

about the same as in period II, but most of it came from animal sources (e.g., 7 eggs a day, meat, and dairy products).

Period	Duration (weeks)	Average percentage of total calories		Main source of fat
		Fat	Carbohydrate	
I	24	8	73	Mixed
II	10½	43	42	Non-hydrogenated cottonseed oil
III	11	45	39	Meat, eggs, milk

The mean level of the S_1 0-20 lipoprotein class in period III was 36% higher than in period I and 39% higher than in period II; but there were no significant differences in S_1 0-20 lipoprotein content of the serum between periods I and II. Thus the period high in animal fat produced a significantly high serum content of S_1 0-20 lipoproteins; but the vegetable fat was not seen to have any specific lowering effect, since the lipoprotein level was about the same in periods I and II. We conclude that the lower S_1 0-20 lipoprotein levels noted in these periods were due to removal of animal fat from the diet.

In all five subjects we found higher levels of S_1 20-400 lipoproteins in period I (when the proportion of carbohydrate in the diet was high) than in period II or III; in three the differences were highly significant. There was little difference between periods II and III.

In our second experiment, on a different group of subjects, the diet was similar to that of period I except that the carbohydrate content was reduced till the diet yielded only 1000 calories a day. There was a considerable loss of weight and a significant fall in all lipoprotein classes studied, including the S_1 20-400 class. We concluded that in the first experiment the high carbohydrate, rather than the low fat intake, was responsible for the increased levels of S_1 20-400 lipoproteins. The data of Hatch et al.¹ support this.

These observations prompt the following comments :

(a) Changes in the serum-cholesterol are not an adequate index of the changes that occur in lipoprotein and lipid content of the serum during controlled dietary alterations.

(b) Our present findings indicate that the S_1 0-20 lipoprotein content of the serum can be lowered by reducing the amount of animal fat in the diet. They do not indicate that such vegetable fat as non-hydrogenated cottonseed oil has any specific lowering action on the serum content of this class of lipoproteins.

(c) Increased carbohydrate consumption can in some people raise the levels of S_1 20-400 lipoproteins. This class seems to be uninfluenced by the origin of the fat consumed.

(d) The risk of coronary-artery disease is intimately related to both classes of lipoproteins discussed, and to establish the risk of such disease both classes must be evaluated. Preoccupation with the cholesterol measurement alone can lead to serious misinterpretation, in view of the proven molecular importance of the S_1 0-20 and S_1 20-400 serum-lipoproteins in health and disease.

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SIR.—We have followed with great interest the correspondence arising from your leading article of April 28. For nearly two years now, we have been investigating the problem of diet and atherosclerosis from the clinical, epidemiological, and experimental angles. The results so far obtained may interest those engaged in similar investigations.

1. Hatch, F. T., Abell, L. L., Kendall, F. E. *Amer. J. Med.* 1955, 19, 48.

We have carried out serum-cholesterol estimations in 447 healthy men belonging to different socio-economic groups in India. Those in the low socio-economic group were manual labourers, and those in the high socio-economic group were medical men, officials, and well-to-do businessmen. In the Defence Forces a comparison was made between officers and other ranks. The results, shown in the accompanying table, reveal that :

(1) The values for serum-cholesterol, especially among the poorer people, are considerably lower than those reported for European and American populations.

(2) In all groups they tend to increase from the 20th to about the 35th year.

(3) After about the 35th year, the poorer people have a stationary or declining serum-cholesterol, but in the well-to-do the level tends to rise progressively with age.

The differences in serum-cholesterol patterns could not be wholly explained by differences in the amount of

SERUM-CHOLESTEROL LEVELS (KENDALL) IN DIFFERENT SOCIO-ECONOMIC GROUPS

Socio-economic group	Dietary intake			Serum-cholesterol (mg. per 100 ml.)		
	Cal-ories	Pro-teins (g.)	Fats (g.)	Age 20-29	Age 30-39	Age 40-49
Low	2000-2500	30-50	10-30	121.0 (3.3)	140.6 (4.9)	176.3 (4.0)
High	2500-3000	70-100	85-120	132.0 (7.4)	151.8 (5.5)	169.9 (9.0)
Officers of Defence Forces	2800-3500	90-100	90-120	154.5 (3.9)	175.6 (5.5)	201.2 (6.3)
Other ranks of the Defence Forces	3000-3500	90-100	90-120	143.3 (5.1)	148.4 (11.0)	144.2 (9.9)

Figures in parentheses indicate standard error.

consumed. There were no doubt marked differences in the fat intake as between the subjects of the high socio-economic group and the officers of the Defence Forces, on the one hand, and the subjects of the low socio-economic group on the other. Apart from quantitative differences in fat intake, the fat in the diet of subjects of the low socio-economic group was mostly derived from sesame (gingelly) oil, which is known to contain 40% linoleic acid. The fat in the diet of the other groups (including the men of the other ranks of the Defence Forces) was derived mostly from hydrogenated vegetable fat and animal fat—roughly in the ratio of 2:1. The serum-cholesterol pattern of the other ranks resembled that of the low socio-economic group, though their diets supplied at least as much fat, protein, and calories as was consumed by the high socio-economic group and the officers. For this we believe that exercise may be the explanation. The manual labourers had to engage in strenuous physical exertion,

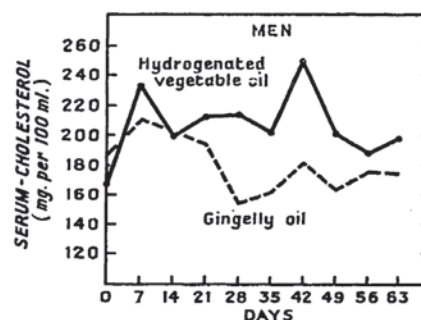


Fig. 1.—Serum-cholesterol levels in volunteers maintained on diets providing fats as hydrogenated vegetable oil or gingelly (sesame) oil.

and the other ranks of the Defence Forces were given physical training which could be considered even more strenuous. The effect of fat intake on serum-cholesterol level may well be related to physical exertion.

The serum-cholesterol pattern of each

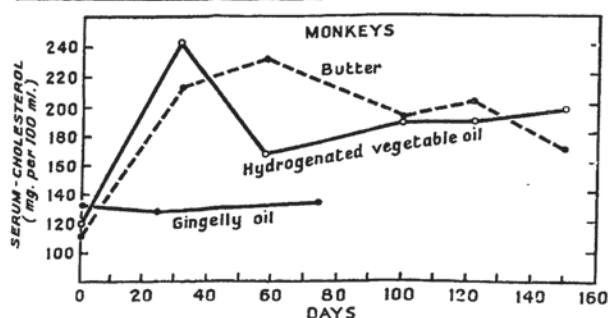


Fig. 2.—Serum-cholesterol levels in monkeys maintained on diets providing fat as butter, hydrogenated vegetable oil, or gingelly (sesame) oil.

group appeared to correspond to the reported incidence of coronary-artery disease in that group. In the part of the population corresponding to our low socio-economic group, about 13% of heart-disease is of coronary origin, whereas in the part of the population corresponding to our high socio-economic group the proportion is over 40%. Among officers of the Defence Forces the incidence of coronary-artery disease was found to be 23 times higher than among other ranks.

We have also investigated the effects of different factors on serum-cholesterol levels in volunteers and in monkeys. Two groups of 4 volunteers, of similar age composition, were maintained for two months on diets supplying adequate calories and nutrients and providing 100 g. of fat; but one group got its fat as hydrogenated vegetable fat while the other got it as sesame oil. Previous investigations had shown that the content of essential fatty acids was roughly eight times higher in sesame oil than in the hydrogenated fat. Similarly three groups of 4 monkeys, of similar age composition, were maintained for periods ranging from two and a half to five months on diets supplying identical amounts of calories and other nutrients and providing 56% of the calories as fat in the form of (1) butter, (2) hydrogenated vegetable fat, or (3) sesame oil. The results shown in figs. 1 and 2 seem to support the view that the type of fat in the diet has an important relation to the serum-cholesterol. The difference between hydrogenated vegetable fat and sesame oil was perhaps less striking in the human subjects because those chosen were below 40 years of age, because the level of fat in the diet was lower than for the monkeys, and because the factor of physical exertion could not be controlled as in the monkeys.

Like Professor Brock and his colleagues,¹ however, we have seen considerable fluctuations in the serum-cholesterol levels of normal subjects even on constant diets. This finding clearly imposes caution in the interpretation of results of studies on small groups of people over short periods.

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SUBMUCOUS TELANGIECTASIS OF THE COLON

SIR,—Mr. Rutter (Nov. 24) is to be congratulated on his final success in dealing with his interesting case of this disorder. I discussed some of the problems arising in this type of case in 1953.² I believe that the lesion described by Mr. Rutter may be part of a syndrome of generalised vascular dysplasia.

In his case gross splenic enlargement was encountered at the second operation, and splenic enlargement is often found in these syndromes of generalised vascular weakness. The

1. Bronte-Stewart, B., Antonis, A., Eales, L., Brock, J. F. *Lancet*, 1956, i, 521.

2. *Brit. J. Surg.* 1953, 40, 409.

patient is still young and some of the manifestations encountered in the Osler-Rendu syndrome—skin lesions, nodular lesions in the buccal mucosa, or other visceral involvement—may yet come to light.

It would be interesting to know, in connection with this patient, whether there is any family history of epistaxis, nodular or telangiectatic skin lesions, or unexplained hæmatemesis or melæna. While the family history is by no means always positive, it is an important pointer in some cases.

Mr. Rutter comments on the infrequency of histological evidence of such vascular malformations in reported cases. I refer in my paper to a case in which an extensive diffuse vascular lesion of the stomach was blatantly obvious before gastrectomy was performed but in the excised specimen nothing abnormal could be demonstrated despite the most careful histological section. The nature of these lesions is such that when the blood-supply is cut off it may be very difficult to produce microscopic evidence of abnormality in the collapsed thin-walled vessels or blood-spaces. Mr. Rutter and Dr. Kohn are accordingly to be congratulated on producing such clear histological evidence in their own case.

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PREVENTIVE PSYCHIATRY

SIR,—Your leading article and the papers by Dr. Macmillan and Dr. Watt (Nov. 24) prompt me to write, as so many of the points in these two papers are of interest to the mental-hospital psychiatrist.

Dr. Macmillan raises once again the long-standing problem of the training of our medical auxiliaries. It is now an accepted fault that we as psychiatrists have allowed the training of psychiatric social workers, occupational therapists, and other auxiliaries to fall into the hands of those who appear to have little understanding of the ways in which their trainees can best serve the mental hospitals. It is heartening in some ways to know that Dr. Macmillan is training his own social workers, and this point might be noted by the organisers of mental-health courses for psychiatric social workers (P.S.W.s), with a view to developing more realistic courses, as is already being done, I believe, by the University of Manchester.

Dr. Watt is at pains to show that an increase in the outpatient services would decrease the admission-rate to the mental hospital, but I doubt this since in most areas relatively few patients admitted directly for the first time to the mental hospital are seen by a psychiatrist beforehand. The answer would appear to be an extension of the domiciliary consultation service and a greater number of home visits by P.S.W.s. This can be brought about only by an increase in the consulting psychiatric staff and social workers in the average mental hospital. Economically, such a development would be well worth while as a social worker has only to keep a small number of chronic or latent psychotics out of hospital for a year for her salary to be equalled by the money saved by the hospital.

Some further points from Dr. Watt's paper appear to require comment. It is probably true that many long-stay patients could leave if adequate homes existed for them, but I feel that provision must be made for psychiatric supervision of these patients while out of hospital and for their occasional readmission for short periods. The possibilities of long-term maintenance treatment with electroconvulsion therapy (E.C.T.) or drugs such as chlorpromazine do not seem to have been fully explored for these patients in addition to community care and social therapy.

Dr. Watt states that "the need to alleviate overcrowding is so urgent that it cannot wait for the results of research." Might I suggest that many hundreds of patients now in our mental hospitals might be discharged within the next few months if the fruits of existing knowledge could be made use of? In many mental hospitals leucotomy is never performed, for want of a neurosurgeon; in others deep insulin has been given up or maybe never started. Other treatments which have not been used as widely as they deserve are variations of E.C.T., such as cerebral stimulation and intensive E.C.T., drug-assisted psychotherapy with drugs such as lysergic acid diethylamide, and the long-term use of drugs in the phenothiazine group in conjunction with occupational therapy, habit-training, and group therapy. Applied research can be carried out in any mental hospital, for it requires the