

News from the American Heart Association

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Progress, Prospects and Provender

Chairman's Address before the

Council on Arteriosclerosis, American Heart Association

Dallas, Texas, November 12, 1969

by Daniel Steinberg, M.D., Ph.D.

My subtitle is: "Atherosclerosis: How far have we come? Where are we going? And is the government going to let us get there?" Or: "If we think we've come down the road a respectable distance, and think we can go further, if properly supported, and that it is in the national interest to do so, then we'd better start talking to our Congressmen. Now!"

How Far Have We Come?

In preparing this address, I've taken the time to look back and I think we can say, with pride, that we *have* come a long way. Many of us tend to undervalue what has been accomplished. The research worker intensively hammering away at immediate problems is much more concerned with the unanswered questions lying ahead of him—and appropriately so. He tends to be underimpressed by comparison with the relatively small, even if very firm, fields of knowledge lying neatly tilled behind him. Once a principle or a set of facts becomes established and accepted, it tends quickly to be taken very much for granted, and the sense of wonder rapidly fades. Nobody today "oohs" and "ahs" about how few cases of smallpox we had last year;

the dramatic insulin rescue of a case of diabetic coma from the very brink occasions little comment; and our younger colleagues probably don't share my recurrent shock of realization that consumption doesn't very often consume any more.

The Record of Atherosclerosis Research

Let's go back about 25 years to about the time this society was founded. At that time atherosclerosis was still thought by many to be an inevitable accompaniment of "aging." W. C. Hueper and L. N. Katz, among others, still found it necessary to argue that it might not be a necessary accompaniment of aging and that, perhaps something could be done about it. Hueper in *Archives of Pathology*, 1944 wrote: "Because of the undue emphasis on physiologic senescing processes, the solution of the problem of arteriosclerosis has remained for many years in a state of scientific stagnation, a state shared until rather recent years by the problem of cancer, another so-called disease of old age." At that time there still was confusion about whether hypertension and atherosclerosis were simply two aspects of the same disease. In the field of blood clotting, it was hardly necessary to use Roman numerals. You had thromboplastin, thrombin, fibrinogen and calcium, and that was that.

From the Department of Medicine, School of Medicine, University of California, San Diego, La Jolla, California.

Lipids and Atherosclerosis

Let me expand a bit on the progress in an area I'm more qualified to talk about, the area of blood lipids in relation to atherosclerosis. Anitschkow and his rabbit-feeding followers were convinced that experimental atherosclerosis could at least be related to cholesterol levels in the blood, and some clinicians were impressed by individual families in which hypercholesterolemia went hand-in-hand with premature coronary disease. However, the notion that this association might extend to less dramatic situations was not generally accepted. Nor should it have been—it was not yet established. Certainly the notion that there might be something that could be done about it was a novel one and certainly we didn't know just what to do about it. Over the past 25 years we have seen the amassing of the incontrovertible epidemiologic evidence from prospective studies as well as from retrospective studies that there is a very real association. Moreover, we are now in the midst of the most important extension, namely, the demonstration that we can do something about the lipoprotein levels in the blood *and* significantly affect the progress of the disease.

When I graduated from medical school we knew that there was cholesterol in the blood, but the concept of a lipoprotein molecule was quite vague and methods were crude. Beginning with the work of Oncley and of Gofman, a previously inchoate mass of fats and proteins started to resolve itself into a series of progressively more discrete and better understood entities. As methods for the characterization of proteins developed, these were applied to the previously ill-defined protein moieties of the several lipoprotein classes. Isotope techniques were utilized to ascertain the origins and the metabolic fate of both lipid and protein moieties. These have brought the deeper insights illustrated by papers presented at this meeting on the detailed structure and interrelationships of the plasma lipoproteins.

Free Fatty Acids

In 1944 the free fatty acid was regarded as

an unimportant trace lipid component, perhaps an artifact. Obviously, the triglycerides and phospholipids, present in much higher concentrations, must be the vehicle for transport of fat in the body! In 1956, only a little over a decade ago, Robert S. Gordon at the National Heart Institute and Vincent P. Dole at The Rockefeller Institute showed that this relatively minor component of the blood lipids had the astonishingly short half-life of 2 or 3 minutes. It soon became apparent that this was *the* form in which depot fat was mobilized. For the first time it was possible to begin to develop and fully understand the system of lipid transport in the human body. Over the years a very intriguing and complex system of hormonal and metabolic regulation has been elucidated. We still don't fully understand the role of free fatty acids in atherosclerosis, but there is some reason to believe that they may contribute to hyperlipoproteinemia, they may precipitate intravascular thrombosis, and they may even have a primary role in atherogenesis.

Twenty-five years ago the pathway for cholesterol biosynthesis was completely unknown. Schoenheimer was just beginning to apply stable isotopes to the study of biochemistry. Today every graduate student is plagued by the need to fathom the 30-odd reactions by which acetate is converted to cholesterol. The mechanisms of triglyceride biosynthesis, of fatty acid synthesis, of fatty acid oxidation—all are almost totally the products of the last 25 years in research. Having learned these ABC's we were able to begin to unravel the *regulatory* mechanisms that impinge on lipid metabolism and determine steady-state lipoprotein levels. We began to see our way towards pharmacologic approaches to the treatment of hyperlipidemia. The pharmacology textbooks, as recently as fifteen years ago, didn't even contain index references to lipids or cholesterol. Today, Goodman and Gilman includes Dr. Eder's excellent chapter on the subject. Today, the practitioner has a growing armamentarium of drugs that affect lipid metabolism. We hope to have an answer in the course of the next few years from the

National Heart Institute-sponsored Coronary Drug Project as to whether the four drugs under study will prevent coronary heart disease.

I'd like to stress that Konrad Bloch did not undertake to study cholesterol biosynthesis primarily because of its possible relationship to atherosclerosis. He approached it as a scholar intrigued by a difficult question posed by Nature. No more did Lynen, Wakil and Vagelos embark on their studies of fatty acid synthesis primarily because they wanted to cure atherosclerosis. Yet without these basic research contributions we would not be where we are today in designing studies to understand the disordered metabolism in hyperlipoproteinemia, the possible abnormalities in lipid metabolism of arterial walls, or any of the other possible disorders of lipid metabolism that may relate to atherosclerosis.

Diet and Blood Fats

About 25 years ago Groen presented the first evidence that the nature of the diet might influence levels of blood cholesterol. It was established that the *amount* of fat in the diet might have something to do with it, but the full development of the importance of the *nature* of the fat was not appreciated until later. Indeed, there was some early resistance to the idea that the nature of the fat mattered one way or another. The work of Kinsell and Ahrens resolved this and "*polyunsaturated fat*" became part of the lay vocabulary.

The amount of cholesterol in the diet was at first not thought to make any difference and there was a prevailing dogma to that effect. It remained for Connor and Beveridge and others to establish that cholesterol does count. All of these basic nutritional studies led up to the National Diet-Heart feasibility study, and should lead us soon to definitive primary prevention trials if the government lets us go ahead. Meanwhile, we have the already very convincing, although not fully definitive results, of the studies of the New York Anti-coronary Club, of Leren and of Turpeinen in Scandinavia, of Dayton and Pearce in Los Angeles. It is now good medical practice to

treat—and I use the word advisedly—people who have definite hyperlipoproteinemia. In short, we have come in twenty-five years to the point where we are probably preventing a disease that was considered to be an inevitable accompaniment of aging not very long ago.

Other Advances

There are a number of other advances worthy of mention. There is, for example, the brilliant elucidation of the mechanisms for degradation of cholesterol to bile acids, the elucidation of the lipoprotein lipase system, the already promising start toward an understanding of lipoprotein biosynthesis, and still others. I think we have come a gratifyingly long way. We have done so at a pace made possible largely by the liberal and generous Federal support of biomedical research. I have convinced myself, at least, that the interweaving of basic research and of applied research has been absolutely essential. There is good reason to think that it will remain so. I am convinced that the mix of the two *must* be maintained if further progress is going to be what we would like it to be.

Where Are We Going?

I don't propose to try to forecast the future directions of research in atherosclerosis. That would be presumptuous and probably wrong. I am, however, prepared to predict confidently that the pace will be considerably faster over the next twenty-five years. Most of the advances I've referred to have come in the latter half of our quarter century of progress. The acceleration in research productivity is quite apparent from a *quantitative* point of view—more investigators, laboratories, papers, journals, and reviews to help us in the almost hopeless task of keeping up-to-date. From the more relevant *qualitative* point of view, there has been a gratifyingly rapid increase in the sophistication, in the cleverness, of research approaches. Gas-liquid chromatography, thin-layer chromatography, mass spectrometry, electron microscopy and many other advances in methodology have made this possible. I look forward with

excitement to what the next 25 years will bring.

Primarily there is the question of whether we are going to be *allowed* to go in the direction we think we *ought* to go. There seems to be an increasing pressure by some for "*results now*." The quick result, the immediate application, the *relevant*, in short, is much in demand. Let me say at the outset that I am all for crash programs in the right places at the right time. Once you show that polio virus can be grown in tissue culture, you have the makings of a vaccine and a crash development program is logical. Once you have the surgical techniques and the materials with which to replace heart valves, an applied research program to apply the technic to practice is obviously in order. I do not intend to debate the question of basic research versus applied research. That frequently heard debate is seldom helpful because the terms are ill-defined. If you listen carefully, you find that one man uses the term "*basic*" pejoratively, almost synonymous with "*irrelevant*"; the other uses the term "*applied*" equally pejoratively, almost synonymous with "*trivial*." What I do want to stress is my concern that the "*result now*" philosophy may militate against maintaining the proper mix of the two.

What to Worry About

Imagine a Study Section meeting held earlier in this century but in the current climate of opinion. An application by a certain Dr. Lawrence Bragg is under consideration. Listen to the reviewer: "This applicant proposes to bombard a sodium chloride crystal with X-rays. By recording on photographic film the way in which these X-rays are reflected he will try to determine the spacing of the atoms in the crystal. The applicant does not show how this would relate to any other current research or have any immediate application. He has had no previous experience in this area and it doesn't seem to be a very active field of research, although the applicant's father seems to have an interest in the problem. The significance of this research to heart disease or any other health problem is pretty obscure. Frankly, gentlemen, I am

much more impressed by the application we discussed earlier today proposing to test whether vitamin C treatment is of value against the scourge of poliomyelitis." The priority granted was 350; the application was approved but not funded. Now, if you'll forgive the whimsy, that's the kind of thing we may need to worry about. If we don't support the Bragg's of our era, we won't have any Watsons and Cricks in our future. We as a Council are on record affirming that *basic* research continues to be essential as we work towards a fuller understanding of atherosclerosis. However, I don't think that many members of Congress are so convinced. Insights that may seem self-evident to you and to me are really not that apparent to the nonscientist. The elusive and often unpredictable relation between basic research and practical application is difficult to convey succinctly. Perhaps that is why justifications for research budgets have tended to stress practical results, in hand or promised, rather than the role of basic science. Each of us who has the opportunity, or can make the opportunity, should try to visit his own Congressmen, discuss with them his own research, and describe the importance and the scope of the problem of supporting basic as well as applied medical research.

Will the Government Help?

I want to grapple more directly with the matter of overall support for medical research in this country, the way that support is already cut and is threatened with still further cuts. *Is the Government going to let us get there?* I don't know how many dollars we should be spending on medical research. I am not going to try to plead for any definite figure because I am not qualified. But I am qualified to comment on the scene as I see it and I don't like what I see. Beyond the potentially drastic effects of budget cutting on specific research programs and progress I see a potential long-term threat to our impressively effective, mutually interdependent systems for medical teaching, medical research and medical care. These systems have grown and matured astonishingly since World War II and the

nutrition for that growth—the provender for progress—has been predominantly Federal financing. If the Federal government continues to turn off its support, there is almost no chance that anybody else is going to pick up the bill. Support at the local level or through private and voluntary agencies, while very important, is and must remain too limited. The fabric of our vigorous medical research and medical training activities has been woven at the Federal level and will certainly become unravelled if the support from Washington fails. Now it is not going to lurch to a sudden and complete stop. But how do you detect the beginnings of erosion and when do you do something about it? There seldom is a sharp division in time, a clear turning point to signal transition from preeminence to second-class status. The time and turning point may not be far ahead. Current Federal support for medical research, corrected for the declining buying power of the dollar, has been estimated to be 25% less than it was in 1966. The total dollar figure has been held at about the same level but, because of steadily rising costs, standing still means slipping backwards in this case. It seems to have taken the scientific community a couple of years to come to the realization of just what was happening, which underscores my concern about “creeping erosion.”

Research Support and the Medical Center

The last point I want to make is one I had to leave the NIH to appreciate. Having recently immersed myself deeply in the complexities of developing and operating a medical school, I can see with perhaps a fresh eye something fundamentally important about the structure of the academic center of medicine. This is probably familiar to most of you and yet it is something the legislator may not easily understand. And that is the absolute interdependence of the several functions—at least 7—of a modern medical center: 1) medical student training; 2) house staff training; 3) continuing education for physicians; 4) delivery of medical care; 5) graduate student training; 6) postgraduate research and specialty training; and, 7) research.

I submit that support for research is really support for the *total* structure that I've outlined. To reduce that support is to weaken the whole structure. It simply is not valid to assume that one can surgically excise items marked “research” and that the remaining six functions will carry on nicely. What has been labeled support for research, and is that primarily, is also *de facto* vitally important to the schools of medicine in their role as health care delivery centers, as physician-producing centers, as continuing education centers, as research-training centers. Narrow the base of research support and you weaken and may even bring down the whole structure.

For example, the Principal Investigator supported on a research grant for 35% of his time is the same man who teaches medical students on Monday and Friday. The laboratory in which he does his research is the same laboratory in which the medical student does his elective research or spends a summer in research. The scintillation counter the PI gets through his grant is the same one the medical student, the graduate student and the post-doctoral fellow use as they learn and try their wings in research. The 35% PI is also the man who runs the Metabolic Clinic on Wednesday, talks to Grand Rounds at a local community hospital on Thursday or contributes a lecture to a postgraduate seminar for physicians.

Research and Teaching

What may be pigeonholed as “research support”—and is that primarily—is also highly important support for the medical school in all of its 7 functions. Some may respond to this—“Well, why not free up that 35% of time devoted to research and give the professor more time for teaching and patient care?” That would represent a giant step backward for two reasons. First, as I have indicated, the research project supported by that grant plays an integral role, beyond the professor's own involvement, in creating the milieu in which the other six functions can thrive. Second, the quality of the faculty and the kind of training they can offer hinges on the marriage of research and teaching.

Many wise men have recognized the inseparability of research and training, beginning with Flexner. In his landmark report of 1925 he wrote: “. . . I have tried to show throughout the impracticability of drawing a line between medical education and medical research.” Again: “. . . efficient and progressive training is procurable only where original scientific activity is in progress.” This is certainly not to say that each faculty member will or should have the same involvement in research, as Professor Julius Comroe has pointed out. But the medical school as a whole should reflect a judicious balance of the two. In fact, this is what distinguishes today’s medical schools from those Flexner recognized as so outrageously inadequate in 1925. So, aside from the broader consequences of declining Federal support for research, there is the specific danger of a retrogression to the pre-Flexner milieu in our medical schools. If research is downgraded, the image of the academic career will change and, predictably, a different breed of young man will find his way to it. Flexner said: “. . . universities must in the long run be conducted by human beings, who, however able and devoted, will, if pressed too hard, be compelled to seek another sphere of activity. . . .”

We are constantly under pressure to increase the flow of trained physicians. Existing schools are increasing their class sizes and many new schools are being established. Where is the qualified faculty going to come from? It seems that training and research funds are being cut *pari passu* with expansion of the medical schools’ responsibilities. This anomalous combination of trends seems tailor-made to produce mediocrity.

I began with a review of 25 years that in retrospect shine with accomplishment and excitement. I hope it will not be the role of some future Chairman of this Council to call for another Flexner report. I hope we won’t look back to ask when the erosion began and find that it was about 1969.

What Can Be Done

What can we do? We must try to tell our story in Washington. But the story is not an

easy one to convey. Each one of us individually has to do what he can—now and over the years to come. Letters and personal visits to Congressmen and Administration officials, public lectures, cooperation with other scientific societies—whatever you can do. The American Heart Association staff will be pleased to advise on request.

Let me close with a final quote from Flexner’s summing up of 1925 that seems peculiarly apt in 1969: “Our own resources, heavily taxed in comparison with a previous era, are far from exhausted. (The Department of Defense budget exceeds seventy billion dollars and the National Aeronautics and Space Administration budget exceeds four billion dollars.) A good case must indeed be made out for every further step. (The national systems for expert review continue to work amazingly well and insure that money is spent well.) But, on the other hand, excessive caution may defeat its own purpose. Research involves risk and waste. If only a small proportion of investigations bear fruit, the harvest will richly repay.”

Scientific Sessions Abstracts Deadline is June 5, 1970

June 5, 1970 is the deadline for submitting abstracts of papers and applications for scientific exhibits and cardiovascular films to be presented at AHA’s 1970 Scientific Sessions. The four-day meeting is scheduled from Thursday, Nov. 12 through Sunday, Nov. 15 in Convention Hall, Atlantic City, N. J.

To be considered for presentation, papers must be based on original investigations in the cardiovascular or related fields. Summaries of the project’s results and the investigator’s conclusions should be included in the abstract and submitted on official AHA forms.

Recently produced cardiovascular films will be selected for presentation by the Association’s Subcommittee on Films. A full day will be devoted to their showing.

Space for industrial exhibits may be requested through Steven K. Herlitz, Inc., 850 Third Avenue, New York, N. Y. 10022.

Official forms for submitting abstracts, films and scientific exhibits are obtainable from the Department of Medical Education, AHA, 44 E. 23rd St., New York, N. Y. 10010.

Affiliates Donate \$229,080 To Aid National Research

Affiliates and chapters of the American Heart Association contributed \$229,080 in supplementary support of the Association's national research program for fiscal 1969-70.

Made through AHA's Cooperative Research Program, the gifts help to underwrite cardiovascular investigations which the National Office budget could not otherwise finance. The contributions are in addition to sums regularly assigned by affiliates in support of national research projects.

The contributions and Grants-in-Aid and Fellowships they will help support, are as follows:

California Heart Association and its local organizations in Bay Area-San Francisco, Central Missions Trails, Long Beach, Santa Barbara and Santa Clara, a total of \$72,760 to Josefina Caravaca-Trujillo, Charles Cochrane and Frank Huennekens, Scripps Clinic and Foundation; Guiseppe Inesi, University of the Pacific; Richard Lewis, Veterans Administration Hospital; Eugene Dong, William Angell and Raymond Clayton, Stanford University; and Richard Cleveland, Harbor General Hospital.

Heart Associations in the Canal Zone and District of Columbia respectively contributed \$1,500 to Paul Johnson, University of Arizona; and \$9,000 to Peter Kot, Georgetown University. Florida chapters in Palm Beach and Suncoast, a total of \$25,300 for Ira Gessner and Seymour Halbert at the University of Florida. Idaho Heart Association, \$10,000 for Alvin Merendino, Frank Parker and Wade Volwiler, all at the University of Washington.

The Sedgwick County (Kan.) Association donated \$1,500 for Darrell Fanestil, University of Kansas; Missouri Heart Association, \$7,500 for Lawrence Sherman, Washington University; and Montana Heart Association

\$1,863 for Giles Cokelet at Montana State University.

Chapters of New York State affiliates in Dutchess County, Mid-Hudson, Northern New York and Southern Tier, New York, awarded a total of \$14,400 to Jules Cohen and Herbert Marx, University of Rochester; P. D. Papahadjopoulos and David Schnatz, State University of New York at Buffalo; Monica Bishop, Albany Medical College; and Richard Guillory, Cornell University.

Also, North Carolina Heart Association, \$10,590 to Herbert Harned, University of North Carolina; Steven Quarfordt, Veterans Administration Hospital; and Eugene Renkin, Duke University. Ohio's Northwestern division, \$23,667 to Virginia Donaldson, University of Cincinnati; Philip Hall, Cleveland Metropolitan General Hospital; and Thomas Lloyd, Case Western Reserve University.

Washington State Heart Association and its Northeastern division contributed a \$52,000 total for John Glomset, John Luft, Alvin Merendino, Frank Parker, Robert Van Citters and Eleonore Tenckhoff, all at the University of Washington; and Robert Hillman, at Kings County Hospital.

5-Day Cardiology Course In Atlanta, May 11-15

A "5 Days of Cardiology" postgraduate course on the subject of *Cardiology Today* will be held in Atlanta's Grady Memorial Hospital on May 11-15, with J. Willis Hurst as course director.

The course is being presented by AHA's Council on Clinical Cardiology and the Department of Medicine of Emory University School of Medicine, in cooperation with the Georgia Heart Association.

In addition to the Emory University faculty, a guest faculty of 15 national and international experts will discuss a variety of topics, including "The Anatomy and Pathology of the Heart," "Physical Diagnosis of the Cardiovascular System," "Congenital Heart Disease," "Rheumatic and Other Valvular Heart Disease," "Coronary Atherosclerotic Heart Dis-

ease," "Hypertension and Renal Disease," "Pulmonary Heart Disease," "Pharmacology of Cardiovascular Drugs," and "Other Forms of Heart Disease."

Registration fees for the course are \$125 for Fellows and Members of the Council on Clinical Cardiology and \$165 for non-members. The fee includes luncheon on each of the five days.

Registration forms may be obtained from AHA's Department of Medical Education, 44 E. 23rd St., New York, N. Y. 10010.

Volumes 27-28 Issued In Monograph Series

Two new booklets have been issued in the Association's Monograph Series as follows:

Volume 27, "Research on Acute Myocardial Infarction," reports on a symposium to identify and promulgate promising concepts for investigation in the still unknown areas of the disease. The many disciplines represented produced promising ideas for the direction of research and reduction of deaths. The volume was edited by Stuart Bondurant.

Volume 28, "Mass Field Trials of the Diet-Heart Question—Their Significance, Timeliness, Feasibility and Applicability," is an assessment of seven proposed experimental designs by the National Heart Institute's Diet-Heart Review Panel, chaired by Edward H. Ahrens.

The new volumes may be purchased through local Heart Associations or from the Association's Central Office, 44 E. 23rd St., New York, N. Y. 10010.

New Editor Named for Circulation Research

The appointment of Dr. Robert M. Berne of Charlottesville, Va. as editor of the Heart Association journal, *Circulation Research*, beginning with the issue of January, 1971, has been announced.

Dr. Berne, Professor of Physiology and Chairman of the Physiology Department, University of Virginia School of Medicine, will succeed Dr. Julius H. Comroe, Jr. of San

Francisco, whose term expires December 31, 1970.

Meetings Calendar

1970

May 2-3: American Federation for Clinical Research, Atlantic City. James E. Bryan, 2011 Eye St., Washington, D. C. 20006.

May 11-15: **5 Days of Cardiology (Cardiology Today)**, Course Director: J. Willis Hurst, Atlanta. Medical Education Dept., AHA, 44 E. 23rd St., New York 10010.

May 15: Scientific Sessions (AHA Council on Clinical Cardiology, San Diego County Heart Ass'n., California Heart Ass'n.), Coronado, Cal. Dr. Rodman Starke, California Heart Ass'n., 1370 Mission St., San Francisco 94103.

May 21-22: Symposium (Current Concepts of Essential and Renal Hypertension: Pathogenesis Evaluation, Treatment and Prognosis), Course Directors: Albert A. Brust, Paul Kezdi, Dayton, Ohio. Medical Education Dept., AHA, 44 E., 23rd St., New York 10010.

June 21-25: American Medical Association (Annual Meeting), Chicago. Dr. Ernest B. Howard, 535 N. Dearborn, Chicago 60610.

July 15-17: **3 Days of Cardiology (ECG and Cardiovascular Drugs)**, Course Directors: Peter M. Yurchak, Dean T. Mason, Henry J. L. Marriott, Montreal. Co-sponsor, Canadian Heart Foundation. Medical Education Dept., AHA, 44 E. 23rd St., New York 10010.

August 2-6: National Medical Association, Atlanta. Samuel C. Smith, 520 W. St., N. W., Washington, D. C. 20001.

August 24-27: American Hospital Association, Chicago. Dr. Edwin L. Crosby, 840 N. Lake Shore Dr., Chicago 60611.

September 25-October 1: American Academy of General Practice, San Francisco. Mac F. Cahal, Volker at Brookside, Kansas City, Mo. 64112.

September 29-30: Basic and Clinical Pharmacologic Concepts of Digitalis Action, Columbus, Ohio. AHA Council on Clinical Cardiology, Ohio State Univ. Medical College, Central Ohio Heart Ass'n., AHA Ohio Affiliate. Dr. Arnold M. Weissler, Ohio State University Hospital, 410 West 10th Ave., Columbus 43210.

October 5-7: **3 Days of Cardiology (Life-Threatening Cardiovascular Disorders: Pathophysiology and Management)**, Course Director: Oglesby Paul, Chicago. Co-sponsor, Chicago Heart Association. Medical

Education Dept., AHA, 44 E. 23rd St., New York 10010.

October 12-16: American College of Surgeons (Clinical Congress), Chicago. Dr. C. R. Hanlon, 55 E. Erie, Chicago 60611.

October 12-17: Canadian Heart Foundation (Annual Meeting), Ottawa. Dr. John B. Armstrong, 270 Laurier Ave. W., Ottawa 4, Canada.

October 25-30: American College of Chest Physicians, Los Angeles. Dr. Alfred Soffer, 112 E. Chestnut, Chicago 60611.

November 10-11: AHA Council on Arteriosclerosis (Annual Meeting) Atlantic City. Dr. Alfred M. Bennett, AHA, 44 E. 23rd St., New York 10010.

November 12-17: American Heart Association, Scientific Sessions, Nov. 12-15; Annual Meeting, Nov. 16-17, Atlantic City. AHA, 44 E. 23rd St., New York 10010.

November 29-December 2: American Medical Ass'n. Clinical Convention, Boston. Dr. Ernest B. Howard, 535 N. Dearborn, Chicago 60610.

December 2-4: 3 Days of Cardiology (Electrocardiography), Course Director: Charles E. Kossmann, Memphis. Co-Sponsors, Univ. of Tennessee College of Medicine, Tennessee Heart Ass'n. Medical Education Dept., AHA, 44 E. 23rd St., New York 10010.

December 10-12: Cardiovascular Seminar, (Coronary Artery Disease), Miami. AHA Council on Clinical Cardiology, Univ. of Miami School of Medicine, Florida State Board of Health, American Academy of General Practice, Heart Ass'n. of Greater Miami, Florida Heart Ass'n. Heart Ass'n of Greater Miami, 5080 Biscayne Blvd., Miami 33137.

1971

February 3-7: American College of Cardiology, Washington, D. C. Wm. D. Nelligan, 9650 Rockville Pike, Bethesda, Md. 20014.

March 28-April 2: American College of Physicians, Denver. Dr. E. C. Rosenow, Jr., 4200 Pine, Philadelphia 19104.

April 12-16: Federation of American Societies for Experimental Biology, Chicago. J. F. A. McManus, 9650 Rockville Pike, Bethesda, Md. 20014.

May 1-2: American Federation for Clinical Research, Atlantic City. James E. Bryan, 2011 Eye St., N. W., Washington, D. C. 20006.

Abroad

1970

May 11-13: European Society for Experimental Surgery (5th Congress), Venice. Dr. T. Longo, Via Lamarmora 11, Milan, Italy 20122.

June 9-12: Conference on Biochemistry of Lipids (14th Int'l), Lund, Sweden. Prof. Bengt Borgstrom, Lund, Sweden.

August 3-7: International Congress on Diseases of the Chest (11th), Lausanne, Switzerland. American College of Chest Physicians, 112 E. Chestnut, Chicago 60611.

August 22-September 8: 4 Cities of Cardiology (Copenhagen, Stockholm, Uppsala, Oslo). Medical Education Dept., AHA, 44 E. 23rd St., New York 10010.

August 23-September 4: International Teaching Seminar on CV Epidemiology (3rd), British Isles. Dr. Jeremiah Stamler, Chicago Civic Center, Room LL 139, Chicago 60602.

September 1-5: International Congress of Angiology (7th), Liege, Belgium. Dr. J. Lambert, 59 Boulevard de la Constitution, Liege, Belgium.

September 6-12: World Congress of Cardiology (VIth), London. The Conference Center, 43 Charles St., Mayfair, London S.W. 1, England.

September 7-11: Transplantation Society (3rd Int'l Congress), The Hague, Netherlands. Holland Organizing Center, 16 Lange Voorhout, The Hague, Netherlands.

1971

January 2-21: American College of Surgeons, San Juan, Caracas, Panama City. A.C.S. 55 E. Erie, Chicago 60611.

May 27-29: International Cardiac Surgical Conference, Melbourne, Australia. Dr. Graeme Sloman, Royal Melbourne Hospital, Grattan St., Parkville, Victoria, Australia.

June 14-18: European Association of Radiology (2nd Congress), Amsterdam. Holland Organizing Centre, 16 Lange Voorhout, The Hague, Netherlands.

September 9-11: International Cardiovascular Society (10th Int'l Congress), Moscow. Dr. Allan D. Callow, 171 Harrison Ave., Boston 02111.