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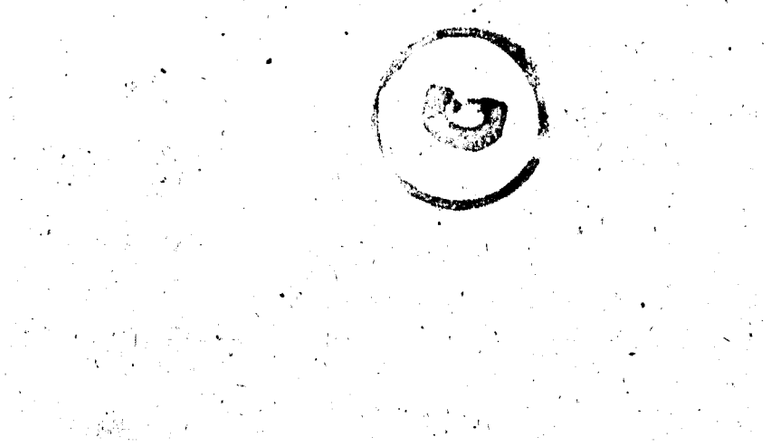

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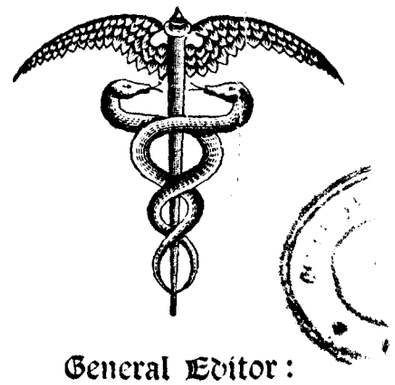

General Editor:
Dr. M. R. GURUSWAMI MUDALIAR, B.

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Medical College J.

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On Diets Necessary to Maintain and Vigour.

By Lieut-Colonel J. W. CORNWALL I. M. S.

IT is easy enough to say that much disability and disease is to inadequate and improper diet, and to suggest that medic practitioners should make it their business to tell all their patients exactly what they should eat, and that public and educational authorities should teach the people generally what they should eat to maintain health and I have already said it on previous occasions, but it is a more difficult matter to decide on the right standards to be adopted and still more difficult from the economic point of view to reach and maintain those standards. The proper dieting of the sick and the healthy needs much consideration and special study and no one who has not made a special study of the subject is competent to advise on it, whether he be medical man or layman : empiricism may have grave consequences. The first thing to do is to understand the general principles involved, the second to qualify the preliminary conclusions by numerous weighty factors and the third to apply the outcome to local conditions and work out the modifications entailed.

I shall not here attempt to deal with dietaries suited to various states of ill health and shall confine myself to the much larger and more important question of the diet required to maintain health and full vigour in those who are in good health or at any rate do not consider themselves to be in ill health.

I. First let the general principles be stated.

(1) The food is oxidised in the body and in the process heat is given off.

be oxidised outside the body in a
.eir theoretical value as heat producers
.nits of heat, calories, each unit being the
quired to raise 1 liter of water 1° C, so the
energy value of any given quantity of food can

e amount of heat or energy required to maintain the
.ns of the body in different circumstances can also be
.

) It is possible, therefore, to calculate the weight of food
.ssary to maintain the vital functions.

(5) The heat values of the three constituents of food are

(Protein as albumin)	4·1	calories per gram
Carbohydrate	4·1	,, ,, ,,
Fat	9·3	,, ,, ,,

making due allowance for incomplete oxidation in the body.

(6) In maintaining the body weight in a state of complete rest some 1700 calories are evolved daily, the assimilation of food produces another 10 %, and the ordinary movements of the body account for 300 more. To enable an average man to maintain his weight and his health and to do a moderate amount of work about 3000 calories daily are required, and these must be supplied by due proportions of the three food constituents.

(7) Chemistry can show the available energy of foods, but only physiological observations will show the proportions that will give the best results. It has been found that between 10 %, and 15 % of the total energy should be supplied in the form of protein and the remainder in the form of carbohydrate and fat, about 10 of the former to 1 of the latter.

This gives a standard of

100—120 grams of protein
500 grams of carbohydrate
50—100 grams of fat

as the daily intake necessary to furnish about 3000 calories.

The ratio of Nitrogen to Carbon,
between the maximum of 1/15 and the min.

II. Next some of the qualifying factors m

(A) Protein:

(1) A certain amount of carbohydrate and of
stored in the body, but surplus protein cannot similarl.
(2) Protein contains about 16 % Nitrogen. Within limits,
Nitrogen is excreted daily by the body as is ingested.
starvation a man still excretes from 4 to 5 grams of Nitr.
daily which is derived from the wasting of his tissues, but
establish equilibrium between the intake and excretion o
Nitrogen, without which health cannot be maintained, several
times that amount must be ingested. (4) Chittenden maintained
nitrogenous equilibrium in athletes for some months on a protein
intake of 60 grams a day and has, therefore, advocated a dietary
containing only that amount of protein ; but although volunteers
are said to have adhered to this standard for a period of years
without harm, if not with actual benefit, it is generally thought
that it is wiser to retain a margin of safety in the matter of
protein and to consume rather more than the minimum necessary
for nitrogenous equilibrium. (5) Though protein in excess of
this minimum, which is required for the maintenance in repair of
the bodily tissues, provides energy which is available for work,
yet the necessity for the excretion of the excess of waste Nitrogen
has been held by some to be a tax on the excretory mechanism
which should be avoided. (6) Physiologists have not yet finally
decided how much protein in excess of the minimum should be
included in the daily intake of food, but observations of the
mental and physical development of the tribes and races of the
world offer clear evidence in favour of a diet rich in protein.

(7) Protein is the name applied to a class of substances of
varying constitution some of which contain chemical complexes
which are essential to the maintenance of life while others lack
these particular components, though they prove valuable sources

a mixture of proteins from different
in a diet, so that one may supply the
er.

s from different sources differ in the ease with
be assimilated. Vegetable proteins generally
ilable than animal proteins.

average percentage absorption of protein.

Meats, Fish, Milk	93
Cereals	84
Legumes	76

(9) The chief use of proteins is to build up and repair the tissues. Energy for both internal and external work is derived mainly from carbohydrates and fats, but neither of these can supply the place of protein in the repair of the tissues.

(10) A very long time is taken, reckoned in months and years, to replace protein lost by wastage from the body as in starvation. Persons accustomed to a low protein intake may have difficulty in utilising a more liberal supply.

(11) Protein is more quickly oxidised in the body and more readily utilised than either carbohydrate or fat as may be shown by the rapid evolution of heat following a meal rich in protein. The total energy set free by the oxidation of equivalent quantities of carbohydrate and of fat is as great, but it is evolved more slowly.

(12) Protein which is not easily digested and absorbed is liable to give trouble by putrefactive changes in the intestine.

(B) Carbohydrates.

Carbohydrates are derived almost exclusively from the vegetable kingdom and are eaten in the form of sugars and starches and their derivatives.

(1) Sugar in the forms of sucrose, lactose and glucose is entirely absorbable and is a valuable source of energy. The rarer sugars need not be referred to.

(2) Starch is also capable of complete
that it be presented to the digestive juices in a
is one of the chief sources of energy. Starche
sources differ somewhat in the ease with whi
digested, but this probably is not a matter of great

(3) Protein must be obtained from outside sour
certain amount of carbohydrate can, in the body, b
from protein.

(4) Carbohydrates are necessary components of a diet within limits may be substituted for protein.

(5) Some carbohydrates, such as cellulose, cannot be digested by the human body but have a use in giving bulk to the food.

(6) If a diet contains insufficient carbohydrate the necessary carbon has to be extracted from the protein of the diet or in the last extremity from the protein of the muscles of the body.

(7) Carbohydrate can be stored in the body.

(C) Fats.

(1) Fat can be formed in the body from protein and carbohydrate but, although fat is a concentrated source of energy and a valuable food stuff and finds a place in almost every diet, it is not quite clear whether it is indispensable or not.

(2) Fats from different sources differ in ease of digestion and nutritive value, animal fats being more useful than vegetable fats.

(3) Fat can be stored in the body.

(4) Carbohydrate cannot be formed from fat in the body.

D.

Few of the simpler inorganic substances compel attention separately. Carbon, Hydrogen, Oxygen, Nitrogen, Sulphur Phosphorus, Iodine and perhaps other of the elements in minute quantities are components of the proteins eaten ; more carbon

ken in as fat and carbohydrate ; oxygen
; sodium, potassium, fluorine, chlorine, calcium
nesium, phosphorus and sulphur may be ingested
with proteins or as simple salts. A well arranged
a sufficiency of the various necessary elements.

ions of sodium, potassium and calcium must however
ually supplied in order to keep the balance of these
the blood. On a vegetable diet much potassium is
ted and a sufficiency of sodium chloride must be taken in
dition to counteract it. Rice, however, contains only a small quantity of potassium, so rice eaters do not require much sodium. On a meat diet little additional sodium chloride is needed.

(E)

Similarly, a well arranged diet contains a sufficiency of the accessory food factors, or vitamins, without special provision being made for them.

(F)

The palatability and digestibility of foods are largely dependent on methods of preparation and cookery. The point to be borne in mind is that uninstructed methods of preparation and bad cookery will sometimes remove essential properties from an initially good food.

III. We now have to apply in practice the knowledge at our disposal.

We know that a certain bulk of food containing certain food stuffs in certain proportions must be eaten daily if health is to be preserved and work is to be done. We know that life may be maintained and reproduction can take place if lesser quantities of food than that which we believe to be the optimum are habitually used or if the proportions of the constituents are greatly changed, but we see good reason to believe that that life is on a lower mental and physical plane, that resistance to disease is less and premature decay more likely than when the optimum of quantity and proportion is adhered to.

The main point is to supply the body with sufficient energy under the guise of calories. No matter how satisfactory a diet may be in other respects if it is insufficient in calorific value the body must suffer or fail.

The body has a certain adaptability in dealing with varying proportions in the main constituents of the food, so that, although we may consider certain proportions the optimum, good results in certain circumstances follow the use of other proportions.

A nation must be regarded as ill-fed and consequently below the standard it might have attained if the average man cannot obtain about 2 lbs weight of food daily of an energy value of 3000 calories. Some individuals may do well on less, while those who perform hard labour will require more. The problem is to provide this amount of energy in the most economical form.

The qualities of the food stuffs vary, so the analyses made of their proximate principles differ. This has to be taken into account.

For instance, in rice, different analyses vary as widely as the following,

	Calories		in 2 lbs.
Protein 5 to 9 %	184	—	332
Fat 0.1 to 0.8 %	8	—	67
Carbohydrate 66 to 81 %	2430	—	2988
	2622		3387

Other analyses give 98 to 108 as the caloric value per ounce of rice. 2lbs of rice would according to these estimations be worth 3136 or 3456 calories. So we may take it that 2 lbs of good quality rice will furnish about 3000 calories daily, a sufficiency for an average man.

But 2 lbs of rice contain

Protein	45-81 grams	instead of	120 grams
Fat	0·9-7·2 ,,	the	50 ,,
Carbohydrate	594-747 ,,	standard	500 ,,

So it is clear that it is deficient in fat and protein and contains

an excess of carbohydrate, and a man could not live on it solely.

It is also deficient in vitamins and mineral salts. Now how could a diet with a rice basis be improved so as to be still acceptable to a vegetarian ?

It could have milk, salts, fresh vegetables, condiments and other cereals or legumes, sugar, vegetable oils added.

Suppose we start with 1 lb of rice (450 grams) containing

		grams	calories
Protein	7 %	31	127
Fat	0·4 %	1·8	16
Carbohydrate	69 %	310	1271
			1414

This gives nearly half the necessary calories. We have to add

365	calories	from	protein	89 grams
449	,,	,,	fat	48 ,,
779	,,	,,	carbohydrate	190 ,,

Suppose we supplement with

		Percentage.			
		Protein.	Fat.	Carbohydrate.	
Milk	500 grams	21	18·5	22·5	
Cocoanut	60 ,,	2	30·0	1·0	
Plantain	300 ,,	3·3	1·5	59·4	
Brinjal	100 ,,	0·4	0·2	1·7	
Dhal	142 ,,	38·0	3·0	99·0	
		64·7	53·2	183·6	
Adding rice	450 ,,	31·0	1·8	310·0	
We get a total in grams		95·7	55·0	493·6	
					calories.
Giving in calories		392	510	2023	2925

This is a reasonably good vegetarian diet, but the quantity of protein has only been reached by the use of the maximum quantity of dhal that the digestive organs can economically deal with.

There are other important points to be considered before the diet can be passed ; (1) the availability of the proximate principles of the diet and (2) the biological value of the proteins. The availability of protein, carbohydrate and fat of a diet, is largely dependent on the texture of the diet, whether the materials are presented to the digestive juices in such a form that the juices can act upon them thoroughly and exhaustively. This rarely happens, and a varying quantity of protein, carbohydrate and fat escapes digestion and is wasted and expelled with the faeces.

The availabilities of the constituents of this diet are shown in the following table :—

Percentage.

	Protein gross.	Protein available.	Fat gross.	Fat available.	Carbohydrate gross.	Carbohydrate available.
Milk	21·0	20·4	18·5	17·6	22·5	21·4
Cocoanut	2·0	1·0	30·0	28·5	1·0	0·9
Plantain	3·3	1·6	1·5	1·4	59·4	56·5
Brinjal	0·4	0·2	0·2	0·2	1·7	1·6
Dhal	38·0	25·0	3·0	2·9	99·0	94·0
Rice	31·0	26·1	1·8	1·7	310·0	294·5
	95·7	74·3	55·0	52·3	493·6	468·9

So the available protein of this diet is reduced to 74 grams, the available fat to 52 grams and the available carbohydrate to 468 grams.

Now we have to consider the assimilability, or biological value, of the proteins which varies according to the source of the protein (vide II·8). Though we have 74 grams of protein available in the diet under discussion it is not all of equal biological

value. To arrive at the biological value of proteins from different sources the quantity available must be divided by a factor arrived at by experiment and calculation.

Source of Protein.	Available quantity.		Factor.	Final biological value.
Animal (milk)	20·4	÷	1	20·4
Vegetable (cocoanut &c.)	2·8	÷	2	1·4
Legume (dhal)	25·0	÷	1·82	14·8
Cereal (rice)	26·1	÷	1·12	22·2
	74·3			58·8

So, although we started with an intake of 95 grams of protein, in the end the amount which can be utilised by the body is found to be only 58 grams with a value of 241 calories.

The diet finally works out as follows

Available and assimilable.	Grams net.	Calories.
Protein	58·8	241
Fat	52.3	486
Carbohydrate	468·9	1922
	580·0	2649

and is on the low side all round.

It would be better if supplemented with some ghee, sugar, curds, fresh fruit and vegetables, and would have to be added to if the subject were living anything but a sedentary life.

The probabilities are that sufficient allowance is not made for faecal wastage, assimilable or biological value, poor quality of materials and last, but certainly not least, bad cookery in calculating dietaries for institutions. It is better for people to have a slight excess of assimilable food than to have their vitality and resistance to disease lowered by deficient feeding over long periods. It is not the single deficient or ill-balanced meal that

does the damage but a deficient or ill-balanced dietary extending over years.

Let us examine one or two other food stuffs. Suppose a man could get nothing but plantains to eat. Leaving out about 35% by weight of waste skin a medium sized plantain weighs about 100 grams and contains

Assimilable	Grams net	Calories.
Protein	0·3	1·23
Fat	0·4	3·72
Carbohydrate	14·0	57·4

48 such plantains eaten in a day would provide

	Grams	Calories.
Protein	14·4	59·0
Fat	19.2	178·5
Carbohydrate	672·0	2755·2
	705·6	2992·7

nearly sufficient calories for an ordinary day's labour, but far too little protein and fat for health to be maintained for long, and too much carbohydrate.

Three pints of milk daily is supposed to be an adequate diet for a sick man. This is equivalent to about 1700 cc. and contains

	Net assimilable grams.	Calories.
Protein	57·8	237
Fat	64·6	600
Carbohydrate	85·0	348
	207·4	1185

Now the basal metabolism of an average man expends about 1700 calories, and a man awake, but lying in bed at rest, requires about 2150 calories to maintain him in equilibrium,

Fever connotes acceleration of metabolism and if the patients' condition is to be maintained and his digestive and assimilable powers are not too seriously deranged by his malady it is quite clear that 3 pints of milk daily will not nearly suffice for his needs and that his stored up fat and his muscular tissue will be called upon to supply the calories needful to maintain his life. It is difficult enough to determine what are good and sufficient dietaries under the varied conditions of life in health : It is a far more difficult problem to feed a sick man so that he is getting as much as he can digest and assimilate. If he is not, then his medical attendant is not doing all that is possible to put him in the way of regaining health. Medicaments are often of secondary importance when a man is ill, whereas a sufficient diet is of first importance.

IV. I have purposely introduced all these figures and factors to show how complex a matter it may be made to calculate the ultimate value of a dietary, but in reality the matter may be much simplified. In taking account of all these factors in the construction of a dietary the assumption is made that they are correct. This unfortunately is far from established. In the first place the percentages of the proximate principles of the food stuffs analysed apply only to the particular sample or average of samples taken by the analyst ; they do not apply with exactitude to the samples we may be using. In the second place there is room for much more research before anything like an average value can be given for the assimilable or biological value of the different kinds of proteins, fats and carbo-hydrates. So much in fact depends on custom, habit, climate and individual differences, as well as on variations in digestibility and assimilability due to admixtures of food stuffs in different proportions, that it does not seem probable at the moment that very definite and invariable biological values can be worked out and fixed. Further it must not be forgotten that food stuffs vary with the chances they have had when alive of arriving at a state of perfection. Just as a cow which is ill-nourished can furnish only a milk deficient in essential properties, so vegetables grown under conditions which

are unfavourable can furnish only food which is deficient in one or more respects. Until further knowledge is available it will suffice us to deduct 10 per cent from the gross calories of a diet to arrive at a good approximation of the true ultimate calorific value of that diet.

Certain general principles regulating the composition of the diet must also be observed which may be summarised briefly as follows :—

(1) The ratio of Nitrogen to Carbon should never be less than 1 to 25. Preferably it should be round about 1 to 20.

(2) Protein from animal sources should never be less than 30 grams daily. Preferably it should be 50 grams.

(3) The total protein available should never be less than 50 grams daily. Preferably it should be round about 80 grams.

(4) The total fat available should never be less than 30 grams daily. It may be increased to about 100 grams according to climatic conditions and individual powers of utilisation.

(5) A sufficiency of fresh green vegetables and fresh fruit should be supplied.

The Nitrogen Carbon ratio may be caculated as follows :—

Proteins	contain	50 %	carbon and 16 % nitrogen.
Fats	,,	75	,,
Carbohydrates	,,	40	,,

So in a diet containing

Protein	100	grams
Fat	50	,,
Carbohydrate	500	,,

we have 16 grams Nitrogen and 50+37+200=287 grams Carbon.

$\frac{16}{287}=\frac{1}{18}$ nearly, the N/C ratio.

Let us see how the suggestion of deducting 1/10 from the gross calories of a diet works out in practice. The gross calorific

value of the vegetable diet detailed earlier was 2925 calories. By submitting its components to a complex process of reduction we arrived at a final value of 2649 calories. If we had omitted this complex process and merely deducted 1/10 or 292 we should have arrived at 2633 calories as our final value. The difference between the two is not great and in view of what has already been said the simpler method may be taken to be near enough for all practical purposes.

V. It may be instructive and not without interest to give here some details of the actual diets consumed by certain persons

(Vide table in pages 146-147).

The accompanying table is an analysis of the actual diets consumed by 25 persons all working for their living in various capacities, some doing manual labour but none anything that could be described as more than moderate labour. Column 5 gives an indication of physique. The standard weight is taken from tables constructed in America. I know of no such standard worked out for Indian races. Possibly it might be lower and in that case the defaults would not be so great. On the whole those who consume the better dietaries containing the largest proportions of animal protein are nearer the standard than those who are or have to be content with diets of poorer quality. Nos. 2 and 13 consume altogether too little food to produce sufficient calories. Nos. 2, 7, 10, 11, 13, 16, and 23 take too little total protein, and Nos. 2, 4, 7, 8, 10, 11, 12, 16, 17, 20, 21, 22, 23, and 25 take a dangerously small quantity of animal protein. Nos. 2 and 3 take more dhal than they probably can assimilate.

Nos. 1, 5, 6, 15, 18, and 19 are the only ones who consume a bare sufficiency of animal protein.

Not a single one reaches what is considered to be the minimum N/C ratio, namely 1/20. Nos. 4,7,9, and 11 are all less than 1/30 and No. 10 is as low as 1/40.

Taking the percentage ratio of protein we see that only Nos. 5, 15, and 19 reach the minimum requirement of 12 per cent.

As for fat, 17 of the 25 take less than the accepted minimum of 7 per cent.

Without exception all exceed the accepted maximum percentage of carbohydrate namely, 78 per cent.

The chief errors of these diets are too much carbohydrate in proportion to protein and fat and too little animal protein. The total calories available are in most instances sufficient.

These errors are caused partly by custom, partly by the pressure of economy. Carbohydrates are by far the cheapest source of energy and must form the bulk of the food of those who are only able to spend two annas or less for 1000 calories.

The point of practical importance that emerges is that though a man may now be able to provide himself with 3000 calories daily for 6 annas, that food will be ill-balanced and in several respects deficient and, though the man may with luck live on in apparently fair health for a good many years, his vitality will be low, his powers of resistance against infective maladies low, the likelihood of his succumbing to disorders of metabolism high and the prospect of his attaining to old age very small.

I do not think that a reasonably good diet can be purchased for much less than 4 annas per 1000 calories or about Rs. 23 per mensem, except perhaps in bulk for institutions.

Such a diet would be the following :—

Rice	16	ounces.
Milk	24	,,
Dhal	3	,,
hi	1	,,
ugar	1	,,
urds	8	,,
Wheat	1	,,
2 eggs	2.8	,,
Green Vegetables....	8	,,
Fruit	10	,,

Available calories	3184	
Animal protein	39.8	grams
Vegetable ,,	40.0	,,
Total	79.8	,,
Percentage of protein	11	
,, Fat	10	
,, Carbohydrate	78	

TABLE

Serial Number.	Age.	Height.	Weight in pounds	Percentage difference from Standard weight.	Total Protein eaten in grams.	Quantity of animal Protein in grams.	Nitrogen-Carbon ratio.	Percentage ratios of Protein.	Fat.	Carbohydrate.	Total available Calories.	Cost per 1000 Calories.	Cost per month in Rupees.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Ft. In										As. Ps.	
1. Brahman	36	5 7	136	— 10	63	30	1—25	10	9	80	2687	3 7	18½
2. Brahman	33	5 4·5	100·5	— 27	51	13	1—26	10	9	80	2190	3 1	14
3. Brahman	22	5 7	120	— 15	77	28	1—27	11	9	79	3112	3 6	20¾
4. Brahman	25	5 3	114·5	— 12	68	18	1—31	9	9	81	3310	3 1	20
5. Hindu, Nair	28	5 5·5	145	+ 5	77	37	1—23	12	8	79	2916	3 11	22
6. Ind. Christian....	44	5 9·5	145	— 12	80	39	1—25	11	2	86	3067	3 0	17
7. Ind. Christian....	30	5	115	— 9	54	10	1—32	8	3	88	2663	2 4	12
8. Ind. Christian....	35	5 7·5	135·5	— 10	75	18	1—25	10	1	88	3020	2 6	15
9. Badaga	32	5 1·5	93	— 28	61	20	1—32	9	7	83	2995	2 11	16½
10. Badaga	26	5 9·5	128	— 17	48	3	1—40	7	4	88	2866	2 1	11½
11. Badaga	22	5 9·5	114	— 23	59	12	1—31	9	6	84	2882	2 8	15
12. Adi Dravida	26	5 6	121	— 15	69	17	1—25	10	3	86	2776	2 9	14½
13. Hindu	47	5 5·5	123	— 17	57	25	1—24	10	4	85	2255	3 2	14½
14. Hindu	47	5 7	141	— 10	69	20	1—26	10	6	83	2968	2 11	16½
15. Adi Dravida	33	5 6·5	119	— 18	81	30	1—22	12	7	80	2898	2 11	16
16. Hindu	25	5 6	116	— 20	56	13	1—27	9	4	86	2543	2 9	13¼
17. Ind. Christian.... (Female.)	39	5 0·5	95	— 23	65	16	1—26	10	1	88	2665	2 5	12½
18. Ind. Christian....	24	5 4	96	— 27	81	37	1—22	11	2	86	2901	3 1	17½
19. Adi Dravida	50	5 5·5	115	— 23	82	30	1—22	12	8	79	2953	3 0	17
20. Adi Dravida	30	5 0·5	94	— 26	100	10	1—26	10	3	86	4121	1 11	15
21. Adi Dravida	32	5 4·5	107	— 22	85	10	1—28	9	3	87	3582	2 1	14
22. Adi Dravida	38	5 6·5	109	— 26	96	5	1—23	11	3	85	3307	1 6	10
23. Adi Dravida	32	5 4·5	105	— 23	56	5	1—29	8	0·9	90	2654	2 0	10
24. Adi Dravida	40	5 3·5	103	— 26	81	20	1—26	9	1	89	3412	1 11	12½
25. Adi Dravida	31	5 3·5	102	— 24	76	15	1—28	9	1	88	3379	2 4	15

If ragi were to be substituted wholly or partially for rice, some reduction in the cost could be made without detriment.

Here is a nice piece of work for a young chemist searching for something to do, to find the percentage of the proximate principles of all the materials that are or may be used for food in Southern India ; more laborious but much more useful than adding to the number of organic substitution products. Some analytical tables are already in existence, but verification and extension are called for and greater precision in the descriptive nomenclature of the articles specified. In collaboration with a physiologist he might also find the actual nutritive value to the body of the different stuffs analysed and succeed in constructing cheap vegetable dietaries which would comply with all physiological demands.

VI. Religious scruples bar certain people from the use of eggs. For them the only possible source of animal protein is milk.

It should be noted that it may not after all be necessary for man to have recourse to any animal product and it may be practicable in the future, when more complete knowledge is accumulated about the composition of different vegetable proteins, to construct dietaries from purely vegetable sources which include a sufficiency of the various necessary amino-acids without being too bulky. At present we have not the data.

From what has been said certain deductions follow logically :—Either we are wrong in our estimate of the factors which constitute a good diet and people can live in health and develop up to the limit of their respective natures on what we now consider to be ill-balanced diets, or it is beyond the resources of a large percentage of the population to obtain a well-balanced and sufficient diet. If the former, there is nothing more to be said, but it would be incumbent on those who disagree to bring forward adequate scientific evidence in support of their contentions.

If the latter, the problem for governmental authorities to solve is to ascertain the cheapest sufficient and well-balanced dietary and then to order the affairs of the nation so that everyone will be in a position to obtain it.

Three alternatives present themselves to the well-provided citizens of a nation who are aware that a percentage of their nationals is ill-fed :—

(1) to acquiesce in allowing it ;

(2) to obtain evidence that, though deplorable, the condition is irremediable ;

(3) to strive to find ways and means of improving the fare of the ill-fed.

A pretty problem for eugenists and social economists about which much could be said, but this is not the place to discuss it.

RELAPSING FEVER

A paper read by Majors J. Cunningham and J. A. Cruickshank I.M.S., at a meeting of the British Medical Association, South Indian Branch, on Wednesday the 1st November 1922.

Mr. President and Gentlemen,

We have chosen relapsing fever as the subject for our paper this evening because this disease is at present of very real interest to the members of the Medical profession resident in the Madras Presidency.

Until the present year we in Madras have been able to assume a somewhat detached attitude towards this disease. We have in fact been in the happy position of almost welcoming the few imported cases which have found their way to our Hospitals because of the opportunity it has afforded us for the study and demonstration of a blood parasite comparatively rarely seen in this part of India.

Our complacency, however, has lately received a somewhat rude shock.

As most of you are aware, the Districts of Tanjore and Salem have been visited in the earlier part of the year with a

severe epidemic of relapsing fever. There is evidence too from the blood smears which are forwarded to the King Institute from time to time that the disease is still present and may therefore recur.

It behoves us therefore to throw aside our air of detachment and realise the fact, however unpleasant, that relapsing fever is yet another epidemic disease with which we have got to reckon in this Presidency.

In the time at our disposal it would be quite impossible for us to give a complete account of "Relapsing fever" nor will we attempt to do so. Our object is rather to deal with certain aspects of the disease alone, and in so doing to bring to your notice the most recent views held by those who have made a special study of the disease.

Relapsing Fever owes its name to the peculiar type of intermittent fever which characterises the whole of this group of fevers. They are caused by "spirochaetes" which as a rule gain entrance to the body through the agency of the louse or the tick. This particular aetiology explains how the disease is so apt to occur under conditions of stress or famine or where human beings are herded together in insanitary sorroundings, for, such conditions are the very ones which favour the multiplication and spread of the insect host.

Relapsing fever has a wide geographical distribution; Europe, Asia, Africa and America have all suffered extensively in the past. Central Europe, parts of Africa and Northern and Western India may however be described as the storm centres of the disease. Major Cragg in his recent paper traces the past history of the disease in this country. He draws attention to some 10 epidemics of varying severity between 1816 and 1916 which occured chiefly in Northern India and which include the well-known epidemic of 1877 made classical by the researches of Vandyke Carter in Bombay. Throughout this account no mention is made of the presence of the disease in Madras. In fact Major Cragg draws special attention to the fact that Madras although

famine stricken in 1877 was immune from the epidemic of relapsing fever which raged in Bombay at that time.

There is therefore little evidence in the literature which we have had at our disposal that the disease has ever been present in epidemic form in the Madras Presidency if we admit the possible exception of a severe epidemic of fever which occured in Coimbatore and the neighbouring districts from 1809 to 1811 and caused the deaths of over 100,000 people. No evidence of the precise nature of this fever is put forward but its association with such a high mortality makes us think at once of the possibility of its having been relapsing fever.

Relapsing fever is said to be more prevalent during the cold season. The reason usually put forward is that at this time the poorer classes, who are presumably the most heavily infected with the specific ectoparasites, wash themselves less frequently and crowd together for warmth. In the school epidemic described by Mackie in Bombay in 1907, the boys were more heavily affected than the girls because they were less cleanly.

The close association of typhus fever with relapsing fever in other countries is also attributable to this cause.

In India this association does not hold good. Typhus fever is confined almost entirely to the most northerly and cooler parts of the country and occurs only in the winter months. The epidemics of relapsing fever in the United Provinces on the other hand reach their highest incidence in the months of April, May and June.

As far as we are aware the late epidemic in Tanjore did not altogether agree with the seasonal distribution. The disease was undoubtedly present during the winter months and when we had the opportunity of studying it during April it was already declining and the paucity of cases towards the end of the month caused the recall of Dr. Ramakrishnan whom we had sent to investigate the disease.

We do not wish to labour this point however. Major Rusell has made a very complete study of the epidemiological conditions present during the epidemic and will give us the benefit of his researches in this direction.

A further interesting fact which came within our observation was the very definite limitation of the disease to the paraiah class. Villages inhabited by the higher castes, although situated right along side the paraiah villages were not infected. Here again it would appear that our experience differed from that of Major Cragg, for, the epidemic investigated by him, in the United Provinces, was widespread amongst the people of the agricultural classes.

Turning to the aetiology of the disease, the whole group of relapsing fevers is caused by a "spirocheate" whch is to be found in the blood during the febrile periods and is absent during the periods of remission. There has been much controversy among the systematists as to the proper classification of this type of organism. The details of these discussions need not detain us. The most competent opinion now-a-days assigns these parasites to a position amongst the Bacteria and considers that the correct generic name for them should be "spironema" not "spirochaete."

The varieties of relapsing fever found in different parts of the world have been considered to be due to different species of spironema and have been given different names. S. recurrentis in Europe, S. duttoni in Africa, C. cateri in India and S. berberum in algeria. According to Todd none of the factors upon which the differentiation of these species depend are valid and he considers "it more practical to regard the relapsing fevers of man as a single disease due to S. recurrentis and to recognise that the disease may both present variations." The typical appearance of these parasites in blood smears stained by the ordinary method is well-known. There is little evidence of waves or spirals in such specimens unless the blood is kept fluid until the spironemata die. In fresh specimens and particularly with the dark ground illumination a much better conception of these organisms can be obtained. We have used this latter method almost exclusively in

examining the blood of our infected animals and have found it much more rapid and accurate than the dried films. By dark ground illumination the typical form and movements of the parasite are beautifully seen and the differentiation into a periblast and a central core is apparent. As the febrile stage progresses, the organisms in the blood gradually increase in number until a climax appears to be reached on the final day, when they rapidly disappear from the peripheral circulation. Although difficult to find during the afebrile period they are not altogether absent, and patient search will sometimes reveal their presence. It is said also that the blood is still infective during this stage. In the few instances where we have inoculated blood at this time we have not succeeded in producing infection but our observations are not sufficient to warrant our drawing any conclusions upon this point.

The periodicity of the disease and its carriage by an insect host suggest a definite life cycle. The periodicity however may be due merely to the gradual accumulation of immune substances in the blood of the host which cause the destruction of the parasite. This latter explanation is unlikely on the face of it, for arguing on the analogy of the known facts about immunity to bacterial infections, one would not expect such a rapid, regular or continuous return of the febrile period. On the other hand, one would expect that, if a definite life cycle was present, it would take a definite time to complete, and that the direct passage of infected blood from one animal to another should not disturb its duration; that is, the duration of the attack in the inoculated animal, should depend upon the period of the attack in the infecting animal at which the blood was taken. In the course of our experiments at Guindy we have made some fifty passages chiefly from monkey to monkey but also to mice and rats. The inoculations have taken place between the first and fifth day of the disease but we have never observed any correlation between the length of the attack and the period at which the blood was drawn.

A life cycle such as that found in the higher type of infecting organism is thus unlikely,

The formation of chromatinic granules by spironemata is much more suggestive. Granules of this description may sometimes be seen in organisms present in the peripheral blood and are best sought for at the approach of the crisis of an attack. These granules in the case of S. gallinarium have been observed to enter the blood cells.

It is in the tick, however, that these changes have been chiefly studied. Two types of granules are formed by the spironema in the tick—large ones extruded from the terminal or lateral swellings of the parasites and smaller ones formed by the fragmentation of the chromotin core of the organism. Both of these types have been observed by Dutton and Todd and others in the alimentery canal, Malpighian tubes and oviducts of infected ticks. In addition, comma shaped bodies and short and normal spironemata have also been observed in the body cavity and organs of the same insect. The actual transition of the granule to the comma shaped body and from the comma shaped body to the spironema has not been observed although Leishman has seen spirochaetes leaving clumps of granules.

The same observer has also shown that the development of these various stages is influenced greatly by variations in humidity and temperature.

Temperatures over 38°.5C are said to render ticks more infective while under more favourable conditions they will retain their infectivity for many weeks. (28°.C).

The present position with regard to the possibility of a developmental cycle can, we think, best be summed up thus :—

The presumptive evidence that these changes are developmental in character is very strong, although the actual proof by observation is still lacking.

Evidence of similar developmental cycle in the louse has also been advanced.

Within a few hours after feeding spironemata cannot be found in the alimentary tract and the lice are not infective. The

spironemata reappear about the 6th or 8th day in the body cavity. It is not until this occurs that the louse becomes infective.

The insect vectors of relapsing fever vary in different parts of the world. These are usually ticks and lice. The exact species of tick varies according to locality. Thus in Central and Eastern Africa and Madagascar *ornithodorus moubata* acts as the transmitter. In Somaliland *ornithodorus savignyi*. In Persia the well known *Argas persicus* and *ornithodorus tholozani*. The last named tick according to Todd is also a vector in India. We have not however been able to find the original source of his reference. Lice have a world wide distribution and may thus presumably carry the disease in any country. All three types of lice—the crab louse, head louse and body louse—may carry the disease. The lice of monkeys and other animals are also said to act as vectors. In this connection it is of interest to note that no case of natural infection has taken place in our monkeys during the six months we have been working on this subject. This is the case although no special precautions have been taken in this direction. Mackie first proved the connection of the louse with the disease in Bombay in 1907. Nicolle and Blanc later demonstrated their complicity in Algeria, and worked out the exact method of infection. Lice do not infect by biting. The body of the louse is crushed by scratching and the spironemata enter the circultion of the host through abrasions caused by the scratching or cracks in the fingers or even through mucous surfaces. One of Nicolle's experiments which was undertaken to prove this mode of infection is very dramatic.

Over 15,000 bites with infected lice failed to infect a human being. A single crushed louse placed on the conjunctiva brought about infection.

Cragg has recently confirmed Nicolle's findings in this country by infecting a monkey with inoculations of crushed infected lice. Ticks also convey infection in an indirect manner, While feeding they exude a fluid swarming with spironemata from their coxal glands. This fluid reaches the skin of the host and the

organisms are thus free to enter the puncture caused by the bite. Both lice and ticks pass the spironemata on to their offspring. In the case of ticks the infection may be transmissible for at least three generations. The possibility of infection at considerable intervals of time and by indirect means where direct contact cannot be traced is thus well illustrated.

Other insects, such as bed bugs have been known to transmit the disease by mechanical means. As Todd says, anything which introduces infected blood into a susceptible host might do so.

Contrary to what has been written on the subject, spironemata will remain alive in the dead host for comparatively long periods of time. As evidence of this, we may cite our own experience. We have found active parasites in animals which have died sometime previously. In one instance we infected a mouse with the bloody fluid taken after a post-mortem on a monkey which had died some 14 hours previously. The monkey had been kept over night in the cold chamber and the body was thus considerably below the normal blood temperature. The inference from an observation of this kind is obvious where bed bugs and other blood sucking insects are concerned.

In the epidemic in Tanjore the infected population was very scantily clothed. No body lice could be found but pediculus capitis was greatly in evidence. There is little doubt, that this epidemic was spread by this means although we failed to infect a monkey with the lice taken from a patient in the one attempt we found it possible to make. Such a failure is of no significance. The majority of such experiments are negative. Cragg only infected one monkey in five attempts under much more favourable conditions.

There is no necessity to draw your attention to the variations which occur in the symptomatology of the disease in different countries. These chiefly comprise variations in the number and length of the attacks of fever, and the intervals between them.

The severity of the different geographical types also varies very greatly. Those of you who were present at the debate on "spirochaetal infection" at the Medical Research Section of the Indian Science Congress last February will remember the emphasis laid by Sinton and Fairley on severe jaundice as an accompaniment of the disease in Persia and Egypt. In the Tanjore epidemic two other symptoms which do not find mention in the text books are worth noting-severe diarrhoea and alopecia. It is of interest to note that a considerable number of our experimental monkeys have died during and after infection of a severe and wasting diarrhoea. Whether this diarrhoea has been a part of the infection we cannot definitely say, but we have repeatedly searched for the usual causes of diarrhoea both anti-and post mortem without any success.

The convalescence of the cases we saw at Tanjore was in many cases prolonged. Wasting and oedema of the dependant parts of the body were fairly common. The people usually cut off the hair of the patient as soon as he was attacked with the disease. This it may be noted was a very useful and practical prophylactic measure.

Since the introduction of salvarsan and its various successors the treatment of relapsing fever has been placed upon a sound basis. Manson and Thorburn give the following doses of the various preparations in the order of their efficiency.

Novarsinobillon	0·9	grammes.
Neo salovarsan	0·6	do
Luayol	0·3	do
Galyl	0·35	do
Salvarsan		

One dose is usually sufficient to produce a cure. Smaller doses cause cessation of the fever but do not prevent relapse.

Under the conditions usually present in large epidemics such as that which occurred in Tanjore, promiscuous intravenous injections are manifestly impossible. The question thus arises whether

there is any evidence available which would justify the hope that a single prophylactic measure, such has some form of inoculation might be introduced which would protect against the disease. This is the subject to which we have turned our attention during the last six months. We are aware that various observers had demonstrated the presence of immune bodies in the serum of both patients and animals after attacks of the disease. The more recent work of Naguchi on spirochaetal infections, however, and particularly his production of the experimental serum and vaccine for yellow fever justify the reinvestigation of this subject.

(A summary of these experiments so far as they have gone was given to the meeting. These experiments are still incomplete and not ready for publication at the present time.)

ATOMIC STRUCTURE

By Major CLIVE NEWCOMB, I.M.S.
Professor of Chemistry, Madras Medical College.

ALTHOUGH the evident relationships of the elements brought out by the periodic law leave no doubt of the essential unity of matter, theories of atomic structure have languished, or remained of only academic interest, since the accurate atomic weight determinations, of Stas (1860—1865), apparently finally disposed of Prout's hypothesis, till comparatively recently, for want of facts on which to base them. Within the last twenty years however the position has altogether changed, and with the discovery of radio-active substances, isotopes and atomic numbers have come to light a mass of facts, altogether revolutionary, and giving rise to many theories of atomic structure. The matter is still largely in the stage of conflicting theories and is consequently somewhat unsuitable for inclusion in an elementary course. The most acceptable of these theories, however, have much in common, and this amount will at any rate probably be generally accepted for many years to come. Apart from any other reason the intrinsic interest of the subject should amply justify its inclusion.

A commonplace but none the less very striking fact in Chemistry is that atoms of elements often appear to entirely change their properties when they combine with one another. Sodium Chloride for example is about as different as it well could be in most of its properties from either Sodium or Chlorine, and such an observation is the rule and not the exception. Sodium ion also has entirely different properties from Sodium, and this is even more striking, since it seems only to differ from sodium by having a positive charge on each atom instead of being electrically neutral. The two outstanding properties of atoms which are unaffected by their state of combination are their mass, and in the case of radio-active elements their radio-activity. The mass of the sodium atoms is unaffected whether the sodium exists as element or as compound, whether as solid, liquid or gas. The radio-activity of Radium is similarly unaffected by its state of combination or its physical state.

Atoms of matter in the ordinary way do not interpenetrate one another, so that up till recently we have only known the atoms from the properties which reside in their surfaces. A great deal has for sometime been known about atoms from the outside—their size, their weight, the number of them in a gram molecular volume of a gas, etc.,—so that the fact of their real existence is not to be doubted, but it is only since about 1911 that we have got any information worth speaking of as to their internal structure. In the elucidation of this, three lines of research have proved specially fruitful.

(1). The investigation of the tracks of X particles in their passage through matter.

(2). X-ray spectra, with the discovery of atomic numbers.

(3). The disintegration of the radio-active elements.

In the X-rays we have particles which will penetrate the atoms of matter, and may well be expected to bring us back from that hitherto unexplored region something of interest. In this expectation we have not been disappointed. The X-ray particles

in traversing matter travel through its atoms for the most part in straight lines, but a few of them (about 1 in 10,000) undergo considerable deviations up to more than 120 degrees, that is to say they may even turn almost in their tracks. The explanation of this extra-ordinary behaviour seems almost inevitable, namely that the atoms consist mostly of empty space in the middle of which is a minute nucleus small as compared even with the atom, which is positively charged, and in which all or nearly all the mass of the atom resides. On this hypothesis we can indeed determine what the maximum size of the nucleus must be, by observing what percentage of the random shots with the X particles hit it, or go sufficiently close to it, to undergo sensible deviations. It is found by this means that the nucleus has a maximum diameter of from 3×10^{-12} to 3×10^{-13} cm. that is to say only about one hundred thousandth of the diameter of the atom itself.

The rest of the atom which is not occupied by the nucleus cannot be absolutely void, and the nucleus being positively charged, and the atom as a whole being electrically neutral, must contain negative electricity or electrons. The mass of these electrons is however negligeable in comparison with that of the nucleus so that the X particles plough through them without undergoing any perceptable deviations. Ordinary chemical reactions take place between these extranuclear electrons since the atoms are ordinarily not interpenetratable.

The mass of the atom is supposed to reside in the nucleus and is thus unaffected by chemical combinations of the atom or its physical state. The other property of some atoms also uninfluenced by chemical combination or physical state is radioactivity, and this too must therefore be property of their nuclei. The study of the disintegrations of the radio-active substances has clearly shown that when an atom shoots out an X particle (i.e. a particle with a mass 4 on the O=16 scale, carrying two positive charges) the element formed has an atomic weight of four less and an atomic number of two less. When on the other hand

the atom shoots out a Beta-particle (i.e., a particle of negligeable weight carrying one negative charge) the resulting element has the same atomic weight as its parent but an atomic number of one more. Since rodio-activity is a property of the nucleus, the nucleus must contain both positively charged particles of sensible mass as compared with atoms, and negatively charged particles of negligeable mass or electrons. From the way in which the atomic number of the element changes according as it looses positive or negative charges, the atomic number must be the net charge on the nucleus, i.e., the difference between the number of positive and negative electrons it contains. The atom as a whole is electrically neutral so that the number of electrons in the rest of the atom must be equal to the net positive charge on the nucleus. The atomic number of an atom is therefore both the net positive charge on the nucleus, and the number of extra-nuclear electrons.

This affords an explanation of isotopes. They are atoms with the same atomic number but different atomic weights. The number of positive and negative electrons in their nuclei and consequently their masses are different, but the net charge is the same, and consequently the number of extra-nuclear electrons is the same. It is on these latter that the chemical properties of the atoms depend, and consequently the chemical properties of isotopes are identical.

So far most of the theories of atomic structure, at present *sure le tapis*, agree. As to the disposition of the extranuclear electrons and the structure of the nucleus they are more conflicting.

There seems no doubt that these electrons are not all placed at the same distance from the nucleus but form different layers or shells like the coats of an onion. It can be shown, I think mathematically, or at any rate experimentally that mutually repellent particles attracted to a centre will group themselves in such rings or shells, and that when a certain number in the outer

shell is exceeded the system becomes unstable and a new shell begins to be formed.

It is to the outermost shell of electrons that the chemical properties of the atoms must be chiefly due, and we must suppose that atoms of chemically similar elements must have similar outer shells of electrons. One supposes that with increasing numbers of extra-nuclear electrons, the number in the outer shell increases up to a point where it can hold no more, when a further increase necessitates the commencing of a new shell.

The atoms which show no tendancy to combine with other elements are the inert gases, and in each of these it is supposed that a shell of electrons is completed. The atomic numbers of these atoms are He=2, Ne=10, A=18, Kr=36, X=54 and Nt=86. It is supposed that Helium atoms have two electrons in their outer shell, Neon an inner shell of two and an outer of eight, Argon three shells with 2, 8 and 8 electrons in them respectively, and so on, up to Niton with six shells of 2, 8, 8, 18, 18 and 32 electrons each.*

In passing from one of these elements to one of the lithium Caesium group, a new shell is begun consisting in each case of only one electron. In passing to the next group for example from Sodium (at no. 11) to Magnesium (at no. 12) another electron is added so that Magnesium has two electrons in its outer shell, and so on up to Chlorine (at no. 17) with seven electrons in its outer shell. If we now add an electron to Chlorine we complete the shell and come to Argon (at no. 18) another of the inert elements.

Sodium therefore has an electron to lose or to share with another element, and Chlorine has a need to gain one. These needs, so to speak, of Sodium and Chlorine are satisfied in the compound sodium chloride.

*It is interesting to note that these numbers can be got by taking 1, 2, 3,.....terms of the series :—$2\{1^2+2^2+2^2+3^2+3^2+4^2+.....\}$ though the significance of this mathematical relationship is not clear.

On the question of the structure of the nuclei of atoms we have little to go on, and it was only a few years ago that Rutherford said that by common consent this must be left to a future generation to solve. This preserve of posterity has however already been preached on and that largely by Rutherford himself. In view of the fact demonstrated by the positive ray spectra that the masses of all atoms (hydrogen excepted) are exact whole numbers on the Oxygen=16 scale, we may suppose that the positive electrical units or 'protons' have a mass 1, and neglect the mass of the negativc units or electrons.

The nucleus of Helium then (mass 4 at no. 2) is made up of four protons and two electrons, giving a net charge on the nucleus of two.* The nucleus of say Sodium atoms (mass. 23, at no. 11) is made up of 23 protons and 12 electrons (23-12=11) giving a net charge of 11. In view of the fact that radio-active elements shoot out particles of mass 4, it is possible that the protons in the nucleus of these elements are arranged partly at any rate in groups of four[1]

Many experiments have recently been made on the effect of bombarding atoms of various elements with alpha particles, and there seems little doubt that in some cases hydrogen atoms are knocked out of them. The fact of this transmutation has not been demonstrated by actually collecting the hydrogen and proving it to be such by ordinary chemical or physical means, but the particles knocked out have been shown to have greater velocities and consequently greater penetration than the alpha particles which hit them, as would be expected when a particle of mass 4 hits a particle of mass 1. From the effects of magnetic and electric fields on these particles it has been shown that they have a mass of 1 on the O = 16 scale. There seems little doubt therefore that they are hydrogen atoms. It is interesting to note that of the elements so far examined by this method only those which have atomic weights 4n+2 or 4n + 3 (where n=an integar) give these particles. From elements such a Carbon, Oxygen and

* Annual Report of the Chemical Society for 1921, p. 20

1 On this point see Aston Isotopes 1912 p. 102.

Sulphur with atomic weights 4n, no such particles were obtained. These results seem to indicate that in the nuclei of atoms the protons of mass 1 are grouped in fours and ones or otherwise but the nuclei of other atoms are made up of Hydrogen and Helium nuclei. The matter however is still very speculative. The theory of the arrangement of the extranuclear electrons outlined above is that known as the Lewis-Langmuir theory, and is only one of several now under discussion. It seems probable that this theory will need modification in the near future. The theory that atoms consist of nuclei round which there are arranged extra-nulear electrons, and that the atomic number is the number of these and the net positive charge on the nucleus is on a much safer foundation. It is theory, and as such is liable to be upset in the future but it seems difficult to see how it can be upset without a very radical change in our ideas of the nature of matter.

OSTEOMALACIA

By Dr. MARY O'BRIEN BEADON, M.B., B.S. (Lond).
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OSTEOMALACIA is a disease characterised by softening of the bones the greatest stress falls on the spine and pelvis, causing kyphosis and pelvic contraction.

In India this disease is much commoner among women than among men though men are sometimes attacked. It is most usually seen during the child-bearing years, and often begins during or immediately after pregnancy; but it is sometimes seen at the onset of puberty, in girls of 12—13 years of age.

Distribution. Osteomalacia is found in all parts of the world where there is a combination of poverty, insufficient food, poor hygiene, and cold winters. It is found in Europe in the north of Italy, in the Black Forest, and at present, to judge by the reports, it is playing great havoc in Austria, where all the essential accompanying factors are present in a very marked degree. In

India it is rife in many parts of the north, for instance, it is very common in Kashmir, Delhi, Amritsar, Lucknow, and Agra. These are all districts where there are some months of more or less severe cold in winter and where also poverty, bad hygiene and overcrowding are common. Possibly the rarity of the disease in Southern India is accounted for by the milder climate, during winter.

Etiology. Arcangeli and other Italian investigators consider that the disease is bacterial in origin; and this would explain its endemic occurrence. But the German investigators consider that it is due to polyglandular endocrine insufficiency. Scipiades concludes that the thymus is responsible for the processes which induce osteomalacia. Any influence which causes accidental pathologic involution of the thymus gland causes osteomalacia, especially when followed by a rapid succession of pregnancies.

Though the origin of the disease is obscure, it is certainly due to abstraction of calcium salts from the bones, thus causing softening of these organs. In pregnancy there is a call for extra calcium salts for the formation of the foetal bones, and if these salts are not supplied in the food, the maternal bones will be forced to part with some of their reserve supply. In this connection it is interesting to note that many cases of the disease begin during pregnancy, and exacerbations of the disease occur during each pregnancy in patients who have had the disease for some time.

But this does not explain those cases of the disease which begin in girls at the onset of puberty.

Nor can the absence of the disease in the South of India, where all the contributory factors of bad hygiene, ill-nourishment, and rapidly recurring pregnancies are present, be explained if the calcium metabolism alone be held accountable for the disease.

In India, doctors of many years' experience find it commonest among poor Mohamedans and rich Hindus. In the north of India the poorer Hindu women have much more freedom than

their Mohamedan sisters. And they may be seen streaming out on feast days in all their gala clothes to the shrines. This gives them much needed exercise in the fresh air, and a welcome change from the humdrum atmosphere of home. On the other hand the richer Hindu women live almost as much in purdah as the Mohamedan women, and this probably explains partly, why they fall victims to the disease more frequently than their poorer sisters.

History. In a large number of cases the history is somewhat as follows :—The patient has had one or possibly two normal labors, during the last puerperium she suffered with " rheumatic pains ", and her convalescence was slow. Her next labor is a little troublesome and she suffers more during this puerperium, and she may be bed-ridden for some months. The next pregnancy is attended with much pain, and the labor is very difficult, and the puerperium is attended with more pain, and when she is ultimately able to get about again, she notices that her stature is considerably diminished, and that she has now much difficulty in walking about. Each subsequent labor is increasingly difficult, until at last if not treated she dies from rupture of the uterus in labor. Some cases are acute. The Patient has one normal labor, some years after she again becomes pregnant, during the pregnancy she suffers much with bone pains, and full term delivery through the normal channel is found to be impossible owing to the marked pelvic contraction.

Symptoms. The early symptoms of osteomalacia are marked anaemia, and severe pains in the pubes and upper part of the thighs. The pain in the pubes is accompanied by tenderness which may be so severe as to cause the patient to scream on palpation of the pubes. There is usually also some fever at the onset. Movement is very painful and the patient even finds difficulty in turning over in bed, or in extending the thighs. She usually lies on one side with the thighs flexed on the abdomen, and contracture may develop quickly, rendering walking impossible. At this stage pelvic examination shows tenderness in the

pubes, usually most severe in the horizontal rami. The uterus and adnexa are normal.

Menstruation is normal, in amount, but may cause exacerbations of pain. The pain at this stage is generally so severe that the patient is completely bed-ridden for some months, after which she slowly recovers, and once more is able to move about and attend to her household duties.

Examination of the pelvis in the later stage of the disease shows well marked characteristic deformity. The whole pelvis is distorted and looks as if some giant hand had crushed the acetabula in, and the sacrum down towards the pubes. Externally the mons veneris is abnormally prominent, and the horizontal rami of the pubes may be felt almost parallel for about an inch of their course in a bad case. In some districts the stage of softening may last for several months, and I have been informed by doctors who had worked in Delhi and Benarese that it was not at all unusual for the head to open out the contracted pelvic bones as it advanced through the force of the uterine contractions. This stage is not met with in Lucknow, or Agra, both places where osteomalacia is common. And I, personally have never met a case in which the bones had the leathery consistence described in the text-books.

Treatment. Medicines are practically useless in this disease. Aspirin is sometimes found to relieve the pain, but does not check the softening of the bones. Adrenalin, Pituitrin, Thyroid extract, Iron, and Arsenic all have their advocates, but none is of any use.

Autoserotherapy is sometimes used with considerable relief of the pain, but I have not enough experience of this method to say if it is permanently beneficial. The serum used for this purpose is from the patient's menstrual discharge, which is collected on pledgets of sterilised cotton-wool, from which it is extracted by water, the extract is filtered, and a certain amount of the filtrate is injected subcutaneously, once or twice weekly.

If the patient is delivered by Cœsarean section, the fallopian tubes may be ligated, or preferably, resected, at the operation. This resection is followed by immediate lessening of the pain, and by arrest of the disease.

In non-pregnant cases, or cases seen early in pregnancy, double ovariotomy is followed by equally good results.

THE PROBLEM OF CHILD WELFARE

By Dr. L. N. VIRASINGHE CHINNAPPA, M.B., B.S.

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I. Introductory

CHILD Welfare is a vast subject, and one that any will own is of paramount importance. "The child is the father of the man", and child life having in it such potentialities for the well being of the race, is truly the wealth of the nation. This untold wealth is in no manner more easily acquired than material wealth. For the acquisition of the latter, master minds unite for mutual support and advancement, associations are formed, representatives are found on the highest councils of the land, both science and law are invoked to lend their valuable aid, in short, no stone is left unturned for the fulfilment of the purpose. But for the former appeal after appeal is put forth in vain, till at last material wealth itself is threatened in no small measure ; then and only then do great leaders and thinkers realise that the support which ought to have been the outcome of human sympathy and fellow feeling should at least be the outcome of human greed for wealth. Alas for ideals ! The thinking world has at last realised after a most bloody and cruel War that child life and child welfare need to be given their due place in national welfare for the accumulation of national wealth. Perhaps only when India has learnt the same bitter lessson, will her leaders wake up to realise the same fact.

Ignorance and poverty have been stated—and very correctly too—to be adverse to child welfare. These are causes in themselves both time worn, and but partly understood and applied. Till now they have been considered only as far as they relate to the unfortunate parent, and more especially to the even more unfortunate mother, a creature at best dependent on circumstances, and with absolutely no control over many factors tending to evil. A great step in the right direction would be taken if these terms were considered relating to a different party altogether, i.e., the so-called enlightened, educated well-to-do and philanthropically minded section of the people. How many of this class are aware of the many difficulties of our poor, or of the despair and dark misery which are their perpetual heritage ? One often hears such remarks as " I wonder how that man can support his family on Rs. 9 per mensem" or " I wonder how they can ever live in such a place". But that is all the sympathy offered. No further advance is made in either enquiry or in more practical philanthropy. For further advance brings the question nearer home and sympathetic questioners are taught however unwillingly, that the cause for A's ignorance and for B's poverty is as much their own wilful selfishness, their own studied indifference, their own poverty of right thought and of right action their own blind avarice as much as anything else. We need a Charles Dickens in our midst to open our minds to pictures such as he described so forcibly :—

" There were the bleared eye, the harelip, the crooked foot, and every ugliness or distortion that told of unnatural aversion conceived by parents for their offspring, or of young lives which from the earliest dawn of infancy, had been one horrible endurance of cruelty and neglect. There were little faces which should have been handsome, darkened with the scowl of sullen dogged suffering there was childhood with the light of its eye quenched, its beauty gone, and its helplessness alone remaining ; and there were young creatures on whom the sins of their frail parents had descended, weeping even for the mercenary nurses they had known, lonesome even in their loneliness. With every

kindly sympathy and affection blasted from its birth, with every young and healthy feeling clogged and starved down, with every revengful passion that can foster in swollen hearts eating its evil way to their core in silence, what an incipient hell was breeding here"! We have yet to realise that so far as we neglect the welfare of our children so far are we fast turning out a new generation not of leaders in every department of life, but of men and women fit to be naught but slaves to foul disease, slaves to evil passions of mind and body, slaves to the varying circumstances of every passing year. Surely this is no record a nation may be proud of!

Child welfare therefore is important, and this article deals with how ante-natal influences may work for good or for evil. Birth is not the beginning of life; nature entrusts the care of the baby to the mother after a period of many months; for this reason nature needs to be helped during this period; rather nature needs to be left to herself, and to act according to her own laws, with no interference whatever. How few of our mothers are really free from such interference!

Taking the geographical and climatic conditions of this Presidency, a large portion of it is a plain, hot and dry in summer, excessively wet, and but ill drained in many parts, in the rainy weather. Droughts are frequent, so are floods. People take things as they come; they are the slaves of circumstances. Thanks to a good deal of ignorance (and also to the poverty of municipalities) an efficient water supply is difficult to obtain, even where the needed source exists. Crops are few and scanty, the sure result of drought where the ryot depends entirely on rain; or fields are often inundated and destroyed. Housing is effected in no intelligent manner and while many die from cold and exposure or from insufficiency of fresh air, more are crippled for life carrying the curse of a dread disease like Tuberculosis, and acting besides as the poisoning agents to the healthy section of the population. Holiday seekers are few; year in and year out those that can afford it live with those that cannot, in the hot dry cities of the plains, while all energy and life are sucked out by a

slow but sure process of deterioration of both mind and body. It need be no cause for wonder that life is shorter than in countries where such wonderful, natural. but unworked, resources do not exist. These general causes affect most the weakest section of the population, the women and the children.

Epidemic diseases play no small a part as devitalising agents. Malaria kills some, but many more are left to fight their way through life with all energy and health fast ebbing away. The picture of three stunted little boys, aged 9, 7 and 5 respectively, rises to my mind in this connection. They were three brothers, with three pale starved faces; three pairs of eyes with a lifeless, joyless look in them; and last but not least, three very enlarged spleens! The adult in whose charge they came was indifferent (through ignorance) to the serious state of the health of the boys. Truly "familiarity breeds contempt". And as for fighting the mosquitoes in that locality! The keenest anti-malarial worker would have found it a different job indeed! Reasons for the quick spread of disease are many; the general apathy of the people to matters relating to their health, their absolute refusal at the beginning to accept plain truths, their great suspicion of welfare workers (for so little unselfish service has been offered to the people, that their minds for a time are altogether unreceptive of goodness), their strong hold on superstition, and last but not least, the little attention—the surprisingly little attention—that has been paid to their health and comfort. Experience has shown that where earnest work is thrown in, pessimism soon gives way to hopeful encouragement, for after all the people that can sacrfice life under the wheels of a car for the sake of an earnest conviction can surely be made to do much less for the sake of mere comfort and well-being. But the idea must take root, and the conviction of truth take the place of superstition. The scientifc truths about cholera, malaria, smallpox, plague, hookworm disease can be taught; for it is not that the crowds in our cities are unteachable, but that for lack of teachers they are yet untaught.

Social customs are perhaps the chief causes retarding advancement. The position the mother holds in the home needs

to be a far higher one. Without in any manner causing a falling away from the high standards in this ancient land of woman's constancy, loyalty, obedience and faithfullness, it is yet possible to raise her position from that of the overworked though willing slave of the household, to the loved, respected, and well cared for lawgiver of the home. The respect and reverence shown to the father of the family in Indian homes is greatly to be admired ; this treatment of the one parent is inculculated in the members of the family by the other. Her religion and her sense of the womanly and the becoming decide for her her cenduct in the home. It were a pity if this same high sense of duty were trampled upon and used as a means of petty tyranny. And yet this is exactly the case in many of our homes. It is only too true that the 'mother' exists for the others, and equally therefore, is it true that for their sakes her likes should be made as healthy, as bright and as happy as possible. Mind and body need to develop freely and unostentatiously into the highest and best attainable; yet of many an Indian woman can it be truly said that her marriage is a sort of funeral for her mind. Early marriages are cruel to say the least. That this pernicious custom should be kept up as a means of safeguarding the honour of our girls is sad indeed, and augurs ill for the future of our land. If it is impossible for our girls to preserve their honour while enjoying the liberty due to growing minds the physical, mental and moral training of both our girls and our boys is seriously at fault somewhere. Roughly speaking, till the age of twenty-one all available energy is needed for personal growth and development and therefore does the childmother seriously risk her own welfare as well as that of her unborn babe. Besides, childhood has it own peculiar joys, grief and sorrows ; its own incidents that shall count as reminiscences through life as so many stepping-stones to the threshold of responsible manhood and womanhood ; its own ideals and ambitions. It were the greatest pity to deprive any individual of such experience. A Tamil proverb says that even from among children engaged in simple play it is possible to pick out the one who shall be most successful in after years. Unfortunately so few of our children (especially our girls) are given

enough time to play, or enough chances to learn in the playground lessons which shall be useful in the great battle field of life. The eager wish on the part of parents to see their sons and daughters "settled in life" leaves the land teeming with dwarfed and debilitated mothers, with irresponsible fathers, with premature and weakly infants, the last sapping away in their demand for existence even the little energy possessed by their mothers, sorely trying the gentlest patience. and causing unselfish mothers to lay their all of health and strength on the cross of motherhood. Unhappy motherhood ! Unhappier still perhaps the patriotism which allows so cruel a state of affairs. The nation's sympathy for its mothers, its chivalry for its women, its care for its future welfare through the citizens to be need to be aroused. Only a civilised nation can realise that womanhood is sacred, that motherhood is holy, that childhood is full of promise, and that therefore its own future is glorious. Infant mortality among the Jews is far less than among the Gentiles due entirely to the fact that home-life is considered more sacred, and that the mother's place by her infant and in the home is given due prominence.

The Influence of the Beautiful and the Good. The home beautiful is yet to be developed in India. The Greeks, a nation with a high sense of art, surrounded expectant mothers with all that was beautiful. Here we find that a large majority of our mothers live in an atmosphere of squalor, dirt, poverty and awful misery. Woman with unkempt hair, loud voices, coarse language, with faces distorted by every undesirable expression, beggars afflicted with every loathsame disease, the prostitute and the leper mingle with the innocent starved, sickly children in our streets. Our streets gape with gutters full of all manner of filth, and above them the stained and defaced walls of our houses houses leer defiantly at those on the other side. Blinking windows shrouded in dirty sacking, doorways with narrow entrances and unsavoury passages, are all too common. Particularly do smells hold their sway ; they creep out of the gutter from behind the tattered sacking, they hang around the woman selling "appums" in the corner, they choke the atmosphere and poison the sun-

shine, every breath of hot air seems to increase them—they move like so many evil spirits under the haze of heat. Could we only see them moving thus mysteriously from house to house, from gutter to gutter, from one heap of filth to another! Could we only hear their murmuring as they pass the leering blink-eyed houses, ill-omened messengers of sickness and death! But they are yet not recognised as enemies of ours; they are yet part and parcel of the lot of hundreds of our mothers and our children.

The Hindu is above all religious. Religion sways the crowd and makes it bathe in one river unmindful of evil consequences; religion causes the vainest woman to sacrifice her much loved head of hair; to the cause of religion is willingly and devoutly sacrificed life under the wheels of a car or on the funeral pyre; religion commands patient penance whether it be rolling in noon day dust and heat, or begging in yellow robes from door to door, or whether it be a life of celibacy and stern discipline. Nothing is hard where religion demands. The growing spirit of irreligion among us is a great menace; the educated and enlightened section of our population is fast growing materialistic owing to the conflict between science and religion. This difficulty would cease and religion as the most powerful factor for good would again take its proper place in shaping the destinies of our race, if one fact were known i. e. that human knowledge of the Divine can never be perfect, and needs to grow from day to day into something fuller and larger. Religion needs to be reformed and the divine ideal of perfect love and brotherhood needs to be placed constantly before our minds. The devotional and the religious in the lives of our women is a great national asset, and there is no doubt that through this excellent means the glorious welfare of our land can be surely worked out.

"Home making is a slow process in any land. William Morris and John Ruskin were the desciples of new principles in both England and in America, and as God and His laws are more fully comprehended in the world and realised to be in and through everything, our homes will become an expression of those

principles in line and colour, as well as in ideals. In India where the whole life is regarded as religious, where the conception of life is a sacrament, a product of the idealism of the Hindus and their religion, the opportunity for art and craft is very great."

"A thing of beauty is a joy for ever" be it Eastern or Western in origin. The minds of our homemakers, the mothers of the land need to grasp at every turn the beautiful and the good, thus surely passing on to their offspring the rich heritage of a nation rising high above all petty opposition to what is "Foreign" "Western", ever alive and quick to advance, realising their citizenship of the world, and their relationship to Nature in her fulness and to Art in her perfection. This is true nationalism, and he who helps in this great task counts among the greatest patriots of the land.

(To be Continued)

RECENT ADVANCES IN GENETICS

Summary of lecture on "Recent Advances in Geneties" by Mr. B. L. Bhatia, M.Sc., F.Z.S., F.R.M.S (London), Professor of Zoology, Government College, Lahore.

GENETICS is the experimental study of Heredity and Mendel may be said to have laid its foundation. He made some very important discoveries as the result of his crossing various strains of Pea, and published his work in 1865. For 35 years his work remained practically unknown till it was discovered in 1900, since which date not only have his experiments and observations been confirmed, but further great advances made along the same lines. Explaining with the help of lantern slides the lecturer pointed out, that the principles which stand out clearly are (1) that here dity must be considered as an assemblage of unit characters, *i*,e.,- we should consider one particular thing at a time, and not the general resemblance of the offspring to the parent in a vague general sort of way, (2) that where there are contrasting

characters, present in the male and female parents, one or the other will be transmitted to the offspring, (3) one of a pair of contrasting characters may be *dominant*, i.e., will be found in all the offspring of a cross, the other remaining latent and reappearing in the subsequent generation. For example if a tall pea plant is crossed with one of the dwarf variety, all the seeds will produce tall plants only, but if these tall ones so produced are crossed among themselves, in the second generation some dwarfs will also appear in the ratio of 1 to 3. If black and albino guinea-pigs are crossed, all the offsprings are black. These blacks crossed among themselves or with similar other mixed black ones would produce three black offsprings to one white. Plants and animals differing in respect of more than one pair of contrasting characters have also been crossed and similar ratios obtained, the characters belonging to one pair assorting independently of those of the other. The seat of these characters is in certain minute particles called chromosomes found in the nucleus of the male and female sexual cells, and the behaviour of these particles is in full conformity with the behaviour of characters.

Working on Drosophila, a small fruit fly, Professor Morgan and his associates working in Columbia University, have discovered some further important principles. The number of inherited characters is larger than the number of chromosomes and several are represented by each chromosome. All such characters remain together (*lingake*) and are not assorted independently of one another. Certain characters remain linked together in the chromosome which is responsible for determining sex, and such characters therefore appear in one sex only and not the other. Sometimes however as corresponding chromosomes mate with each other, there is handing over or exchange of certain characters between the two, and the linkage is therefore modified by this *crossing over*.

The lecturer then referred to the economic aspect of the subject and explained how new breeds or varieties of domestic animals or plants have been produced by combining several good points and getting rid of bad points of several ancestral forms.

Professor Biffen working at Cambridge has been thus able to obtain a strain of wheat which combines heavy cropping capacity, hardness of grain and immunity to rust.

He next dealt with the subject of Mendelian inheritence in man and pointed out that the transmission of many normal and abnormal character is governed by the same laws. As examples that will interest our readers may be mentioned :—

Curly hair are dominant to	straight
Dark hair ,, ,,	light or red
Brown eyes ,,	Blue
Nervous temperament	Phlegmatic
Average intellectual capacity ,,	very great or very small
Normal size	dwarf
Hands or feet with short fingers or toes.	Normal ones
Six fingered hand	Five fingered

Normal condition of the nervous system is dominant to General Neuropathy, e.g. Hereditary epilepsy, feeble mindedness, insanity, alcoholism, criminality, hysteria, e.c.

The inheritance of mental characters is often elusive, as it is difficult to separate the effects of early environment in determining a man's bent.

The progress of human race has been in the direction of creating better and better environment thus leaving to subsequent generations a social heritage, but this has nothing to do with inheritence through the germ. Acquired intellectual ability or muscular power are not transmitted as such to the children, but still indirectly influence the progress of the human race.

Referring more particularly to Indian conditions, the lecturer condemned the rigid caste system as it exists to-day on social grounds, and advised the younger part of his audience to marry after developing definite ideals for race improvement and seek to materialise these by selecting their partner wisely and well. He advised them to fellow the principle "choose and love" and

not "love and choose", and made a powerful plea for intermarriages irrespective of caste, community or province.

CLINICAL LECTURE

A clinical lecture on ***Encephalitis Lethargica,*** *delivered at the Clinical Theatre, General Hospital by Lt. Col. F. F. Elwes, M. D. C.I.E., I.M.S. (First Physician, General Hospital, Madras).*

I HAVE brought before you to-day two very interesting and rather uncommon cases for clinical demonstration,

Case I

The first is, I think, almost certainly a case of "Encephalitis Lethargica" or Sleeping sickness, not the sleeping sickness due to the trypanasome. The latter is peculiar to the tropical climates particularly Africa, while the former is more often met with in temperate climates.

It has been known for some years now that after some epidemics of Influenza, a good number of cases develop cerebral symptoms. And it is believed by some that there is a connection between these cerebral cases and the previous epidemics of Influenza and that these cases are mostly post-influenzal.

Signs and Symptoms. The onset of this disease may be in a variety of ways. Usually there is a history of fever, then there is an interval and then the cerebral symptoms set in. Frequently there is a history of head injury also. Now, in this case, there is a history of fever with chill and pains in the limbs and vomiting, possibly Influenza, about a month back. Three weeks back she had a slight head injury. I lay particular emphasis on these two points. One is apt to attribute these symptoms, I am going to describe to you, to the head injury she had had. But as I have said a fair proportion of cases of Encephalitis Lethargica do give a history of head-injury.

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I first saw this patient on the road standing between a man and a woman with her head hanging down, saliva dribbling from her mouth and very marked strabismus. I was sure that it was a cerebral case and I sent her to the hospital at once. On examination, I found that she was very drowsy as you all see her now. She is probably not aware that she is in the midst of so many of you. So drowsy indeed is she that the nurse tells me that she begins to nod in the midst of taking her food. Her speech is very indistinct, of a low muttering type and eniunciated very slowly as though she was too much unable to speak at all. She could not carry on any sort of conversation with you. If she sits up in bed, which she very rarely does, there is dribbling from her mouth. I am not sure if she has any facial paralysis. You can't get her to show her teeth or smile or put her tongue out and her expression is so mask-like that the presence of facial diplegia is hard to determine.

To summarise, the absolute immobility, the mask-like appearance of the face, the peculiar attitude suggesting an effigy on a tomb, strabismus of a variable extent, the condition of profound lethargy which is really not true sleep, the slow hardly audible speech and less commonly inequality of pupils and nystagmus are the most characteristic features of the case.

Daignosis. There is practically no difficulty in the diagnosis of this case. She gives a typical history and her symptoms are fairly definite. For the purpose of confirmation or rather refutation lumbar puncture was done. In this connection let me tell you as to how best to do the lumbar puncture. The point of puncture may be half an inch on either side of the middle line a little above or below the line joining the highest points on the iliac crests. The patient must be bent double, her head and knees almost touching so as to get the maximum intervertebral space. A trocar and cannula is used. The trocar must be pushed forwards and a little inwards towards the centre line. Ordinarily the fluid is clear and free from cells even after centrifugalisation. In encephalitis lethargica the fluid is transparent and

may be under slight pressure, in fact apparantly normal but possibly a slight increase in cells may be present. In pneumococcal meningitis fhe fluid is cloudy and rich in polymorphonuclear cells.

In tubercular meningitis the fluid is not cloudy but there is a great increase in the number of cells chiefly lymphocytes. In this particular case the fluid was clear and free from an abnormal number of cells.

Prognosis. I don't mind talking about the prognosis of this disease in the presence of the patient for I don't think she can understand much. Some cases recover, but the general prognosis is not good.

Pathology. Miliary punctiform hæmorrhages in the grey matter of the fourth ventricle and sometimes in the third and certain other minute changes have been described.

Treatment. Various measures have been adopted. On the supposition that it is a sequel of Influenza vaccines have been administered and the first reports have been as is generally the case in all new measures of treatment for whatever the diseases very encouraging. But subsequently it has not met with much success. It has been tried in this case and has not done any good.

Hexamine, by mouth, or intravenously has been tried. As much as 40 gr. of it in 10-20 c.c. of saline may be given intravenously. This patient has had an injection of 20 grains in 10 c.c. I began with the smaller dose but as she had no reaction whatever I propose to give her 40 grains intravenously.

Case II

The other case is the case of a child 2 or 3 years of age. The history is indefinite. All that is known is that the child has been having fever for the last month, that she has had quinine injections, that she has been unconscious for the last 15 days and

that for the last five or six days she is having convulsive movements.

On examination you find that she is unconscious, that she has strabismus, that she is blind and that there is carpal spasm and some rigidity of the muscles. There is, distinct paralysis of the orbicularis palpebranum. There is, I think, tache cerebrale in this case although it is not well marked. Kernig's sign is present in the right limb.

Now the question is, is it a later stage of Encephalitis Lethargica, for I have told you this disease may present a great variety of symptoms. The other case was a typical one. It may be that this case is an a-typical form. But the history is not of the usual type. There is a continuous history of fever, there has been no definite interval.

We can safely discard *cerebrospinal meningitis* for the duration is too long for that disease and other charecteristic signs are not present.

The other possibility is *Tubercular meningitis*. This disease is common in children particularly, but it is not so common in this country as in the temperate climates. In this disease there is usually a history of fever. The child is out of sorts. Frequently it develops symptoms charecteristic of the allied surgical condition known as the *cerebral irritation*. If this stage is seen it is fairly typical of the disease. Unfortunately the history does not help us in this case at all. The child lies curled up in bed in a position of universal flexion. The thighs are flexed on the abdomen, knees bent and the hands and the arms drawn in. The face is sometimes buried in the pillow, and the child is very irritable. Most ot the children utter a peculiar high-pitched cry called the hydrocephalic cry perhaps only two or three times a day but often much more frequently, even one in every five minutes. There is also tache cerebrale. Constipation as a rule is very marked. This child is constipated and has had no motion for the last five or six days.

The child then goes on to the second stage or the *stage of compression*. It lies on its back in a semicomatose condition. The abdomen may be boat-shaped, tache cerebrale is well marked. There is also certain amount of ocular paralysis. Strabismus and paralysis of the orbicularis palpebrarum are the commonest forms of paralysis of the eye muscles in Tubercular meningitis. Fever is present.

Then the child goes on to the third stage of paralysis. It is completely comatose, may be blind from optic neuritis; the ocular paralysis is more marked. Spasms and convulsive movements may occur.

One sympto n often present, I particularly omitted to mention, for this child does not have it and that is retraction of the hea d. The pupils may be unequal in size.

Diagnosis. Very early in the disease ophthalmoscopic examination on the eye may reveal little yellowish patches of tubercular nodules in neighbourhood of the retinal vessels. The child came in over this morning and I have not had time to make an ophthalmoscopic examination. But I think that very probably this is a case of tubercular meningitis for the history as I told you is against encephalitis lethargica, and more in favour of tubercular meningitis although we have not been able to get a definite history of the various stages. Again starbismus and paralysis of the orbicularis palpebarum are most common in tubercular meningitis. The fact that it is blind, probably from optic neuritis is also in its favour. It has also got tache cerebrale though not very distinct. I propose to do a lumbar puncture also, which may assist the diagnosis as though the spinal fluid will probably be clear. Yet, on microspopic examination, it will probably show an increase of the cellular elements if the case is one of tubercular meningitis.

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CASE REPORTS

A Case of 'Acanthosis Nigricans'.

A gentleman of status, aged 58 years, consulted me for " eczema " of his hands.

Previous History. The patient was addicted to alcohol for some years, and he had hepatitis a year ago. He voluntarily gave a history of Syphilis.

History of present illness. About a year ago he noticed a slightly pigmented warty growth of the size of a small pea a little above the bend of the right elbow. Sometime later a similar wart was noticed over the corresponding part of the left arm. Gradually the patient has been noticing fresh eruptions around these warty growths varying in size from a pin's head to a small pea, although he overlooked the condition till lately. According to the patient he took some Ayurvedic medicine called " Makaradwaja " to purify the blood; and a few days after that he noticed a few patches of " eczema " on the dorsum of both the hands and all the fingers especially over the distal phalanges. There was no itchiness at any time and the patches were quite dry, throughout and very " hard to the touch." In fact he sought medical advice not so much on account of the discomfort caused by the disease as the fear of being shunned by society.

Condition on Examination. There were two or three moderately pigmented warty growths of the size of a small pea, over the outer and front aspect of both elbows, and surrounding these and extending for a couple of inches above and below was a somewhat horny and pigmented patch, which on closer examination was found to consist of hard papular eruptions of the size of a pin's head or more. On squeezing one of the bigger warts a sebaceous material exuded from a minute opening on its summit. The whole patch was quite dry.

On the dorsum of both hands were several patches of varying duration, and also a few small warty growths towards

the ulnar end. The younger ones looked very much like patches of ringworm. They were comprised of hard papules of the size of pin's head, and were more distinct towards the periphery than at the centre. They appeared to be of a lighter colour in comparison with the surrounding skin. On closer examination some of these papules were found to have the remnant of a hair in the centre. The older patches were the most peculiar. At the periphery was seen a ring of papules as described above. Towards the centre was a darkly pigmented and hyperkeratosed area which was extremely rough to the feel. None of these patches was itchy and there was no kind of exudation from any of them, The dorsum of the fingers also presented the same appearance, more marked over the distal phalanges and the dorsum of the first interphalangeal articulation. The finger nails showed a very unhealthy appearance being of a bran colour, not shiny and longitudinally ridged. There was a patch of pigmented hyperkeratosis 1 inch by 1 inch in the palm of either hand, and another smaller one over the root of the left index finger. On running the finger over his palms it gave a peculiar feel as if there were " leadshots under the skin"; and this was most marked over the hypothenar eminences.

There were a few small warts, some of them looking like molluscum contagiosum., scattered over other parts of the body, especially over the nape and sides of the neck and front of the chest ; but at the time I failed to appreciate that they too were manifestations of the same disease.

Diagnosis.

In this case the points that first struck me were the symmetry of the lesions, the pigmentation, involvement of the palms of the hands and absence of itchiness, The possibilities were that condition was either syphilitic or only purely a skin affection. But the voluntary history of syphilis strengthened the supposition that it might be only a syphilitic manifestation and the treatment was accordingly directed to it. The patient was given three

injections of N. A. B. and one of intramine. Also Pot. Iodide was given by month and Ung. Hydrarg. Ammon externally. Not only did the condition not improve but the original patches gradually grew bigger ; and fresh ones appeared over either side of the neck, front of the chest, region of the genitals and anus, and either legs especially over the posterior aspect of the knee joints and inner malleoli. Now the treatment proved that the disease is not syphilitc in nature, and demanded a closer study of the case. The other possibility is that it is purely a skin affection, If that be so, what is its exact nature. In all its charecteristics, it differed very widely from the skin deseases commonly met with in these parts. The keratosis, the affection of the hair follicles and sweat ducts accounting for the formation of the innumerable minute papules, which in most cases formed the basis, as it were, of many of the lesions, the absence of impairment of general health or of any local symptoms, and the symmetry as well as the distribution of the patches all pointed to the condition being the same as that rare affection of the skin first described by Darier in 1889 and called " Darier's disease " or psorospermosis follicularis vegetans. But, later on, while treating it as a case of Darier's disease, the patient told me one day that he felt peculiar in his mouth. On examination, the mucous membrane of the mouth showed an exactly similar condition as the younger patches in other parts of the body. It was fully studded with almost clay coloured papules, though not much raised from the surface. On the hard palate there was a very small warty growth of the same colour, The papillae over the anterior part of the tonge were very prominent. Now the mucous membranes are s e l d o m affected in Darier's disease. An exactly similar condition with involvment of the mucous membranes is present in the still rarer skin affection called "Acanthosis nigricans" first described by Unna in 1889. Also the formation of warty growths, the marked pigmentation and the age of the patient are in support of this diagnosis. Further microscopic examination of scrapings from the lesion did not reveal any of the charecteristic bodies or pseudo-coccida met with in Darier's disease.

Etiology and contagiousness. Very litttle is known as to the etiology of this disease. Microscopic examination of scrapings from different patches failed to reveal the presence of any fungus or micro-organism that may be a possible causative agent. No bacteriological culture was attempted. Further, none of those charecteristic cells the so called psorosperms or "corps ronds" of Darier found in *Keratosis follicularis vegetans* were present, although many normal prickle cells were seen. The balance of evidence at present is to consider the condition asidiopathic. It is, however, said to occur generally in association with Carcinoma of any of the abdominal or pelvic organs although the relation between the two is yet unexplained. In the case under discussion no evidence of abdominal cancer is yet seen though his age is in favour of it. But it is possible that the skin condition may be a rare precursor of visceral cancer, and so the patient has to be kept under observation for a further period. As to the possible view that the condition may be only an expression of run down general health, it may be mentioned that in all cases the general health is quite uninfluenced by the skin condition except when associated with cancer in which case the Cachexia is due to the malignant disease. The marked pigmentation has led to the suggestion that the condition may in some way be connected with defective suprarenal secretion. But in all the thirty cases mentioned in the literature, only in one the suprarenals were found swollen and inflamed.

Regarding the contagiousness of this disease I am inclined to think that it is not contagious at all to others. The fact that persons who were in close contact with the patient for months have not so far shown any evidence of acquiring it lends support to this view.

Treatment. As mentioned above intravenous injections of arsenical preparations were of no avail. Internal medication with Pot. Iodide was also useless, Having recognised the disease as purely a skin affection, only local treatment was persisted with. Mercurial ointments were found to have no effect on

the lesions. After trying different permutations and combinations I have found the following application to be very effective.

Re.

Resorcin	Grs.	XXX
Acid Salicylic	Grs.	XLV
Glycerini Amyli ad	oz.	II

To be applied over the lesions night and day.

V. K. NARAYANA MENON, M.B., & B.S.

Report of another Case

Guruvappa. Aged 29, was admitted into S 3 wards on 23-8-22 with a tumour in the abdomen.

Family History :—Nothing particular.

Previous Illness :—Nothing particular.

Present History :—The patient had been complaining of pain in the whole of the abdomen soon after food for the last three months. The pain was of gradual onset. Since then he was not able to take solid food. The patient at present complains of increasing pain after food. The pain is more or less constant and localised to the right side of the abdomen between the umbilicus and right costal margin. Appetite bad. The patient says that the tumour in the abdomen had been of the same size for the last three months.

General Condition :—The patient is an ill-nourished and emaciated individual. The tongue is coated in the middle but free at the edges except for the raised yellowish-brown patches. Teeth dirty and pyorrhoea present. The patient is slightly anaemic.

Local Examination :—There is a tumour of the size of a big mango situated in the epigastric, right hypochondriac, and umbilical regions. The right border of the tumour is about an inch internal to the right nipple line and the left border on the linea alba. The upper border is ½ inch below the right costal

margin and the lower border about an inch above the umbilicus. This tumour is hard and nodular on palpation. The extent of the tumour cannot be distinctly marked out especially the upper border. The tumour is not movable with respiration. It is dull on percussion; but not continuous with the liver or spleen dullness. Liver and spleen are not palpable.

X-ray Examination :—Nothing definite.

X-ray with Bismuth meal :—Great constriction of the pyloric end of the stomach; tubercular deposits along the intestinal canal.

Differential diagnosis :—

1. Tumours of liver or spleen: Eliminated, because the dullness is not continuous with spleen or liver and not moving with respiration.

2. Malignant growth from the pancreas i.e. cancer of the head of the pancreas. This cannot be because there is no jaundice and no enlargement of gall-bladder and by the absence of cachexia of malignant disease.

3. Tumour of the pylorus or duodenum—cannot be because there is no history of vomiting at any time.

4. Tumour of gall-bladder. The irregular shape of the tumour is against a gall-bladder tumour.

5. Tumour of the right kidney or hydro-nephroma: This cannot be as the tumour

1. is not movable with respiration
2. does not extend into the lumbar region
3. the colon resonance is not present over the tumour
4, no history of urinary trouble.

6. Enlargement of the mesenteric glands (tubercular) or Retroperitoneal Sarcoma. The former is the more probable as there are signs of tubercle in both lungs.

7. Secondary malignant growth in the mesenteric glands. There does not seem to be any primary malignant growth present in the body.

Progress of the case :—The patient complained of increasing pain in the abdomen.

Died at 6 A. M. on 31-8-22.

POST-MORTEM REPORT.

Guruvappa Age 29 Caste Hindu Sex Male.

Admitted 23-8-22. Died 6 A. M. 31-8-22. P. M. 31-8-22.

Cause of death :—Septic peritonitis.

General appearance :—Body of an emaciated male. Rigor Mortis absent in both extremities. Pupils equal and somewhat dilated. Almost complete absence of subcutaneous fat.

On opening the abdomen, coils of gut are semidistended, red and inflamed with minute punctiform haemorrhages, there are 64 oz of yellowish turbid fluid in the peritoneum. Coils of gut are adherent to one another with flakes of lymph. The omentum is small, inflamed and adherent to the transverse colon and to the left side of the abdominal wall. There is an irregular lump of the size of a cocoanut in front of the vertebral column and situated at the root of the mesentery, on which the intestines are perched. This growth consists of a number of whitish nodules varying in size from that of a bean to that of a hen's egg. On lifting the transverse colon, there is a dark bluish-black gangrenous ulcerated area of the size of half an anna at the root of the mesentery. The base of the ulcer is covered with slough, through which dark matter escapes in small quantities. The major portion of what usually corresponds to the right lobe of the liver occupies the left side of the abdomen underneath the left dome of the Diaphragm and the small portion of the liver which usually corresponds to the left lobe lies underneath the right dome of the

Diaphragm. Gall-bladder is to the left of the middle line underneath the bigger portion of the liver occupying the left side. The fundus of the stomach is on the right side and the pyloric portion on the left. The spleen is on the right side. The intestines also show transposition. The appendix, caecum, and ascending colon are on the left side ; the descending colon and the sigmoid are on the right. The pylorus and duodenum are to the left of the middle line.

On opening into the thorax, the lung on the left side is somewhat collapsed. It is adherent to the chest wall near the apex. A number of nodules are to be felt in the lung. The lung on the right side is adherent with fairly old adhesions throughout its surface to the chestwall. No fluid is present in the pleural cavities. The lung on the left side is larger and composed of three lobes. The lung on the right side is firmly adherent throughout to the chest wall and Diaphragm. The adhesions are broken down with difficulty and are firm and fibrous.

On opening into the pericardium, 2 oz of clear, straw colored fluid are found. The pericardium is directed towards the right side of the middle line. The cavities of the heart are empty. The condition is one of complete transposition of viscera.

Heart :—Heart is much smaller than normal in size and weighs 5 oz. There is very little fat on the surface and the fat is of a yellowish brown color, The vessels are unduly prominent. The mitral orifice admits two fingers and the tricuspid admits three fingers. The valves and orifices of the heart are normal. The heart muscle is atrophied, bnt firm in consistency and of a uniform dark brown color. The appearances are typical of Brown atrophy.

Left side Lung :—The Lung on the left side weights 15 oz. The lobes are not adherent to each other except that the middle and upper lobes are blended together on the surface of the lung. On the surface of both the upper and lower lobes are seen some raised reddish areas which to the feel are nodular and firm. A

number of such nodules frem the size of a small bean to the size of a large marble are felt in the substance of the lung. The nodules are distributed in all parts of the lobes. About an inch and a half below the apex is felt a small cavity with fluctuation. A slight pressure tore through the pleura covering the wall of the cavity on the surface. On cutting into the lung in the upper lobe is seen a large irrregular cavity about the size of a small orange. The cavity contains thick yellow pus. On wiping away the yellowish stuff from the wall of the abscess, the latter is seen red and inflamed. The appearances are typical of a tubercular cavity. The outlying nodules on section are seen to be composed of greyish and yellowish tubercular deposits.

Right side Lung :—Weighs 1 lb ; the pleura on the surface is thickened. Scattered on the surface of the pleura are seen a large number of slightly raised tiny greyish-white tuberculous deposits strewn over the surface of the lung like fine sand. The glands at the root of the lung are pigmented, and show no evidence of tubercle. The upper lobe feels solid and airless. The apex of the lower lobe feels solid. On section practically the whole of the upper lobe is seen to be consolidated and reddish in color, containing a number of small cavities. The condition is one of chronic tuberculosis of the lung with cavity formation on which acute military tuberculosis has supervened.

Spleen :—Is small in size and weighs 3 ozs. The capsule is smooth, greyish in color and wrinkled. The organ is flabby. The section is dry, reddish in color. The trabecular markings are well seen.

Liver :—is smaller in size than normal and weighs 26 ozs. The surface is smooth and there are flakes of lymph on it. The Gall bladder is distended and contains some viscid yellowish green bile. On section the liver is of a dark brownish color.

The section surface is dry and the consistency is firm. The appearances resemble 'Brown atrophy'. A small nodule about half the size of a split pea is seen on the right lobe of the liver

and another deposit of the size of a pin's head near it. The deposits are probably tubercular in origin. No other deposits are seen in the substance of the organ on further section.

Kidney :—On the left side. The section is dry. The cortex is reddish in color. The medulla is dark and the apices of the pyramids are dark reddish in color. The cortex is normal in extent and streaked with reddish lines of blood vessels. The capsule is thin, strips easily and leaves a smooth surface. A small retention cyst about the size of a pin's head is seen in the cortex.

Abdomen :—The ulcer seen at the root of the mesentry was opened into and traced to the lower border of the pancreas. A small fistulous communication exists between the sloughing ulcer and the duodenum and is situated in front of the vertebral column. Through this fistulous opening, dark yellowish matter was seen exuding. The mesentery is seen studded with nodules of various sizes which look like enlarged lymphatic glands. On section these are seen to be enlarged glands, some of which appear to be breaking down inside. No typical areas of caseation are seen in them. The appearances are suggestive of tuberculosis of the mesenteric glands. Also, the vertebral glands are enlarged.

The *Suprarenal* on the right side has completely lost its appearance. On section, it is of a greyish white color.

Intestines. Stomach etc:—The walls of the small intestine are oedematous and thickened. In the small intestine are seen a number of small ulcers, some of them transverse in direction and others irregularly circular, with raised indurated edges. On the peritoneal aspect of some of the ulcers, at the lower end of the ileum, small tuberculous deposits are seen. An inch above the cæcum is a large ulcer about the size of half a rupee.

The mucous membrane of the large intestines is normal and that of the stomach of a pale color. No worms are found.

Appearances found :—

1. Great emaciation.

2. Complete transposition of all viscera both thoracic and abdominal.

3. Generalised septic peritonitis.

4. Tuberculous abcess at the root of the mesentary communicating with the duodenum. It has opened itself into the peritoneal cavity. Massive enlargement of abdominal lymphatic glands.

5. Brown atrophy of the heart.

6. Left side lung shows a large tuberculous cavity and broncho-pneumonic nodules. Right side lung shows miliary tuberculosis of the pleura, tuberculous consolidation of the upper lobe and tuberculous broncho-pneumonic nodules in the lower lobe.

7. Spleen is atrophied.
8. Liver is atrophied and pigmented.
9. Small intestines show typical tubercular ulceration.

Death is due to general septic peritonitis, result of the rupture of a tuberculous abcess communicating with the duodenum into the peritoneal cavity in a man, subject of tuberculosis of the mesenteric glands, tuberculous ulceration of the intestines and tuberculosis of the lungs.

Pathological report :—Section of lungs show tuberculous broncho-pneumonia and those of the intestinal ulcers typical tuberculous ulceration. Sections from different parts of the pancreas were examined. The condition appears to be a primary carcinoma of the pancreas with secondary chronic interstitial pancreatitis. There is a large amount of round cell infiltration in the interstitial fibrous tissue. The pancreatic growth is charecterised by the presence of large multi-nucleated carcinomatous cells. Sections of growths in the liver and suprarenal present the histological structure of the pancreatic tumour. The lymphatic glands show malignant infiltration with carcinomatous cells

having the same histological characters. Death was evidently due to the septic peritonitis, result of rupture into the abdomen of a tuberculous abscess communicating with the duodenum. The patient was the subject of Tuberculosis of the lungs and tuberculous ulceration of the intestines as well as primary carcinoma of the pancreas with metastatic deposition in the liver, right suprarenal gland and mesenteric glands. The association of both extensive tuberculosis and carcinoma in the same patient is of interest. Complete transposition of all viscera is a rare condition.

OUR ANATOMY PAGE

The following peculiarities were seen in the dissecting room. **Vasa Aberans in the arm.** The third part of left axillary artery gives off a big branch which after running for half an inch divides into the subscapular, the posterior humeral circumflex and a third which at a lower level gives off the profunda brachii and the superior ulnar collateral. The above third branch proceeds downwards on the brachialis to the cubital fossa giving off muscular branches from its lateral side and the inferior ulnar collateral from its medial side and joins the ulnar artery immediately after its origin from the brachial in the cubital fossa. The brachial artery is the continuation of the third part of the axillary artery after giving the branch referred to above. The median nerve crosses the brachial artery from the lateral to the medial side posteriorly and the aberrant branch which join the ulnar artery anteriorly. This vessel is closely accompanied by the venous comites.

The aberrant artery is not present on the right side. The third head of the biceps brachii is also present arising at the level of the insertion of the coraco-brachialis muscle.

In another subject an aberrant artery in the arm is present but is joining the radial artery at the cubital fossa.

The brachial artery gives off a large common interosseous artery at the middle of the arm and later divides into the terminal branches at the cubital fossa. The ulnar artery is subcutaneous throughout the forearm. The common interrosseous in the arm lies on the brachialis muscle posterior to the brachial artery.

A venous sinus is seen connecting the spheno-parietal sinus with the superior petrosal sinus on both sides of the middle fossa of the base of the skull. It is about one-fourth of an inch in diameter. The entrance of the middle meningeal artery lies to the outerside of this sinus.

Omohyoid Muscle. (1) Some of the fibres of the inferior belly of this muscle are separated into a fleshy bundle which develops a small rounded tendon passing forwards to be inserted into the first rib at a point from which the subclavius muscle arises. Perhaps the deep cervical fascia has drawn the lower fibres of the muscle to the first rib to which the fascia is attached, thus bringing about the existence of a separate muscle.

(2) The inferior belly of the omohyoid arises from the posterior surface of the inner two-thirds of the clavicle extending to about an inch from the sternal end. A few fibres arise from the deep cervical fascia. These fleshy fibres proceed upwards and medialwards to be inserted into the superior belly. There is no scapular origin for the muscle.

(3) The scapular origin of the muscle is double the normal extent and bifurcates. The median half takes the place of the normal posterior belly while the lateral half ends by being inserted to the undersurface of the inner two-thirds of the clavicle.

I have to thank Dr. T. Sundara Reddi, F.R.C.S.I. Professor of Anatomy for permitting me to publish the above notes.

P. ARUNACHALAM, M.B. & B.S.
Demonstrator in Anatomy.

Wit & Humour.

Force of Habit

One of the physicians of the G. H. questioned the nurses why the pillow cases were not renewed. It was said that the clerk had not sent them. The physician sent for the linen clerk who came all in haste.

Physician : Are you the linen clerk ?
L. C. : "Yes. Madam !"
Physician : I am no madam.
L. C. : Excuse me, Madam,
Physician : Never mind. Don't you issue linen on Stock-taking days ?
L. C. : No, madam, I mean Sir
Physician : Did you receive any notice to that effect from the matron ?
L. C. : Yes, Sir.
Physician : You can go.
L. C. : Good morning, Madam

* * *

New Synonym of 'Doubt'

A lecturer after explaining a difficult lesson at great length asked his students 'Have you any *suspigion* ?."

* * *

Vagaries of the Language.

A Junior student in a medical ward reading the case sheet : Patient X, aged 30, has discharge from the ear, etc.

Physician : Which ear ?
Student : 3rd year, sir.

* * *

Physician in his rounds : What is that box up there ?

House-Surgeon : Charity Fund Sir.
Physician : 'O. P. Relief Fund ; Is it ?'

* * *

An enthusiastic candidate from the Arts College for the University Training Corps appeared for medical examination.

Medical Officer : I can't pass you.
Anxious Student : May I know why, Sir ?
Medical Officer : Yon have got varicose veins in your legs.
Indignant Student : Haven't you got various veins in your legs Sir ? (Adapted.)

* * *

A violent discussion was going on among a batch of students about a newly admitted case of Cerebrospinal meningitis.

New arrival ! What is that case ?
Student, A ; C. S. M. Temperature 106°.
Student, B : He is in the High Road and we are 'packing' him.

* * *

Physician to Students : A case of jaundice with one eye only yellow. What do you think of it.

Students (in a chorus) ; Impossible, Sir.
Physician : The other eye was a glass eye.

MADRAS MEDICAL COLLEGE

An appeal

WE draw particular attention to a letter, published elsewhere, regarding a hostel for the Medical College students. There is no denying that a hostel for these students is a crying necessity. The Vice-Chancellor of the University, while presiding over the college prize distribution gathering this year was kind enough to promise a hostel for the college in the near future. Now that there is a proposal to remove the Victoria Caste and Gosha Hospital to the beach, would it be too much or too late to expect that the building given up by the Gosha Hospital authorities will be utilised for locating the hostel for medical students. We are certain that the minister, who has been fighting so valiantly for the cause of medicine and sanitation will take the question in special earnest and will help to decide that the building may be converted into a Medical College Hostel. There are some whisperings here and there that the Presidency College which has already got sufficient hostel accomodation for its students, will get this building also as an adjunct, but we are certain that the Vice-Chancellor and the minister will see that help is rendered to those who are in most need.

Editor.

Notes and News

Since the publication of our last issue, the following changes have occurred in the college and hospital staff :—

Lt.-Col. T. H. Symons, O. B. E ; I.M.S. as S. M. O. first surgeon and Prof. of Surgery.

Major. E. W. C. Bradfield, M.S ; F.R.C.S ; O.B.E ; I.M.S. as second surgeon and Prof. of Medical Jurisprudence.

Major. K. G. Pandalai, F.R.C.S ; I.M.S. as third surgeon and Prof. of Biology.

Major. Forsyth, I.M.S. as third Physician and Prof. of Pathology.

Dr. Rajagopal Naidu, L.M.S. as Asst. Prof. of Chemistry.

Vice-Dr. H. Krishnan, L.M.S. transferred.

Leave granted

Lt.-Col. Scroggie, C. I. E ; I.M.S. gone to England.
Lt.-Col. Hirsch, I.M.S. Do.
Dr. T. S. Tirumurthi, M.B. & C.M. on leave.

* * *

As we go to the press we learn with great pleasure that our patron Major-General G. G. Giffard, C.I.E., I.M.S. is the recipient of K.C.I.E. in the New Year honours list. We offer him our hearty congratulations.

* * *

Since our College closes in March for summer vacation, we propose to publish our next issue in March itself.

* * *

As usual, the election of the Secretary for 1923-24 will take place in the first week of March when a report of working of the association shall be presented.

THE MEDICAL COLLEGE ATHLETIC CLUB

We began the year rather inauspiciously by losing the M. C. C. Hockey Tournament, after coming up to the finals; and the lady students, in these days of equal franchise, not to be behind the boys even in matters of sporting, lost a tennis cup. The intercollegiate football shared the same fate as Hockey did last year, our team having been washed out early in the rounds, owing to lack of enthusiasm. The fate of the Intercollegiate Hockey cup is hanging by a thread and unless our team avenges its defeat by the Engineers, we shall be the poorer for that also. Cricket is the only game in which so far we have held our own, thanks to the able captaincy of Mr. Lakshmanan who, by the way, is also the Battalion Sergeant Major of the Madras University Training Corps. There is still a good deal of nasty talk that the best avilable talent is not requisitioned in some games specially in Hockey. In an institution like the Medical College, where the priestly Brahmin, the Neoplasmic Non-Brahmin and

the adipose Anglo-Indian, all sit at the same table and peck at the same carcase in the anatomy room or Post-Morten room, if partisan feelings enter into any matter and above all into sports then the sooner we relinquish our title to superiority in sports over other colleges, the better it would be for all concerned. I refuse to believe that such a state of affairs really exists. The annual sports will be held early in February 1923 and it is proposed to charge a small nominal fee for each event or a consolidated fee for all the events. It is earnestly hoped that all would co-operate to make the event a grand success.

S. LUTHER, *Honorary Secretary,*

Our College Cricket

The characteristic feature of the Madras Inter-collegiate cricket this season is one of low score and this is not only true of the College cricket but of Southern India as well. In the case of the local cricket the reason is not far to seek and we can boldly say it was mostly due to the weather. But as regards Intercollegiate cricket there is something else and that is the standard itself. The world-wide cry of the people of the last decade saying that all the games have degenerated is but too true in our own case.

Now that we have won all the matches of the first round it is really worth while to glance through the scores.

We began very well winning the first match against the Veterinary College by 8 wickets and 8 runs. In the second match we met our old rivals, the Engineers, when we did not fare as well as we expected and put in a meagre total of 105 runs. ut we were not in any way disheartened. Our captain with his n determination, and the men always ready to follow his ex ple, fielded for all their worth and won the match by a nar margin of 25 runs. The match with the Presidency Colle was productive of some good cricket and our college put in for 6 wickets and our opponents put up only 37. The fourth ch of the round was with the Pachaippa's and it a sort of 'cricket clinics' to us in as much as we

put only 52 runs against one of the weak teams of the round. Elated by their performance which was least expected they tried to exceed our score ; but it was not to be. However they came up to 40 all told. Against R. M. S. we ran up to 169 but they could reply with only 47. The next match was of considerable interest and the Christians who had the first tenancy of the ball played havoc with our players and disposed of us all for 67 runs. With a few good batsmen to cope with our prospect of winning was very slender indeed. Even the few people who used to back up the always 'lucky people' (meaning medicos) were hesitating to side us. With all such odds we won the match with a good margin of 25 runs. In the last match of the round the Lawyers could score only 49 against our 191 runs.

From the above facts it is evident that we are far superior to some teams and we are not equally so to the rest. But the fact that throughout our opponents have not been able to score high is also patent. Though we are off our color in batting in certain matches we are never so on the field. Thanks to our Captain the mainstay of our team for pulling us safely through the first round. Let us hope that our crieketeers with the advent of the new year, will come out with success and glory in the 2nd round of the Intercollegeate Matches.

Batting Analysis.

	Veterinary.	Engineers.	Presidency College.	Pachaiappas.	R.M. School.	Christian College.	Law College.
1. Ananta Rao	....	....	....	5	....	....	....
2. Thomas	....	23	5	....	1	3	9
3. Devaraj	....	8	30	1	23	2	48
4. Lewin	20	....	....	5	20	4	....
5. Bhandari	17	16	22	....	1	7	18
6. Lakshmanan (Captain)....	....	14	51	1	31	18	57
7. Bhaskar Rao	....	0	21*a*	4	0	....	1
8. Garson	3*a*	3	11	3	5	7	0
9. Katre	....	10	21	3	42	0	7
10. Craggs	....	8	1*a*	7	1	2	1*a*
11. Raghavachari	....	0	....	18*a*	41	2	11
12. Hensman	....	3*a*	....	2	0*a*	11*a*	12
13. Swingler	....	5	....	3	....	4	....
Extras	1	15	24	0	4	7	19
Total	41	105	188	52	169	67	191

a Not out.

Bowling Analysis for the I round

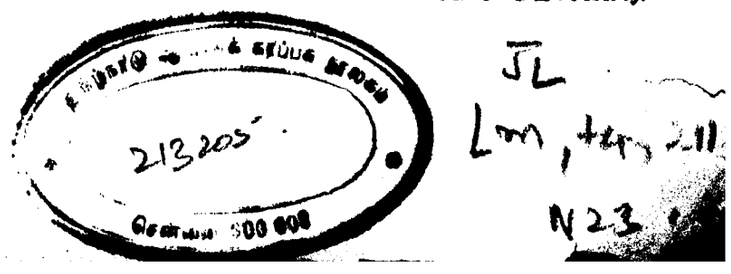
	Overs	Wickets	Runs	Maidens	Avarage runs per wicket
Lakshmanan	80	29	120	30	4·14
Bhandari	65	20	115	17	5.7
Katri	13	3	29	1	9.6
Garson	9	2	15	2	7.5
Devaraj	7	7	26	—	3.7
Lewin	2	1	4	1	4.0

Combined Colleges vs. M.C.C.

The combined college match with the M.C.C. came off on 26th and 27th and our college was represented by C. K. Lakshmanan (captain of the team) A. C. Devaraj, and Bhandari. This again was another match of low scores. The M.C.C. who entered first could only put up 78 runs, the chief scores of the side being Shattock, Denniston and Carrick. The colleges replied with 92 runs. In the second innings the M.C.C. fared a little better scoring all told 124 runs.

On the second day when the Colleges batted the prospect was very gloomy indeed at the begining, 4 wickets being lost for 28 runs. Lakshmanan who entered next changed the whole outlook by hitting a valuable 30 runs in a little more than five minutes. This changed the morale of the team and Sivasankaran and Rama Rao, of the Christian College who made a magnificent stand were able to bring up the score to over 140 before lunch. Thus the colleges won by a wide margin of 5 wickets and 39 runs. Lakshmanan and Sukumaran deserve all the praise and shared the bowling honours getting 8 and 10 wickets respectively. The team as a whole fielded splendidly and there was nothing wanting.

A. C. DEVARAJ.



CORRESPONDENCE

We Do Protest

To The Editor, *The Madras Medical College Magazine.*
Dear Sir,

In their G. O. No. 1555 dated 14th November 1922 the Government of Madras propose to give over the present buildings of the Victoria Caste and Gosha Hospital (in Bell's Road) to the Presidency College as a hostel when the former is removed to the beach next July. This proposal, coming so soon after the Vice-chancellor's promise to give us a hostel at the first opportunity, takes our breath away. The following facts regarding our claim for the building we should like to place before the powers that be :—

Of all Colleges—Government and private—in Madras the Medical College is the only one which has no hostel attached to it and what is more, it is the college which on account of its inconvenient hours of work, requires a hostel most. The morning meal has to be brought to the College and unless the college has a hostel of its own, it cannot be-as it is not now-conveniently done. Many students starve till 3 or 4 o'clock in the evening and much the greater majority of the rest have to rush to and from the Hotel De Luxe in Walltax Road where the meal is not all that could be desired. Once food used to be brought from the Victoria Hostel but now that Hostel-the only one open to all colleges-has shut its doors against the Medicoes by refusing to send the morning meal out to the college.

Further, the Presidency College has two hostels all for itself-the Presidency college hostel in Vallaba-agraharam and the Victoria Hostel which is now practically filled with Presidency College students.

It does not matter if Bell's road is not quite near the Medical College. It does not matter how far the college is from the hostel so long as we keep ourselves fit by taking wholesome food at regular hours. We do hope that the Hon. Mr. K. Srinivasa Iyengar will redeem his promise and that the Minister-in-charge and the Surgeon-General will help to get us the building.

K. S. S.

[The editor heartily sympathises with the above letter and hopes that the authorities will pay serious consideration to it and get the students a hostel].