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CARL F. SCHMIDT
artificial valvular replacement for diseased aortic valves is presented. Twenty-four factors occurred in 15 patients which were responsible either alone or in combination for the deaths. These factors fell into five main groups related to the patient, the heart, the myocardial protection, the general body protection, and the valve. Most of these factors contributing to death are preventable. Therefore, the over-all operative mortality of 16 per cent should be materially reduced in the future.

References

"The Usefulness of Useless Knowledge"

The marvel of beholding for the first time a fresh aspect of nature fascinates the investigator and, even through privation and struggle and repeated disappointments, the possibility tends to hold him strictly to the search. This single-mindedness in striving for new knowledge involves a large degree of neglect of the motives for money-getting. After all, new knowledge—knowledge in its unprofitable infancy—obviously does not possess commercial value. The vast majority of mankind are well satisfied with what they know. There is no demand from them that their relative ignorance be increased by further additions to the accumulated information available to the race. During nearly twenty years the Dutch botanist, De Vries, investigated the origin of variations in plants. His discoveries threw much light on the processes of biological evolution. If money were the motive, who would labor twenty years in order at the end to publish a book which only university libraries and a few meagerly paid biologists would care to buy?

No intelligent person would for a moment think that research in "pure" science, which has been motivated by personal curiosity and which, though satisfying that curiosity, has not resulted in immediately useful discoveries, is destined to have little or no economic value. There are too many examples all about us illustrating the fact that increased knowledge of nature yields increased power over her processes. The mathematical predictions of Maxwell and the experiments of Hertz made possible the elaborate modern development of wireless transmission which brings news and entertainment to myriads of homes and protects the lives of travelers on land and sea. The two men were not concerned with possible commercial value of their studies. The motive impelling them was the scientific motive, the desire for understanding. Such men may be grateful that accumulated wealth gave them leisure to carry on their investigations, free from the worries of uncertain livelihood; but they would look upon eagerness for money without envy. This attitude should not be regarded as implying a claim of moral superiority, for the investigator is in the happy position of doing his specially chosen work and receiving a livelihood in addition. This livelihood is not lavish, to be sure; if it is sufficient to meet the simple requirements and tastes of the investigator and his family, it is enough.—WALTER B. CANNON, M.D. The Way of An Investigator. New York, W. W. Norton & Company, Inc., 1945, p. 206.
ANGIOCARDIOGRAPHY OF INFERIOR VENA CAVA

from the right atrium rather than directly through the inferior vena cava, variations owing to the phases of the cardiac cycle, and variations in projection and position. However, in the absence of previously reported inferior vena caval measurements during life, the data herein presented are useful.

Acknowledgment

The authors are grateful for the statistical assistance provided by Dr. Melvin S. Schwartz, Assistant Professor of Biometrics in Public Health at Cornell University Medical College.

References


Galvani and the Electrophysiology of Muscular Contraction

It was in the course of studying the effects of electricity in bright daylight that Galvani made his most valuable discovery. The description of this experiment in one of his manuscripts is worthy of quotation. "Accordingly, on an evening early in September 1786, we placed some frogs horizontally on a parapet, prepared in the usual manner by piercing and suspending their spinal cords with iron hooks. The hooks touched an iron plate; behold! a variety of not infrequent spontaneous movements in the frog. If, when they were quiescent, the hook was pressed with the finger against the iron surface, the frogs became excited almost as often as this type of pressure was applied."

At the beginning of the Third Part of the Commentary (the most important part) it is interesting to note that while the manuscript said that the hook piercing the spinal cord of the frog was made of iron (of the same metal as the railing on which the animal was placed), in the printed copy the small instrument is described as being made of copper. Galvani noted that the response was more readily obtained with a bimetallic arc than when using a single metal. Subsequently, in the Commentary, he stressed the greater efficacy of heterogeneous over homogeneous arcs, which are the basis of what later came to be called Galvanism and is today called electrodynamics.—Giulio Pupilli. Commentary on the Effect of Electricity on Muscular Motion. By Luigi Galvani. Translated by Robert Montraville Green, M.D., Cambridge, Massachusetts, Elizabeth Licht, Publisher, 1953, p. xi.
The Environment

The world of our senses is a world of matter and energy, space and time. After centuries of philosophical and scientific study, these, the very logical elements of science, are still without a final description.—LAWRENCE J. HENDERSON. The Fitness of the Environment. New York, The Macmillan Co., 1924, p. 8.


The University and The Hospital

After all, it is a great laboratory in which we collect for rectification the experiments which nature makes upon us. The study of disease is just as much a part of university work as is the study of mathematics, and a close affiliation of the two institutions is the best guarantee of that combination of science with practice which it is the right of people at the present day to demand.—Sir William Osler. Aphorisms From His Bedside Teachings and Writings. Edited by William Bennett Bean, M.D. New York, Henry Schuman, Inc., 1950, p. 46.

As a clinician, meaning thereby a man who understands the course, the prognosis and the treatment of disease, Sydenham had no rival in his day and I doubt whether later ages have produced one. When he describes the gout or the smallpox, his wordpictures are unsurpassable.—David Riesman, M.D. Thomas Sydenham, Clinician. New York, Paul B. Hoeber, Inc., 1926, p. 23.


Religio Medici

And thus I call the effects of Nature the works of GOD, Whose hand and instrument she only is; and therefore to ascribe His actions unto her, is to devolve the honour of the principal agent upon the instrument; which if with reason we may do, then let our hammers rise up and boast they have built our houses, and our pens receive the honour of our writings.—Sir Thomas Browne. Religio Medici. Edited by W. A. Greenhill, M.D. London, MacMillan and Co., Ltd., 1950, p. 28.


It has somewhere been said that true science is like a flowering and delectable plateau which can be attained only after climbing craggy steeps and scratching one's legs against branches and brushwood. If a comparison were required to express my idea of the science of life, I should say that it is a superb and dazzlingly lighted hall which may be reached only by passing through a long and ghastly kitchen.—Claude Bernard. An Introduction to the Study of Experimental Medicine. New York, The Macmillan Company, 1927, p. 15.
4. An approximation commonly used to express these relative contributions is the equation developed by Goldman\(^3^8\) and by Hodgkin and Katz.\(^3^9\) If movements of Cl may be assumed to be passive, this equation takes the form,

\[ V_m = -61.5 \log \left( \frac{P_K [K]_i + P_{Na} [Na]_i}{P_K [K]_o + P_{Na} [Na]_o} \right) \]

in which \(V_m\) is the electrical potential difference across the cell membrane at 37\(^\circ\)C, \([K]_i\) and \([Na]_i\) are the intracellular K and Na concentrations, \([K]_o\) and \([Na]_o\) the corresponding extracellular concentrations, and \(P_K\) and \(P_{Na}\) the permeabilities of the membrane to K and Na, respectively.

5. Changes in the apparently small electrical potential differences across cell membranes of excitable tissues may alter the permeability of the membrane to ions because the short distances across which such potential differences exist set up relatively large forces. The force acting on a charged particle in the membrane is called an electric field and may be approximated by the electrical potential difference divided by the thickness of the membrane. For an electrical potential difference of 100 mV across a cell membrane 100 Å in thickness this calculation gives a force of 100,000 volts per centimeter. In an electric field of this magnitude positively charged molecules within the substance of the membrane will tend to move toward the negatively charged face of the membrane and negatively charged molecules will attempt to migrate to the positively charged face. Since the charged molecules making up the substance of the membrane are fixed, they are prevented from moving in these directions. Such molecules, however, may have a certain amount of freedom to rotate about an axis. This freedom permits them to orient themselves so that their fixed charge groups tend to point toward the face of the membrane toward which they would migrate if they were free to move. Variations in the electrical potential difference may alter this orientation of fixed charges, suggesting a possible mechanism for permeability changes.

If our feeling constantly puts the question why, our reason shows us that only the question how is within our range; for the moment, then, only the question how concerns men of science and experimenters. If we cannot know why opium and its alkaloids put us to sleep, we can learn the mechanism of sleep and know how opium or its ingredients puts us to sleep; for sleep takes place only because an active substance enters into contact with certain organic substances which it changes. Learning these changes will give us the means of producing or preventing sleep, and we shall be able to act on the phenomenon and regulate it at pleasure.—Claude Bernard. *An Introduction to the Study of Experimental Medicine.* New York, The Macmillan Company, 1927, p. 82.


Galvani and the Electrophysiology of Muscular Contraction

The most outstanding proof of his strength of character was shown by Galvani during the final year of his life. When an edict of the Cisalpine Republic, created by Napoleon, ordered that all public officials take an oath of allegiance to its constitution, this great patriot refused because he would not subscribe to a formula so contrary to his principles: the oath was atheistic. By refusing to take the oath he lost all his offices at the University and the Institute in April 1798 which reduced him to poverty in his last days. Pietro Giordani wrote that “he neither suffocated the voice of conscience, nor made it subservient to profit and ambition, but accepted poverty, losing without protest those academic offices which were his very bread.” His fellow citizens, and specially Giovanni Aldini, appealed to the Government to remedy this injustice, and Galvani was restored to his previous offices as emeritus professor, but the decree was announced when death was about to take him. He died at 61 on December 4, 1798, in the house of his birth to which he had returned to live with his brother following the death of his wife.—Giulio Pupilli. Commentary on the Effect of Electricity on Muscular Motion. by Luigi Galvani. Translated by Robert Montraville Green, M.D. Cambridge, Massachusetts, Elizabeth Licht, Publisher, 1953. p. xix.
Applications for AHA Grants Are Due by November 1

November 1, 1962 is the deadline for submitting applications to the American Heart Association for Grants-in-Aid for the fiscal year beginning July 1, 1963. Grants are made to non-profit institutions in direct support of a particular investigator for a specific program of research under his direction. Awards are in support of research in the cardiovascular field or basic sciences for periods up to five years.

Application forms are obtainable from the Director of Research, American Heart Association, 44 East 23rd Street, New York 10, New York.

AHA Scientific Sessions

Abstracts of 193 original scientific papers, to be presented at the 35th annual Scientific Sessions of the American Heart Association from October 26-28 in Cleveland, are included in Part II of this issue of Circulation (October).

Papers will be presented during six sessions on clinical cardiology and concurrent scientific sessions on various aspects of cardiovascular research. Additional presentations will be made at panels, symposia and lectures throughout the three-day meeting.

As in the past, Cardiovascular Conferences for small group discussions of timely problems will be held on Saturday evening. Tickets, required for each Conference, will be available without charge from the registration desk beginning Friday morning. For those unable to obtain tickets, an open clinical pathologic conference is being held concurrently on Saturday evening.

Advance copies of the Scientific Sessions program will be sent to advance registrants.

Associations Pledge $174,000 To Aid AHA National Research

State and local Heart Associations had pledged a record total of nearly $174,000 by August 1, 1962, in supplementary support of the AHA national research program. These sums are over and above amounts regularly assigned for research support nationally. They will help underwrite grants which have been approved by the Association's Research Committee but which could not otherwise be financed for lack of funds.

Also as of August 1, a total of $41,695 was received from Heart Associations in support of the program. In addition to those previously reported, sums have been donated as follows:

Orange County (New York) Heart Chapter, $5,500, Schoharie County (New York) Heart Chapter, $100 and Tompkins County (N. Y.) Heart Chapter, $500 in partial support of the grant to Dr. David F. Brown, Albany, New York, Medical College; Vermont Heart Association, $2,405 to help support the Established Investigatorship of Dr. Arthur J. Samuels, Dartmouth Medical College, Hanover, New Hampshire; Florida Heart Association, $6,000 and its chapters in Orange County, $3,000, Broward County, $1,000 and Suncoast Heart Association, $1,000, in full support of a two year grant to Dr. Clyde M. Williams, University of Florida College of Medicine, Gainesville; and Mon-
tana Heart Association, $4,450 in partial support of a grant to Dr. V. L. van Breeemen, Mercy Institute for Biomedical Research, Denver.

Also, the Heart Association of Palm Beach and Martin Counties, Florida, contributed $5,360 in partial support of grants to Drs. Leon I. Goldberg, Emory University Medical School, Atlanta, and total support of Henry D. McIntosh, Duke Medical Center, Durham, North Carolina. The Georgia Heart Association donated $10,400 to help support Dr. Goldberg’s grant and grants to Drs. Gerhard A. Brecher, also at Emory University, and Wayne V. Greenberg, Medical College of Georgia, Augusta.

Council on Arteriosclerosis

Eugene M. Landis, M.D., of Harvard University, will deliver the Lyman G. Duff Memorial Lecture on “Interstices and Gaps in the Capillary Wall; Illustrated by Motion Picture Studies,” at the Annual Meeting of the Association’s Council on Arteriosclerosis on Wednesday, October 24. The meeting is scheduled from October 24-25 in the Hotel Manger, immediately preceding the American Heart Association’s annual Scientific Sessions in Cleveland.

The Council’s annual business meeting on October 25 will be addressed by Campbell Moses, M.D., of Pittsburgh, Chairman of the Council.

All interested individuals are invited to attend the Council sessions.

Meetings Calendar


November 1: American Federation for Clinical Research, Sectional Meeting, Chicago. Wm. R. Drucker, Lakeside Hospital, Cleveland, Ohio.


November 25-30: Radiological Society of North America, Chicago. M. D. Fraser, 1744 S. 58th St., Lincoln, Nebraska.


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March 29-31: American Society of Internal Medicine, Denver. Mrs. A. V. Whitehall, 3410 Geary Blvd., San Francisco 18, California.

March 29-April 5: American Academy of General Practice, Chicago. Mac F. Cahal, Volker at Brookside, Kansas City 12, Missouri.

Abroad

October 7-13: Fourth World Congress of Cardiology, Mexico City. I. Costero, Secretary General, Ave. Cuauhtemoc 300, Mexico 7, D. F.

November 11-16: World Medical Association, New Delhi, India. H. S. Gear, 10 Columbus Circle, New York 19, New York.

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