the maintenance of a good standard of health. Many doctors have been dissatisfied with the incompleteness and lack of organization and co-ordination of medical and health services. Various attempts to improve things have been made, such as the National Health Insurance scheme (which provided for wage earners but not dependants) and the hospital regionalization scheme (which attempted to make the hospital resources more generally available to those needing them) and so on, but these have been felt to be merely palliative treatment, and now more radical treatment is planned.

The details of the disorders from which the medical services of England are considered to be suffering and the general principles of the radical treatment recommended to remedy these disorders are discussed in the report mentioned, which is abstracted on page 309 of our present issue.

There are three striking facts about this report. The first is that the report was drawn up by representatives of the main corporate bodies of the doctors themselves, headed by the British Medical Association. The second is that the report is very frank in its discussion of the shortcomings of the different branches of the medical services, these shortcomings being largely attributed to the adverse conditions created by the lack of a co-ordinated plan. The third striking fact is that it makes definite proposals of a revolutionary nature, and encourages the adoption of some of these proposals almost at once.

This report appears to indicate a marked change in the views of a large section of the medical profession of England. It proposes to abolish or greatly modify the three main bulwarks of medical practice of the past, *viz*, the special status of the voluntary hospitals, the system of consultant practice sometimes called 'Harley Streetism,' and most important of all, the system of individual general practice, each practitioner working in competition with other similar practitioners.

It may be asked, What has brought about this change? We cannot answer this question in full, but there are certain factors which have certainly contributed. There is, no doubt, a marked 'shift to the left' (to use a medical term), in the views of a great many people in Great Britain. There has always been a considerable number of doctors who have held views which may be generally described as 'socialistic', and that number seems to have increased; (there is a strong and influential socialist medical association headed by eminent members of the profession). Many other doctors, while perhaps not being politically socialists, are in favour of the practice of such principles in medicine.

Numerous doctors in Great Britain have in recent years visited Soviet Russia, and some have published very favourable accounts of the achievements of the state-organized medicine incorporating both curative and preventive work in that country. Such writers, by the way, have included one retired Director-General of the Indian Medical Service. All these facts have helped to mould opinion inside and outside the medical profession.

The report abstracted in our present issue is not however the work of a few enthusiasts, but has been prepared by a very carefully selected representative body including all shades of thought, and all branches of the profession. The report has moreover been adopted by the Annual Meeting of the British Medical Association.

It appears that there is little or no difference of opinion regarding the general type of medical service that is needed, or on the general lines of its organization. The main difference of opinion has been regarding the best method of administration. Two general methods have been considered. The first is the organization of a state medicine service by a state department. On this basis, all practising doctors would become Government servants. The second method is the organization of the scheme by a representative corporate body, not a state department but responsible to the state. This latter method was favoured by the majority at the British Medical Association meeting, but the former method seems to have been recommended by Sir William Beveridge in his social security scheme prepared at the request of the Government and now under their consideration.

We hope that all our readers will read the report either in the abbreviated form in our present issue, or in the full form given in the *British Medical Journal* (June 20, 1942, p. 743).

So many of the faults of the medical services in England so frankly discussed in the report are seen perhaps in an even more serious form in India. Are any of the remedies suggested applicable to India? At present it is obvious that many of them are not, but we think that the idea of the 'health centre' staffed by a group of practitioners and undertaking the wide range of activities outlined in the report may be applicable in some urban areas in India. Moreover, we are quite sure that the aim of future developments in India should be to create conditions such as will favour the application of the general ideas outlined in this report.

J. L.

Special Article

A PLEA FOR A MORE COMPREHENSIVE OUTLOOK ON THE HUMAN BODY

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IN a previous article in this Journal (Cox, 1941) I voiced a plea for a more comprehensive outlook on the human body, believing, as I do, that much is missed by the admittedly necessary

specialization of to-day. It is indeed unfortunate that life is so short that no one can survive long enough to be a specialist in all the branches of medicine and the allied sciences.

In what follows, I attempt to lead the reader to a realization of the necessity of an even more comprehensive view of life. The idea I have in mind is the necessity for the pooling of all knowledge available with the anatomist, biologist, veterinary surgeon, odontologist, geologist and physician. Perhaps in the remote future, man may acquire sufficient cerebral power to embrace all this knowledge, but at present it is not possible, nor even is intercourse with such as have a knowledge of these subjects possible in a remote corner of India. I need therefore offer no apology for inaccuracies and speculation.

Science has suffered seriously during the last one thousand years on account of the difficulty man has experienced in breaking away from the thought-patterns of his forbears, for the various beliefs prevalent in the world have been in no small way responsible for the retardation of understanding. Men have for a thousand years sought to fit the facts of life to their beliefs, rather than base their beliefs on the facts of life. It is indeed but a short time since emancipation from the fetters of dogma has allowed of free thought without penalty. I need only recall the Inquisition, the fate of Copernicus, Giordano Burno, Galileo and a host of other thinkers, not to mention the controversy that arose over Darwin and even more modern pioneers of scientific discovery.

However, we are now free to think, and I ask the question: Is Man the masterpiece of creation, or is he singularly imperfect? If man is a final perfection, then why do we doctors see so much suffering? If imperfect, in what direction is man progressing towards perfection?

Let us free our minds from the thought-patterns woven by our upbringing, and project ourselves to such a distance from the world as will allow of a proportional view of all life in the animal kingdom, in the almost infinity of time that is past, in the present, and in the infinity of time that is to come, see what impression we get of the species *Homo sapiens* and decide where we are to place him in the evolutionary scale.

We should I think, without undue surprise, regard life as springing from some of the permutations and combinations of possibilities resulting from the interaction of the inorganic elements in an electro-magnetically and radio-active world, and recognize that life does not originate at 'a beginning' but as a continuous sequence of events.

We should see, in panorama, all stages of development, from the sub-kingdoms protozoa and metazoa to the final species, some perfected and others developmental. In the past we should see innumerable species now extinct; in the future, species to come, and extant species passing on to an optimum, and dying out from the earth.

In an infinity of time past, an infinity of forms of life must at various times have been possible, but in the present, no. In the present there is an all-powerful veto on life that we may term 'environment'.

Environment, which is ever slowly changing in the eons of time, has a powerful control over life, and over the surface of the earth environment differs; hence do forms of life differ. One need only call attention to the environmental differences between life in the sea and life on land, life near the poles and life near the equator, and all the degrees of change, infinitely small, between these extremes, to realize that forms of life, once life is started, must be almost infinitely numerous. But all forms of life do not attain to a growth of any appreciable size. Lowly forms like the amœba may undergo but little environmental change, and so remain content in their degree of perfection, awaiting only some change either to bring about their extinction, or to force a modification into some kind of the more efficient metazoon.

On the other hand, life that has struggled against constant environmental change over millions of years, may have achieved such perfection in a particular line of development as to be incapable of further improvement. This may well be the case with the extinct mammoth, which, with its perfect tusks up to 13 feet in length and 200 lb. in weight, strongly curved, forming a considerable segment of a circle, failed to further modify itself in accordance with the demands of changing environment and died out. On the other hand, its modern analogue, the comparatively straight tusked Indian elephant, less perfected, has been able to survive to the present day.

One could cite a number of such cases of growth, development, perfection along some particular line, followed by extinction; but what better example than the giant tortoise, which, with its rigid shell of nearly half a ton, perfected in defence until its leg muscles failed to hypertrophy with the weight of armour, which, unable to develop further because of it, collapsed and died out, not only ossified, but literally keratinized. Its modern analogue, the leather back, has no such restriction, for its backbones have not yet joined, this fact permitting of even greater growth of the species.

True, these are but stories, but these stories clear the viewpoint I wish to set forward; for viewing the animal kingdom thus, one cannot avoid the conclusion that each species having selected a particular organ for special development in its struggle for existence, has pursued, or is pursuing its selected course up to and until it achieves an optimum; and then perfected, is unable to change in accordance with the demands of its changing environment, and either dies out or is killed off by enemies that have developed more efficient weapons of offence.

From this imaginary viewpoint, I can see no evidence that any species, having once developed

an organ for its own preservation, and having come to the realization of failure in its purpose, has been able to change over to another line of specialization. To do so would presuppose the change of one animal into another. The point here is that perfection in the development of an organ or group of organs heralds the senile decay of a species, and there is no evidence that the species *Homo sapiens* is near decay. On the contrary, it suggests that man has as yet far to go before reaching the optimum of perfection.

Many forms of life are similar in appearance and action, and on this similarity the systematist bases his classification of the animal kingdom into sub-kingdom, grade, phylum, sub-phylum, class, order, family and so on, but nowhere is there evidence of one species developing into another. Hence there is no need to hold fast to the idea that man has evolved from monkeys. It is more probable that monkeys and apes have progressed so far in their specialization as to have lost for ever their chance of becoming man. But sure it is that man has developed through simioid forms from creatures even more primitive than the tarsius, and has much that is primitive, in fact almost reptilian in his present make up, for Professor Wood Jones proves very conclusively in his book *Arboreal Man* that the arm and hand of man has never been wasted as a body-supporting agent, but that the arm and hand have retained the form and freedom of their very early amphibian state.

It is possible that man as we know him to-day is a species similar to the cro-magnon man and/or pithecanthropus, and not necessarily a development of those man-like creatures. Homo's ancestors may have been too poorly ossified to permit of preservation. Man may indeed be more embryonic in the span of his species than any of his oft-time supposed immediate ancestors, and comparatively new in the scale of life, indeed almost fœtal in structure in relation to his potential. This idea is, to some extent, supported by the fact that one-third of the life of *Homo sapiens* is spent in growth, the delayed ossification permitting of considerable further adaptation to future changing environment.

From such a view of life it would appear to be more a matter of proportional degree of development to possible perfection of development along one line that determines the future span of a species before final extinction, rather than the gradual efforts of nature under the guidance of a supreme being to produce a perfect creation that we are pleased to call *Homo sapiens*, destined to survive the extinction of all else; for homo to the physician is far from perfection, either in form or structure, as evidenced by the multitude of reparative operations now grouped as classical. Is it possible in the present stage of evolution to forecast the changes that are likely to take place in the future, and if so, can these changes be accelerated and assisted, or the disabilities of the transition ameliorated? For it appears possible that the species man in its present stage of development in the life-span of the species is at a point where instinct is at an ebb, and reason has not yet developed sufficiently to replace it; a dangerous period comparable to that of a child of seven years, who, lacking the guidance of parents, experiments for itself.

If the physician realizes that he is not dealing with a perfect organism, and if he is able to form a correct idea of the line of development selected by the species, then only will he be able to teach reason to his fellow creatures, and offer true guidance. At present one hears, only too frequently, reference to conditions that obtain in sub-human types, thus presupposing the human type to be the latest evolutionary development. Science challenges this, for sub-human types may well be a distinct advance on the human, so far as the mechanics of the animal are concerned.

For this reason, I essay a comparison between the alimentary systems of two perfected types, the carnivorous and the herbivorous on the one hand and *Homo sapiens* on the other. The study is interesting, for at present large numbers of the species homo are meat-eaters, and large numbers either from economic necessity or mental persuasion are herbivorous, and my experience with both types leaves me without any doubt that there is much more suffering and illness among the latter. Also the following comparative study points to what is the nearest approach to a proper diet for man in his present stage of development, by showing how closely man's alimentary canal approximates to that of the truly carnivorous animal.

Let us make a brief survey of the alimentary tract of man, beginning at the mouth. The skin that covers the surface of the body alters its character only to become the mucous membrane at the lips, and the teeth are but a modification of the epidermis. This is clear in the case of the shark, were the dermal hooks, turning up on end as they round the margin of the jaw, hypertrophy as a result of the sudden extra use (and hence extra blood supply) and form a continuous series of primitive teeth. This fact is not readily recognizable in, say, the elephant, yet the process is the same, and can be traced in the early embryo, for the enamel organ remains epithelial, only the pedestal on which it stands, and which later grows into it, being the secondary result of a demand on the mesoderm of a fixed base.*

The tooth of the shark is primitive, like its elasmobranch owner. The tooth of the elephant, like its owner, is nearly perfected for its use.

In what stage between the primitive and the perfected, is the tooth of man? The teeth of man are 'bunodont', that is, they have rounded

* Does this not suggest that vitamin A would be of more benefit than D, for developing teeth capable of resisting caries?

cusps set upon short roots, diphyodont and not persistent growing. They are modified neither for chewing the cud, nor for killing large game. The teeth are simple teeth, and are capable of considerable modification if necessary, or they may remain unwanted and so become reduced in both size and number. The analogue of such simple teeth is found in fossils as far back as the cretaceous period of mesozoic times, when life was primitive and probably entirely reptilian, and, as in the case of the fore limbs of man, there has been but little change. Such a primitive state of affairs of the teeth is to be expected, for hands of primitive mobility can relieve the teeth of much of the work required of them. A monkey can catch a bird and kill it with its hands; a dog can catch a hare only with its mouth, and kill only by use of a mouth in which it has grown specialized teeth. So in man, who has retained the primitive mobility of the fore limb, and acquired a brain with which to make use of that limb, the teeth have remained primitive in the absence of a specialized use for them.

Then the mouth of man is simple. The tongue is free, to permit of speech in accordance with the demand of the developing cerebrum, but as an organ of alimentation it is a poor article. Compare it with the tongue of a herbivorous animal. There are none of the enormously hypertrophied rasping papillæ, neither can it grasp articles of food. The mucous membrane of the lips and cheek is smooth. This is not so in the case of the tongue and cheek of the well-developed herbivora.

The œsophagus in man is a simple tube; there is no modification comparable with the crop and gizzard of herbivorous birds.

Then that important organ the stomach. In homo it is very simple dilatation of the alimentary tract, showing but little specialization. It is of comparatively small capacity, so presumably the animal man must be selective in diet and not waste space.

The secretion is of a fairly strong hydrochloric acid, and this fact, with the small capacity, suggests that it is intended for a diet rich in protein, yet consisting not wholly of animal flesh, as it is insufficiently specialized, more closely approximating to the insectivorous and seasonal frugivorous animals of the order Primates. It is indeed far from showing any modification comparable with the typical herbivorous animals.

Considered physiologically, in the typical 'carnivorous' stomach, and in the stomach of man, the gastric hydrochloric acid is high, 0.4 to 0.6., while in the 'herbivorous' stomach it is from nil to 0.13. In the carnivorous animals and in man, roentgen ray studies show that the empty stomach is contracted and tubular, bent upon itself at the junction between the fundus and the pylorus—the incisura angularis. Moreover, this type of stomach is seen to empty completely between meals. In the typical herbivorous animal, the stomach is highly specialized, and where the stomach is less obviously specialized, there is compensation in a specialized colon and an enormous cæcum, called a 'floating cæcum', as in the horse.

For instance, in the cow, the rumen is relatively enormous, filling nearly three-quarters of the animal's abdominal cavity, while in the horse, where the stomach has not attained the same degree of specialization, the colon has developed, and with it there is a relatively enormous cæcum. The colon attains the capacity of some 16 gallons, and the cæcum up to 8 gallons. It is in these enormous natural fermentation vats that cellulose is digested and converted into glucose, not by enzymes poured out by the animal, but by some enzymes contained in the vegetable food itself (cytases) and by bacteriological fermentation. Only thus is cellulose utilized by the vertebrate species. Again, only the carnivora and man empty their stomachs between feeds. The herbivora never empty their stomachs: in fact it is found necessary to starve some herbivorous animals up to five days to empty the stomach, after which time there is danger of death from starvation unless there is some other specialization, as in the camel.

CAT

Fig. 1.—Typical carnivorous alimentary canal. Simple stomach. Relatively small and short. Small intestine. Cæcum small. No appendix. Large intestine, small and short.

COW

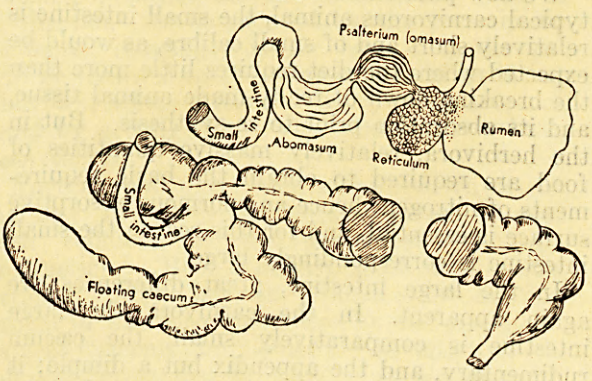

Fig. 1*a*.—Typical herbivorous alimentary system. The first three compartments of the stomach are for maceration and fermentation and occupy three-quarters of the abdominal cavity. Small intestine voluminous. Large intestine relatively enormous. Cæcum very large to complete cellulose digestion.

Many of the carnivora are unable to subsist on a diet other than flesh; this is the case with

the tiger and lion, and in the natural state these animals choose the herbivora for the ideal diet, possibly on account of the acquired ability of the herbivora to utilize plant life in building up

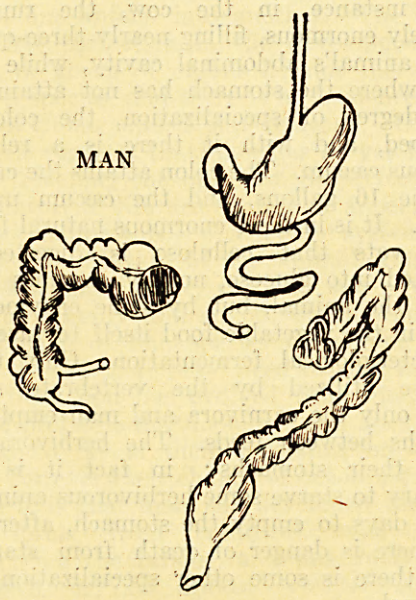

Fig. 1*b*.—Simple stomach. Relatively small and short small intestine. Medium to small large intestine. Small cæcum and appendix.

their necessary store of vitamins. Others, like the dog, can, albeit with detriment to their health, subsist on a mixed diet. Here I recall the fact that I, when a student, kept a sheep dog in London, and with the mistaken idea of keeping the animal docile, I fed it on biscuits and rice, with the result that it developed diabetes and carbuncles.

Man can subsist on either or both diets, the Esquimo being wholly carnivorous, and many in this country being wholly herbivorous, a mixed diet rich in protein being generally acceptable.

We now pass on to the small intestine. In the typical carnivorous animal, the small intestine is relatively short and of small calibre, as would be expected where the diet requires little more than the breaking down of ready-made animal tissue, and its absorption prior to re-synthesis. But in the herbivora, relatively massive quantities of food are required to obtain the basic requirements of nitrogen; hence an enormous absorptive surface is essential, and for this reason the small intestine is correspondingly large.

In the large intestine, great differences are again apparent. In the carnivora the large intestine is comparatively small, the cæcum rudimentary, and the appendix but a dimple; it can indeed be said to be absent. In the herbivora, the large intestine is voluminous and in those animals which have not developed stomachs specially modified for cellulose digestion, the cæcum is developed to massive proportions, and is known as the 'floating cæcum', and, except in the rabbit, there is no appendix. In the rabbit, however, there is a large cæcum, *and* a large appendix that may well be opening out to form a complete floating cæcum as in other herbivora, as it approximates to full development, from a rodent to a true herbivorous animal (*see* figure 2).

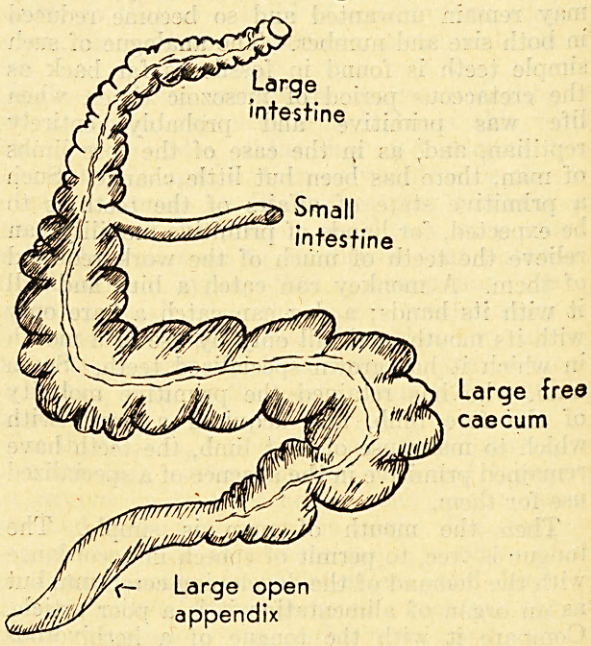

Fig. 2.—Cæcum and appendix of a rabbit.

In man the large intestine approximates to the carnivorous type, with the exception that it is comparatively large, and there is a cæcum and an appendix. It is of interest here to note that the *Science of Life* by Wells, Huxley and Wells (1937) describing the cæcum, appendix, and large intestines of man, states: 'In man these structures have no functions that other organs cannot carry out—indeed, it is probably better to be without an appendix, for it may be the seat of acute and even fatal inflammation. It is improbable that the human large intestine plays any important part in digestion. People can live to be healthy and active after its removal, etc.' Certainly Lane was an enthusiast for its removal. But early natural man was not concerned with the necessity of being prematurely pitchforked from a carnivorous species into a herbivorous.

Keith (1920) states: 'In all the higher primate forms, we note, on the right side of the abdomen just above the groin, that the small intestine ends in a capacious cæcum, the name given to the dilated commencement of the great bowel. At the closed and lower end of the cæcum in the anthropoid, as in man, is attached a narrow tube, the notorious vermiform appendix. It terminates bluntly below, and hangs freely within the abdomen, lying more or less behind the cæcum, into which its upper end opens.

'It varies in size according to the age of the individual and state of digestion.

'In the gorilla, it is of the thickness of the small finger, but twice as long; in man it is shorter and smaller, but in him its shape and

size are subject to the utmost variation after puberty.

'Unfortunately we do not know the uses of the appendix, but on many occasions the writer has noted in the anthropoids, and in children, that the contents of the cæcum pass freely into it.'

This opens the possibility of man's cæcum-cum-appendix being in reality a developing floating cæcum, the appendix being the undilated projection of a slowly dilating cæcum. Certain it is that the appendix in a child is much larger and longer than it is in an adult, and, I am inclined to think, the cæcum correspondingly smaller. The whole picture is that of child's sausage balloon half blown up. It looks like this :—

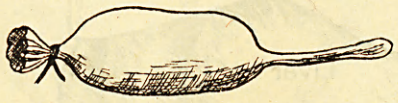

Fig. 3.—Half inflated sausage balloon like a cæcum and appendix.

Fully blown up it looks like this :—

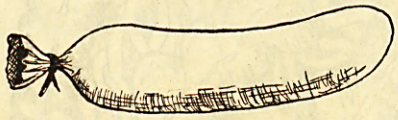

Fig. 4.—Fully inflated balloon like a floating cæcum.

The first is the cæcum and appendix of modern man, and the second is the floating cæcum of the fully develop herbivorous animal. Is not the appendix of man possibly the sign post pointing in the direction in which the development of man's alimentary canal is taking place, an index of the belated struggle of man's alimentary canal to evolve into a more herbivorous type ?

If the alimentary system of man really is but little more than fœtal, (and the rule in nature seems to be the suppression of development of all organs not immediately concerned in the developing speciality), and like all fœtal animals carnivorous, then we may expect the major digestive glands to fail when they are plied with a diet for which they are not yet modified. The two large organs, the liver and pancreas, immediately come to mind, and we may confidently expect their failure from causes other than specific diseases.

Those of us who practise medicine in India will immediately think of the large ample-bellied unfortunately strict sectarian who, vegetarian from the time that he was weaned, suffers from either hepatic or pancreatic failure or both at the early age of 40, and from a blood pressure to correspond, resulting from thirty-nine years of vascular irritation from an abnormal blood sugar, the result of a diet of starch, for the reception of which his alimentary system has not yet been developed. It is known that in the herbivora, glucose feeding causes less hyperglycæmia and consequent exogenous glycosuria, than in animals with simple stomachs. In practical support of this, I again recall my dog story mentioned above. The cause of death may, of course, have been pure vitamin deficiency, but a well-fed dog seldom calls for vitamins. Vitamins may have helped the animal to exist under the abnormal dietary conditions, much as we too try to compensate for our dietary conditions, to-day by covering the breakfast table with potted vitamins.

Another point is that the carnivorous stomach is allowed to empty between meals. This gives the liver time to distend to the maximum, and then, as it were, to deflate, thus permitting of a good flushing with an unimpeded blood supply. The overgorged vegetarian stomach is never at rest, and the liver is never permitted to discharge its overload of glycogen, with the result that it is seldom or never allowed to relieve the engorged pressure against its inelastic capsule. The delicate reticulo-endothelium is robbed of its free blood supply, the venous channels are compressed, while the arteries maintain their calibre. Venous stasis and engorgement result, and the end is not surprising, namely a classical hypertrophic cirrhosis.

The body of man has a small alimentary system compared with that of the herbivora ; hence if the food is mainly starch, cellulose and roughage, the call for more and yet more nourishment may well become irresistible ; more food will be taken, and the stomach will be further gorged until the compensatory efforts of nature, namely hypertrophy and dilatation, fail, and atonic dilatation with a sour fermenting decomposing content remains; belching of wind, (a bi-product of fermentation), constipation, and starvation result to complete the picture. All these symptoms are only too evident in a vegetarian population, and are dubbed the 'evils of civilization', to be relieved by the prescription of more 'roughage' in the hope that the gut will be irritated to the stage of a mild irritating diarrhœa, which naturally brings a measure of relief by getting rid of what should never have been there.

Another not uncommon manifestation of the inability of man's alimentary system to deal with cellulose, is the occurrence of 'ragi obstruction'. Ragi is a small grain with a hard pericarp. Man has no rumen nor floating cæcum in which to digest this by the process of natural fermentation ; hence the irritation of the cellulose gives rise to spasm so severe as to render the intestinal canal identical in appearance with a string of sausages, and a clinical picture indistinguishable from that of advanced intestinal obstruction is produced.

Still further, in the frugivorous and insectivorous birds, the gut is very short, while it reaches its maximum length in the grain-eating birds.

Recently Dr. Aykroyd gave me the opportunity of examining the belly of a *Macacus sinicus* monkey. The following diagrams were sketched from the appearance presented. A glance at the sketch will show that this little creature has become almost entirely herbivorous ; indeed Dr. Aykroyd tells me that he cannot get this type of monkey to eat meat. It is seen that, although the stomach is simple, very like that of man, the large intestine, the cæcum, and the appendix are purely herbivorous. The haustrations stop short at what appears to be the end of the original cæcum, and beyond this is a smooth sack just as would be expected were an appendix to be inflated. Has this little animal attained the optimum of its evolutionary development, the optimum at which man is aiming as regards his alimentary system ? It looks very much like it.

Another interesting point about this dissection is the fact that the animal was out of condition (the reason for its destruction) ; the disability was an enteritis.

Now the cæcum shared in this enteritis more strikingly than the rest of the gut, and from it there ascended to the pre-aortic glands just such a lymphangitis as I described in my previous article. The enlarged and pathological glands arising from the cæcum increased in size as they approached the pre-aortic glands at the root of the mesentery, where there was one large suppurating gland. Had that monkey been able to talk, I am sure it would have complained of appendicitis, and discomfort relating to the epigastrium as I have described, and had it been human and so treated on general lines with recovery, it would, after a long period of years of discomfort, have been subject to all the complications described, including volvulus, as the lines of lymphangitis became scars, and contracted, giving rise to the various obstructive points that I enumerated. But this is wandering from my theme. To return, Elliot Smith states on page 30 of his Essays on the Evolution of Man '. . . It is the steady growth and specialization of the brain that has been the fundamental factor in leading man's ancestors step by step upwards from the lowly *insectivorous status,* and through every earlier phase in the evolution of the mammals . . .'

Man has specialized in the development of the cephalic end of his anatomy, and a broad survey of the animal kingdom strongly suggests that any animal, having once selected a particular organ for development for its preservation, pursues that course up to an optimum of perfection, and then, being incapable of further modification, should environmental change demand, gives place in the world to a species more youthful, less perfected, but of much greater potential.

While he has been specializing in a cephalic perfection, man's other organs have lagged behind, subservient to the one great branch of growth, the brain, and I suggest that man's body in general, and the alimentary canal in particular had remained primitive and unspecialized, showing but little change since the days

Macacus sinicus

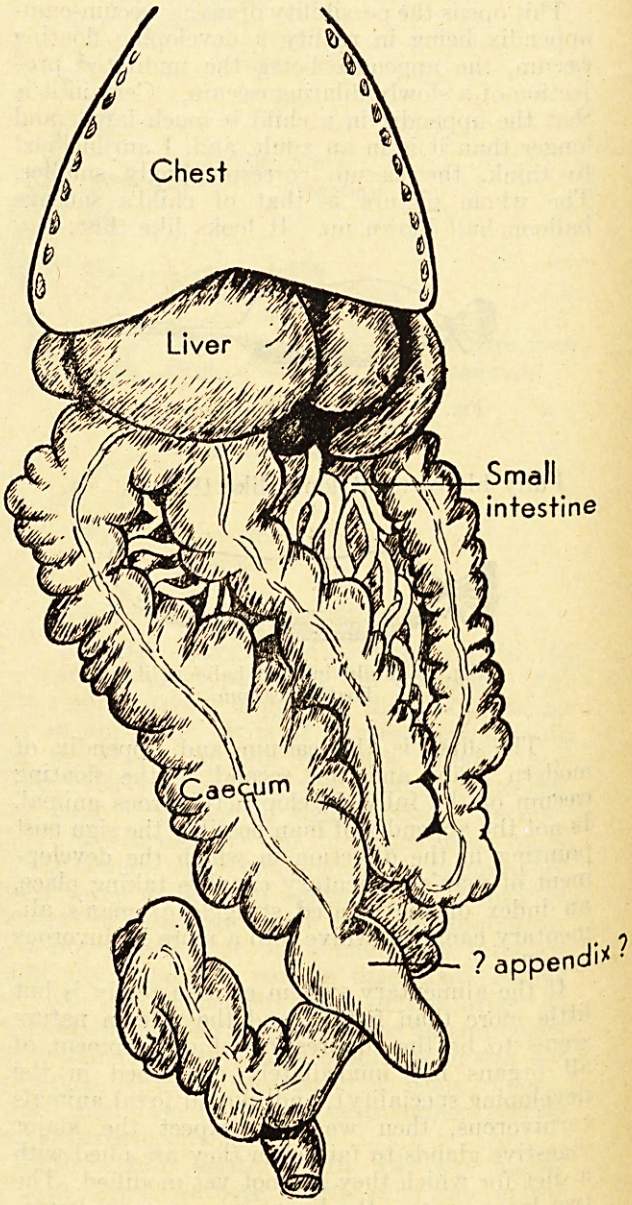

Fig. 5.—Natural position.

of an insectivorous (carnivorous) and seasonal frugivorous modification, ill-adapted to the environmental change forced upon it by present-day economic and religious necessity, whereby it is compelled to become vegetarian and granivorous. It is thought that milk may supply the absent animal protein and fat. But again the infant stomach only is modified for milk by the secretion of rennin, whereby the milk is rapidly solidified and so retained in the stomach sufficiently long for acid digestion. In the adult, milk quenches thirst ; that means, that milk being

fluid, rapidly passes through the stomach into the intestines, where, in an alkaline digestive medium, it cannot be adequately digested, and so it gives rise to flatulence, distension and diarrhœa, the constant complaint of the hospital patient who, unused to a diet of milk, complains that it causes such discomfort that he cannot take it; this too is my own experience on a diet of milk. Hence I challenge the belief that milk is a perfect food for anyone but the

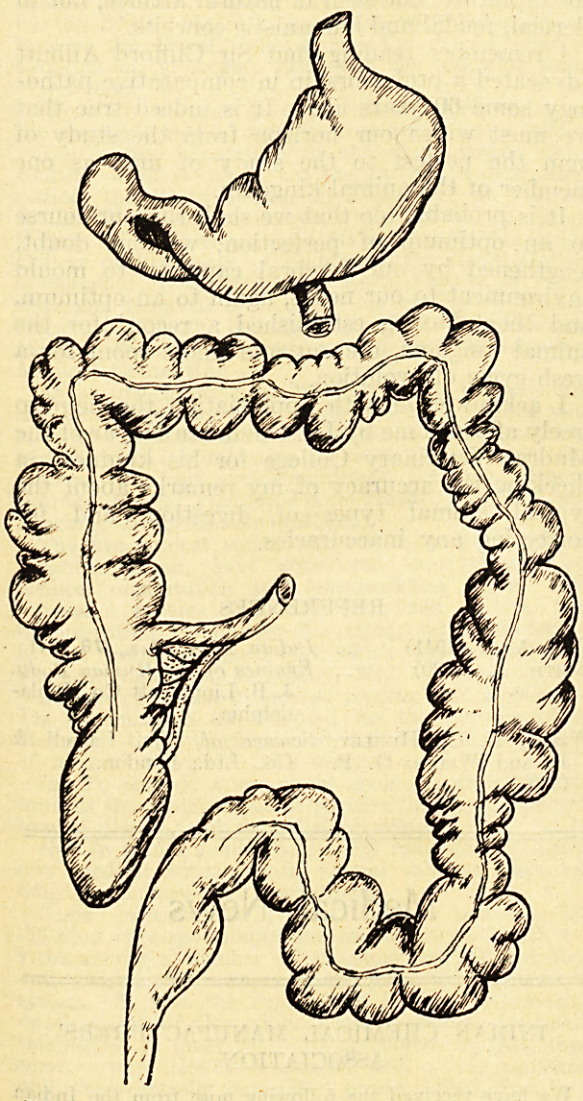

Fig. 5*a*.—Stomach and large intestine spread out.

infant, who is able to submit it to true gastric digestion by virtue of its rennin secretion.

In the light of the above suggestions, would it not be profitable to further pool our knowledge of the sciences, and include at least a survey in the student's curriculum? The genetic specialist may be able to throw light on the natural changes that take place in nature by some form of mutation, but it is probable that mutation plays only a small part amongst the more developed of the animal species, and least of all amongst herd species, for the herd does not tolerate anything egregious. It is probable therefore that the species man has suffered but few and slight, if any, changes by mutations since the days of reptiles.

Speculation on man's past, present and future is likely to remain speculation until sufficient recorded time is past, possibly millions of years, but sufficient knowledge of the past may be unearthed to permit of the establishment of a sense of direction ; and of the sciences, a comparative study of the animal kingdom is likely to be the most fruitful.

The subject of dietetics has received much attention of late. The fact of a high protein content of a cereal is recognized as some measure of its value, and by finding a cheap diet, mainly vegetarian, compensated by the host of vitamins,

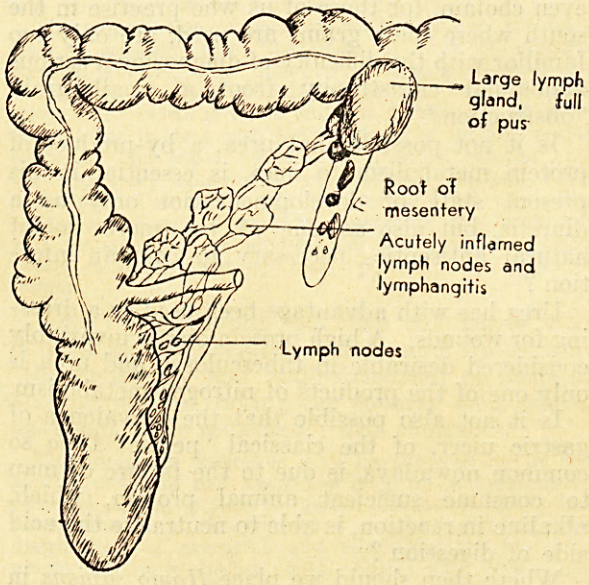

Fig. 5*b*.—Cæcum and appendix showing the ascending lymphangitis from inflammation in the cæcum and 'spread out' appendix of the monkey.

it seems to me that we seek to accelerate the environmental change, (whereby man is to live by the plough rather than by the chase), so rapidly that nature is unable to modify the anatomy and physiology of the species at the rate required by man-made economic conditions.

The tendency now is to calculate the capacity of a land to maintain a population by its herb-producing capacity. 'Grow more food' refers to vegetables, wheat, rice and so on, while cattle are crowded out; yet insects and herbivorous animals are the natural protein and vitamin factories, and man is not. Are we sure that man with an alimentary system so little developed as to be more 'proteinivorous' than 'carbohydrate-ivorous' will not suffer progressively for want of the many by-products of protein metabolism? I mention only one, urea. In my previous article I stressed the clinically anæmic and hydræmic state of a number of the poorer class of patients who suffer from a permanent

state of lymphatic catarrh, a 'naso-oro-pharyngileus' as an able colleague of mine once aptly dubbed the condition, and I endeavoured to trace to this source the prevalence of tonsillitis, granular pharyngitis, Payer 'patchitis', appendicitis and the abdominal glandular adenopathy so prevalent amongst a poor and hence herbivorous population, albeit living on a soil rich in iron and manganese (laterite). Is it not possible that the discovery of vitamins has to some degree thrown dust in the eyes of the physician, and blinded him to the prior need of animal protein? The fact that a grain has a high vitamin content is no criterion of its nutritive value, for a grain may be quite unsuitable for the alimentary system of man, the quondam carnivorous, as in the case of small grains like ragi, hill paddy (chamai), kumbu or even cholam, for those of us who practise in the south where these grains are used, are only too familiar with the difficulty of diagnosing a serious abdominal catastrophy from a small grain 'obstruction'.

Is it not possible that urea, a by-product of protein metabolism to man, is essential in his present state of development not only as a diuretic, but also as one of the more potent natural antiseptics necessary to combat infection?

Urea has with advantage been used as a dressing for wounds. A high protein diet is invariably considered desirable in tuberculosis, and urea is only one of the products of nitrogen metabolism.

Is it not also possible that the prevalence of gastric ulcer, of the classical 'peptic' type so common nowadays, is due to the failure of man to consume sufficient animal protein, which, alkaline in reaction, is able to neutralize the acid side of digestion?

Where then should we place *Homo sapiens* in the evolutionary scale?

The facts seem to suggest that no animal can be typed and placed, for we must admit that, when cerebral development is considered, man is the highest attainment; but when the alimentary system is considered, man is far down the evolutionary scale.

If tooth and claw be considered, the tiger probably leads; if speed, then the horse may be near the highest attainment.

And so, it is not possible to consider man as a whole. The perfection of creation is but a jumble of organs in various stages of evolution, some highly specialized and others elementary and rudimentary.

The artificial separation of medicine and surgery (said to date from Avicenna A.D. 1000), has given rise to two professions, and, later, specialization has given rise not to two professions, but to a dozen.

These divisions must be bridged if man's anatomy, physiology and pathology are to be properly understood; this idea calls to mind the fact that as far back as 1904 Sir Clifford Allbutt wrote: 'As we cannot know any part of an age or people without an idea of the whole, nor take to ourselves a lesson from other times of other folk without some conception of their nature and fashion, so we cannot know modern medicine unless we study it as a whole, in the past as well as in the present.

From Greece, and mediæval Italy we have to bring home the lesson that our division of medicine into medicine and surgery had its roots not in nature, nor even in natural artifice, but in clerical, feudal and humanistic conceits.'

I remember reading that Sir Clifford Allbutt advocated a professorship in comparative pathology some 60 years ago. It is indeed true that we must widen our horizon from the study of man the perfect to the study of man as one member of the animal kingdom.

It is probable too that we shall run our course to an optimum of perfection, without doubt, lengthened by our cerebral capacity to mould environment to our needs, again to an optimum, and then, having established a record for the animal kingdom, die out and make room for a fresh cycle of evolution.

I acknowledge with appreciation the help so freely afforded me by Dr. Govindan Nayar of the Madras Veterinary College for his kindness in checking the accuracy of my remarks about the typical animal types of digestion, and for correcting any inaccuracies.

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Medical News

INDIAN CHEMICAL MANUFACTURERS' ASSOCIATION

WE have received the following note from the Indian Chemical Manufacturers' Association, 102-A, Clive Street, Calcutta :—

The Indian Chemical Manufacturers' Association is receiving a number of complaints from its member concerns regarding their difficulties in getting a sufficient supply of opium alkaloids, particularly codeine and morphine, for the manufacture of various important pharmaceutical products. The Association has already taken up the matter with the Government of India, and would also like to have full information from the trade and medical practitioners about the supply position of these important alkaloids. All dealers and medical practitioners experiencing difficulties in obtaining alkaloids such as codeine and morphine are, therefore, requested to communicate with the Indian Chemical Manufacturers' Association, 102-A, Clive Street, Calcutta.