Abstracts of Current Literature

CURRENT PROGRESS IN ARTERIOSCLEROSIS

The cholesterol-lipid-lipoprotein concept of pathogenesis of arteriosclerosis is based on the hypothesis that elevated dietary fat intake represents the major factor in atherogenesis. However, there are many weak links in the chain of evidence cited to support this concept. Among the epidemiologic studies which dispute the nutritional theory are the following:

A Population Study—Atherosclerosis. D. Groom. *J. Am. Dietet. A.*, 35: 919, 1959.

This study compares the autopsy findings in 139 Negro adults at the Medical Center Hospitals of the Medical College of South Carolina with the autopsy findings in 128 patients from the Hospital General of Port-au-Prince, Haiti. The main purpose of the investigation was "to measure the prevalence of atherosclerosis in the coronary arteries and aortas of representative samples of these two populations and to do this by pathologic rather than clinical criteria."

The severity of atherosclerosis at autopsy was graded according to the number of plaques in the arteries and the resultant degree of occlusion of the lumen, and the severity of the disease in the aorta was gauged by the number and size of plaques.

Since the two populations studied were of common racial origin the author believes that "any observed inequality in incidence of coronary disease might. . . be properly attributed to differences in environment—whether that be primarily diet, stress, climate or whatever."

Pathologic evaluation of the degrees of coronary and aortic atherosclerosis revealed that the American Negros had almost double the average severity of coronary disease of the Haitians. This held true for both men and women and at all age decades over twenty. No comparable differences were observed in the aortas of these subjects. The author believes this lack of differences indicates the importance of factors other than diet in the genesis of atherosclerosis.

The age distribution of the two populations is interesting. Among the Haitians, 67 per cent were twenty to fifty years of age whereas 34 per cent of the South Carolinians were in this age group. The Haitians numbered 26 per cent and the South Carolinians 53 per cent in the fifty to seventy year age groups. The remainder or 16 and 13 per cent, respectively, were in the seventy to ninety-nine year age group. This difference in age distribution may have had some effect on the average score mentioned although the author made comparisons decade by decade. J. M. SMITH

The Biochemical Syndrome of Nutritional Arteriosclerosis. J. Enselme. *Ann. Nutrition*, vol. 13, no. 4. 1959.

The author describes the biochemical syndrome of nutritional atherosclerosis. He successively studies facts relating to anomalies of the lipids: cholesterol, phospholipids, glycerides and lipoproteins. He discusses the first studies on glucoproteins and points out that a more extensive study of serum holoproteins and of cellular permeability will probably yield interesting results in the future. H. GOUNELLE

Cardiac Infarction in the Bantu. V. Schrire and C. J. Uys. *Am. J. Cardiol.*, 2: 453, 1958.

Three cases of myocardial infarction in the Bantu, proved at autopsy in Cape Town, South Africa, are reported in detail. Only one of these was associated with extensive atheroma. One was associated with severe hypertension, the other with syphilitic aortitis and incompetence of the aortic valve.

These three cases represent the total autopsy incidence of myocardial infarction in the Bantu during a seven-year period comprising 162 proved myocardial infarcts in Europeans and Cape Coloureds. The Bantu racial group accounted for 11.4 per cent of the total autopsies performed. W. H. ABELMANN

Effects of Periodic Mental Stress on Serum Cholesterol Levels. S. M. Grundy and A. C. Griffin. *Circulation*, 19: 496, 1959.

Two groups of medical students, comprised of fifty and forty-seven men, respectively, were studied. Total serum cholesterol values were determined in serum obtained in the postabsorptive state during the middle of the teaching sessions and again on the first day of final examination.

The control values averaged 213 and 215.7 mg. per 100 ml. for the two groups, and rose significantly to 248.2 and 239.4 mg. per 100 ml. during the examination period. In 50 and 44 per cent of the students the increase was greater than 25 mg. per 100 ml.

W. H. ABELMANN

Atherosclerosis, Disease or Syndrome? An Attempt at Classification. J. de Brux. *Presse méd.*, 67: 813, 1959.

It is difficult to consider atherosclerosis as a morbid entity with a definite onset, full blown clinical state and development. There is not *one* atherosclerosis but a number of such conditions, the only slightly different histologic forms of which probably do not correspond to identical etiological processes, at least in their terminal stage. Atherosclerosis presumably stems from a physiologic disequilibrium between deposit of glycolipoprotein in the plasma and the processes of lysis; there are many causative factors that can disrupt the normal equilibrium of these substances. The danger is not apparent until the process has become irreversible or too intense. H. GOUNELLE

Cytochemical enzyme studies on blood vessels have been initiated revealing variations in localization of esterases (ATPase) and glycolytic enzymes which may be important in the accumulation of lipids within certain areas in the vessel wall.

Relationship of Lipolytic and Esterolytic Activity of the Aorta to Susceptibility to Experimental Atherosclerosis. T. Zemplenyi, Z. Lojda and D. Grafnetter. *Circulation Res.*, 7: 286, 1959.

The lipolytic activity of the aorta was compared in male rats, rabbits, hamsters, guinea pigs and cocks. Lipolytic activity was measured in terms of the amount of nonesterified fatty acids freed during incubation of finely divided fresh aorta with lipemic human serum. The data reported indicate that the lipolytic activity of the aorta is significantly greater in the rat than in the rabbit, cock or guinea pig.

Histochemical estimation of nonspecific (simple) esterase and A-S esterase (esterase splitting naphthol-AS acetate) by an azo-coupling method was carried out in the aortas of rats, rabbits, hamsters and guinea pigs. The localization of esterases was always the same in a given species, but differed between species. In the rat aorta, there was intense esterase activity in the media and in connective tissue cells of the adventitia, while the intima reacted only occasionally. The rabbit aorta reacted similarly but much less intensively. In the hamster, adventitial fibrocytes reacted strongly, while media and intima showed only weak reactions. In the guinea pig, there was marked activity in endothelial cells and adventitial fibrocytes, and only weak staining of the media.

The implications of the data for species susceptibility to atherosclerosis are discussed.

W. H. ABELMANN

Studies of Fat Lipolysis by Post-Heparin Human Plasma Lipoprotein Lipase and by Human Pancreatic Lipase. H. Engelberg. *Circulation*, 19: 884, 1959.

The rate of lipolysis of various fat substrates in human plasma obtained from fasting subjects after the administration of heparin was studied by determining the release of unesterified fatty acids. Such plasma samples from twelve of fourteen subjects showed a higher rate of lipolysis of unsaturated triglyceride lipoproteins than of saturated (cream) lipoproteins. In each of five experiments, using aliquots of citrate eluates of tricalcium phosphate adsorbates of plasma from nonfasting subjects after the administration of heparin, lipolysis of lipoprotein of vegetable origin was more rapid than that of cream. Similar results were obtained when human pancreatic lipase was used as the fat-splitting enzyme.

The author proposes that more efficient activity of heparin lipoprotein lipase upon unsaturated fat substrates may account for the hypercholesterolemic and hyperlipoproteinemic effect of animal (saturated) fats in man. W. H. ABELMANN

Saturated and Unsaturated Fats. Effects on Cholesterolemia and Atherogenesis in Chicks on High Cholesterol Diets. J. Stamler, R. Pick and L. N. Katz. *Circulation Res.*, 7: 398, 1959.

The effects of supplementary saturated and unsaturated oils were studied in young growing cockerels on high cholesterol (0.5 to 2 per cent) diets for periods of five to fifteen weeks. Plasma total cholesterol values and evaluation of gross lesions of the aorta and of microscopic coronary lesions are reported.

Hypercholesterolemia and the patterns of atherosclerosis were similar in the groups fed various unsaturated oils and in the groups fed various saturated fats (5 or 10 per cent). Unsaturated oils failed to suppress hypercholesterolemia and atherogenesis. Cholesterol-fed cockerels given supplements of fats and oils high in oleic acid tended to show slightly lower serum choles-

terol levels, while cockerels given oleic acid *per se* showed less atherosclerosis. W. H. ABELMANN

The mucopolysaccharides of the blood vessel have a binding capacity for calcium and other electrolytes. This binding activity may account for the retention of lipids within an area of increased mucopolysaccharide deposition.

Radiographic Study of Aortic Plaque Formation. I. G. Fels. *Circulation Res.*, 7: 693, 1959.

The ability of the human aorta to bind calcium ion was studied. Pieces of thoracic aorta were extracted with acetone-petroleum ether and decalcified. The tissue was then incubated in a solution of Ca^{45} Cl_2, washed and radioautographed.

In sclerotic aortic tissue, the uptake of Ca^{45} was specifically confined to the positions of plaques. Binding of calcium was localized primarily in the intima. Binding was demonstrated in the aorta of a twenty-three months old male infant. Much of the binding ability was lost upon boiling.

The influence of bound calcium upon the stability of emulsions was also studied. After recording the Ca^{45} binding pattern, aorta was incubated with an emulsion containing oleic acid-I^{131}, and another radioautograph was made with a short exposure. The radioactive oleic acid was found deposited in the sites which bound Ca^{45}. Emulsions containing cholesterol-C^{14} were also studied.

The author concludes that the binding of calcium has a marked effect upon the stability of emulsions, causing precipitation. W. H. ABELMANN

Passage of Labeled Cholesterol into the Aortic Wall of the Normal Dog. L. E. Duncan, Jr. and K. Buck. *Circulation Res.*, 7: 765, 1959.

Dogs were force-fed gelatin capsules containing cholesterol-4-C^{14} in sesame oil, and sacrificed at varying times. Serum labeled cholesterol was determined, and the inner, middle and outer layers of different portions of the thoracic and abdominal aorta were analyzed for radioactivity.

The serum concentration of labeled cholesterol rose rapidly to a peak between one and three days after injection and then decreased gradually. From three days on radioactivity could be detected in the aortic wall. Initially the ratio of tissue concentration to serum concentration for the inner layer of the aorta rose most rapidly in the ascending aorta; the rise was progressively less down the length of the aorta. Between ten and forty days the rates of increase of the ratios changed so that the ratios became greater distally than proximally. The ratios became constant at about forty days, forming a gradient with the highest value at the distal end and the lowest value at the proximal end of the aorta. The ratios for the middle and outer layers rose with time and became constant at about forty days; there was no systematic difference between sites.

Labeled cholesterol entered the abdominal aorta only one sixth as fast as it entered the thoracic aorta. At each level of the aorta, labeled cholesterol entered at about one third the rate of albumen.

The authors suggest that cholesterol is carried into the aortic wall of the normal dog as part of normally occurring lipoprotein molecules. W. H. ABELMANN

Experimental Studies Concerning the Role of Vegetable and Animal Dietary Fat in Arteriosclerosis. H. Holzner, E. Kriehuber, and R. Wenger, *Arch. path. Anat.*, 333: 210, 1960.

Young rabbits weighing about 2,000 gm. received a stock diet supplemented with (1) 1 gm. cholesterol, (2) 1 gm. cholesterol and 10 gm. olive oil, (3) 10 gm. olive oil only, (4) 1 gm. cholesterol and 10 gm. lard, (5) 10 gm. lard only. The fat-enriched diets did not agree with the animals, and they died of diarrhea. Therefore, in another group the supplements of lard and olive oil were reduced to 5 gm. The rabbits thus treated were observed for periods up to three months. At necropsy, the aortas were studied for the occurrence of arteriosclerosis. The findings indicate that in the rabbits fed cholesterol more severe arteriosclerosis developed than in those fed lard whereas those fed olive oil had only minor aortic changes. Addition of lard to the cholesterol-containing diet accentuated and supplements of olive oil decreased the severity of the vascular lesions. Vegetable fat thus had a protective effect on the evolution of arteriosclerosis. M. SILBERBERG

Localization and Retention of Triolein I^{131} in Various Tissues of the Atherosclerotic Rabbit. L. Felton, M. Friedman, S. O. Byers and P. Cady. *Am. J. Physiol.*, 197: 351, 1959.

The rate of disappearance of intravenously injected triolein I^{131} from the blood stream and its concentration in various tissues were studied both in the normal and in the atherosclerotic rabbit. No difference in the rate of disappearance of the I^{131} from blood was observed between the normal and atherosclerotic rabbit. The atherosclerotic aorta was observed to take up approximately twice as much I^{131} as normal aorta when the tissues were assayed ten minutes after injection. However, twenty-four hours after injection no essential difference was observed. All other tissues examined (fat, adrenal, spleen and liver) were observed to take up and retain more I^{131} than either the normal or the atherosclerotic aorta. The results suggest that the atherosclerotic aorta of the rabbit, while taking up initially more I^{131} than the normal aorta, appears to metabolize or otherwise rid itself of such I^{131} as rapidly as the latter in a period of twenty-four hours. AUTHORS

Coronary Atheromatous Changes Induced by Chronic Hypercholesterolemia in Dogs. G. L. Jordan, Jr., M. E. DeBakey and B. Halpert. *Am. J. Path.*, 35: 867, 1959.

This article deals with the findings in aortas and cor-

onary arteries of dogs used previously for the study of arterial grafts. The animals were treated with I^{131}, and fed a diet supplemented with cholesterol for periods from five to fourteen months. The serum cholesterol rose to values ranging from 735 to 1,770 mg. per 100 ml. In thirty-nine of eighty-four male or female dogs atheromas developed in the aortas, and in thirteen of these thirty-nine they also developed in the coronary arteries. Myocardial infarcts were not observed. Why these atheromatous lesions occurred only in a limited number of animals has not been discussed or explained.

Several questions arise regarding the results obtained. (1) The condition cannot be referred to as "ablation" of the thyroid without considerable restrictions. The degree of destruction of the thyroid by I^{131} varies remarkably and can be evaluated only by microscopic studies. However, pertinent data are not given. (2) Regenerating thyroid nodules develop rather frequently in the thyroid region, a condition that should be investigated in every case. However, there is no information about this point. (3) Thyroid function varies from strain to strain and depends upon sex and age. Such factors are known to influence the effectiveness of the treatment with I^{131}. In view of these complicating factors it is hard to see why use of I^{131} should be more suitable for the study of atherosclerosis than surgical removal of the thyroid as has been carried out in dogs by many investigators. M. SILBERBERG

Correlations between lipid abnormalities in serum and incidence of arteriosclerosis are often cited to support the nutritional theory of atherogenesis. However, it is equally possible that lipid changes derive from disease states which affect blood vessels independently and simultaneously.

The Distribution of Lipid and Phospholipid in Paper Electrophoresis of the Serum Lipoproteins in Normal Subjects and in Patients with Atherosclerosis. M. A. Chapin and S. Proger. *J. Lab. & Clin. Med.*, 53: 39, 1959.

Total lipids and phospholipids were measured in serum beta- and alpha-lipoproteins which had been separated by paper electrophoresis. The serum specimens studied were obtained from small groups of young men, young women, older people and about twenty patients with atherosclerosis. A few patients with diabetes mellitus, nephrosis, myxedema and essential hypercholesterolemia were studied. More lipid with relatively smaller amounts of phospholipid in beta-lipoprotein and less lipid with relatively larger amounts of phospholipid in alpha-lipoproteins were found when the serum specimens from young men were compared with those from young women. The serum specimens from the patients with atherosclerosis showed more total lipid and phospholipids in beta-lipoproteins than those from young women. The lipid content of the alpha-lipoprotein fraction in these patients was somewhat lower with relatively more phospholipid than that in young women. Similar patterns were found in the few subjects with diabetes, nephrosis, etc. studied.

G. HOLLIFIELD

Dietary Fat, Serum Cholesterol Levels and Incidence of Atherosclerosis in Delhi. S. Padmavati, S. Gupta and G. V. A. Pantulu. *Circulation*, 19: 849, 1959.

Fat intake, total serum cholesterol levels, and clinical and electrocardiographic evidence of coronary atherosclerosis were evaluated in one hundred men and twenty-four women of high socioeconomic status and in twenty-six urban and twenty-two rural men of low socioeconomic standing.

In the high income group the serum cholesterol levels increased with age and with increasing intake of fat, both of these features being absent in the low income group. In both groups serum cholesterol levels rose with increase in body weight. Clinical data suggest but do not establish a lower incidence of atherosclerosis in the group of low socioeconomic status.

W. H. ABELMANN

Diagnosis of Atherosclerosis. I. Correlation Between Clinical Diagnosis, Serum Cholesterol and Low-Density Lipoproteins, and Resting and Exercise Electrocardiograms. H. Engelberg. *Am. J. Cardiol.*, 1: 315, 1958.

Electrocardiograms at rest and after exercise, serum cholesterol and ultracentrifugal lipoprotein levels of 560 adult private patients were analyzed. Serum cholesterol and lipoprotein levels were generally elevated in 149 patients who had experienced a myocardial infarction, the latter more predictably so. Both levels were also elevated in twenty-seven patients with clinical peripheral arteriosclerotic disease.

The mean serum cholesterol and lipoprotein levels of forty-six patients with hypertension and coronary or cerebral complications were significantly higher than those of fifty-four patients with uncomplicated hypertension. Again the lipoprotein level showed greater separatory power between the two groups than the serum cholesterol.

The lipid measurement correlated directly with the severity of the electrocardiographic findings at rest and during exercise. W. H. ABELMANN

Myocardial Infarction in Rats Fed Diets Containing High Fat, Cholesterol, Thiouracil, and Sodium Cholate. W. A. Thomas and W. S. Hartroft. *Circulation*, 19: 65, 1959.

The authors present an experimental method to produce, by dietary means, cardiac and renal infarcts in male rats. Seven groups of ten rats each were fed diets of varying composition. Myocardial and/or renal infarcts were found in eleven of twenty rats surviving for four to fourteen weeks on diets adequate in protein, minerals and vitamins, containing propylthiouracil, cholesterol and cholic acid and 40 per cent butter or lard.

The infarcts closely resembled cardiac and renal infarcts in man. Abnormal deposition of strainable fat in all layers of walls of coronary arteries was frequent, but mural plaques, intimal or medial fibrosis were not found. Control of individual dietary factors was insufficient to evaluate their role in the production of disease.

W. H. ABELMANN

Lipid-Bound Glutamic Acid Deficiency in Aging Arteriosclerotic Subjects. R. E. Hamilton and L. O. Pilgeram. *Proc. Soc. Exper. Biol. & Med.*, 103: 574, 1960.

Plasma of normal subjects (average age twenty-seven years) was found to contain 33.9 μM/L. of lipid-bound glutamic acid while that of a group of patients with proved but not recent cardiac infarction (average age fifty-six years) contained 17 μM/L. Of the lipid-bound glutamic acid forty-seven per cent was present in the alpha-lipoprotein fraction in the normal subjects, in contrast to 35 per cent in the patients with arteriosclerotic heart disease.

Glutamic acid has been shown to have a thrombokinase inhibitory action, and it is possible that a deficiency of lipid-bound glutamic acid was associated with abnormal coagulability of the blood in the patients who sustained coronary thromboses. Unfortunately the control group was not matched for age or weight.

G. WALKER

Alimentary Lipaemia and Heparin Clearing in Ischaemic Heart Disease. J. R. A. Mitchell and B. Bronte-Stewart. *Lancet*, 1: 167, 1959.

Intravenously administered heparin is known to have a clearing effect on alimentary lipemia, less effective in persons with athroma than in those without, but the possible modes of action have not been fully investigated.

Twelve subjects with ischemic heart disease and twelve age-matched control subjects were given a meal containing 75 gm. of fat. Examination of their plasma showed a greater rise of postprandial lipemia in those with heart disease. Two days later, after ingestion of a nonfatty meal, the same twenty-four subjects were each given 15 mg. of heparin intravenously. Plasma samples obtained fifteen minutes later were tested for their capacity to clear the lipemic samples obtained two days before after the fatty meal. Both types of lipemic plasma were each mixed with heparinized plasma from both groups of subjects; there was no difference.

It is suggested that the difference in postprandial lipemia is due to differences of fat absorption rather than to differences of removal from plasma. F. E. HYTTEN

A possible influence of the type of carbohydrate included in the diet of animals upon cholesterol absorption and atherogenesis is an interesting observation. Further investigation of this action in man is awaited.

The Increased Severity of Atherosclerosis in Rabbits on a Lactose-Containing Diet. W. W. Wells and S. C. Anderson. *J. Nutrition*, 68: 541, 1959.

It had been reported that the absorption of cholesterol is increased in the rat by the addition of 40 per cent lactose to the diet. In this study, with rabbits, the diets consisted of 45 per cent soybean meal with additions of cottonseed oil, cod liver oil, vitamins and such, together with 0.35 per cent cholesterol. Lactose or sucrose was added to the test diets at 29.35 per cent.

The groups fed lactose consumed somewhat less food and finished the experiment somewhat lighter. Serum cholesterol values in the groups fed lactose averaged 100 to 180 mg. per 100 ml. higher than the control animals fed sucrose; differences began to be seen as early as two weeks. Total liver cholesterol concentrations of the groups fed lactose were more than double that of the animals fed sucrose. The "atherosclerosis score," as determined from measurements of plaques in the aortas, was higher also in the former. A good correlation was noted between serum cholesterol levels at two weeks and the eventual atherosclerosis scores.

The authors have no explanation for their findings. They eliminate the possibility that the influence of the lactose in the diet is related to a lowering of pH value in the cecum, or to a change in intestinal tract motility. Whether the known influence of lactose in producing a greater flow of lymph is related to cholesterol absorption is unknown. FRANK E. RICE

Coronary thrombosis is an event which appears, in some instances, to be related to the thrombophilic action of fats. This alteration in coagulability induced by certain fats may represent an important factor in the occlusion of coronary vessels affected by arteriosclerotic plaque formation.

The Independent Production of Atherosclerosis and Thrombosis in the Rat. G. A. Gresham, and A. N. Howard. *Brit. J. Exper. Path.*, 41: 395, 1960.

The development of thrombosis, myocardial and vascular lesions, and of obesity was studied in young male and female piebald rats. When they had reached a weight of 100 gm., the animals were fed diets up to 113 days varying in amounts of saturated and unsaturated fatty acids and their carbon number. The diet producing myocardial infarcts contained essentially 5 per cent cholesterol, 2 per cent cholic acid and 3 per cent thiouracil. Primarily the effects of butter fat and of arachis oil were tested, the latter rich in linoleic acid of low carbon number, the former rich in saturated fatty acids. Only the diet containing 40 per cent butter fat produced myocardial and renal infarcts due to thrombotic occlusion of the vessels. Substitution of 40 per cent butter fat by arachis oil failed to produce thrombi or infarcts; however, atherosclerosis was noted in the thoracic aorta and in the coronaries of rats thus fed. If the dose of arachis oil was reduced to 10 per cent, the atherosclerotic lesions were attenuated.

Rats fed 40 per cent butter fat or arachis oil only became obese but no vascular or myocardial lesions developed. All diets containing cholesterol and cholic acid produced arterial calcification with the presence of lipid-filled macrophages in the viscera. It is thus concluded that thrombosis, atherosclerosis and obesity are independent phenomena. M. SILBERBERG

Polyenic Acids in the Serum of Patients with Arteriosclerosis. G. Krickau and W. H. Hauss. *Ärztl. Forsch.*, 13: 187, 1959.

The question is examined as to how far alterations of the fatty acids of the serum, especially of highly unsaturated fatty acids, occur in persons with arteriosclerosis and metabolic diseases such as hyperlipemia, in comparison with healthy persons. The saturated fatty acids were separated from the unsaturated fatty acids by means of deep-freeze crystallization. The latter were measured up to the hexenes in the ultraviolet spectrum. In cases of hyperlipemia due to metabolic diseases, the saturated fatty acids in serum are clearly increased compared with the unsaturated ones. This was not the case in patients with arteriosclerosis. Among the polyenic acids the trienes were especially diminished in serum from arteriosclerotic subjects.

AUTHORS

Coronary Artery Disease and Obesity. K. Sanders. *Lancet*, 2: 432, 1959.

A group of forty-eight white male hospital patients with confirmed, uncomplicated coronary disease of recent onset were matched with a control group selected from a general practice. The control subjects were healthy men matched with the hospital group for age and for three factors which may have influenced dietary habits: nationality, place of living and religion. Body fat was estimated from a number of skinfold measurements in both groups.

The patients with coronary artery disease were no heavier than their control subjects but their skinfold thickness and therefore presumably their subcutaneous fat, was greater at all sites measured. These differences are said to be statistically significant but there is considerable overlap and such measurements would be of no diagnostic value in an individual subject.

F. E. HYTTEN

Inhibition of Progress of Preestablished Atherosclerosis by Diethylstilbestrol in the Rabbit. P. Constantinides and N. Gutmann-Auersperg. *Arch. Path.*, 70: 35, 1960.

Young male and female white New Zealand rabbits were fed a diet containing 1 per cent cholesterol, 5 per cent cottonseed oil, 90 mg./rabbit/day for nine weeks. At that time the degree of hypercholesteremia (1,315 to 1,372 mg. per 100 ml.) and plasma turbidity was determined. One batch of animals was sacrificed and the atherosclerotic involvement of aortas and of coronary arteries was graded. The remaining animals were observed for another eight weeks and treated as follows: (1) Feeding of 90 gm./rabbit/day of a stock diet, (2) feeding of 90 gm./rabbit/day of the stock diet and simultaneous subcutaneous injections of 2 mg./kg./body weight diethylstilbestrol in aqueous solution 3 times weekly, (3) feeding of the stock diet in amounts restricted to 40 gm./rabbit/day. Animals of group 1 showed no plasma turbidity and cholesterol values of 315 mg. per 100 ml., those of groups 2 and 3 showed slight plasma turbidity and cholesterol values of 465 and 466 mg. per 100 ml., respectively. In animals treated with the hormone the progress of atherosclerotic lesions was arrested in the aorta; but not in the coronary arteries. Underfeeding promoted the further development of atherosclerosis. M. SILBERBERG

Failure of Parenterally Administered Pyridoxine to Influence Serum Cholesterol Levels and Development of Atherosclerosis in Cholesterol-Fed Rabbits. F. W. Martens and D. W. Hoskins. *Circulation Res.*, 6: 159, 1958.

Twelve rabbits on a cholesterol-free diet and twelve on a 1 per cent cholesterol diet were given 25 mg. pyridoxine hydrochloride intramuscularly on alternate days for nine weeks. Twelve rabbits on a 1 per cent cholesterol diet and receiving phosphate buffer solution intramuscularly served as controls.

Serum cholesterol levels remained unaltered after three, six and nine weeks in all groups. Gross and microscopic examination of representative tissues from all animals after the ninth week showed no evidence that pyridoxine had any effect on the degree of atherosclerosis produced by cholesterol feeding.

W. H. ABELMANN