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HUMAN NATURE IN SCIENCE[1]

By Dr. JOHN K. WRIGHT

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THE Executive Committee has asked that emphasis be placed throughout this session of the association on "the indispensability of science for the future of civilization." This seems a little like putting the cart before the horse. If civilization were to disappear there would be no science, and science will contribute nothing to civilization if men of science fail to cultivate civilized qualities and respond to civilized motives. Hence, my talk to-day will bear, rather, on "the indispensability of civilization for the future of science." I shall invite your consideration of certain relationships between human nature, both individual and collective, on the one hand, and science on the other, and I shall illustrate some of these relationships with particular reference to geology and geography.

During their careers scientists acquire by bitter and sweet experience considerable information—even wisdom—concerning the influence of human nature on science. This they pass on to younger colleagues, who now and then give heed to it. Perhaps more heed would be given if the information itself were more "scientific." Actually most of it is gained hit or miss. Scrappy, unorganized and unsystematic, it breeds "pet theories."

The question of how human nature affects science is surely important enough to warrant a less personal and more systematic approach. Large quantities of data on the subject are available in published and unpublished documents relating to the history of science. From analysis of these data principles could be derived and illustrative examples could be drawn that would offend no one, as well might the use of examples taken from contemporary observation. Indeed, among the most valuable of the lessons to be learned from the history of science are those concerning the ways in

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[1] Address of the retiring vice-president and chairman of the Section (E) on Geology and Geography of the American Association for the Advancement of Science (1943), Cleveland, September 13, 1944.

tion under action of physical, chemical or biological agents, etc. The detailed account of these investigations will be published elsewhere.

L. Marton

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A WORKING MODEL OF THE HUMAN CIRCULATION

The circulation schema here pictured and described has proved helpful in explaining the complexities of the circulation to beginners in physiology. Its construction is simple and inexpensive[1] and its relation to the human body is much more direct than that of commercial models.

Most of the essential features are visible in the illustration. The heart consists of four rubber bulbs operated by cross-bars attached to a central rod, the sequence of events being as in the heart itself. Small light bulbs flash on at the proper times to represent the activation of the S. A. and A. V. nodes. The connection of blood vessels with heart is through one-way valves, glass flutter valves being employed which can be seen in operation. Glass tubing is used for blood vessels, the fluid being appropriately colored, methylene blue for venous and Congo Red for arterial blood. Peripheral resistance is obtained by stop-cocks representing arterioles; in the systemic circulation one serves muscle tissue, the other is located in the splanchnic region. Anatomic regions of the body are painted in lightly, as background, on the panel. Beyond the arterioles a capillary network is indicated and by a proper arrangement of the tubes the emerging blood has the opposite color of that entering, *i.e.*, changes from blue to red in the pulmonary, and from red to blue in the systemic circulation. The aorta is cannulated and connected to a manometer writing on a kymograph drum. Heart sounds are reproduced by electrical contacts and a loud speaker.

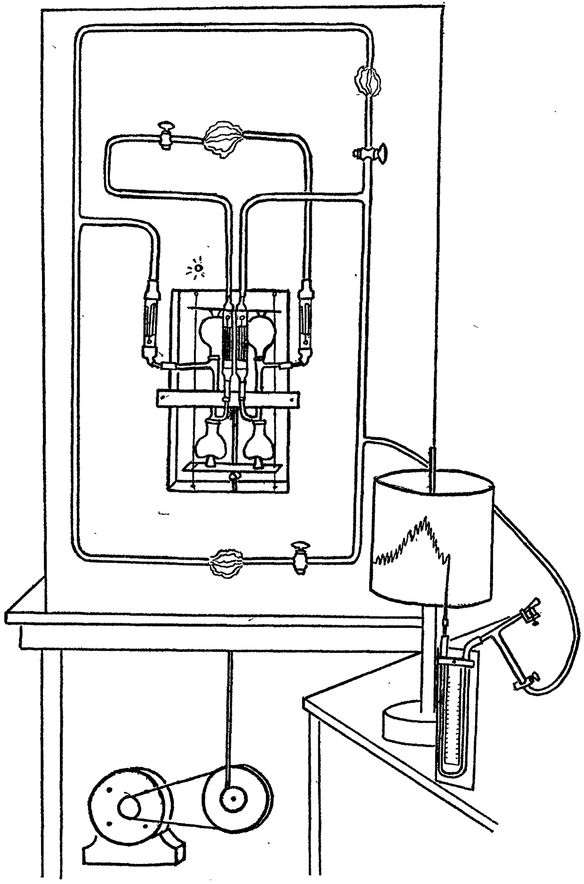

FIG. 1. This drawing shows how the effects of a simulated injection of adrenalin may be demonstrated. The motor has been speeded up and the stop-cocks in the systemic circulation narrowed.

Among the physiologic events which can readily be demonstrated are the sequence of events in the cardiac cycle, the details of the circulation and the effect of various factors on the blood pressure, such as alterations in the cardiac output, variations in the peripheral resistance, the shunting of blood from visceral regions to muscles during exercise, the loss of blood in hemorrhage, etc.

It is evident that, except for motor, kymograph and loud speaker, no expensive items are required. The motor can be dispensed with, manual operation being satisfactory, a kymograph is available in most laboratories and a loud speaker can be found in almost any basement.

Fred E. D'Amour

University of Denver

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[1] The device may be purchased from the Denver Fire Clay Company.

BOOKS RECEIVED

Anson, M. L. and John T. Edsall. *Advances in Protein Chemistry.* Volume I. Illustrated. Pp. xi + 341. Academic Press, Inc. $5.50. 1944.

Crum, Roy W. and Fred Burggraf. *Proceedings of the Twenty-Third Annual Meeting of the Highway Research Board.* Illustrated. Pp. vii + 606. Highway Research Board, Washington (25), D. C. 1944.

Exell, Arthur Wallis. *Catalogue of the Vascular Plants of S. Tome.* Illustrated. Pp. xi + 428. British Museum of Natural History. One pound and ten shillings. 1944.

Harris, Robert S. and Kenneth V. Thimann. *Vitamins and Hormones. Advances in Research and Applications.* Illustrated. Pp. xv + 514. Academic Press Publishers. $6.80. 1944.

Muenscher, Walter Conrad. *Aquatic Plants of the United States.* Illustrated. Pp. x + 374. Comstock Publishing Company. $5.00. 1944.

Nikolsky, Alexander A. *Notes on Helicopter Design Theory.* Pp. vi + 228. Princeton University Press. $3.00. 1944.

Rodgers, Andrew Denny, III. American Botany, 1873–1892, Decades of Transition. Pp. vii + 340. Princeton University Press. $3.75. 1944.

Chemical Books

For the Reference Shelf

- **Organic Reagents in Inorganic Analysis**

  By Ibert Mellan, Ph.G., M.Sc., F.A.I.C.

  Organic reagents are described and their reactive groups and resulting compounds are demonstrated graphically. 230 qualitative, 240 quantitative (colorimetric, gravimetric and volumetric) tests are included. 682 Pages. $9.00 (1941)

- **Chemical Dictionary—3rd Edition Thoroughly Revised**

  By Ingo W. D. Hackh.
  Revised by Julius Grant, M.Sc., Ph.D., F.R.I.C.

  This new Hackh-Grant Dictionary provides over 57,000 definitions of chemical terms covering all of modern chemistry and including the latest research findings in the field. Many tables, formulas, diagrams and portraits are included. 217 Illus. 925 Pages. $12.00 (1944)

- **Examination of Waters and Water Supplies—5th Edition**

  By Ernest Suckling, M.R.C.S., D.P.H.

  This is a complete guide to the solution of all modern problems concerning the examination, estimation and purification of waters and water supplies. It includes physical, bacteriological, microscopical, biological and chemical methods. 63 Illus. 849 Pages. $12.00 (1943)

- **Theory of Emulsions and Their Technical Treatment —4th Edition**

  By William Clayton, D.Sc., F.I.C.

  This is a thorough, modern study of emulsions with emphasis on their industrial application. Many new illustrations and useful tables have been included. 103 Illus. 492 Pages. $10.00 (1943)

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