

**SUPERIORITY OF VEGETARIAN
DIET FROM THE SCIENTIFIC
AND
HYGIENIC STAND-POINT**

MADRAS VEGETARIAN ASSOCIATION

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BY

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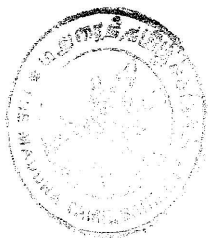
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PREFACE

The Madras Vegetarian Association offered a prize for the best essay on the subject appearing as the title of this book. Seven essays were received and the Executive Committee of the Association found Mr. Azariah's to be the best of them. The prize was awarded to him at the annual meeting of the Association held at Royapettah on 30th August 1930, under the presidency of the Hon. Diwan Bahadur Justice K. Sundaram Chettiyar, B.A., B.L., Puisne Judge of the Madras High Court. The essay is sent forth into the world in print so that the public at large may have the benefit of reading the convincing arguments in favour of vegetarianism, which Mr. Azariah has so well embodied therein, as a result of his thought and close study of the researches and conclusions of modern doctors and scientists of great eminence.

1st October 1930.
'THARAKA VILAS,'
Cathedral Post,
Madras.

} C. S. SWAMINATHAN,
Secretary,
The Madras Vegetarian Association.



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Living Matter

ALL the material objects which we see around us in this world of ours, may be classed under two main divisions, viz., *Animate* and *Inanimate matter*. That which has life in any form falls under the former, while the rest come under the latter head. The animate or living matter may again be divided into, the animals and vegetables. The animals and plants are alike in fundamental structure and may be said to form two divergent branches of the one tree of life. The researches of Sir J. C. Bose of Calcutta have established the close affinity that exists between these two forms of life.

Animal

The term "animal" is used by Scientists to denote all living creatures except plants. A living creature is defined as an organism which exhibits the following five forms of activity :—

1. Movement.
2. Sensation.
3. Nutrition.
4. Growth,
5. Reproduction,

The creature must be able to move by its own impulse and not as the result of some force or other agency from without. It should possess the power of sensation or irritability in the widest sense of the word and respond by contraction or otherwise to the impact of external objects or forces. It must feed or take in nourishment which by assimilation becomes part of its own tissues, for the purpose of repairing a waste that is continually going on as the result of activity. By the process of assimilation of food, the creature must grow. And lastly it should possess organs of reproduction. Recent researches have shown that plants possess all the above-mentioned characteristics except that of movement. Thus it is the absence of spontaneous movement that distinguishes plants from animals.

Man

Man is a member of the animal kingdom. The structure of the human body shows clearly that he belongs to the family of animals. But there is a wide gulf separating man from the other members of the animal kingdom. Man, unlike the other animals, is capable of articulate speech. He can stand erect as the result of the peculiar great toes with which he is endowed. He is the only one who has two hands instead of fore-feet. His great superiority to all other creatures is by reason of his mind. The intelligent behaviour of man is manifested by the originality of the actions concerned and the individuality displayed in dealing with novel conditions. The intelligence of man distinguishes

him from instinct which is the characteristic of lower animals. This superior status of man is attributed to the difference in the size of the brain. The brain-chamber of a fully developed man is found to measure 1480 cubic centimetres (about 90 cubic inches) while that of a male gorilla, the nearest relative of mankind, is 500 cubic centimetres (32 cubic inches). It is the human brain which causes him to think and act better than any other member of the animal kingdom and to reason between right and wrong.

Ages of human history

Science tells us that the world was in existence for countless ages before it was inhabited by man, and that man has lived upon the earth for thousands of years before history began, that is to say, before the time of written records ; for of primitive man we have no records beyond proof of his actual existence. The prehistoric men were savages who had not learned the use of the various metals and how to spin and weave the fibres of plants or the wool of sheep into cloth. They lived in caves and holes made in the trunk of trees. Then by degrees, as the years passed by, they learned how to build for themselves rude huts and dwellings. The earliest tools and weapons used by man were very roughly fashioned out of stone and so, the most remote age in man's history is called the *Stone-age*. The *Stone-age* may really be divided into two periods, the *early stone-age*, when stone implements were of very rough workmanship and the *later stone-age*, when

all stone-work was polished and much more skillfully carved. The next weapons and implements were of still more skilful workmanship and were made of bronze. Hence the second period of man's history is called the *bronze-age*. Then after many centuries had passed, man discovered the use of iron. This age is called the *iron-age*. Next we pass on to more civilized times and to historical times also ; for it is with the iron-age that those written records of the peoples of the great nations of the world called History, begin.

Nourishment

All living matter whether animals or plants require food or nourishment for power to perform their various functions. Both transform nutriment by a process of digestion into tissues but while plants assimilate the nitrogen and carbon dioxide in the air and build up their tissues by absorbing mineral salts from the soil, animals can only assimilate those chemical elements and compounds after they have been transformed into organic compounds by the plants. The unit of structure known as the cell is essentially the same in both animals and plants but the combination of the cells into tissues and organs shows marked differences. All animals depend for their food upon materials elaborated by plants. The green plants alone have the power to construct the basic food material from elemental substances. It will be thus seen that nature has ordained that plants should be the *great producers* and animals the *great consumers* of food. This natural distinction between

the basic function of plants and animals is of great importance and will be adverted to later on.

Kinds of food

There are different kinds of food which vary greatly in their value as nourishment. The foods ordinarily used by human beings may be divided into three classes :—

- I. Animal flesh or meat.
- II. Animal derivatives.
- III. Vegetables.

I. Meat

This term was originally applied to food of all kinds especially solid food but is now generally used to connote simply the flesh of animals including birds and fish. The composition of meat especially its high protein content is considered to make it an important element in the diet of the more highly developed nations and of those which are engaged in heavy and continuous labours.

The different kinds of meat used by human beings are *beef* the flesh of the ox, *mutton* the flesh of the sheep, *veal* the flesh of the calf, *pork* the flesh of the pig, *venison* the flesh of the deer, the flesh of birds such as fowl, goose, turkey, pheasant &c., and the flesh of fish.

The percentage of composition of lean beef is found to be as follows :—

Protein	...	...	18·4
Gelatine	...	...	1·6
Fat	...	...	0·9

Extratives	...	...	1.9
Ash	...	...	1.3
Water	...	...	75.9

In pork there is 65 p. c. of fat and only about 8 p. c. of protein. Mutton also contains less protein and more fat than beef. In fish the chief nutrient constituents are protein and fat which vary largely in amount and proportion in different fish.

Meat no doubt contains a great proportion of protein which is the material for the building up of the body. But by eating meat, a greater amount of protein than is required to repair the waste of tissues in the body is admitted into the body. During the process of decomposition of meat in the stomach, certain alkaloidal substances known as ptomaines are formed. The elimination of these poisons gives extra work to the liver and the kidney. Dr. Menkal says:—
 “animal diet is still considered by many as the most important article of diet. The idea is often accepted without question or without a thought that it can be seriously challenged. A careful consideration of the subject will soon show that in addition to its known nutritive values, there are dangers and after-effects which considerably detract from its position as a superior food substance * * * * The ill-effects of a flesh diet may not be immediately realized but this must not be taken as evidence that it is doing no harm. Few can be made to believe that it is the meat that they have eaten, which is largely responsible for physical degeneracy and many die of diseases wholly due to flesh-diet while the real cause is not suspected by themselves or others.”

Natural diet of man

We shall therefore proceed to consider whether a meat diet was intended by nature for the sustenance of human beings. A careful consideration of the circumstances mentioned below will clearly show that the flesh of animals, birds and fish, could not have been and was never meant to be the food of man wherever he is found to exist.

1. Food of the Primitive man

The primitive man must have limited his dietary to fruits and roots. Scientists affirm that man belongs to the highest order of mammalia. The anthropoid apes closely resemble man in form and structure and are included in the same natural order of mammals. All the members of this order are fructivorous and men could not have formed an exception to this rule. They are inhabitants of tropical or sub-tropical countries where plant-food is quite abundant. The fact that human beings are found at present in all the regions of the world is due to his habit of migration on account of pressure of over-population and the consequent hunt for food in later ages. The primeval man must have fed himself on fruits and roots like his precursors, the anthropoid apes. A consideration of this question will clearly establish that the primitive man was a fruit-eater and his degeneration as a flesh-eater was due to a number of extraneous circumstances.

2. Mode of drinking water

The human body is made up of two-thirds of water and a third of solids. Water is therefore the

most important article of food for the human beings. On a careful consideration of the mode by which water is drunk, the whole animal kingdom may be divided into two classes as follows :—

(a) Those that drink water by their mouths.

(b) Those that drink water by licking it with their tongues.

Under the first class may be grouped, the sheep, the cow, the monkey, the ass, the horse, the elephant &c, as they drink water by their mouth. The second class includes, the cat, the dog, the tiger, the lion &c., which drink water by licking it with their tongues. The former are herbivorous, while the latter are carnivorous. How do human beings drink water, which after air, is the chief element required by them? They drink water by their mouth and not by licking it by their tongues. It must therefore follow that men belong to that class which drink water by mouth and therefore ordained by nature to take that kind of food which such animals consume viz., herbs and fruits. This should clearly establish that men are not carnivorous animals.

3. Physical structure

An examination of the physical structure of animals shows that there is the closest affinity between the organs of man and those of the fruit-eating animal. The anthropoid ape is similar in shape and structure to man and it is a fructivorous animal. Its teeth and stomach are just like those of man while those of the carnivorous animal are different. There is also some similarity between the

organs of men and those of the herbivorous animals but the bowels of the latter are larger and differently shaped. These facts also will show that nature designed man to feed on herbs and fruits.

4. Teeth

By an examination of the nature of the teeth of animals it is possible to state whether an animal was intended by the creator to be carnivorous or not. The chief characteristics of the carnivores may be briefly mentioned. They possess three pairs of incisors or cutting teeth in each jaw. All have large and prominent canine teeth. The teeth are generally modified into more or less flat sharp blades which work upon one another somewhat like the blades of a pair of scissors. The hinge of the lower jaw with the stalk is so formed that the jaw is only capable of an up and down movement and cannot be worked from side to side as in the act of chewing. Thus it comes about that the molar or grinding teeth having no work to do, are either lacking or rudimentary among the carnivores. The herbivorous animals, on the other hand, have generally molars of a more or less complex character which being subjected to a considerable amount of wear on account of chewing the food, get worn down on the crown; but this is compensated for by the more or less continuous growth of the teeth. The lower jaw among the herbivorous as well as in man is so arranged that the jaw is capable of being worked from side to side indicating that the food should be chewed instead of being swallowed. One of the marked characteristics,

of human teeth is their similarity to those of the anthropoid apes. The teeth of man are relatively smaller than those of the apes. The canines are not developed so as to project above the line of the other teeth. The structure and nature of human teeth so different from those of the flesh-eating animals establish beyond any doubt that man's diet was prescribed by nature to consist of herbs.

5. The function of liver

One of the important functions of the liver of animals is to decompose the uric acid generated in the system. It is a scientific fact that the animal food generates a greater amount of uric acid, which if not eliminated, poisons the whole system and brings on illness. Now, Biologists tell us that the liver of carnivorous animals is bigger than that of human beings and is found to possess the power of decomposing uric acid ten to fifteen times more than that of the human beings. If nature intended that man should live on a meat diet, he would have been provided with a liver similar to that of flesh-eating animals. As he is not so provided, it follows that he should avoid eating the flesh of animals. By consuming such food, a great quantity of uric acid is produced in the system and as the human liver is not able to decompose it, the poisonous uric acid gets into the blood and causes many diseases and finally death.

6. Plants-food Producers

As has been stated already plants are the great food-producers, The fine divisions of roots explore

the soil in search of water in which are dissolved the salts of sodium, potassium, iron, phosphorus, calcium, sulphur &c. The hairs with which the root-lets are clothed, absorb this fluid and it is passed upward through long vessels by a sort of heart-pumping as discovered by Dr. Bose of Calcutta, until it reaches the cells of the leaf. In the leaf-skin there are innumerable pores through which the surplus water from the roots is evaporated and through which atmospheric air is admitted to the spaces between the leaf-cells. The chloroplasts in these cells have the power to utilize solar energy in decomposing the carbon-dioxide of the air and the cells retain the carbon setting free the oxygen. Water from the roots is broken up also into its elements, hydrogen and oxygen and with these and carbon, starch is formed. This starch is converted into sugar and is passed from cell to cell to parts of the plant where it is needed for the production of new cells, wood, bark, leaves or fruit. Starch is the material from which are made all the organic substances produced by the plant. It is for this reason that plants are called food-producers.

The animals, birds, and fish, on which man feeds, do not contain such an elaborate system for converting elementary substances into food. Now, let us suppose that all the animals, birds and fish from which man derives his food disappear from the face of the earth. Man can still continue to live on vegetables without any danger to his life. But, on the other hand, let us suppose, that for some reason, the plants and herbs are destroyed from this world of

ours, the inevitable result will be that all the animals which live on land, sea and the air will perish miserably in a short time. This will clearly show that the never-failing food prescribed by a wise Providence for the subsistence of human beings is nothing but vegetables.

7. The nature of the young of the carnivorous animals

The young of the carnivores, say, a kitten even before it opens its eyes, will be found to twist its tails on hearing the cry of its natural prey, say, of the rat. This will show that such animals by heredity and instinct disclose the kind of food prescribed by nature. On the other hand a human baby does not behave in the same way towards a kid or a lamb. It must therefore follow that animal food cannot be the natural food of human beings.

8. Food and latitude

The kind of food suitable to man is supposed to depend upon the distance of the place he lives in, from the equator. A law has been evolved to the effect that human beings require more meat if the place is cool and less meat if it is warm. Thus the more we go north, the more animal food and fat do we find eaten. In the south, people live mostly on fruits and vegetables. In temperate climates, a mixed diet partly animal and partly vegetable is taken. It is no doubt true that people tend to become fruit and vegetable eaters, where these foods grow abundantly, but where they are not plentiful, people consume

more meat. But this cannot be enunciated as a law of life. In the first place, we do not find any structural alteration in the physical body of the people who live in the colder regions so as to enable them to live on a meat diet. We have found that the animals which live on a flesh-food have peculiar teeth, larger liver and many other structural alterations; no such physical differences are found between human beings in warmer climates and those in colder regions. Secondly, people who migrate from a cold climate and settle down in warm lands do not give up their meat-diet under the operation of the above said law. If latitude is a factor which determines the kind of food a human being should eat, many Europeans who have settled permanently in India should tend to become vegetarians. But the force of habit and custom is so strong that they continue in the tropics the food they were accustomed to take in the temperate zone. The vegetarian of the warmer regions manages to get on most comfortably on a non-meat diet even in a very cold country. The statement of law enunciated above cannot hold good as an axiomatic truth.

But there is a law which governs latitude and food. It may be stated that a land where food-plants do not grow was never intended by nature to be fit for human habitation. The races that lived in the Arctic regions where food-plants do not grow have perished or will perish soon. No doubt the ingenuity of man will find ways and means to carry on some sort of existence even in such places. The Eskimos live on animal flesh and fat. But the irresistible law

of nature mentioned above must relentlessly continue to operate and the disappearance of a race living in a place where food-plants do not grow is only a question of time.

The reasons set forth above will clearly establish that Nature did not intend that human beings should live on an animal diet like the carnivorous creatures. Some other considerations may also be advanced to show that a meat diet is not desirable for human beings either exclusively or with vegetables.

1. Cruelty

The meat diet involves awful suffering and acute agony to millions of dumb animal creatures. The animals are very sensitive to the smell of blood and it is observed they get a shock when a butcher approaches them. Dr. Bose of Calcutta thinks that the plants also experience a similar shock when they are about to be plucked for the table. But this shock can be perceived only with the aid of powerful instruments specially constructed for the purpose, whereas in the case of the animals, it is visible to the naked eye, by their refusal to take food and their general apprehension of fear. Moreover, it is not known whether the nervous structure of plants is so well-developed as in animals. The removal of the animals marked for death from the market or the place of rearing to the slaughter-house is attended with much cruelty and brutality. They are made to witness the blood-dripping carcasses of their companions and the inhumanity attending their slaughter is really heart-rending. If the meat-eater will witness the agony and suffering endured

by these weak creatures, it is doubtful if he will continue to live on such an unholy diet. The vendor of the animal and the eater of meat are as much guilty, as the stone-hearted butcher, of the horrible cruelties that are inflicted on the animals that are killed for the table. "He that killeth an ox" says the prophet Isaiah "is as if he slew a man". If each man kills the animal he requires for his food, it is doubtful whether he will continue to be a meat-eater, as much cruelty is involved in the process. When dame nature has spread a bloodless feast on a lavish scale for man, why should he inflict so much unnecessary pain on innocent sheep and lamb ?

2. An experiment

An incident in the Jewish history mentioned in the Book of Daniel may be quoted in support of vegetarianism—"And the King (Nebuchadnazar of Babylon) spake unto Ashpenaz the master of his eunuchs that he should bring in certain of the children of Israel even of the seed royal and of the nobles; youths in whom was no blemish but well-favoured and skilful in all wisdom and cunning in knowledge and understanding science and such as had ability to stand in the king's palace; and that he should teach them the learning and the tongue of the Chaldeans. And the king appointed for them a daily portion of the King's meat and of the wine which he drank and that they should be nourished three years; that at the end thereof, they might stand before the king. Now among these were the children of Judah, Daniel, Hananiah, Mishael and

Azariah. And the prince of the eunuchs gave name unto them; unto Daniel, he gave the name of Belleshazzar and to Hananiah, of Shadrach; and to Mishael, of Meshac; and to Azariah, of Abednego. But Daniel proposed in his heart that he would not defile himself with the king's meat nor with the wine which he drank; therefore he requested of the prince of the eunuchs that he might not defile himself. Now God made Daniel to find favour and compassion in the sight of the prince of the eunuchs. And the prince of the eunuchs said unto Daniel, I fear my Lord the King who hath appointed your meat and drink; for why should he see your faces worse looking than the youths which are of your own age? So should you endanger my head with the king. Then Daniel said to the steward whom the prince of the eunuchs had appointed over Daniel, Hananiah, Mishael and Azariah, 'Prove thy servants, I beseech thee, ten days and let them give us *pulse* to eat and water to drink. Then our countenance be looked upon before thee and the countenance of the youth that eat of the king's meat; and as thou seest, deal with thy servants.' So he hearkened unto them in this matter, and proved them ten days. And at the end of ten days, their countenance appeared *fairer* and they were *fatter* in flesh than all the youths which did eat of the king's meat. So the steward took away their meat and the wine that they should drink and gave them pulse." This practical experiment on human dietary, conducted about three thousand years ago establishes beyond the shadow of a doubt the superiority of pulse over meat and of water over wine.

3. Vegetarians and Physical strength

It is a vulgar superstition to say that the vegetarian diet is not capable of producing the greatest physical strength and ability. It cannot be stated that the races who live on animal food are stronger and have greater amount of endurance than those whose diet is vegetarian. The Japanese whose main diet is rice demonstrated that they were stronger than the Russians whose diet is non-vegetarian. The physical strength lies not so much on the food taken as on the power of assimilation of the same in the body. The elephant lives on plantain stems and cocoanut fronds but its strength is simply marvellous.

The following occurrences have been often quoted :—

“ In Germany 14 meat-eaters and 8 vegetarians started on a seventy mile walking-match. All the vegetarians reached home in splendid condition, the first, covering the distance in 14½ hours. One hour after the last vegetarian came in, the first meat-eater appeared and was greatly exhausted. All the other meat-eaters had dropped out. The race from Dresden to Berlin in 1902 was also very interesting, and the competitors consisted of 18 vegetarians and 14 meat-eaters. The vegetarians and three meat-eaters completed the race ; and Karl Mann the winner was seven hours in front of the first meat-eater and he was a strict fruitarian and practically never touched ordinary vegetable foods. Dr. Alexander Haig examined the winner two or three weeks after the race and reported, ‘his circulation was far better than

that of any meat-eater and the records show that his heart was smaller at the end of the race than at the beginning. In my opinion the meat-eaters who gave up have dilated hearts owing to their obstructed circulation."

Another fact also may be quoted from "How to keep well" by Dr. Web Johnson. "In the desert, many Arab tribes live on dates, corn and water; and individuals are said to live to a very advanced age - even 200 years - and they are recognised as being very strong and healthy and capable of enduring great hardships; when however they migrate to the cities and learn to eat meat and drink alcohol, they degenerate physically and morally and become lazy and quarrelsome".

4. Flesh diet and disease

Medical experts affirm that the meat-diet is the chief cause of different kinds of diseases. Many diseases are greatly aggravated by flesh eating. This is not unexpected because a great amount of meat consumed is derived from animals killed in a state of chronic disease. The tissues of swine can never be healthy as they feed on filth of all including diseased persons. Moses, the Law-Giver, forbade it as a food for the Jews and the followers of Mohamed, the Prophet, strictly eschew it. Birds like hens, geese, turkey and pheasant similarly carry disease to their consumers. The sewage of large cities is carried to the rivers and the sea. The fish become contaminated by the filth on which they feed. Fish is the staple food of the majority of the people and they do

not realize that the contaminated fish is the cause of much ill-health. Cholera is a disease which is considered to be caused by infected fish. It is well-known that this terrible epidemic causes the greatest havoc among the fish-eaters.

Expert opinion

The opinion of a few experts selected from a paper prepared by C. W. Forward on the effect of Butcher's meat on the human body may be quoted here. "Sir Arthur Keith expresses the opinion that the whole system of mastication, the teeth, the jaws, the face and throat, has undergone and is undergoing a process of degeneration in man; and that, further the lower part of the bowel, the appendix, the caecum and the colon are degenerating. He thinks that the degenerative changes in these two regions are manifestations of a common cause which may be an alteration in the kind of food upon which we modern people live. Our alimentary system was evolved through millions of years to cope with the food of primitive man and our digestive system may have become unbalanced by the nature of our diet."

"Mr. Thomas Ryan tells us that on an examination of 10,500 school children, the British Dental Association found 80 per cent suffering from more or less pronounced defects of the teeth, the result of a diet lacking in the essential mineral elements."

"One of the most marked effects of butcher's meat is the condition known as intestinal toxæmia—the result of putrefaction process in the large intestine,

whereby poisons are formed and absorbed into the system. Bouchard proved that the toxicity of an extract prepared from the contents of the bowel was twice as great in the case of a person living on a mixed diet as compared with that of an abstainer from meat; and Herter remarked upon the highly poisonous properties of the bowel-contents in carnivorous animals in comparison with herbivorous animals".

"Matchnikoff held that the inherited structure of the human intestine and the customary diet of civilized men are specially favourable to the multiplication of a large number of microbes that cause putrefaction. Not only, he declares, is auto-intoxication from the microbial poisons absorbed in cases of constipation but microbes themselves may pass through the walls of the intestine and enter the blood. Curiously enough he recommended not the modification of the dietary to suit the anatomical structure but the alteration of the anatomical structure to suit man's unnatural diet. In other words, he advised that if our colons interfered with our meat-eating habits, we should seek the assistance of the surgeon and cut out our colons. This suggestion was too much for Sir A. Keith, who remarks "If Matchnikoff's system is well-founded, then the colic system in man is a gigantic blunder in animal construction. We have always supposed that nature made no mistakes. What little we know of the function of the colon favours the opinion that the fault lies not in the colic system, but in the nature of the work it is asked to perform in modern

man. Its main work in our ancestors consisted in the digestion of the cellulose of husk, elements of grains and of fruit and vegetables. Our modern dietry is totally different from that for which it was evolved. Should we then blame the colon and call it a useless structure?"

"Kellogg declares that the colon of the average man is in the condition of a congested railway system. The right of way is choked and if bowel movements occur, they are belated two or three days in arrears; the residue of half a dozen or more meals being packed away in the colon undergoing putrefaction and poisoning the body".

"In commenting upon the increase in the quantity of butcher's meat eaten per head from three pounds per annum in 1850 to 50 pounds in 1900, Sir. A. Keith remarks that we have here the most important factor in the development of appendicitis".

"The pulse of an abstainer from meat might be slower than that of a meat-eater by as much as ten beats per minute. This represents something like 500 beats per hour, or 1200 per day to the advantage of the former. These extra 12,000 heart beats per day or 40,00,000 per year seem to explain the increase of diseases of the heart and arteries in meat-eating communities".

"High blood pressure is the bane of the meat-eater. It gives him a false sense of physical strength which is too often the prelude to a physical breakdown. Dr. Clifford Albutt declares his opinion that the persistence of high arterial pressure-a condition

that is one of the direct causes of arterio-sclerosis is due to excessive feeding with meat and wine".

"Brice and Drilling point out that the amount of urea, the secretion of bile, the proportion of stone-plycogem in the liver may all be modified by the amount of food allowed and that the bile, urea and plycogem may be made to vary with relative proportion of starchy and sugary food as compared with the nitrogenous elements supplied".

"The kidneys of the meat-eater have imposed upon them the double duty of removing from the blood the waste matters of human body plus those of the animal upon whose flesh it has been fed."

Dr. Paul Carton says "There is clear evidence in medical practice of the part played by meat in causing Dyspepsia, Enteritis and Appendicitis, in favouring the out-break of Typhoid and Dysentery, in forming the rallying ground for the germs of Tuberculosis and cancer."

From the foregoing statements, it will be seen, that the meat-diet is the cause of many of the dreadful diseases that afflict humanity. Modern science attempts to cure these diseases by means of drugs. It may be possible to effect temporary cures by means of medicine. But so long as the root-cause of diseases viz. meat-diet is not eradicated, the result must be increased sickness and untold miseries to human beings who were made to enjoy life as happily as the birds of the air.

5. Blood poison

A strictly non-meat diet keeps human blood in a condition of purity. Sportsmen assert that a

herbivorous animal like the deer, if wounded, gets healed without much difficulty. If on the other hand, a carnivorous animal is similarly wounded, decay sets in and death ensues. The experience of surgeons goes to show that operation on vegetarians is safer and more successful than on those whose usual diet is animal flesh. This is due to the contaminated condition of the blood caused by the meat of diseased animals.

6. Flesh of carnivorous animals

If human beings should live on a meat-diet, how is it they do not feed on the flesh of animals which live on other animals? The system of dietry prescribed by law-givers forbid the eating of the flesh of carnivorous animals on the ground that it is unclean and unwholesome. Men and the beasts of prey consume the same kind of animal flesh and if the one become unclean by such a food, it must follow that the other also must become similarly unclean. It was perhaps for this reason that the notorious system of untouchability and un-approachability of India came into existence. But a people who live on milk and ghee which are products of animals and in some places on fish, should not have thus treated other poor people who on economical grounds took to flesh-eating. There is also an inconsistency in not extending the same treatment to other races who equally offend against the vegetarian law of diet. Efforts are now being made to abolish untouchability and unapproachability. This can be done only by a vigorous propaganda

of humanitarian principles and if all the depressed classes will take to vegetarianism, the evil of untouchability may be easily abolished.

7. Diet and intelligence

Animals which are herbivorous are found to be more intelligent than the carnivores. The elephant and the monkey are considered the most intelligent among the members of the animal kingdom and these live on a purely vegetarian diet. But those animals which live on the flesh of other animals are very dense in their intelligence. The effect of eating flesh is to put on flesh and cannot contribute to the development of the brain. It was for this reason, that Auvayar stated, "It is better not to increase one's flesh by eating flesh". The superiority of man over animals is due to his intelligence and if he continues to live on animal flesh there is no doubt he will degenerate into a lower grade of intelligence.

8. Diet and Character

The nature of the diet has a great effect in shaping the character of the person who lives on it. The animals which live on the flesh of other animals are cruel and ferocious in their character. In ancient days, the gladiators who were trained to fight with wild animals were fed on raw flesh so that they might show a good fight against the beasts of prey. In the same way people whose main dietry consists of meat are selfish, aggressive, warlike and cruel. They become irritable, quarrel-some, bad-tempered and

develop other bad qualities. Chicago is the greatest meat-packing and meat-eating centre. It is also a hell on earth in point of crime. On the other hand those that live on vegetables are peaceful like their kindreds of the animal kingdom which feed on herbs of the field. The aim of civilization is to remove mankind as far as possible away from the qualities of the beast and this can never be achieved without the change of the diet into a vegetarian one.

9. Diet and Economy

On economical grounds also, the meat-diet has to be avoided. The following quotation is worth reproduction :—

“The late Lord Playfair, under whose directions a series of official investigations on the subject of military rations in England, France, Prussia and Austria was carried out some years ago, calculated that an adult man in good health requires daily four ounces of proteinaceous substances and at least ten and a half ounces of dynamic substances (hydrocarbons and carbo-hydrates). To obtain this proportion of proteinaceous food it would be necessary to consume *weekly* :—

	s.	d.
147 oz. of butcher's meat costing about	6	1
or 93 „ „ cheese „ „	3	0
or 341 „ „ white bread „ „	2	8
or 175 „ „ oat-meal „ „	1	6
or 127 „ „ dried peas „ „	1	2

Whilst in order to supply the necessary proportion of heat and force-producing material, the following quantities would be required :—

	s.	d.
416 oz. of butcher's meat costing about	17	4
or 224 „ „ cheese „ „	7	0
or 298 „ „ white bread „ „	2	3
or 616 „ potatoes „ „	2	9
or 221 „ dried peas „ „	1	10
or 183 „ oat-meal „ „	1	7

The above tables show oat-meal to contain in almost exact proportions the elements needed for nutrition. Present prices are higher but the ratio is the same ”.

Oat-meal is the natural food of the Scots and this may partly explain the intelligence, enterprise, and success of the Scotchman in the world at large. The tables mentioned above also show that the vegetable diet is more economical than the meat diet in point of quantity and cost.

One cause of poverty among human beings may be the unnatural taste developed for a meat-diet. There are more than three hundred varieties of herbs and grains fit for human consumption. The ingenuity of man if properly directed may increase the number of such foods. If every one who has a bit of land at his disposal will cultivate a kitchen garden, there is no necessity to go to the market for his daily necessities. Meat is more costly and at the same time unhealthy. It is therefore a matter of supreme importance to convert the people of our country,

which is economically very poor, to a vegetarian diet. This will not fail to bring health, activity and wealth to the people.

10. Food Waste

All classes of food can be divided into Body-building foods and working foods. The first class consists of mainly nitrogenous foods and the second class of carbo-hydrates and fats. The meat-eaters are under the mistaken impression that meat which generally contains a greater percentage of protein is more important than vegetables which contain a higher percentage of carbo-hydrates. That is to say, they hold that the body-building food is more important and necessary than energy-producing food. The human body may be compared to a steam engine. An engine consumes a greater quantity of coal and water than it will consume iron to mend it. So it is with our bodies, at any rate after full development. We require more working-food-fats and carbo-hydrates than we do body-building food. Dr. H. C. Menkal has forcibly expressed this aspect of the matter. "Once a house has been completed, there is need for only a small quantity of building material there-after for maintaining essential repairs. The same is true of the body after it has reached mature development; thence-forward only a small quantity of "building stones" viz., proteins, is required to replace the small daily tissue-loss. An excess over the actual needs of this food element clogs the machinery much, as excess of carbon clogs the water engine or clinkers choke the fires of a boiler and the result is, lowered efficiency and a shortened life."

The actual amount of tissue, as is stated just now, that has been wasted and that requires replacement is very small. But a meat-eater supplies a greater quantity than is actually needed for repairing the waste. The consequence is that instead of repairing the system, we give over-work to the liver and the kidneys in expelling the excess matter supplied. Thus we see a greater amount of nitrogenous food is not required for the body.

11. Sanitary Considerations

The places where vegetable food is prepared are generally clean from a sanitary point of view. The same cannot be said about animal food. The cuttings, bones and other useless parts of the animals, birds and fish make the surroundings stink with bad odour. The fishermen's quarters are notorious insanitary dens which are the root-causes of many kinds of diseases in an epidemic form. The decay of animal matter is the reason of this unhealthy state of affairs.

The same consideration may be extended to the stomach which may be termed the kitchen of the human body. The flesh used as diet undergoes decomposition and putrefaction in this system. The germs inimical to the health of human beings live and flourish upon such putrefied food. Those germs generate certain toxins which are very poisonous. Constipation is also brought on and the contents of the intestines become more loathsome than the worst latrine. The poisonous toxins get into the blood and loss of health is the inevitable result.

The faeces of herbivorous animals are pleasant to the sight and are used as a sort of disinfectant to drive

away flies which love to swarm round filth and dirt. But the faeces of men who live on a meat or a mixed diet invite the flies even in the wildest deserts on account of its foulness. If the merit of a cause can be judged by its effect, surely this one consideration must warn intelligent human beings of the danger of a diet in which meat forms a part and make such a diet undesirable for human beings.

A careful consideration of the facts and figures mentioned above must convince every one that a meat-diet is not the natural, healthy or economical food for human beings. Meat or flesh of animals birds and fish in any form should therefore be avoided.

II. Foods derived from animals

Some foods such as milk, cheese, butter, ghee, and eggs are obtained, from animals, birds and fish. Milk is the most important food in this class and we shall proceed to consider its value as a food.

Milk

The milk of the cow, and the buffalo plays a very important part in human life especially as it is the source of butter and cheese. In certain countries, quantities of goats' asses' and even sheep's milk are used although the milk yielded by these animals is not nearly so rich and wholesome as cow's milk. The average percentage composition of cow's milk is as follows :—

Water	87.10
Albuminoids (casein, albumin) ..	3.50

Milk sugar (lactose)	„	„	4.75
Butter (fat)	„	„	3.90
Ash	„	„	0.75

Milk thus contains a certain amount of all the essential constituents required for the up-keep of the human body and is therefore recommended as an ideal food. Certain breeds of cows yield better milk than others. The cow must have an abundant supply of fresh green pasture if her milk is to be good in quality. Some medical men question the value of milk as a food for adults. The chief objections of Dr. Webb-Johnson against a milk diet are given below with some notes of mine showing that the objections are not so serious as they are made to appear:—

(a) Milk makes no demand upon the functional activities of the muscles of mastication nor on the salivary, lingual or mucous glands.

This objection may be raised against many kinds of food. Water is an important article of food and if this objection is to prevail, water cannot be taken as it does not call forth the functional activities of the muscles of mastication &c. But no one will ever think of giving up water from being an important article of human diet, for the reason stated above.

(b) The mucous surfaces are lined with a film of milk which block their orifices and form a Nidus for the growth of saphrophytes.

(c) A milk diet causes a foul mouth, coated tongue and acidity proving functional inactivity and initial structural decay.

These two objections can be removed by a copious supply of good water to the system.

(d) The quantities of cow's milk are variable depending on the food, the health and the housing of the cow.

This cannot be a serious objection as it is incumbent on every owner to see that the cow is given proper food and is housed properly.

(e) The vitamins are not present in large enough quantity and vitamin A depends upon the supply of green fodder given to the cow.

It must be the duty of every owner to give green fodder to the cow ; such food as oil-cakes &c. should be avoided.

(f) Milk is apt to coagulate into a firm solid within the alimentary canal and often patients will be found to evacuate from the bowels undigested masses of curd,

(g) The formation of clots leads to constipation resulting in intestinal stasis and fermentation and a train of symptoms which may be briefly referred to as alimentary toxæmia.

These results can be avoided by taking milk diluted with water or aerated water and if necessary with a little sugar or lime water.

(h) Milk is too bulky a diet for an adult and it contains too great a proportion of albumen and too little carbo-hydrate and organic salts.

The evil mentioned in this objection can be prevented by taking a less quantity of the article. The deficit in carbo-hydrates and organic salts can be made up by other foods.

(i) Milk and milk diet are the commonest cause of dental caries and pyorrhea.

(j) Many infectious diseases are conveyed by milk.

The evils mentioned in these objections can be removed by boiling the milk properly before taking it.

(k) Only the digestive apparatus of an infant is adopted for the proper digestion of milk and owing to the acid gastric juice secreted in the stomach of the adult, milk forms large tough curds which are not easily digested.

This objection can hold good, only if milk forms the sole diet of the adults. The water and the other substances usually taken go a long way to mitigate the evil mentioned above.

(l) Milk is seldom sipped slowly as it should be taken.

This does not contain any evil in the article itself but only in the mode of taking it which can be corrected.

The objections given above are not so serious as to make milk and its derivatives obnoxious articles of food. Another objection is generally raised that nature never intended that the milk obtained from animals should be used as a food for man. It is the natural food of the calf. But the amount of milk produced by a good cow is more than necessary for its calf. That being so, no injustice is done to the young of animals by taking the superfluous quantity of the milk for the food of man. There is, however, some cruelty done to the calves by the ordinary

milk-vendors who do not give a sufficient quantity of milk to them. This is due to the avarice of milk-vendors and also the shortage of cattle due to their slaughter for flesh-food. It is stated that in the beginning of creation, God said unto the first pair of human beings "Have dominion over the fish of the sea and over the fowl of the air and over every living thing that moveth upon the earth" (Genesis 1-28). This verse is quoted as an authority for killing the animals. This is not warranted by the text. The authorization was for enjoying the animals for service and their product for food. Mr. E. H. Miles says "The Lord of everything in a country need not necessarily use everything in that country for food. He may even have some of the sentient beings in that country as his friends or he may make them work or he may let them die out altogether. It might seem that the Jews were allowed to eat animals by divine order but "divine order" has been credited with a large number of mistakes; and besides, the Jew's meat was bloodless meat. The objection that if we do not kill animals we shall be over-run with animals and that if we do not breed animals for food we shall have no animals at all practically cancel one another. Both are ridiculous."

Though there may be the greatest objection to the use of animal-flesh for food, there cannot be any to utilize its product e. g. milk as food. Of course the animal must be fed with green fodder, housed properly and kept in a healthy condition. The milk of such an animal is the best form of natural food and people who have strong aversion for the flesh of

animals need not have any scruples to use milk as part of their diet.

The derivatives of milk such as cream, cheese, butter-milk, ghee &c. are equally valuable foods supplying the necessary amount of protein and fat and keeping up the health and strength of human beings.

Eggs

Eggs being the produce of birds belong to the order of nitrogenous foods. The protein element predominates in them. The eggs mostly used by men are those of the ordinary hen, though duck's eggs and goose's eggs are much liked by some people. The constituents of eggs are as follows:—

	Water	Protein	Fat	Non-nitrogenous matter	Mineral matter
White	85·7	12·6	0·25	Nil.	0·59
Yolk	50·9	16·2	31·75	0·13	1·09

The white of egg is nearly all albumen. The yolk is the more important part of an egg. It contains in addition to protein, considerable fat and mineral salts, especially iron, phosphorus and lime. The egg is naturally nutritious and is most digestive if boiled lightly. When freely used, it causes constipation. It is also a stimulant. There is life-germ in it and to destroy life in 'Posse' is as bad as to destroy life in 'esse'. Mr. Miles says:—"Eggs are also irritating and stimulating to certain people. Here also Dr. Haig is emphatic as to the results. Dr. Hutchison says that eggs contain Proteid in abundance but also, "at least in their

yolk, something that may be true nuclein which is a source of uric acid or may be merely a paranuclein." Dr. Haig says "that he gradually eliminated from his diet all articles that contained even the smallest quantities of this, as he got very distinct evidence that this, when taken every day, decidedly increased the excretion of uric acid." Uric acid is a substance found normally in small quantities in urine in combination with sodium, potassium and aluminium as urates. It is present in large quantity in various diseases particularly gout. Uric acid is believed to be the cause of such diseases. It is advisable therefore to avoid eggs as an article of food.

III. Vegetable

This term, in its narrow, everyday use indicates any herb that is cultivated specially for table use in whole or part such as turnip (root), cabbage (leaves), broccoli (flowers), peas and beans (fruit). In its widest sense it includes all living things that are not animals, trees, shrubs, herbs, fern, mosses, sea-weeds fungi and the microscopic diatoms. We shall here use the word in its narrow sense and consider in some detail, the different classes of vegetables used as food.

1. Legumes

Legume is a term denoting one form of fruit commonly known as Pod. It is the characteristic fruit of peas, beans, and other plants of the order of Leguminosae which are natives of all parts of the world. The roots of this order of herbs, shrubs and trees, as a rule bear tubercles produced by a bacterium

which enables the plants to utilize the free nitrogen of the atmosphere. The edible seeds of a very large number of the species are known as pulse. A distinctive albuminoid found in the leguminous plants is known as Legumin. It is also called vegetable casein owing to its resemblance to the casein of milk. The vegetable cheese made in China and Japan from Soya bean consists largely of leguin. This substance predominates in such seeds as dhal, beans and peas. They are rich in albuminous or protein elements, the proportion being thrice that of wheat and 50 per cent greater than beef-steak. They also contain a liberal supply of carbo-hydrates and salts. They are therefore capable of supplying body-building and energy-producing foods required for the human body.

The nitrogenous elements in some of these seeds as green peas, are found to exist in the skins in much larger quantity than in the kernal. If the skin of green peas is thrown on a wet yard, it will stink in a few minutes like decayed flesh on account of the nitrogenous matter contained in it. It is a mistake therefore not to use the skin. It is usual among the majority of people in Travancore to eat the green peas, boiled with skin and all, and seasoning it, for their break-fast of rice-porridge. This preparation is found sufficient to give them ample supply of proteids and carbo-hydrates.

Dr. Menkal says "By depending upon these foods for a good part of the protein supply, rather than flesh foods, one gains an additional advantage due to their alkaline base-forming properties. Their

base-forming properties aid materially in counter-acting the tendency in modern feedings towards an acid ash-forming diet."

"All our foods may be divided into two classes, those which leave after digestion an acid-ash residue and those that leave an alkaline or base residue."

"The mistake of modern feeding is that it inclines strongly to an acid-forming diet. Acidity is inimical to the best interests of life and health. It is well to know, therefore, that the foods which leave an acid-ash are eggs, fish, meat, fowl, cereals and ground-nuts; where these are made use of, it is essential to provide liberally those foods which counteract this tendency of acidosis by their alkaline or base-forming elements. Such foods are the legumes just mentioned, green vegetables, usually served as salads, also cauliflower, beat, carrots, potatoes, turnips, asparagus, tomatoes and all fruits both fresh and dried."

2. Green Vegetables

Green vegetables are not high in nutritive value. But fresh vegetables are an abundant source of the newly discovered food elements called vitamins. For this reason some fresh uncooked food should be eaten at each meal. They also supply, potash, iron, calcium and other salts in important quantities. These vegetable foods also prevent constipation.

We shall consider some kinds of ordinary green vegetables.

(a) POTATOES

Potato is a native of South America; it is said to have been introduced from Peru into Europe by

the Spaniards early in the 16th Century and into England by Sir Walter Raleigh about 1585. It is now cultivated in India in high altitudes. It is available everywhere in India and can be kept for a long time. It is readily digested and ranks high in nutritive value. Dr. Menkal says "The potato is counted as a food low in protein element but according to the great Danish scientist, Hinhede, it contains sufficient of this food element to meet man's needs under the strain of heavy labour."

3. Other kinds of roots

Chena (Elephant yam) is a very healthy food. *Chempu* or Egyptian arum and *Kachil* are other edible roots. *Tapioca* is the poor man's food, and can be used in various ways. Its flour is said to excel many other kinds of flours. It is a pleasant digestible food ; cut into small bits and dried in the sun, it can be kept for a long time without being spoiled.

The common vegetable are the Brinjals (Kathiri), Cluster beans (Cheni avarai), Cucumber (Vellari), Lady's finger (Vendai), Snake-gourd (Pudalai), Bitter-gourd (Pavakai), the Drumstick (Muringai), the Pumpkin (Mattankai) &c. They are rich in mineral salts.

Cereals

The name cereal is given to cultivated grasses that constitute grain crops. It is derived from Lat. Ceres goddess of corn. Cereals are of primary importance in agriculture being the source of bread-stuff and also producing straw which is valuable as a

feeding stuff for cattle. The familiar cereals of temperate climates are wheat, barely, oats and rye, white maize (Indian corn), rice, durra, and millet; other less known forms flourish in warmer parts of the world. The origin of these cultivated species from wild plants dates from remote antiquity. A grain of corn though familiarly called a seed is in reality a fruit but the distinction is only of botanical importance. The internal part of such a grain is a store of nutritive matter chiefly consisting of starch with a thin external layer of nitrogenous nature. In the preparation of flour for whole-meal bread this is preserved, so that, this kind of bread is of more value as a food than the white bread which is chiefly composed of starch. The husk contains also minute quantities of vitamins which play an important part in the nutrition of the body.

The important grains used by mankind for food are wheat, oats, rice, maize &c. These provide nearly all the substances required for man's needs in almost correct proportion with the exception of rice which is low in protein element.

(a) WHEAT

Wheat is the best of all the cereals. Whole wheat-bread possesses properties which so nearly represent the constituent parts of the body as to make it ideal for building up and keeping in repair the human organisation. "Give us this day our daily bread" was the prayer taught by Lord Jesus Christ and if every one makes it a point to obtain and live on whole meal wheat-bread, humanity would

have been better off in every respect. Dr. Menkal says "Wheat is the best of all bread-making grains as well as of all the most nourishing because of the large amount of gluten which it contains. Gluten is one of the most valuable elements of the grain. It serves specially to build up brain, bones and muscle as well as blood. Gluten is found most abundantly in the outer layer of the kernal, the chief remaining constituents being starch. It is for this reason that flour should be made of the entire grain possessing these important elements."

(b) OATS, MAIZE AND BARLEY

These grains chiefly resemble wheat in their constituents. These cereals are best served as porridge or scones. They are deficient in vegetable gelatine although they are quite rich in other albuminous elements.

The porridge made from oat-meal is very valuable as a food. It is a most whole-some breakfast dish especially for growing boys and girls. It has been said that the poorest classes of Scotch people owe a great deal of their health and strength to the fact that porridge is very largely their chief food. Oat-meal contains a great deal of the nitrogenous substance called gluten so valuable in food.

(c) RICE

Rice is a valuable food easily grown, easily cooked and easily digested. It is rich in carbohydrates, mineral salts and water soluble vitamin. One half of the world's population live on rice as their

principal article of food. It is however deficient in nitrogenous constituents and on this account it is not so nourishing as wheat or other cereal grains and demands the addition of leguminous seeds like dhal, peas &c. and of milk and butter-milk or meat and fish in the case of some. It is also deficient in fat and therefore requires butter or ghee to be added ; salt also is ill-provided for ; hence it needs the aid of condiments, curries, chutneys &c. In the southern parts of India, paddy is partially boiled and then dried before it is husked. Rice prepared from un-boiled paddy seems to be more healthy. For actual eating the rice is first carefully cleansed with water and then allowed to boil slowly till the grain becomes soft, when the superfluous water is strained away and the rice allowed to cool ; it should not be over-boiled into a pulpy mass, but the grains should be soft and not adhere to each other. The poorer classes live solely upon the conjee (rice-porridge) and they seem to be better in point of health and strength.

A substance named orizonia, a salt of iodine, is found in rice-bran ; white rice polished in mills lose the cover or bran which contains the said substance. Beriberi, a depressing disease of the nervous tissues characterised by degeneration of certain nerves is found to occur among people who use the white polished rice as a staple article of food.

4. Fruits

Dr. Webb Johnson says " the value of fresh fruit in the daily dietary cannot be overestimated, a value that consists on the alkaline mineral salts and feeble

acids and the potassium and calcium salts. The tartaric and malic acids in fruit are quickly burnt up and form alkaline carbonates. An ideal fruitarian meal would consist of a mixture of almonds, and Brazil nuts, with grapes, apples and oranges. The relative value and importance of fruits are said to be according to the following order :—

Apples, grapes, bananas, oranges, peaches, pears, apricots, pine apples, plums, strawberries. * * *
Analysis of an orange after it has been peeled shows it to contain 80 per cent of water and about 10 per cent of sugar, citric acid and citrate of potash, albumen cellulose &c.

Both oranges and bananas are excellent articles of diet but it must be remembered that they are foods and should replace other foods and not be taken in addition to them."

In addition to the nourishing value they are indispensable as natural laxatives and for other disease-preventing properties.

Some of the fruits may be considered in detail.
Plantain.—Several varieties of plantain are known to exist, each having a special characteristic. The Padathy or Chingan, Tavan Kathali or Mutti and the varieties of the Poovan are the most valuable ones for eating purposes. The Palayancodan, Peyan and Rajathali are very nourishing fruits. The plantain is considered very nutritious and wholesome either dressed or raw. The fruit contains every element of food mixed with fragrant principles. It is almost the only tropical fruit without stone or core of any sort, which can be eaten without any inconvenience. The

nutritive value of banana is considered even superior to that of the potatoes. The following represents the percentage composition of the pulp of the ripe banana:—

Nitrogenous matter ...	...	4.820
Sugar, pectin &c. ...	...	19.657
Fatty matter ...	...	0.632
Cellulose ...	...	0.200
Saline matter ...	...	0.791
Water ...	...	73.900

Mango fruit.—This is very abundant all over the country though the quality of the fruit varies in different kinds. Any fruit free from acidity is good for consumption. The graft-mango fruits are the best. They are very nourishing. The fruit of the best cultivated kinds is very delicious.

Jack fruits.—These fruits which grow to an enormous size, hang by a peduncle from the stem and larger branches and often form part of the stem touching the earth. Two varieties are recognised, one known as *Koozhan* the fruits of which are generally used green as curry stuffs, being not so delicious, when ripe, as the other sort *Varikka* or honeyjack which is eaten as a ripe fruit. The latter variety is a delicious fruit highly valued for its taste and nourishing properties.

5. Nuts

Nuts in their various forms present the most concentrated nutriment of all food substances. They are rich in protein and also contain carbo-hydrates, fats and mineral salts. So rich are they in protein or

albumin content, that one pound of nuts equals two pounds of beef-steak. Dr. Menkal is of opinion that "the pea nut, the almond and the English walnut are particularly desirable sources of complete protein, when meat is to be discarded from the diet. Four or five ounces of nuts, if this is to be the exclusive source, afford an abundance of protein for a day's ration; but half this quantity will suffice to supplement the proteins of an ordinary varied non-flesh diet. If nuts are not used in the daily non-meat diet, then two eggs, or a pint and a half of milk should be added to the regular vegetable fruit and bread ration. Either of these will insure the amount of complete proteins."

Some information about cashew-nut may be given here. The cashew-nut tree is not indigenous to India or Ceylon. It was introduced into India by the Portuguese and hence known as Parangima. The cashew mangoes or apples are only the swollen red or yellow peduncles which bear at their widened extremities, the nuts or the real fruits of the tree. These nuts when mature are hard and glistening, dark gray in colour, uniform in shape and contain each a curved inch-long kernal. The kernal is a most delicious food whether as a boiled dish or fried when mature. It resembles the best almond in taste containing large quantities of a nutritious oil. The shells also contain a black caustic oil which is got rid of by roasting.

Ground-nuts are also valuable as food.

The two kinds of nuts mentioned last contain an oil which may be used as a substitute for olive oil. They are rich in fat and very difficult to digest.

Foods and their function

Having considered the three classes of food, we shall proceed to discuss the foods absolutely necessary for human consumption,

The purposes for which food or nourishment is taken by animals including human beings are two-fold :—

1. Building up the body and repairing waste. The foods which serve this purpose may be called the *body-building foods*. The nitrogenous foods are the great means by which the human body substance is not merely made but through which it is always being repaired to make up for the loss of substance which the body's work causes. The chief body-building foods or the foods which build up the body and repair the daily waste of tissues are :—

1. Water.
2. Proteids.
3. Mineral salts.
4. Vitamin.

II. Supplying material from which energy necessary for the activities of the body is derived. This class of food may be called the *working foods*. The human bodies get their power of doing work from two kinds of food :—

- (1) Fats.
- (2) Carbo-hydrates,

These foods being burned in the body by a chemical action give to the muscles and the other parts the power of doing work. They are also heat-

producers; they give rise to heat in the body and this heat is transformed in the muscles into working power. Fat is the most powerful heat-producer. Carbo-hydrates also are valuable working foods and probably we depend for our power mostly upon them. We shall now proceed to consider this subject in some detail.

Body building food (I) Water

Water is a well known compound of hydrogen and oxygen. It is a colourless, tasteless and chemically neutral liquid. The human body is made up of one-third of solids and two-thirds of water. Water enters into the composition of every part of our body and largely in blood. Water is always used up in the body and is given off from the skin, the lungs and the kidneys. It is also needed for the digestion of food and for many other uses and actions in the body. Hence the necessity for the supply of a large quantity of pure water every day.

Water for human use is obtained either from wells or from rivers and surface springs. Well-water has gone through a natural process of filtration but although it may be clear and sparkling it is not necessarily fit for drinking purposes, as dangerous germs may still be found therein. Water from shallow wells in the neighbourhood of houses should be regarded with suspicion. The process by which water for large centres of population is purified are : -

1. Sedimentation by storage.
2. Filtration.

3. Sterilisation
4. Chemical treatment.

Water containing a high percentage of suspended matter and bacteria is improved by being stored in large open reservoirs. Most of the solid matter is deposited leaving the water in a better condition for filtration which is the next process. Filtration does not give absolutely sterile water. Sterilisation by hydro-chlorite or ozonized air gives good result. After being purified, water flows or is pumped to reservoirs from which it is distributed by a net work of iron pipes, buried under the earth.

The supply of pure water to the public is a very important function of every Government as many kinds of diseases are caused by infected water. There are many villages where it is not possible to obtain pure water for drinking and cooking purposes. The people therefore use the water from tanks or surface springs which are easily contaminated. Cholera is mainly a water-borne disease. From very ancient times, cholera in an epidemic form has devastated communities in many parts of India and elsewhere. Every village must be supplied with a good well as it cannot be expected that people will go over a mile or two to get pure water. Enormous sums are spent in fighting against this disease when it rages in an epidemic form. If this amount is spent in providing good water for each village, such diseases can be prevented and the lives of many can be saved. For after all, a healthy population is the real asset of a State.

For all practical purposes well-water heated to boiling point and then cooled in covered vessels, may be considered fit for human consumption. The amount of water required for a man depends upon the nature of the climate and the work he does. In hot countries a greater amount of water is required. Works which require much physical exertion may cause a great demand for water. Copious drinking of water at meal-time is condemned. If abnormal thirst for water is felt, one should see if it is not due to some disease.

Coffee, Tea and Cocoa

We have seen that water is one of the most important requirements of the human body. To meet this demand, people have fallen into the habit of drinking a decoction of coffee, tea or cocoa with milk and sugar. All these substances are poisonous. A doctor of New York is stated to have made a decoction of a pound of tea into half a pint. He found 10 drops of the same killed a rabbit three months old. He further reduced the decoction into quarter of a pint and found 8 drops of the same killed a cat in a few minutes. He calculated that there is sufficient poison in a pound of tea to kill 17,000 rabbits. Such is the nature of the poison in these substances. They impair the digestive powers so much that those who are addicted to the drink, lose their appetite for normal food. They are undesirable stimulants causing sleeplessness. People who are accustomed to them complain of head-ache and a feeling of exhaustion if they forego the same for a day. These drinks

have been found to be injurious to health and therefore should be avoided. Our forefathers did not know the use of these articles and they were healthier and blessed with longer life. It has now become a fashion and it is useless to suggest substitutes such as, fried wheat, coriander or dried ginger to take the place of these substances.

Alcohol

We see many persons complaining of thirst and going to the bar to quench it by drinking some kind of liquor. The natural drink for quenching thirst is water but from the dawn of history man has made for himself all kinds of distilled and fermented liquors. Alcohol is almost invariably obtained by dehydrating the produce of the distillation of fermented liquors. The raw articles used in its manufacture are sugar-containing materials such as molasses and starch-containing materials such as corn and potatoes. By far the largest amount of alcohol is obtained from starchy material. All kinds of material are employed, barley, oats, wheat and maize. The social, domestic and physiological evils of alcohol are so great that all civilised Governments have enacted laws to control its manufacture and sale. The United States of America and nearly the whole dominion of Canada have adopted total prohibition by State enactments. The habit of drinking distilled liquor differs widely among different races. The Hindus and Muhamadans generally abstain from alcoholic drinks out of religious scruples. It has been stated that the vice of alcoholism—using alcohol to excess—is least

prevalent among the nations who have known longest how to prepare drinks containing alcohol and worst among those to whom it has been introduced recently. Certain races e. g. the Red Indians, Patagonians, Terra del Fugians, Austrians, Blacks and East Indians who have recently learned to take alcohol are the most drunken. This factor has played an important part in their disappearance or diminution before the advance of the more civilized man, which must serve as a warning to Indians, who are thrown in the midst of a conflict of eastern and western civilizations. They are physically weak and if intoxication is added to the other causes that undermine society, no prophet is needed to foretell of their degeneration in the near future. This consideration should also make the temperance leaders work for bringing about total prohibition in our country.

It may be argued that alcohol being a vegetarian product, could serve as a food for man. There are poisonous products of the vegetable kingdom and no one would care to use them for nourishment. Alcohol is indeed a poison. The effects on the body of excessive indulgence of alcohol are serious, there being scarcely an organ or tissue which does not suffer directly or indirectly as a result of long continued drinking. Delirium-tremens is a form of acute alcoholic insanity ; and complete mental breakdown may follow chronic alcoholism. Inflammation of the nerves is another common effect. It will also produce diseased liver, disorders of digestion and degeneration of the heart and arteries. The words

of the wisest of the Kings of Israel may appropriately be quoted here. "Who hath woe? Who hath sorrow? Who hath contentions? Who hath complaining? Who hath wounds without cause? Who hath redness of eyes? They that tarry long at the wine; they that go out to seek out mixed wine. Look not thou upon the wine when it is red, when it giveth its colour in the cup, when it goeth down smoothly. At the last it biteth like a serpent; and stingeth like an adder". Can such a poison be the drink of man? Never.

Body-building food. (2) Proteids.

Proteins or proteids are complex organic compounds containing carbon, hydrogen, oxygen and nitrogen with a little sulphur. Proteins form an important part of all living organisms and are the essential nitrogenous constituents of food. There are 50 proteins known to occur naturally in plants and animals. These differ from one another in physical and chemical properties.

Protein or albuminous foods are necessary for building up the tissues of the body. Such foods in which nitrogen enters prominently into their combination are found indispensable for repairing waste materials of the human body. The foods which contain all the elements required to construct nerves, muscles, glands and other nitrogenous tissues are milk, eggs, meat, nuts and soya beans. Cereals or grains such as wheat, rice, pulses, dhals, vegetables and fruits contain lesser amount of protein in the form of gluten.

Having pointed out elsewhere the evils of meat-diet it is advisable to eliminate completely from our diet meat and to a greater extent eggs as sources of supply of protein.

Body-building. (3) Mineral salts

We require phosphate of lime to build our bones and it is when infants do not get enough of this mineral, that they grow up with deformed bodies. But minerals are also needed for other purposes. Common salt is required for the digestion of food in the stomach and it is also needed for the blood. We know salt is important because it is given off in many fluids of the body. We thus find it in sweat and in tears. Other minerals needed in the food are iron for the blood because iron assists in giving to its red colour and is necessary that the blood-globules may do their work. We also require soda and potash for the body and it is a curious fact that if we do not get enough potash a disease called scurvy breaks out. This disease was once very common among sailors who on long voyages got no fresh meat or vegetables which contain potash. The minerals we need, we get mostly along with other foods such as bread, rice, tapioca and the like. Salt, of course we take separately while iron is got from certain foods mostly of vegetable nature. When enough iron is not present in the blood and a person looks pale or anaemic, we see the reason why the doctor gives the patient iron in the form of medicine. This disease

is caused by germs in the blood which consume all the iron found in it. By supplying more iron in the form of medicine these germs find more food to thrive on. The leaves of *agathi* (*corrilla grandiflora*) when cooked and eaten continuously for a month, is found to destroy these germs.

Body-building food. (4) Vitamins

Vitamins are substances discovered in recent years to be present in natural foods in very small amount, which nevertheless exercise an important influence in nutrition. Their chemical nature is not known and they have not yet been isolated in pure form. Three vitamins have been recognized. The first is *anti-scorbutic vitamin* and when this is completely absent from the diet scurvy rapidly ensues. It is present in fresh meat and fresh vegetables. The second is a *vitamin soluble in water*, the absence of which from the diet causes the disease beri-beri to supervene. It is present in the seeds of plants, eggs and fishroe. In cereals, the largest quantity of this vitamin is contained in the embryo or germ. The third vitamin is associated in the fats and is known as *fat-soluble vitamin*. When absent from food, general nutrition fails. This vitamin is present in butter and is absolutely essential to growth. Vitamins in food are destroyed or largely reduced in amount by cooking or by processes of preservation. It is not possible therefore to obtain this essential element of food from meat as it cannot be eaten uncooked, whereas fresh butter, vegetables and fruits contain the vitamins so necessary for a normal

condition of health, in a pure form ready for consumption.

Working-food. (1) Fat

Next we may consider the working foods.

Fat is the chief constituent of fatty or adipose tissue which is present to a varying extent in nearly all parts of the body. Adipose tissue consists of a foundation of connective tissue in the meshes of which are the fat-cells containing an oily material which is a mixture formed by combination of fatty acids with glycerol. Chemically, fat consists of carbon, oxygen and hydrogen and its function in the animal economy is to provide a reserve of combustible material which is drawn upon to maintain the heat of the body.

Excessive deposit of fat in the body is undesirable. Corpulence or general over-growth of fat in the body results from some disorder of nutrition probably due to both excessive absorption of fat-producing constituents of food and to incomplete combustion of fat in the tissues. Some persons remain thin in spite of being large eaters; and others become corpulent though they take food sparingly. In some cases, heredity is a marked factor. Excessive obesity leads to shortness of breath, interference with the action of the heart and difficulty in walking. Corpulent persons should avoid taking too much food and particularly should reduce those articles of diet which contain much starch or sugar.

Working-food. (2) Carbo-hydrates

Carbo-hydrates are bodies of complex chemical constitution. They consist of carbon, oxygen and hydrogen, the two last named being present in the proportion necessary to form water. They constitute a valuable class of food-stuffs, the most important being starch and sugar. In the process of digestion, starch becomes converted into sugar. Carbo-hydrates undergo oxidation in the body, thus producing heat and energy and they also go to the building up of new fatty tissues. The starch necessary for the body is mainly obtained from wheat-bread, rice, potato &c.

Diet

We shall now proceed to find out the diet most suitable for the human beings.

Meat-diet

There are some people who live exclusively on a meat-diet. The difficulty of obtaining vegetable food in certain regions of the world is the reason why such people live on a meat diet. The Eskimos of the Arctic regions live on the fat of whales and seals. But as has been stated already, a region where plant-food cannot thrive was never intended by nature for a habitation of mankind and the disappearance of a race of people living in such a place is only a question of time. Moreover an exclusive meat-diet, as we have seen, is not the natural food of men and it is attended with many evils as pointed out else

where. It may therefore be stated that a meat-diet either exclusively or with other foods should be given up.

Vegetable diet

An exclusive vegetable diet is also not desirable. No race of people can be regarded as living on an exclusive vegetarian diet. The so-called vegetarians of India cannot be styled strict vegetarians as milk, curd, and ghee which are produced by animals form part of their diet.

About 1850, a movement was started with a view to make vegetable food the sole diet of human beings. The followers of the movement abstain from eating the flesh of animals, birds and fish and all foods which are derived from them, such as eggs, milk, butter and cheese. The movement made a good deal of progress in Great Britain, the United States of America and several European countries. Vegetarian restaurants were opened in large towns and other measures taken to popularise vegetarian dishes. Societies were formed for the promotion of vegetarianism and several periodicals published in its interests.

But pure vegetarianism cannot become the sole universal food of mankind. Dr. Robert Hutchinson says :—“ Vegetable foods are rich in carbo-hydrates and with a few exceptions, comparatively poor in proteid and fat. They are bulky, partly from their richness in starch but also from the presence of cellulose and a large amount of water. Even though compact in their raw state, they tend to take up much water and to become bulky in cooking • • • The

question of vegetarianism becomes a question of nitrogen (Proteid). The consistent vegetarian is placed in a dilemma. He has either to live on a diet deficient in proteid or to consume an excessive bulk of food. The former of these courses tends to diminish energy and the power of resisting diseases; the latter is apt to lead to derangement of the stomach and bowels."

Dr. Hutchinson adds that in 1854 an epidemic like scurvy broke out among the prisoners of the German prison at Waltenburgh who were fed on rye-bread, groats and pulses. It was thought that the scurvy was due to a deficiency of proteid in the food and so the proportion of pulses (peas and beans) in the diet was increased, yet the ravages of malady extended. Another medical man puts it more strongly thus:— "We may be deprived of starches and yet live; we may be deprived of sugars and yet live; we may go without fats, but unless we have proteid we die".

There are no doubt vegetable foods, containing protein, but to make up the required amount, a great quantity of the same will have to be consumed which will derange the digestive system. It may therefore be concluded that a pure vegetable food cannot ensure proper health and strength.

Mixed-diet

The third class of food may be called a mixed diet. The majority of the human races live upon such a diet. Vegetable food contains a greater quantity of carbo-

hydrates and animal flesh and animal products, of protein. To obtain the essential constituents of carbo-hydrates and protein, a mixed diet may be taken by eating bread (carbo-hydrate) with butter (fat), potatoes (carbo-hydrates) with meat (proteid), rice (carbo-hydrates) with ghee (fat) or milk (proteid), and so on. For the reason stated elsewhere, meat has to be eliminated and milk and its other forms substituted to supply the necessary amount of protein.

It has been calculated that if it were possible to obtain the essential constituents of food free from all non-nutritious material, the average daily amount required would be,

Protein	„	...	...	3½ oz.
Carbo-hydrates		...	...	180 oz.
Fat	„	...	...	2 oz.

As however there is a certain amount of waste material in all foods, the actual quantity of the ordinary articles of diet taken must be larger than the amounts of the essential constituents. Examples of standard diets are given in different text books. The amounts and proportions of the different articles of diet may require to be varied in different climates and in different conditions. Of these latter, the most important is active muscular work. For the diet of a man engaged in hard labour such as a blacksmith both fats and carbo-hydrates should be increased and to a lesser extent the protein, in order to make good the increased wear and tear of the muscular tissues. On the other hand, with rest and sedantary occupation much less food is required. A person engaged

in serious mental work should be well-nourished but there is no need to increase either the amount or any particular form of food. Indeed, an unnecessary amount of food is unfavourable to mental work. A child, in proportion to its weight, requires more food than an adult, since it has not only to make good wear and tear, but has actually to build up new material into its body. On the other hand aged persons require a relatively small amount of food. Women as a class require less food than men.

Summary

To sum up, the flesh of animals, birds and fish should be strictly eschewed from the diet. The amount of protein needed can be supplied by milk, pulse and nuts. Other elements of food which are easily obtained from such fruits grains or vegetables, as are best suited individually, should be freely consumed. Plenty of pure water should be taken between meals. Stimulants of all kinds should be avoided. Over-feeding is attended with many evils ; underfeeding will assure good health and strength to those who are not engaged in hard labour. The stomach whose disorder is the root-cause of all the ills of life should be given rest for at least five hours between meals. Each one should judge by the results of a particular food in his own case and adopt that diet, excluding meat, which is found agreeable.

Conclusion

This paper may be concluded with a simple but an ideal diet prescribed by a medical gentleman with

an experience of over 60 years in the field of dietary and disease. It is most suitable for middle aged men and women; and the testimony of hundreds of people goes to show that it is the most agreeable diet for such people. Several of the common ailments of life are found to disappear by following the said diet strictly. It is as follows :—

Breakfast at 8 a.m.—Fresh fruits of the plantain called Thevan Kathali or Mutty with a pint of well-boiled cow's milk which should be sipped slowly.

Dinner at 1 p. m.—Rice-meal cooked from raw rice with dhal or green-peas and ghee, along with some vegetable curry,

Tiffin at 4 p.m.—Nothing or hot water or, if necessary, a cup of milk.

Supper at 7 p. m.—Rice as cooked above and a pint of milk with a chutney. The quantity of food should be less than that of the dinner.

All the elements required for an ideal food are present in the diet mentioned above. The bowels move freely. The stomach has sufficient rest and the food is properly digested and assimilated. A trial for a fortnight will result in perfect health whatever be the condition of the body.

