BOOK REVIEWS


If the title of Dr. Pappworth’s book was chosen to raise the hackles of the clinical investigator, it has succeeded in my instance; and I hope that my admitted bias in this review is not greater than his quasi-admitted bias in the presentation of examples of human experimentation in his book.

With the statement that there should be limits to the permissibility of experiments on humans and the thesis that the boundaries have been overstepped at times, I have no argument. Dr. Pappworth has done a worthwhile service to the profession in collecting examples of apparent infringements on the personal rights of patients (the invasion of private domain) and, as an inescapable corollary, questionable ethical conduct of physicians. I liked his awareness that his judgments were his own and his bold listing of references to the works to which he took exception.

It may be noted that the authors of the referenced papers would constitute a “Who’s Who” of English and American clinical investigators, and that among the American periodicals which have carried the greatest numbers of the reports in ethical question, CIRCULATION is second only to the AMERICAN JOURNAL OF CLINICAL INVESTIGATION. Included in the whole implied exposé of ethical misconduct is criticism of the standards of the editors who accepted the papers for publication, which in the case of CIRCULATION is myself.

It is proper and salutary that Dr. Pappworth has published his J’accuse of, and to, the profession; but definitely less predictable is its effect on the lay public. The troublesome question is whether the latter has been accurately informed of representative practices and whether the lay reaction will be philosophical and constructive or the opposite—emotional and obstructive.

For example, what will result from the statement, “I have a strong suspicion that at present both in England and America the most reprehensible experiments are those which are never published because of unsatisfactory or negative results.”

The extent of Dr. Pappworth’s reading and his erudition are evident, but can one man judge so many and so varied fields of medicine? Dr. Pappworth quotes Maimonides to epitomize his monograph: “May I never see in the patient anything but a fellow creature in pain.” A more rational 20th-century approach would be, “May I never see in my fellow creature pain and suffering that might have been prevented.” I submit that there are gaps in Dr. Pappworth’s experience, exemplified by such statements as that electroshock defibrillation may cause a “large burn on the chest,” and that carbon dioxide is a toxic gas and ammonium chloride a toxic substance in the amount used. He allows his readers to infer that the radiation hazard from small tracer doses of radioactive iodine might be equivalent to that from therapeutic doses.

To me it seems Dr. Pappworth fails to distinguish those investigations designed to give enlightenment on basic processes from those newly developed diagnostic procedures applied before risk and value have been evaluated and from those new but unproved therapeutic approaches (including surgery) submitted to patients. Neither does he give credit to those investigators, diagnosticians, and surgeons who have made carefully weighed, sometimes agonizing decisions. Scientifically, the treatise is definitely imperfect in that the author accepts hearsay remarks without qualification—unmindful, so far as the text indicates, of the probability that his postgraduate students consciously or otherwise would like to tell him what they thought he would like to hear.

Dr. Pappworth’s choice of quotations from the many writers who have been troubled by human experimentation is excellent, but even here the throes of decision-making expressed by the quoted authors are minimized: witness an apt quote from Claude Bernard—which, however, hardly can express that investigator’s chapter-long detailed discussion of the problem in his Introduction to the Experimental Medicine.

There are innuendos to certain phrases used, for example, “tightly fitted mask . . . used with a nose clips (sic)”; thyrotoxicosis, a condition which is invariably associated with marked apprehension”; “catheter passed into the heart and then through the heart into a lung artery so as to obstruct its flow”; “so that his position (during catheterization) often resembles crucifixion”; “sticking of needles into various heart chambers”; “a second needle was stabbed into the same femoral artery”; “a large bore needle was inserted.
to penetrate the femoral artery”; and “to pass the catheter . . . may take as long as an hour or even more, the patient being exposed to x-rays all the time” (italics, mine).

In final analysis, perhaps Dr. Pappworth falls into a philosophical trap of his own making. To the ever-present question, “Do ends justify the means,” his answer is a vigorous “Nay.” But his book suggests that he believes his ends—laudable in that they should cause the profession to look closely at their practices—can justify questionable means, including minor misrepresentations, scientific errors, and dictation calculated to engender emotion to the extent of horror.

If the readers of this review may wish to consult a less personal critique, they are invited to read that of L. J. Witts (Brit Med J. June 10, 1967, p. 689).

In summary, Human Guinea Pigs carries a challenge to those who do (and will) carry out metabolic and hemodynamic studies on patients and normal subjects. The best parts are the “Introduction” and the “Conclusion” and the excellent chapter on “Principles.” The examples of alleged unethical conduct will be of real value as a collection that every physician should study seriously as a basis for open discussion with his colleagues to form a judgment of the ethical principles that apply.

HOWARD B. BURCHELL, M.D.


The American Society has followed the successful example of her younger European sister organization by publishing the full length papers presented at its annual meeting beginning with the eleventh. A digest of the transactions of all preceding meetings and a short history of the Society are scheduled to be incorporated in the forthcoming proceedings of the twelfth annual meeting.

The first five of a total of 19 papers in this present volume are concerned with instrumentation, oriented in particular to the taking of records in more degrees of freedom, that is, not limited to the head-to-foot direction, both in the supine and in the upright position. Two of the proposed new instruments were of a resonant frequency high with respect to the heart rate, one recording forces in the vertical direction only, another in all three directions of a subject sitting upright. The other four were of the ultra-low frequency type now generally used to circumvent difficult mechanical coupling problems that give rise to distortion of the records. One of the new ultra-low frequency ballistocardiographs, supported by a single large surface air bearing, may be used on the fluoroscopic table, thus permitting catheterization and cineangiology while the ballistocardiogram is recorded. Another model permits the ultra-low frequency ballistocardiogram to be taken with the subject sitting up, thus making it possible to study cardiac performance with a bodily orientation more closely resembling that during daily work. A prototype of an instrument entirely on air bearings with six degrees of freedom was described—three were in translation and three in rotation—all had a natural frequency much lower than the heart frequency.

Previous evidence, based on experiments on cadavers and, later, on an electrical analog, suggesting that the acceleration ballistocardiogram is very sensitive to the pattern of left ventricular ejection, was verified by direct experimental results secured from experiments on dogs. After a recovery period, ejection flow was recorded by means of an implanted flowmeter in conjunction with longitudinal acceleration ballistocardiograms. Changes in ejection pattern, but not in stroke volume, were induced by means of tightening a snare which had been previously placed around a branch of a coronary artery or by injection of a cardiotonizing or cardiotonizing drug into a coronary artery. The amplitude of various waves in the ballistocardiogram proved sensitive to alterations in cardiac ejection and the ballistocardiographic changes were more marked than those in peak aortic blood flow or even in peak aortic blood acceleration. These findings were corroborated by results of studies using a mathematical model of the systemic arterial tree and by others in which an electrical analog was employed.

A new method was proposed to obtain the fraction of the respiratory tidal volume contributed by the motion of the diaphragm utilizing the ultra-low frequency displacement ballistocardiogram as well as other methods of measurement. In addition, detailed observations were reported concerning the effect of suspension of respiration on the amplitude of the displacement curve with air volume in the lungs and airway pressure as parameters. The similarity between records of air movement through the open glottis
during held respiration and the displacement ballistocardiogram, noted earlier, was studied by means of a mathematical model relating, in first approximation, central blood flow and resulting air flow under such conditions. In contradistinction to the ballistocardiogram, venous flow contributes strongly to the generation of this air flow record.

Pharmacological studies were concerned with determination of the beat-to-beat stroke volume in conscious human volunteers with the aid of a general purpose analog computer as compared with determination of cardiac output by use of dye dilution both before and after administration of a variety of drugs. Rapid changes in cardiac output were reportedly detectable by the former but not by the latter method.

A large volume of statistical information was presented on the relationship between the wave form of the ballistocardiogram and such variables as age, blood pressure, and smoking habits.

A digital computer search of indices that could be used to distinguish between normal persons and patients with left ventricular hypertrophy due to aortic insufficiency or hypertension elicited a surprisingly large number of significant correlation coefficients among the quantities taken from the electrocardiogram, the ballistocardiogram, the arterial pulse, and the phonocardiogram. The probability density functions showed a separation between normal and abnormal of from eight to more than 30 orders of magnitude.

Other clinical studies reported were concerned with the interpretation of the acceleration ballistocardiogram when related to simultaneously recorded first or second time derivatives of an arterial pressure pulse and with the effect of induced anoxemia on isolated abnormalities in the ballistocardiogram. Another report dealt with the recording of ballistocardiograms and a variety of other physiological variables by means of the magnetic tape recorder; the advantages and versatility of this method of data collection were emphasized.

Abraham Noordergraaf, Ph.D.


Few cardiovascular investigators stand so unchallenged at the top of their chosen scientific fields as does Dr. Isaac Starr. His contributions to ballistocardiography (Bcg) are the result of more than 30 years of research which has touched almost every aspect of the subject. The book is not only a review of Starr's own work but puts his findings into proper perspective with the work of others, for an accumulated literature of formidable size and scientific complexity is also reviewed.

Dr. Starr was wise in the selection of the junior author, Dr. Noordergraaf. His contributions to Bcg from the biophysical point of view are as authoritative as are those of Starr from the physiological and clinical points of view. Dr. Noordergraaf's specialized talents have resulted in a highly sophisticated mathematical analysis of the basic meaning of Bcg and of the reliability of the various instruments that have been used. Some of Dr. Noordergraaf's studies will be beyond the understanding of most cardiologists and cardiovascular investigators, but they have been highly praised by those competent to judge them. In brief, Dr. Noordergraaf has succeeded in duplicating records obtained in the clinic and in animal experiments by feeding appropriate data into computer models of the circulation. These rigidly controlled observations strongly support the Bcg concepts formulated from clinical and physiological studies and indicate that Bcg provides unique information about myocardial contractility. This information is provided quickly and without inconvenience, undue expense, or danger to the patient; and if one wants to study a patient repeatedly, one can do so with ease.

The fact that the records of normal youths are monotonously similar and highly reproducible in both amplitude and wave form is the basis for the belief that deviations observed in the clinic are indeed due to physiological variability. Hence, early in his Bcg career the senior author became concerned with the obvious relation of the Bcg amplitude to cardiac output and addressed himself to the problem of stroke volume determination. This work, as well as that of others on the subject, is thoroughly reviewed. The fact that Bcg determined stroke volume does not always correlate with cardiac output, determined by what are considered more conventional methods, is critically discussed. Many guidelines are given for intensification of the already vigorous study of the Bcg stroke volume method. It is clear that the reward of success would be a method that could be used repeatedly, quickly, safely, and inexpensively in the study of patients.

Evidence is presented which establishes the fact that the easily obtained Bcg force record reflects the acceleration with which the myocardium ejects its stroke volume. Numerous studies on animals, simulations of systole in cadavers, experiments made on electronic circulatory models, and finally, a few studies on man constitute the evidence. A Bcg is therefore a measure of myocardial strength. That this information can be put to many uses is abundantly illustrated by exami
 plees showing the success or failure of therapeutic procedures and the abnormal responses of diseased hearts to stress.

Ballistocardiograms (Bcgs) become smaller and of bizarre form as age advances, so the circulatory system of the aged does not usually perform like that of youth, and the Bcg record provides a measure of this change. It is well known that the muscular performance of the aged can be improved by physical conditioning; that this is also true of heart muscle is demonstrated by the changes in the Bcg wave form and amplitude, in the direction of those which characterize youth, which are found in older people after training.

Because Bcgs are more likely to be abnormal in patients with coronary heart disease than in normal controls of comparable age, the value of Bcg in the management of patients with coronary heart disease early attracted Starr's attention. That normal subjects with abnormal Bcgs have more asymptomatic coronary atherosclerosis than do those whose Bcgs are normal has now been established by the appropriately designed prospective studies of Starr and impressively confirmed by others.

There is much discussion of those additional questions which progress to date has not answered. There is need for better methods of quantitating records of bizarre wave form, and so of improving their interpretation. Much more needs to be done to improve our knowledge of the relation of Bcg abnormality and simultaneously recorded hemodynamic variables in man. To date all prospective studies have been based upon resting records; it is obvious that much more information would result from records recording the response to various stress procedures such as physical exercise.

Reliable Bcg beds are now commercially available. All who are interested in acquiring the kind of information Bcg uniquely provides should have this book.

Benjamin M. Baker, M.D.


This carefully prepared book contains a large series of photographs of capillaries obtained in man under a variety of conditions and in various disease states. The quality of the photography is excellent and many aspects of capillary microscopy are presented which have hitherto not been available in book form. These include pictures of conjunctival, lingual, and labial vessels among others. It is regrettable that a few color photographs could not be included.

The authors emphasize the experimental and investigative aspects of this work in the text without overstating the specificity of any of the findings. It is clear that except in certain conditions such as the collagen disease capillaroscopy is of informative rather than diagnostic value. Even in scleroderma, where the capillary picture is fairly specific, diagnosis is usually established in other ways and capillaroscopy is merely confirmatory.

The authors' observations are generally in accord with the literature and with the experience of others, with a few exceptions. One of these is their method for measuring small vessel pressure in the digit. This consists of noting when the capillaries open while lowering cuff pressure around the middle phalanx from high to low levels. The range of pressures obtained in this way are quite low and must be due in part to venous congestion produced by inflating the cuff. One could take issue with other aspects of the work, although, in general, such disagreement would be minor.

On the whole, therefore, this is a carefully prepared book with excellent illustrations and a good bibliography, which is recommended for those especially interested in vascular disease as it affects the capillaries.

Milton Mendlowitz, M.D.


This reviewer expected, from the title of this book, that it would deal with biomedical engineering, the interdisciplinary science of medicine and engineering. The introduction by Dr. Segal indicates that biomedical engineering as a "science, employs engineering concepts and methods in the study of living things" and in "practical applications, it is concerned with the design and construction of instruments for biological research in the practice of medicine." The tacit understanding by this reviewer and the clear statement by the editor are in sharp contrast to the popular definition of engineering, "The art or science of making practical application of the knowledge of pure sciences, as physics, chemistry, biology, etc." (Random House Dictionary, 1966). The contents of this book are clear evidence that there is a science of engineering as
well as an application of engineering and that important contributions have been made to the science and art of medicine.

Despite the intent and promise of the editors to present a symposium, the reader of this work encounters a series of 40 chapters, each rather self-contained, dealing with one or more activities of engineering science or application in biology and medicine. Several general areas are evident from the groupings of topics. These include biomedical engineering in surgical practice, the application of computer methods in analysis or retrieval, the application of engineering principles to circulatory assist devices, and the development of specific diagnostic and treatment devices. The last nine chapters contain miscellaneous and unrelated dissertations.

The contributors are all outstanding authorities in their fields and the symposium contains carefully written and up-to-date views of the topics outlined. Unfortunately, this work remains a collection of dissertations rather than a symposium—since there is no well-defined central theme and careful reading of the 40 chapters does not reveal any significant internal reference between authors or topics. There is no discussion of topics by other participants.

The work reviewed herein, therefore, should be considered a supplement to such texts as "Medical Physics," but without the advantages of cross reference and editorial organization. It has some value as a reference text but would be of limited use to members of either the medical profession or the engineering professions.

Ramon L. Lange, M.D.


This short book by the noted Oxford pathologist is a pleasure to read on account of the scholarship and style of its author. When the devil's advocate comes in such attractive guise, he is known to be all the more dangerous! In the past decade or so, workers in the field have become more and more firmly convinced that coronary heart disease has become more common over the years, that its frequency varies widely in different parts of the world, and that these phenomena are largely due to environmental factors. According to this book, all these views are thoroughly wrong.

Dr. Robb-Smith is rightly critical of mortality statistics and the vagaries of death certification and nomenclature, but the major portion of the book is based on just such data. The conclusion that mortality trends show no increase in coronary disease is not shared by most other equally responsible and, if anything, equally conservative workers. A prime target is Morris' paper, published in 1951, suggesting an increase in coronary deaths but not coronary atheroma during past decades. The accusation that Professor J. N. Morris has failed to take into account the age-structure of the groups is quite unjustified, as the reviewer of Dr. Robb-Smith's book in the Lancet (June 10, 1967) has also noted and as the reader can easily check for himself.

The author grudgingly concedes that geographic differences probably exist, but he almost tacitly assumes that these are due to "racial susceptibility" rather than the mode of life. Such telling comparisons as between Hiroshima and Framingham are brushed aside by the claim that the Framingham study "suffers from serious biological defects," quoting as evidence a single paper—another quite unjustified accusation. A straw-man is easily knocked down! Coronary heart disease must obviously be an enigma, to quote the title of the book, for anyone who all but disregards the spectacular advances in epidemiological knowledge concerning risk factors. We are admonished to look for "variable individual susceptibility" but are told nothing about the great strides in identifying high-risk individuals and groups. Incidentally, how can anyone familiar with the epidemiological literature say that the proportion of men with elevated risk factors, in this case in Framingham, who do not develop coronary disease is unknown? (Page 113.)

Dr. Robb-Smith's treatise cannot be recommended to those who search for a balanced account of some of the main problems of etiology and mechanisms which are, alas, still truly enigmatic about coronary atherosclerosis and its consequences. Those who feel strongly that environmental influences are in large part responsible for the great frequency of coronary heart disease should read this book. If they can counter Dr. Robb-Smith's arguments point by point, they will find their conviction strengthened and be further rewarded by the wealth of information provided.

Frederick H. Epstein, M.D.


Dr. Stamler has produced an important book, one which Dr. Paul D. White says, in the foreword, that he "would have liked to have written."
BOOK REVIEWS

It is important factually in that it reviews from 644 references most of the salient papers on the incidence, mortality, prevalence, etiology, epidemiology, and the “primary” and “secondary” prevention of atherosclerotic coronary artery disease, hypertensive heart disease, and rheumatic heart disease. In a final chapter, the author discusses iatrogenic heart disease in children.

The data and opinions come, in addition, from the author’s wide experience in experimental and industrial medicine and public health.

The book is important, secondly, because it is written by an optimist, an environmentalist, who believes in the potency of mass administered hygienic advice and the managed perfectability of mankind. His major thesis is that we are suffering in the Western world, and especially in the United States, from an “epidemic” of coronary artery disease brought upon us by our mode of life, particularly by our diet (high in calories, saturated fats, and cholesterol), cigarette smoking, physical inertia, overweight, hypertension, and diabetic tendency. What is needed is to submit all males to annual physical examinations, beginning in early adult life, and to appropriate laboratory tests (with repeated advice about reducing these “risk factors”); thus, the way of life will be so altered as to result in wholesale retardation of atherosclerosis and the prolonging of many lives. No one can deny the possibility of this happy result, since the program has never been tried on a total population, and one could wish that it might be, but it is doubtful if it ever will—not because such a massive effort is impossible, but because the material rewards of Western civilization are not only the major goals of our present society, but because they are infinitely appealing to the masses of the developing countries. Much of what is offered to prevent atherosclerosis are the precepts of good health, which have been presented to men for thousands of years and rather generally disregarded.

Dr. Stamler’s book devotes about 300 of 386 pages to the atherosclerotic problem—a reasonable allotment in view of its importance and the author’s years of work in this field.

He believes that there is a real increase in middle-age specific mortality rates from atherosclerotic coronary heart disease in the twentieth century in males. This implies a faith in vital statistics not shared by everyone, in view of the changes brought about by the public health triumphs starting in the 1880’s, the changes in diagnostic terminology, the overdiagnoses of coronary disease today, and the increase in the population “at risk.” But he says “. . . the question may be asked whether it is possible to designate an essential or necessary cause for large scale occurrence of premature clinical atherosclerotic disease in populations. In this sense, diet certainly can be soundly designated as the essential cause, for the data overwhelmingly indicate that a certain pattern of habitual diet is an essential prerequisite for the development of a high rate of clinical coronary disease in a middle-aged population.” And one can find no stronger article of faith in the defense of the control of Man’s medical destiny than this, “It has been unequivocally demonstrated that medicine has the means—nutritional, hygienic, and pharmacologic—to correct and control the cardinal coronary risk factors (e.g., hypercholesterolemia, hypertension, overweight, diabetes mellitus, improper diet, physical inactivity, cigarette smoking) in most persons. These incontrovertible facts make it fully possible and feasible to undertake the primary and secondary prevention of atherosclerotic coronary disease and other forms of atherosclerotic disease.”

Perhaps the prescription has been prepared but will the American public fill it? Dr. Stamler gives detailed directions for attaining this prevention of atherosclerosis. With strong motivation the regimens may be acceptable. In the author’s own Chicago Coronary Prevention Evaluation Program, 335 higher risk men in the age group 40 through 59 years have been followed, but about one third have dropped out in the 6-year period, most in the first 24 to 30 months. However, the results have been encouraging. Whether the preliminary figures from this and similar small, highly specialized groups can be extrapolated to include the total American population remains questionable.

For success, Dr. Stamler would invoke the efforts of private physicians, the medical directors of industry, labor, government, Veterans Administration, hospitals, clinics, the welfare medical apparatus, voluntary health agencies, medical societies, civic groups, nutritionists, health educators, social service workers, physical educators, psychologists, and others.

Everyone should have an annual “checkup,” including history; physical examination; analysis of nutritional status, weight, blood pressure, blood cholesterol, uric acid and glucose; assessment of cigarette smoking, exercise status, kidney and thyroid function; and routine serial electrocardiograms, beginning in young adulthood.

Foodstuffs must be altered in their fat and cholesterol content; cigarettes must be eliminated by education, control of advertising, and subtle diminution in availability of tobacco. Regular, frequent, moderate exercise must be encouraged. Drugs must be resorted to, if necessary.

Such gigantic planning, perhaps, tends to disregard the well-attested fact that the triumphs of preventive medicine have been based upon pro-

Circulation, Volume XXXVII, January 1968
cedures which have not required individual effort on the part of the citizens. Things were done for them—pure food and water, preventive inoculations, iodized salt, improved economic status, and so on. It has recently been shown that the general health of Britain has not been improved by socialized medicine because acute or communicable diseases, whose victims previously filled the wards, have been replaced by coronary disease, gout, diabetes, and other chronic diseases, the prevention of which lies in the individual effort of the afflicted person.

Since the total American public is "at risk," relative to coronary disease, it would seem more feasible to educate the mass of men and let each decide whether or not to utilize the knowledge. Health, as a concept or fear of delayed retribution in the form of coronary disease, is not readily accepted by the present human being, if this acceptance comes out of the satisfactions of thick steaks, fried eggs and bacon, cigarettes, automobiles, and television. To hope otherwise is, I believe, to join King Canute.

The chapters on "Hypertensive Disease," "Cor Pulmonale," "Congenital Heart Diseases," and "Rheumatic Heart Disease" contain specific directions for prevention which are generally accepted and the advice is detailed and practical. Much of it, however, contains the admonitions emphasized in the sections on atherosclerosis.

This book should be available to every doctor, if only to remind him that prevention of heart disease in his patients is a lively part of his duty, and that, perhaps, he should set a good example.

Howard B. Sprague, M.D.


Dr. Dible's monograph deals largely with the results of an extensive study of the gross and microscopic pathology of the arteries of amputated extremities. He lays groundwork for a discussion on atherosclerosis by presenting a general consideration of the blood vessels, relating, in particular, the extent of development of elastic and muscular coats to the discrete function and environment of the arteries.

In a very interesting chapter on the vasa vasorum he presents some of his own work and develops the theory that freedom from dependency on the vasa vasorum may be a factor in the relative immunity of the small vessels in atherosclerosis. There is a well-illustrated, rather extensive discussion of the development of the vasa vasorum and recanalization in arterial thrombosis, emphasizing the lack of inosculation of vessels of vasa vasorum with the vessels which have a luminal origin.

Since atherosclerosis is a disease of the aged and changes due to aging are difficult to disentangle from those of atherosclerosis, the author included a chapter on his studies of aging arteries without atheroma, dealing mainly with intimal thickening and laying down of additional elastic tissue layers without proposing a causal relationship between these changes and atherosclerotic vascular disease.

The remainder of the monograph is devoted to a description of the arteries in atherosclerosis and thromboangiitis obliterans. X-ray examinations were performed on the amputated extremities, using an oily suspension of metallic mercury, after which the legs were fixed and dissected. The author admits the difficulties in trying to relate and explain the findings in such a complex system as the arterial tree of the extremity. He notes the sparing of the distal, smaller arteries and concludes that the high incidence of gangrene in the digits is not due to local failure of the circulation, but rather due to general circulatory insufficiency of the extremity, the toes being more prone to ischemia since they lie at the terminal end of the arterial circuit. Examples are presented of the general patterns of arterial occlusion with the "peroneal leg" described as the type most frequently encountered. The descriptions are well illustrated with x-rays and diagrams. Muscle lesions are considered and pathological findings are illustrated.

The volume is quite specialized but should certainly be of interest to clinicians and clinical investigators dealing with arterial occlusive disease.

Margaret C. Conrad, Ph.D.


The material collected in this book is mainly based on the Proceedings of the First International Conference of Preventive Cardiology held at the University of Vermont in August 1964. As stated by the editor, Dr. Raab, in the introduction, "The program of this conference was deliberately focused on the nonvascular neurogenic and hormonal mechanisms which, by interfering in myocardial oxygen and electrolyte metabolism, determine the degree of vulnerability of the heart muscle to existing coronary atherosclerosis and which, under certain conditions, destroy myocardial tissue even in the absence of vascular..."
lesions.” This general philosophy is further emphasized by another statement in Dr. Raab’s introduction, “The readers are urged to beware of the still widespread and misleading semantic confusion of coronary atherosclerosis as such with its pathogenic corollary, i.e. myocardial metabolic vulnerability and resulting hypoxic disease of the heart muscle.”

The emphasis of the book is clearly on the extravascular pathogenic factors of ischemic heart disease, which is considered basically the result of a disproportion between vascular oxygen supply and myocardial oxygen consumption. Hence, the problem of atherogenesis is given only limited consideration in the book.

The 58 chapters of the book are grouped in four sections dealing with “Pathophysiological Data,” “Epidemiologic Data,” “Preventive Measures” and “Educational Aspects.” The chapters of the first section are mainly concerned with the effects of the catecholamines on the heart muscle. Electron microscope and biochemical studies, as well as studies of the electrical activity of the heart, are reported here. The role of the catecholamines in the production of myocardial damage which may be caused by stimulation of the nervous system, by nicotine, and by various forms of physical and emotional stress, is discussed by several authors. Other chapters of this section deal with the concept of “coronary reserve” defined as the ratio of vascular O2 supply to myocardial oxygen consumption and with the sensitizing effects of the adrenal corticoids on the cardiotoxic action of the catecholamines. Although much of the work reported in this section is still fragmentary, most of the authors seem to feel that the knowledge already available must serve to encourage the adoption of more positive preventive action, without waiting until all the theoretical problems are solved.

The epidemiological data presented in Section II deal with criteria for “coronary proneness,” the effect of cigarette smoking and its relation to catecholamine liberation, and the personality characteristics of the coronary-prone individual. Some of the epidemiological data reported, like those of a Somali primitive tribe, are not completely convincing because of the limited information available. To conclude that these tribesmen have a low incidence of ischemic heart disease because they are free of emotional tensions and anxieties seems to be an oversimplification of the problem. These tribesmen are also reported to have very low serum cholesterol values (maximum level, 153 mg/100 ml).

This section contains the description of a test for early evaluation of cardiac risk which is based on the measurement of the heart rate and the duration of the isometric period of the left ventricle at rest and in response to sensory and mental stresses.

The section on preventive measures devotes some attention to dietary factors, but is mainly concerned with the preventive value of physical activity. There are a number of chapters describing the extensive work being done in Germany, the Soviet Union, and other countries. These chapters will be of great interest to those who are not familiar with these extensive programs of physical reconditioning. The evaluation of the results obtained in these programs is, however, difficult. Lack of proper controls and of rigid statistical criteria in the analysis of the data is common to many of these programs. One is left with the impression that some of these programs have been planned to meet social demands more than to answer critical scientific questions.

The final section, devoted to “Educational Aspects,” discusses the role of lay and professional education in the prevention of ischemic heart disease. The criticism of current medical education, with its lack of emphasis on the preventive aspects and its neglect of sociological problems, is justified. But on the other hand, the resistance against the introduction of large scale preventive programs before we have proof of their effectiveness is understandable.

As a whole the book represents a most commendable attempt to present the current status of our knowledge in connection with selected problems that may be involved in the prevention of ischemic heart disease. It has the shortcomings of a work embracing so many questions, and contributed by so many authors. Some topics are discussed at great length, while others are given little attention; but perhaps this is only the consequence of the present situation of our knowledge. The book will have a useful role in promoting interest for the development of a more active approach to the prevention of ischemic heart disease.

Francisco Grande, M.D.


Two books appeared within a week of each other in June: one written by Dr. Walter H. Seegers, the other edited by him. Although the larger book has a number of authors, essentially both books tell the Seegers’ philosophy of blood clotting. This philosophy is controversial and not
too widely accepted, mainly because it has yet to be confirmed by independent laboratories.

The shorter book, a monograph in Thomas' American Lecture Series, is an elaboration of a Beaumont lecture that Seegers presented to the Wayne County Medical Society in 1966. It is a brief but thorough review of his lifelong work in the chemistry of prothrombin and ends with five pages of "Notes" which are very personal commentaries.

The longer book contains 12 chapters, the first by Seegers and many of the others by present or past associates of his. For the most part each chapter is well written and thoroughly summarizes the field; particularly effective are the chapters on "Immunochemistry" by Dr. Marion Barnhart, "Platelets in Hemostasis" by Dr. Shirley Johnson, and "Fibrinogen to Fibrin Transformation" by Dr. Birger Blombäck. Dr. Leo Vroman masterfully reviews surface activation in blood clotting and gently chides the narrow view of the traditional coagulationist. Excellent electron micrographs of the ultrastructure of fibrin are presented by Dr. Nils Bang, but his accompanying text tends to meander. Dr. F. C. Monkhouse deprecates the common use of the term "anti-thrombin" for various clot inhibitors and would like it to be reserved for the enzyme that destroys thrombin.

For the first time we have a chance to study Dr. C. Martius' concept of the biochemistry of vitamin K in English. He believes that, despite the form of vitamin K absorbed (menadione, vitamins K₂, or K₃) and regardless of the lengths of the isoprenoid chain in the 3-position, the mammalian body converts them all to vitamin K₇(20). Not only is this not universally accepted but neither is Martius' view that the vitamin acts in the main line of cytochrome oxidation and reduction in the liver. Perhaps Seegers intentionally sought a minority point of view.

His own concept of clotting represents a minority report. In essence, Seegers believes that the prothrombin molecule can undergo a series of degradations to form autoprothrombin I, autoprothrombin II, autoprothrombin III, and finally autoprothrombin C. This last factor, acting upon another derivative of the prothrombin molecule, prethrombin, generates thrombin. The cofactors for the various activation steps include calcium ions and accelerator globulin. If, in addition, tissue extract is added, the main product is autoprothrombin C, but if the lipid activator is derived from platelets, and platelet cofactor I is added, the main product is autoprothrombin III.

One's first reaction to Seegers' scheme is dismay because of the strange terminology. But if one substitutes the more common synonyms of the day, his hypothesis turns out to differ in only one important respect from the more popular ones. Thus, converting autoprothrombin I into factor VII, autoprothrombin II into factor IX, autoprothrombin III into factor X, autoprothrombin C into activated factor X or prothrombinase, accelerator globulin into factor V, and platelet cofactor I into factor VIII, one finds the ingredients of the "cascade" or "waterfall" theories of clotting.

The main difference between Seegers' school and others is that factors VII, IX, and X and prothrombin are usually considered to be four independent protein molecules with many properties in common (stability, adsorbability). Seegers conceives of three of these four to be derivatives of a single molecule, prothrombin, and presents rather convincing evidence for his stand. If he is correct, then a congenital deficiency of factor VII (hypoproconvertinemia), factor IX (PTC deficiency or Christmas disease), or factor X (Stuart-Prower factor deficiency) represents a congenitally anomalous prothrombin molecule. One might reply to Seegers' obvious antipathy to the terms, factors VII, IX, and X, by quoting from Dr. Vroman, "Even an error, if well defined, deserves a name."

For an intimate view of the Seegers' school of thought about blood clotting, his monograph Prothrombin in Enzymology, Thrombosis and Hemophilia is highly recommended. Blood Clotting Enzymology recapitulates the monograph and adds a number of other enzymologic steps in clotting to make it the most complete book on this subject available.

CHARLES A. OWEN, JR., M.D.


This book, essentially the proceedings of a conference, presents an outline of the present state of knowledge and future research needs of cerebrovascular rehabilitation. It consists of 11 chapters, each made up of a short, formal presentation on an aspect of the stroke syndrome and a dialogue or commentary on the material presented. The authors are well-qualified authorities in a variety of disciplines related to neurology and rehabilitation.

The epidemiology section is a short and yet comprehensive review of the present state of knowledge. The statistical nature of the material makes for rather difficult reading, but this is due more to the topic than to the form of presentation. The commentary that follows is good in

Circulation, Volume XXXVII, January 1968
emphasizing the complex interrelationships involved when risk factors are being studied. It should be clear to anyone reading epidemiological reports that results are in terms of associations of factors and diseases and not in terms of causal relationships. Epidemiology offers leads by identifying associations that are worthy of further study, while causality is determined by experimentation and laboratory research.

The chapter on associated conditions reports the result in a series of patients studied at a single hospital. Since this gives the reader a limited viewpoint, it might have been more appropriate to review the present state of affairs in this field from the literature rather than from one group's experience.

The discussion on the clinical varieties of stroke is short but good. The clearly written formal presentation groups the various types of stroke into broad, easily recognized categories. In the commentary there is some discussion of the difficulties in diagnosis of cerebrovascular disease and the oversimplification of the classification used in the formal presentation. Together the chapter and the commentary give a good overview of these diseases within the limitation of the space available.

The material on the procedures available for cerebrovascular diagnosis is fine for those not well-versed in the field, but most clinicians will not consider it a very useful presentation. The emphasis is on the use of the cerebral arteriogram as the method of choice for evaluating occlusive disease of the cerebral vasculature. However, experience with this procedure has demonstrated that there is a great problem in evaluating the functional significance of anatomic lesions and, therefore, methods of physiological testing are required. In many ways this situation is analogous to that occurring in the evaluation of renal vascular hypertension, in which angiographic abnormalities require corroboration with tests of renal function.

The portion of the book concerning rehabilitation continuously returns to the need for better methods of data handling. Better means of objective quantitation are needed in the behavioral sciences and the rehabilitation field so that statistical conclusions can be drawn regarding the efficacy of treatment programs.

The discussion on stroke research emphasizes the fact that only 50% of patients with cerebral ischemia have stenosis or thrombosis of the cerebral vasculature and 20% of those with an ischemic stroke have no angiographic evidence of significant arterial occlusion or stenosis. It stresses that, without better diagnostic procedures in all cases of cerebral infarction, epidemiological studies will continue to suffer from the problem of equating infarction with arterial thrombosis and infarction without thrombosis because they cannot be easily differentiated on a clinical basis. This presentation clearly outlines the need for more investigation into the pathophysiological aspects of these diseases.

The closing comment by the commissioner of the Vocational Rehabilitation Administration suffers from rather dramatic overstatement. Our present neglect of many of the physically disabled is most unfortunate and should, of course, be emphasized. But I find it rather hard to accept that this sorry state of affairs puts our very democracy in danger, as suggested by the commissioner.

This book is a concise statement of the present status and future needs in the field of cerebrovascular rehabilitation. It clearly delineates the deficiencies in our knowledge of cerebrovascular disease and its natural history and our lack of quantitative methods for research in the rehabilitative fields.

John P. Fitzgibbons, Jr., M.D.


This monograph presents a comprehensive review of the physiology of the coronary circulation and the various methods employed to increase coronary blood flow. Considerable attention is directed toward a review of experimental methods for producing myocardial ischemia and also of the physiological techniques by which these changes may be evaluated. Although primary emphasis is placed upon the surgical management of occlusive coronary disease, the anatomy, pathophysiology, pharmacology, and radiographic features of the coronary circulation are presented. Particularly important aspects of the book include a summary of nearly a thousand animal experiments performed by the author and a detailed description of the Sones' technique of coronary arteriography. The illustrations are good and clearly illustrate the points which the author chooses to emphasize.

In presenting the surgical procedures for myocardial revascularization, primary attention is placed upon the author's technique of internal mammary-pedicle implantation into the ventricular myocardium. It is to be expected that the enthusiasm expressed for this technique is perhaps greater than is generally accorded this procedure, although increasing numbers of such procedures are being carried out in various centers. It is recognized that the subject is a controversial one,
and quite properly so, and in this connection the data upon which conclusions are based are carefully presented. In addition to the author’s own method, other surgical procedures including poudrage, pedicle flaps, thrombo-endarterectomy, and related procedures are summarized with an analysis of the published experience.

The final chapter considers “Future Problems” with emphasis on the fact that much remains to be done in this important field. In an area of medicine beset with controversy and frequent unconvincing conclusions, the author has attempted to place the evaluation of results of surgery on a more objective basis, especially upon an analysis of postoperative coronary arteriography. This monograph represents a convenient reference source for those interested in a more complete understanding of the total problem of coronary insufficiency.

DAVID C. SABISTON, JR., M.D.

Pertaining to Ethics

. . . here the ethics of the scientific physician still remains vague and shadowy, it manifests itself in its fully developed form in the doctrine of the Hellenistic Empiricists whose sect was of the sceptic persuasion. The empirical physician therefore, like all sceptic philosophers, accepts the established rules of life which, though by no means representing absolute truth, have the sanction of probability. In accordance with the common aim of men, he practices medicine for the sake of reputation or of money, of neither of which he desires to have too much or too little, but just as much as is adequate and guarantees peace of mind. In his character and behavior he evinces tranquillity and gentleness. In his work he is not given to unnecessary talk, but prefers action; talking much or talking big is the habit of those who, unlike the empiricist and sceptic, believe in speculative theories. In his writings and in his research he is truthful, not intent on winning an argument à tout prix, or on displaying his conceit. On the whole, then, he follows in the wake of the day, relying on indubitable data of sense perception and experience; living thus, he lives like Hippocrates himself who, in the opinion of the sceptics, had of course been a sceptic, and as a sceptic had equalled the fame of Asclepius. . . .—LUDWIG EDELSTEIN (1902-1965): Professional Ethics of the Greek Physician. Bull Hist Med 30: 405, 1956.