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A SEARCH FOR MAN'S SANITY. Trigant Burrow, Oxford University Press, New York, 1958.

A collection of the letters of Dr. Trigant Burrow, a psychoanalyst more critical of psychoanalysis than most, who extended the methods of individual analysis to mutual analysis of members in a social group and to society itself. As a kindly patriarch, as a maverick psychoanalyst, and as the Scientific Director of the Lifwynn Foundation, Burrow carried on a wide and perceptive correspondence with members of his family, with friends and colleagues, with intellectual leaders in philosophy, the sciences, and the arts, and with cranks. His style in letter-writing is readable, his understanding and tolerance for the ideas of others is commendable and imitatable. His own ideas, while stimulating, are not satisfying. Like many moralists, Burrow was more concerned with a description of the configuration and meaning of maladjustment and conflict than with the discovery of determining conditions which must be manipulated in order to remedy them.

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Botany—Not Posy Picking

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Every high school biology course spends some time, albeit usually too short a time, on botany. Yet, I am afraid that what time is given to a discussion of plant life is quite often poorly used and most students are left with the impression that botany is just "posy picking." As a result the best students turn their interests to seemingly more colorful fields such as chemistry, physics, and electronics, and the average students are not even left with respect for plants as living organisms that face many of the same everyday problems as human beings and other animals.

One consequence of all this (the problem is compounded and not resolved in most college biology and botany courses) is that very few good students ever become interested in the plant sciences. This is most regrettable because many of the critical problems of today and in the future are botanical. Agriculture, forestry, feeding the world's pyramiding population, and even feeding future space travelers are all botanical fields and problems that need the highest calibre of human talent to study them.

Indeed, many of the scientists who are working at the frontiers of botanical science are not even botanists, but rather are persons trained in other fields and who recognize the intriguing and important problems that lie in the plant sciences. In the field of photosynthesis much of the current research is being led by Melvin Calvin, an organic chemist; Farrington Daniels, a physical chemist; and Otto Warburg, a biochemist. Much of the original work on plant growth hormones was done by Kögl and Haagen-Smit, both organic chemists. And the U. S. Department of Agriculture recently awarded a medal, which is given each year to the U.S.D.A. scientist who has made the most outstanding contribution to agriculture, to Sterling Hendricks, a physical chemist who quite successfully studied seed germination and plant growth.

I have given high school and even college students a "cook's tour" of our botany research laboratories, and they are usually amazed to find that our laboratories look so much like what is found in the chemistry building. In fact, the standard question is: "Where are the plants?" In our research on fatty acid metabolism in plants, my students and I are using radioisotopes to trace the pathways by which long-chain fatty acids and fats are made from acetic acid, better known as vinegar. I have described the methods and techniques used in our studies to high school students and teachers, and the subject of botany has often taken on new meaning for them when they learned that our work involves a knowledge of a) how to grow plants in the greenhouse, b) how to grow plant tissues in petri dishes with radioactive substrates, c) methods of extraction, isolation, separation, degradation, and other chemical procedures for studying fatty acids and fats, d) the isolation and identification of fatty acids and their breakdown products by paper chromatography and gas chromatography, e) the use of radioisotope detection instruments such as Geiger counters, scalers, ratemeters, and monitors, f) the use of standard pieces of apparatus such as balances sensitive to one-hundreth of a milligram, pH meters, colorimeters, densitometers, culture chambers, and many others, and g) the calculations and statistics associated with interpreting the data. Thus botany, chemistry, physics, and mathematics all merge into one in solving a botanical problem.

Whether it be in the field of plant physiology, genetics, ecology, morphology, modern taxonomy, or any application of these fields, plant scientists in 1958 must know much more than just posy picking. In all fairness to the student, the field of botany should be presented to him in such a way that he realizes this. If he is exposed to botany in a less descriptive and more dynamic manner, he will not only gain greater insight into plant life, but he will also be better able to decide whether he will spend his life in some field of plant science. It is one thing to teach a student to be able to name all the parts and structures of a plant or to have him collect and press a number of flowers, but it is quite something else to have him think about why plant roots grow down instead of up; why a cell divides; how a plant makes sugar from carbon dioxide and water; why some plants flower only in winter and others flower only in summer; how a genetic character for red petal color brings about a red petal; how water gets to the top of a 200-ft. tree; why some plants grow only on the north side of hills; in what ways man is dependent upon plants for his very existence (there are more reasons than one would at first think, even when clothing, shelter, and fuels are not counted); in what ways (taxonomically, morphologically, physiologically, chemically, genetically) two closely related species of plants differ; how and why different wave lengths of radiation affect plants, and many others. If these problems are presented to him, including a discussion of how these problems are or have been studied by plant scientists, my guess is that everyone in the classroom, including the teacher, will find something that challenges his imagination and interest.

Books for Biologists

TEACHING HIGH SCHOOL SCIENCE: A BOOK OF METHODS, Paul F. Brandwein, Fletcher G. Watson, and Paul E. Blackwood, 568 pp., $6.50, Harcourt, Brace and Company, Inc., New York, 1958.

A substantial contribution to science teaching methods literature. Teachers whether in training or in service will want this cleverly written and highly organized volume. An extensive section of the book is devoted to teaching the scientific method and building up science concepts. The authors refer frequently to their own personal experiences in the classroom and to their own research. Quite vigorous stands are taken on most of the controversial issues in science teaching. In all, this is a stimulating and highly informative book which teachers will want as a handy reference.

WORKBOOK AND LABORATORY MANUAL IN GENERAL BIOLOGY, William C. Beaver, 251 pp., $3.75, C. V. Mosby Co., St. Louis, 1958.

Written to accompany the text by the same author. Emphasizes the recording of data and observations from which conclusions are to be drawn. Contains taxonomic chart for plants and animals. Valuable summary included for teachers which itemizes all supplies and equipment necessary for each exercise.