formed in regard to collecting expeditions while in their planning stages, in time so that we may have the opportunity of explaining our simple needs to those who will be in a position to help. The Serological Museum acts as a kind of world center for the study of comparative serology and has been designated as a Subsection of the Section of Zoology of the International Union of Biological Sciences. It has also been approved as a reception agency for animal bloods and sera from all parts of the world by the U. S. Department of Agriculture, subject to their regulations in regard to the treatment of the bloods and sera so received. We offer services of several kinds to those interested in comparative serology, such as an identification service for blood dots representing the blood meals of insects or other arthropods feeding upon unknown hosts. We offer materials, facilities, and instruction to visiting scientists, and publish a semiannual bulletin, distributed free to those interested in this field of work. Help has already been given us by many cooperating institutions and other agencies and by collectors in many parts of the world. But the task of obtaining representative collections of the sera of animals of many groups is so vast that more help will be needed for a long time to come. The source of all contributions of animal sera will be acknowledged in the scientific reports which concern them.

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Wanted—Definitions

RECENTLY Bauer (SCIENCE **117,** 40 [1953]) made a plea for "Logic and Language in Medical Writing." The other day in quizzing my class the meaning of the word "spore" came up and since no one seemed to know its meaning I assigned them an exercise on the derivation and meaning of the word. I was rather disappointed with the results, but when I looked in the books (including two medical dictionaries) which were available to the students, the only one that I found to have a correct derivation and definition of the term was Webster's *Unabridged Dictionary.*

As samples of the definitions given I quote the following. "A cell in a resistant covering, capable of developing independently into a new individual. Gr. *spora* (sic), seed." This definition would not hold for bacterial spores, which are not reproductive, or for zygospores, which do not develop independently, or for spores which do not have a resistant covering. Another: "A cell which produces a new individual without fertilization." Parthenogenetic eggs do this. A third: "Gr. *spora* (sic). A special reproductive body of one of the lower organisms. It is protected by a resistant covering, and capable of developing independently into a new individual." Same objections as to first definition. A fourth zoology text did not define the word at all.

How can we expect our students to be accurate when their textbooks and even reference books are inaccurate and misleading?

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Book Reviews

Advances in Cancer Research. Vol. I. Jesse P. Greenstein and Alexander Haddow, Eds. New York: Academic Press, 1953. 590 pp. Illus. $12.00.

This is a remarkably fine collection of reviews in ten lines of investigation on cancer. Every contribution displays thoroughness, sound knowledge, and evaluation of the topic, and a scholarly, scientific approach. This would be anticipated from the authors, each one of whom is an expert research worker in the specific field.

The orientation of the volume is along "fundamental" research. All but two of the reviews deal with some aspect of carcinogenesis. C. A. Coulson's presentation indicates that the high expectations of some years ago in the mathematical formulations that a high condensation of Π-electrons in the so-called K region of condensed polycyclic hydrocarbons is related to carcinogenic property have not been realized.

L. Dmochowski brings up to date the work on the milk agent in the origin of mammary tumors in mice. It is now clear that the milk agent is not essential for the genesis of some of the tumors, and that the milk agent is not essential for the continuous growth of the neoplasms. Rapid progress in the subject still awaits at least partial isolation of the agent and more rapid bioassay methods for its presence. R. J. C. Harris, in describing studies on the Rous virus, where rapid bioassay methods are available, shows how far we still would be from the heart of the problem even if such viruses were available in the pure state. The key problems are the functional organization of cells and the effect of viral invasion upon such function. As such, research on viruses in general, and on cells in general may in the long run contribute more to the understanding of the role of viruses in cancer than the direct study of the few examples of virus-induced neoplasia.

E. V. Cowdry reviews the studies of his group on the cytologic and biochemical events that occur when

the skin of mice is painted with methylcholanthrene. The large amount of data allows no particular conclusions with the possible exception of the relation of reduced calcium content to decreased cohesiveness of cells. Even the general statement that the findings "are consistent with the hypothesis that malignant transformation is one of probably several mutations" is tenable only if the word "mutation" is used in the sense of any change rather than in the more exact genetic meaning of the term.

Much more promising than these overall studies appear to be the more exact tracings of metabolic pathways and of conversion products with the use of radioisotopes, as presented by C. Heidelberger. This reviewer is still highly impressed by the work of J. A. Miller and E. C. Miller, who first clearly presented evidence through their studies on azo dye carcinogenesis that abnormal protein patterns are formed in the process. With successful extension of these investigations to polycyclic hydrocarbons, generalizations of utmost importance are feasible and susceptible to factual experimentation.

W. U. Gardner gives a résumé of data on hormonal aspects of experimental tumorigenesis. Little new information seems to have been added during the past five years, and the era of steroid hormones appears to be drawing to a close in this field. Reports which have appeared since this review, on the effects of hypophysectomy upon carcinogenesis will undoubtedly revitalize the advances. A. Tannenbaum and H. Silverstone review nutrition in relation to cancer, another chapter in cancer research that is fairly well delineated. Diet plays a definite role, albeit a peripheral one, in the genesis of many tumors in animals, and probably in man. Underfeeding leads to a lower incidence and later appearance of many neoplasms, but the nutritional state has no marked effect upon the growth of established cancer.

W. C. J. Ross contributes a technical chemical paper on the cytotoxic alkylating agents, "radiomimetic" compounds, which have found a small place in the clinical chemotherapy of the lymphomas. His review shows the extensive, detailed investigations that have been performed with these agents and, at the same time, reveals the limitations of this type of approach in experimental chemotherapy of cancer. R. J. Winzler presents the subject of plasma proteins in cancer. Although many abnormalities have been shown, none is specific for neoplastic disease and probably reflects the systemic changes in the host. One wonders whether accentuation upon the analysis of the proteins of neoplastic tissues themselves may not be more profitable than further search for possible specific changes which may reside in the proteins of the blood.

For all investigators in cancer, as well as for laboratories of biochemistry, endocrinology, virology, and radiology, *Advances in Cancer Research* is a must. The index of papers scheduled for Volume II indicates that the quality of the presentations will be maintained.

The editors and the publishers are to be congratulated for the initiation of a valuable series of publications.

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Science and Humanism: Physics in Our Time. Erwin Schrödinger. New York: Cambridge Univ. Press, 1952. 68 pp. $1.75.

> I consider science an integrating part of our endeavour to answer the one great philosophical question which embraces all others, the one that Plotinus expressed by his brief: Who are we? And more than that: I consider this not only one of the tasks, but the task, of science, the only one that really counts (p. 51).

It is customary to say "This is the age of science." And science means to most people radar and atomic energy, jet planes and supersonic flight, miracle cures and wonder drugs. It means all the achievements of modern technology based on science. With this outlook many engaged in industry and technology lose sight of the fact that science is much more—that science has completely changed spiritual values and our whole outlook on the world and its meaning. In the first part of his book, Schrödinger emphasizes this point and strongly urges counteracting the tendency toward technical specialization by a deeper study of the humanistic side of science. He emphasizes the necessity of bringing science to the citizen and he considers lectures, such as these which he gave under the auspices of the Dublin Institute for Advanced Studies, as one of the tasks scientists have to undertake, "for there is always a certain time lag between the views held by learned men and the views held by the general public about the views of those learned men." He also realizes (p. 9) "that the majority of educated persons are not interested in science and are not aware that scientific knowledge forms part of the idealistic background of human life." Thus his introduction is in a sense a summary of the ideas which prompted the development of general education programs not only in this country but also abroad, programs sponsored not only by educators and philosophers but by some of the leading scientists of our time.

The main part of these lectures is devoted to showing how completely physics changed our ideas about the nature of matter, and that, in spite of the fact that modern techniques make it possible to follow a single fast particle and its path, that the nature of this particle and its interaction with matter or radiation is to be described in an entirely different form from what we have been accustomed to.

He discusses the nature of our "models" and brings out the paradoxes of infinity and the difficulty in a continuous description based on causality. This chapter is followed by a lucid and simple discussion of the