early gave him mastery over other members of the animal family. By gradual steps he forced other animals to become his slave to save him from using his own muscular effort. In due time h leaned to harness the wind and water to serve his purpose. Fire too he learned to xspect a bend to his resourceful will, leaving his more xxxx primitive fears behind him; and as he progressed the latter of invention conqueroing the envivonment around him and utlizing not only the animate but forging the inanimate by his will into his tools of today. Locomotion on his part has been reduced to a minimum. While 25 to 50 miles were the ultimate of primitive man' self propulsion, the genii of the atomic age propels him at thousands of times that he could move himself. So puny man stands in the midst of his marvels,xxx sits back and assumes that mechanicalx locomotion

is all that is necessary for him and wonders why his puny body and locomotive responses are hardly sufficient to even cope with the machines of his own invention.

Through locomotion is primitive, reproduction is even more so. It was the first act of biological life and existed when only the chance locomotion of cells (movement from place to place) from wind, rain and other natural phenomena was their sole means of moving from place to place. However, in man reproduction is quite different from chance fertilization. It is theresult of an integrated system of cellular responses depending uponlocomotion bith with the body and without. In the normal building of the body, the food we eat provides the building metabolites that renew worn out cells that stores fat in the lipoid depot, that provides the substance that renew each and even part of the body, regardless of its demand with the organic and mineral requirements of that particular cell.

In injury, injured cells are cast off. New tissue fills the space, to be surefrequently forming a scar but to all intents and purpos s reproducing a tissue that will enable the damaged organ to continue to function. This reproduction is frequently , in fact, usually more rapid than normal replacement of cells. Yet with all of the process of repair usually continue in a normal manner. The destruction of cells by disease is slightly different from mechanical destruction of injury but such damage too is replaced fro the most part with a minimum of scar

and only as some unknown force comes to play does the replacement of cells follow an uncontrolled pattern such as is experienced in malignanacy.

So it is that reproduction and locomotion both primitive functions must go on if life is to exist. Locomotion can be curbed but cellular replacement cannot be.

The third function of life, the maintenance of the body in a state of monothermia regardless of external environment is a more recent acqusition in the animal kingdom and is not processed by many of the lesser varieties. Primitive man made the first attepts to lessen his demand for heat production when he learned the use of shltering caves, of fire, and the skins of the animals, serving as his food. He apparently consumed much food to carry out his steenuous efforts to exist and produced much bodily heat by such effort. When _____ he could do much to make himself comfortable by an excellent thermo-regulating mechanism. But in times of low food supply, he must have suffered .

Modern man on the other hand has done much to make his environment comfortable. He has built homes. He has warmed them. He has cooled them. He has migrated to areas of lesser climatic stress, and he has become less able to cope with the "rigors of nature" and so it is that the warner regions of the continent are growing at phenomenal rates, to appease man's desire for environmental confort. Though

clothes too create an environment, they have to some extent lost their baser meaning, namely, to protect one from his environmental thermic demands., to more of the pure asthetic. But with all these advantages, man has frequently failed to meet his environment and suffers from being too hot and too cold because of failure on the part of his nutritive up take to meet his metabolic demands.

Though failure to meet ones bodily temperature requiement is a nuisance, it has not been generally recognized in its true light. The man or woman who must be bundled even on a warm summer day has frequently been looked upon as a classical case of subthyroidism, though this may be the case frequntly, the blood iodine is in normal range and no other bodily _____exust except a subnormal temperature. Frequently, these individuals are women or men who have been on reducing diets, have lost their bodily proteins.

Similarly, there are others who have trouble keeping cool. They are fewer in number and may be of either sex, but more frequently man, especialy those who have been on salt free diets. Their blood chlorides are usually low from 415 to 440. They may be just as hot in winter ti e and want to come home and throw all the windows and doors open.

Under normal circumstances the mechanism of temperature control of the indiv a precise one so that the diurnal variation is not more tha 1^{o} - 2^{o} The capilary bed of the skin and subcutaneous tissues are controlled by a vasomotor mechanism

which brings the major protion of the blood flow to the deeper structures in cool weather while in warm, the cutaneous capilaries are wide open and secrete sweat when further tepperature reduction is needed. The nose too comes into play. To cool the air that enters the body in summer and warm it in winter. These functions are all automatic but they require energy. Heat of metabolic origin is necessary to cool the body just as it is necessary towarm it.

On other metabolic processes that come to play in muscular activity It may come to play as a shivering and call for more blood and energy to warm a person or it may be the normal excercise of daily living. In cool weather the loss of this extra heat may be slight but in hot weather it may require a heavy addition to the metabolic load to get theextra blood to theskin surfaces to radiate. Not only does radiation occur _____ from surface area but the addition of salts to the perspiration raise its evaopration temperature and improve its effectiveness. Excess clothing interferes with evaporation. Individuals who are too hot frequently do not get enough salt. On a hot day, a hot cup of coffee with a teaspoon of salt is almost miraculous in its effext. An uncomfottable moping individual frequently can be returned to comfort in less than five minutes time.

The rate of metabolism is also a factor those with abnormally high

It may result from infection or endocrine disease, too much cover or any of several factors that prevent bodily evaporation, especially in the individual who metabolizes his food well. Such sweating is not necessarily associated with raised temperature. The sub-metabolic too may sweat profusely in a attempt to cool his body, particularly if it is incased in a hypo-metabolic subcutaneous stroma. which at operation or autopsy proves to be of the gelatinous white rather than oily yellow type. Such a subcutaneous tissue is less vascular and of poorer insulating quality.

Rate of metabolism is used not in the sense of "Metabolic Rate" the resting breakdown of tissue but more truly in the sense of the total metabolic activity of the individual. Many individuals run a sub-normal temperature which results from chronic ~~ax~~ insufficient food intake or occasional chronic inability to utilize food completely.

EXERCISE.

The normal response to exercixe is simple. It consists of an increase in metabolism, increase in heat production and demand for oxygen. T The demand for fuel depends on the rate at which the activity is carried out and th effort expended. The cooling off period is rapid in the healthy individual and depends on the external temperature, humidity, clothing, air movement and the evaporative (cooling) efficiency of the individual but the thermal curve is a slight rise in temperature followed by a drop.[x] In a similar manner the pulse rate follows the temperature representing the adequacy of the muscular response. The ratio of termperature rise to pulse increase is the

is the regular 10 beat increase to 1° elevation of temperature. In the normal individual, only about ¼ of the heat (beat? energy is used as work. (W. 9th Oxford p. 442 Applied Physiology)

This normal physiologic response can well be used as an index in the nutritionally disturbed individual to determine the adequacy of his nutritive and muscular response to a measured exercise.

The individual (Mrs. Floyd) whose bodily build tells one that he has been accumstomed to an adeuate food intake because of his excellent bone musculature and is found to be subsiding on a substandard diet, both nutritionally and calorically requently to reduce shows a dirunal pulse and temperature chart which drops below normal. These patients have lost their thermo regulating mechanism. They can still perform work but their recovery time is much increased and a frequent remakr is, "it must be old age." They sometimes state that they do not feel warm after exercises, infact they are frequent ly in the cold group. Their exercise response is usually that of temperature drop on exercises followed by a variable recovery. The pulse as a rule increases slightly and returnsto normal within a half hour. Our method of test of these patients is as follows: The patient rests a half hour. The pulse and temperature istaken. The patient exercises a prescribed distance of walk. Temperature and pulse is then immediately

on return from walk. Patient rests and pulse and temperature is taken at 10 or 1/5 minute intervals for ½ to 3/4 hour.

This type of individual when his caloric and nutritive intake is returned to an adequate level, quite naturally, gains weight but at the same time increases the normal diurnal temperature level and in what is a relatively short time can perform a work at an increased level. Frequently this type of individual can be returned to a level of output comparable to a 5 mile consecutive walk.

Now on the other hand, an individual (Selegue) who has spent most of his life in a sedentary post, who has worked under the misguided concept that the body is only a means of fullfilling the need for providing locomotion in a physical sense for the brain and all that it needs is to stop at the filling station to get enough "Gas and Oil" for the day. Such drivers are a"menace to the highway you say. To insurance and a run down car". They come with a broken down chassie and knocking bearings, holes in the upholstery and frequently a loss of most of the accessories. They do not

have the energy to appear smart. Driving is an effort, locomotion is even painful and distressing, their work load is too heavy. They sometimes appear fat yet a whole string of usual clinical tests reveal they are"normal". Only suffering from psychic fatigue and need a few vitamin pills. Such individuals often can date their mal nutritution from college when the feeding of the brain was looked upon as the important function of life. They appear well nourished, have had the usual number of colds, dental appointments for orthdontic caries control, pyrhoea, extractions. . Most have lost their tonsils, appendices and have had other surgical experience before 40, but finally in spite of "normality," their engine begins to conk out first. A little psychological counseling is needed because it is all in the mind. Then some tranquilizer or a combination of pep pills in the morning and sedation at night.

However, a daily diurnal pulse and temperature record reveals a different story. The motor is running cold and the muscle is not responding to effort. The general body of the temperature may rarely reach 98, usually 97-97.6

An analysis of the food intake again shows an insufficient consumption of calories and as a correlary insufficient vitamins and minerals.

The recovery of the individual is much more difficult than the former. The excellent musculature has not been present. The physiological and psychological trauma has been severe. Though the desire to improve the situation is present, the energy is lacking. Food is distasteful though usual clinical test are " within normal range." The presence or stimulation of the"appetite juices" is slow. Sometimes lacking .
Too, the engine has lost its ability to accelerate because of too much carbon in the cylinders.

It knocks and wheezes and suffers from diverse diseases!

The child on the other hand who has a rapid metabolism responds promptly to dietary change and rapidly improves his muscular endurance under a properly guided program and unless there is a definite infection such as a severe synthetic disease. He can rapidly regain muscular control, provided he is fed properly and given adequate rest. On the other hand, he can lose his tone even more rapidly. Such children continue to grow often at an increased rate, are too large in size, but lack the physical and muscular stamina to carry on a normal consecutive effort. (Robert Schlegal) Frequently these children are plump after too much carbohydrate consumption. They run fevers with ease. Not infrequently, (Stanley Packard) a child whose nutrition pattern at birth was that of sub-metabolism grows with a soft tissue that prevents proper radiation even though he is placed on a good dietary it takes a prolonged period of time to re-establish the proper utilization of food. Just as we have previously shown that a coarse bone pattern once established either experimentaly if the child continues throughout life and the only real change that can be made in the bone is the amount of density of calcium on the trabeculae. The child who fails to radiate is frequently in the so-called vasospastic class. The child is looked upon as being anemic when in reality he has an adequate unit composition of blood though he may be low in the true volume of blood. Though he cannot cool off properly he is not sick in the accepted use of the word though he may be nervous and lack the physical stamina of other children.

He can be given a measure of help through an understanding of his problem, especially if he can be shown that his excessive thermal reaction orally is not a true physiologic excess but is in reality a local radiation problem. With this understanding it is possible to give the individual on exercise program with in his limit.

The improvement in his nutritional status is usually slower than that of other children but as long as his pulse and temperature studies respond normally, he can be pushed and gradually as his nutritional status improves one will find that his physical response will go hand in hand, though it is improbably that such an individual will excell in skill, nonetheless, he can play the games within the limit of the superior group if he will work hard enough. Though the failure to reach 98.6 as a daily maximum is usually looked upon as a glandular failure or a failure in metabolic process due to inability to utilize enough fuel, one must not forget the basic food supply. However, if the clinician fails to study his patient and overlook the basic organic activity of the individual because the fuel supply is implicated by a dietary analysis he may overlook serious metabolic disease due eityer to prolonged partial starvation or diesease.

Among the diseased organs whose under function permits a sub-normal temperature are the thyroid, adrenals, and gonads. The former acting largely on the oxidative rate of the individual, the adrenals on fluid and fuel interchange in the cells whle the gonad play an important part in muscular activity.

The digestive organs, the stomach, pancreas, intestinal glands and liver may singly or in combinztion fail to produce the necessary secretion to properly

digest the injested food, leadigg to a lowered metabolism even though the intake is adequate.

Aside from its digestive function, the liver has another role which might be likened to the heavy chemical plant of industry that makes the basic elements which the other plants use for producing the specialties. If the funntion is impaired, all bodily activity is interfered with. It is thax this function in the chronically ill or the individual recovering from a proЬonged illness frequently keeps the temperature down.

We have discussed work and its normal effect on the elevatdd temperature. Though they are beside the detailed discussion of thaix this discussion nonetheless, they should be mentioned.

The first of these is the one with which we are all familiar-- the response to infectious disease.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx The precise mechanism of how the body reacts has had many explanations, however, it is obvios that the production of fever results from the rapid break down of bodily tissues and a reaction of foreign material or the bacterial products.

Though infections are the most familiar to us, excessive concentration and mental work such as competitivve examinations can raise the temperature to as high as 103° Of a similar nature is the stress of anxiety or fear.

The abnormal vasomotor control in which the skin glands are inter-

interfered with can cause an elevated temperature because of lack of radiation in a similar manner. Excessive environmental factors can come to play. However, in a normal individual with adequate intake of nutritional elements this does not occur. On the other hand, the normal individual does not feel the need to completely control his environment, so when we mention houses that are too hot, excessive dothing, and more recently the electric blanket, we are assuming that the evidence is primafacia that the individual is not "normal." All such artificial protective mechanisms only depelete further a bodily function that determines our true physiology.

If the clinician has determined that there is no infectious disease, disturbance of metabolism, or any glandular upset, it is then obvious that the thermal and pulse responses to exercise are purely those due to the food utlization of the individual.