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THE NUTRITION MOVEMENT IN CANADA

A review of the development of the nutrition movement in Canada and an attempt to draw conclusions from Canadian experience may at this moment help us to bring matters into focus. A Canadian Nutrition Council first emerged in the spring of 1938 from the consultations of a special committee that had been formed by the Dominion Council of Health in the preceding year. The committee that had given it birth was constituted as the Council's executive body in association with its scientific advisory committee under the chairmanship of Dr. C. H. Best. A broad programme of investigation was drafted. Few surveys of Canadian diets had so far been carried out, though some investigations into the consumption of milk and other protein foods had been initiated by the Department of Agriculture; and in the course of 1937 an inquiry into food purchases in Alberta and into the dietary conditions of low-income families in Toronto had been undertaken. Four further surveys were therefore completed, under the direction of the Council, in Toronto, Halifax, Quebec, and Edmonton; the results were summarized in the *Canadian Public Health Journal* (May, 1941, **32**).

The findings of these surveys indicated to the Council that the nutrients in which the diets of low-income Canadian families were peculiarly deficient were aneurin and other members of the B group, ascorbic acid, calcium, iron, and vitamin A, in that order. It was tentatively estimated that some 20% of the subjects studied were seriously undernourished on a dietetic assessment, while a further 40% were in a borderline state. It has been further remarked that the average gain in weight by recruits to the Canadian Army during the first month of their service is 7 lb. The cumulative effect of these discoveries and of experience both in our own country and in the United States was sufficient to persuade the Nutrition Council to appoint a special committee in the November of 1941, charged with the task of expressing the ascertained deficiencies in terms of food. The committee's report was approved by the Council, and at the same time the Dominion Department of Pensions and National Health established a Nutrition Services Division under the directorship of Dr. L. B. Pett of the University of Alberta. The function of Nutrition Services has been to carry out recommendations of the Nutrition Council. To this end its staff of five (including three field workers) has been directed to work along the following lines: (*a*) to visit, inspect, and confer with those maintaining canteens in industrial plants with a view to assessing the nutritional value of the food served and to suggest improvements; (*b*) to help the public by advice on the choice of food, on suitable purchasing to secure a balanced diet, and on proper methods of preparation; (*c*) to make expert opinion available for the information bureau of the Department of National War Services.

The broad programme laid down by the Nutrition Council in the December of 1941 placed special emphasis upon the requirements of war workers. Accordingly the staff of Nutrition Services had by July, 1942, inspected about 150 war industries, comprising some 200,000 workers; additional information was assembled from a number of other plants; and a report was published summarizing the canteen facilities in 363 plants, which are stated to include well over half the war workers of the Dominion. It may be remarked that the delicate task of factory inspection was carried out under the authority of an Order in Council; but in June of the same year the Nutrition Council had suggested that, to avoid annoyance to industry and labour alike, the primary function of assistance to and inspection of canteens in war industries should rest with qualified representatives of the Federal Office (Nutrition Services), but that local groups were urged to make investigations into industry and the homes of industrial workers a part of any nutrition programme after consultation with Nutrition Services. A series of wholesome suggestions follows, closing with the recommendation that Divisions of Industrial Hygiene in Provincial Departments of Health shall co-operate with Nutrition Services.

The supplementary features of the programme proposed for the guidance of Dr. Pett and his colleagues are of some interest. All pamphlets used for nutritional education were to be reviewed and suggestions made for their simplification and standardization; studies were to be undertaken as to the best method of spreading nutritional information; use was to be made of the schools and the education departments; and, finally, Nutrition Services was envisaged as a central clearing-house of information on nutrition, which might assist in co-ordinating nutritional research in Canada. At the same time it was suggested that various existing groups might well be organized into provincial committees as a basis for the development of future campaigns. It is evident from the published material that the provincial committees, set up during 1942, are viewed as the intermediate link between the central authority in Ottawa and the community nutrition committees, through which the essential work is done. The provincial committees have been formed under the Provincial Departments of Health; and it has been their function to organize the province for the advance of the nutrition programme in all its aspects, as well as to advise the central authority on appropriate methods of education. The community nutrition committees are assumed to spring from the initiative of local interested groups or individuals. In the literature officially distributed such groups are recommended to establish a committee with representation from as many suitable bodies as may be approached. A model structure for local committees is laid down; and it is stressed that *liaison* with the provincial committee shall be maintained. The main work of the local committees is recognized as being education; and it is proposed that, through the activities of volunteer trained home economists, small classes of "leaders" shall be trained from every part of the community. The need for a carefully thought out plan for a prolonged campaign through lectures and study groups is stressed, and an outline course of six lectures on the main dietary defects believed to be common in Canadian homes has been issued by Nutrition Services. The mention of the use of posters, of well-advertised public meetings, of the radio, and of the co-operation that might be invited from restaurants and retail stores suggests that the promoters of the movement contemplate a popular campaign of some size.

It will be instructive to observe, as news comes through, how this campaign succeeds. The results of inquiry into factory canteens and cafeteria will be of import to every country that has to deal with the problems of war industry. Similar surveys in our own country, where detailed figures are still inaccessible to the general public, would also bring out useful information. We already have here a fair number of housewives' groups organized by the Women's Voluntary Services, and a few of them have taken up the study of elementary dietetics. But these occasional efforts

appear to be subject to chance interest or local eccentricity. These "patrolling activities" will be largely wasted unless they are followed up by a mass attack on the whole problem.

MEASUREMENT OF CLOT RETRACTION

Most blood clots contract on ageing, the phenomenon being known as syneresis or clot retraction. It has long been recognized that retraction may be defective in disease, and in recent years haematologists have sought methods for its quantitative measurement. Normally retraction begins as soon as the blood has clotted completely, and proceeds rapidly to a maximum. We may therefore measure either the rate or the extent of retraction of the clot. The latter is the procedure usually employed, the extent of retraction being determined by the amount of serum expressed. The conditions of observation must be rigidly standardized, in particular the calibre of the tubes, for extrinsic factors influence both the speed of coagulation and the amount of retraction.[1] In this country the technique of Macfarlane[2] is commonly followed, which makes use of a graduated centrifuge tube into which is fitted a cork bored to receive a glass rod. To perform the test, 5 c.cm. of blood obtained by venepuncture is immediately introduced into the tube, the glass rod and cork are fitted, and the tube is placed in a water bath at 37° C. One hour after a firm clot has formed the tube is taken from the bath and the clot is carefully freed and removed on the glass rod. The volume of serum is measured directly, and the result is expressed as a percentage of the original volume of blood. Macfarlane found that the normal serum volume fluctuated between 43.9% and 65.5%; he made no correction for anaemia. Since the entire bulk of the clot is proportional to the formed elements of the blood, some correction for anaemia or polycythaemia seems desirable. The simplest way of doing this is to compare the amount of serum extruded with the plasma–corpuscle ratio of the unclotted blood as determined by the haematocrit. We may call this the serum–plasma (S/P) ratio. Using this index of clot retraction, Van Allen[3] found a normal serum output in rabbits of 87% to 100%. A more difficult and less meaningful way of recording the results has been suggested by Aggeler, Lucia, and Hamlin.[4] They subtract the volume of the corpuscles from the volume of the clot and obtain a figure for the extracorpuscular volume of the clot. The mean value for this figure in man was 9.1%. However the results are recorded, it is generally agreed that clot retraction is characteristically decreased in thrombocytopenia and hypoprothrombinaemia, and it may indeed be used as a measure of the latter defect. The test is in no way specific, and low values are also obtained in pneumonia, malignant disease, and occasionally in health.

It is interesting to put up two clot-retraction tubes and observe the second at 24 hours. In health little change will have occurred, but in other cases a greater or less number of red cells will have freed themselves from the clot. Van Allen[3] was of the opinion that the quantity of corpuscles which escaped from the clot was directly proportional to the rate of retraction, and could indeed be used to estimate that rate. It would seem probable, however, that both the extent and the rate of retraction are in inverse proportion to the tendency to bleed, and Van Allen's anomalous results are probably to be explained by the fact that he exposed his clots to a good deal of mechanical strain. Certainly most workers with the Macfarlane technique would agree with Reimann,[5] who suggests that any considerable extrusion of corpuscles from the clot is an indication of a haemorrhagic tendency. Reimann speaks of this as the "escape phenomenon," and suggests that it indicates an undue readiness of the clot to break down *in vivo*. Nevertheless the sequence of events may be more complex than this. In some cases it may be found that the clot has completely dissolved again at the end of 24 hours. This is the phenomenon of fibrinolysis, which is prone to occur after trauma or operations and which is the basis of the employment of corpse blood for transfusions.[6] Fibrinolysis may be regarded as the next step after the coagulation of the blood, just as autolysis follows rigor in muscles, though not all would agree with this simile. In any event, fibrinolysis is not evidence of a haemorrhagic tendency but rather the reverse. Taylor and co-workers[7] have shown that when plasma is clotted by the addition of chloroform fibrinolysis invariably follows, and this fibrinolysis is slower in haemophilia than in health. The "escape phenomenon" may therefore be due either to friability of the clot, which indicates a haemorrhagic tendency, or to fibrinolysis, which does not. To study clot retraction completely, therefore, we should need to measure at least four things: the plasma–corpuscle ratio in the haematocrit; the volume of serum expressed at the end of 1 hour; the output of corpuscles at the end of 24 hours; and the rate of fibrinolysis as determined on the citrated plasma. None of these tests is particularly time-consuming, but it is doubtful whether the energies of the ordinary laboratory would really be well spent on measurements whose clinical and physiological bases are so obscure. In the present state of knowledge it seems wiser to regard the study of clot retraction as a research and not a routine procedure.

1 Emile-Weil, P., and Perlès, S., *Le Sang*, 1934, **8**, 1014.
2 *Lancet*, 1939, **1**, 1199.
3 *J. exp. Med.*, 1927, **45**, 69.
4 *J. Lab. clin. Med.*, 1942, **28**, 89.
5 *Acta med. scand.*, 1941, **107**, 95.
6 *Lancet*, 1937, **1**, 10.
7 *J. clin. Invest.*, 1943, **22**, 127.

ORIGIN OF CHORIONIC GONADOTROPHIN

The evidence that the gonadotrophin excreted in the urine during human pregnancy is produced in the placenta has in the past been largely indirect, since the substance is only transiently excreted in pregnant monkeys and not at all in the lower experimental animals. The theory is based on the appearance of the gonadotrophin in the urine soon after the implantation of the egg and its abrupt disappearance after parturition. Contributory evidence has been supplied by studies of the amount of gonadotrophin that may be extracted from the placenta at different stages of pregnancy. One such study has been made by Bickenbach,[8] who found that the largest amount present in the placenta two to three months after the onset of pregnancy, when the concentrations in blood and urine were also maximal, was equal to 100 mouse units per gramme of placenta.

Recently, however, definite evidence that the gonadotrophin is actually formed in the placenta has come from America, where Seegar Jones, Gey, and Gey[9] have reported the formation of chorionic gonadotrophin in placental cells grown in tissue culture. Tissues cultured included 5 placentae obtained at hysterectomy, in women 4 to 5 months pregnant, 2 placentae from ectopic pregnancies, 2 full-term placentae, and 2 hydatidiform moles. The supernatant fluid from the cultures was injected into 21-day-old rats, and histological changes produced in their ovaries were studied. Positive results were obtained in 20 out of 28 samples of supernatant fluid: follicle growth in 6 cases and the formation of corpora lutea in 14. There

8 *Arch. Gynäk.*, 1941, **172**, 152.
9 *Johns Hopk. Hosp. Bull.*, 1943, **72**, 26.