The record of the seismograph work indicated that on the forenoon of October 17, two shots were fired on Section 15, Block 36, T.4 S. At midnight shooting was resumed at this locality and eight shots were fired between 12:20 and 8:15 A. M., October 18. Charges of dynamite were used in the following order: 50, 300, 300, 900, 1,500 pounds, and 50, 300, 300, 900 and 1,800 pounds. The 1,500-pound shot fired at 3 A. M. on October 18 made the tremor which caused one person at Big Springs to think that an automobile had bumped his house and another to think that some one was rattling the door; the 1,800-pound shot fired at 6:15 A. M. coincides with the reports as to the strongest tremor felt. The shooting on the following night, October 18–19, was as follows. On Section 39, Block 36, T.3 S. from 9:25 to 11:30 P. M.: 50, 300, 300, 900, 1,500 pounds; from 12:50 to 3 A. M.: 50, 300, 300, 900, 1,500 pounds, and on Section 31, Block 35, T.3 S. from 3:50 to 5:55 A. M.: 50, 300, 300, 900, 1,500 pounds.

The 1,500-pound shot at 3 A. M. on October 19 seems to have been less generally felt than was the same charge at the same time on the previous night. All the shots were similarly placed, being covered by about five feet of earth. The temperature at 3 A. M. on October 18 was 14° C.; the wind velocity, 11.2; the direction of the wind, from 10 degrees east of north; the sky cloudy. On the next night the temperature at 3 A. M. was 18° C.; the wind velocity, 8; the wind direction, from 10 degrees east of south; the sky cloudy. The ground conditions at the locality of the shot which are not recorded in detail may account for the seemingly different intensity of the tremors. One or two observers at Knott report that the tremors of the second night were greater than those of the first. However, for the region as a whole those of the second night were not so generally felt or reported upon.

The shots of October 17 and 18 were made fourteen miles west of Garden City in Glasscock County. The tremors were felt at Sterling City forty-four miles east; at Big Springs thirty-two miles northeast; at Knott forty miles north; at Stanton twenty miles north, and at Midland twenty-one miles northwest. Inquiry among farmers and ranchmen indicated that even beyond the towns mentioned the tremors were more or less distinctly felt. Apparently the tremors were readily detected within a distance of forty or fifty miles east and north from the locality at which the dynamite was discharged, this being true at least for the larger shots of 1,500 and 1,800 pounds. The distance the tremors were felt west and south is less well known from lack of records. The surface formation at the locality where the dynamite was exploded and of much, but not all, of the country affected is Cretaceous limestone. Where the limestone is absent the surface formations consist of either Cretaceous sands or Triassic or Permian red sands and clays. The limestone is apparently an effective medium for the transfer of earth tremors.

E. H. SELLARDS

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IN AID OF AMERICAN MEDICAL BIOGRAPHY

DR. I. FISCHER, of Vienna, is engaged in the preparation of supplementary volumes to the second edition of Hirsch's "Biographisches Lexikon der hervorragenden Aertze aller Zeiten und Völker" (Berlin and Wien, 1884–6), which is the only international dictionary of medical biography in existence. The supplement will contain biographies of recent and living physicians, and Dr. Fischer is particularly anxious to obtain American material, the conditions for inclusion being original laboratory and clinical work, important discoveries and inventions, publications, editorial work and such like. Any help which may be given him by the donation of "Who's Who," volumes of biographical sketches, clippings of important obituaries from medical periodicals, etc., will be much appreciated. Such material may be transmitted directly to Dr. Fischer himself (address: Biberstrasse 15, Vienna, I, Austria).

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SCIENTIFIC BOOKS

Outlines of Biochemistry (The Organic Chemistry and the Physicochemical Reactions of Biologically Important Compounds and Systems.) By ROSS AIKEN GORTNER. John Wiley and Sons, New York, 1929.

THE success of the application of physics and chemistry to biology depends upon two conditions: first, the ability of the biologist to master physics and chemistry and yet remain a biologist, and second, the willingness of the physicist and the chemist to cooperate sympathetically with the biologist. Professor Ross Aiken Gortner is an outstanding example of the fulfilment of the first condition. In reading his "Outlines of Biochemistry," it would be difficult to say whether Professor Gortner is biologist or

chemist. He speaks to both in their own language, an attribute which few possess.

The second condition, that of the willingness of the physicist and the chemist to join hands with the biologist, is one which is differently viewed by people on both sides. There is the biologist who sees only futility in the attempt to solve vital problems in terms of physics and chemistry. Often have I received the injunction from biologists to remain a pure physiologist and not venture too far into the fields of physics and chemistry; and often have physicists and chemists said to me, "Good Lord, you talk of the structure of protoplasm, a *living* thing of tremendous complexity, and I do not yet know the structure of gelatin," or, "Why speak of the plasticity of protoplasm when we do not know the full meaning of this property as applied to paint and starch?" Fortunately, not all of us are of this mind. A delightful example of the opposite view-point came to my attention this past summer, and it came soon after I had heard the plaintive cry of a biologist who all his life has attempted to apply physical and chemical laws to biological processes, and now, with his work over, looks back on it as a failure. But not so Geheimrat Fritz Haber. We had just heard a lecture at the Kaiser Wilhelm Institute on sexuability in the lower organisms, and we waited, hoped, for some suggestion of the cause of the phenomenon, just one thought beyond the experiments, but none came. (I believe it was Professor Gortner himself who once said, "Science consists not only in the assembling of facts but in the marshaling and interpretation of these facts.") Fritz Haber then arose and told how he had long looked forward to the time when biologists would search for the cause of such characteristics of organisms as sex intergrades, in the specific nature of the proteins, the polarity of the proteins, of the respective individuals. Now, the task which Haber has given the biologist is a big one; how are we to isolate these proteins, and how then determine those specific characters which are responsible. But Haber's point of view is as far-sighted as it is courageous; he has a vision into the future, and it is such a vision, based on sound experimentation, which Professor Gortner gives us in his "Outlines of Biochemistry."

The book is of nearly eight hundred pages, well illustrated and excellently printed. There are thirty-five chapters separated into seven parts as follows: I. The Colloid State of Matter; II. Proteins; III. Carbohydrates and Allied Compounds; IV. The Tannins; V. Plant Pigments; VI. Fats, Lipides and Essential Oils; VII. The Biocatalysts.

Students often come to me and ask what book they should get in order to familiarize themselves with colloid chemistry, and until now I have had to tell them that there is no book which meets their specific requirements. Professor Gortner has supplied this need in Part I of his volume.

One of the valuable features of the book is brought out in the first part. Professor Gortner again and again calls attention to the many applications of a fact or an experiment in related fields; thus, in defining hysteresis he points out that although the word refers to a lag of some sort when used both in biochemistry and in engineering practice, yet the term is not the same in the two cases.

The last section of Chapter VI is on adsorption. This subject, which has played so important a part in Professor Gortner's own work, is treated fully and well. The theory of adsorption is first discussed, and then problems and applications given. There is included a definition of "negative" adsorption. Here is a term I have never liked. I react to it as I do to the popular conception of suction as a "negative" pressure, and to the definition of osmosis as "diffusion from a region of low concentration to one of high concentration." The difficulty in all these cases is, that while the thing we are thinking about is apparently negative, somewhere else in the system there is a positive force which is the cause of the supposed negative event; thus, in "negative" adsorption the solvent is positively adsorbed.

In the chapter on gels there is a useful discussion of imbibition and the rôle of water in the living organism—this might well have been made a chapter by itself. There is included an account of one of Professor Gortner's contributions to agriculture, on the nature of winter hardiness in wheat. In this connection the important fact is stressed that the biochemistry of both plant and animal cells has much in common, for the same factors which enable plant cells to live through the winter are likewise factors in the winter hardiness of insects. Work of this character, in what is usually referred to as "applied" botany, is an excellent example of the close interrelation of theoretical science and practical needs, and of the application of the one to the other. Indeed, Professor Gortner repeatedly shows, both in his work and in his book, how true is Pasteur's exclamation, *"Non, mille fois non, il n'existe pas une catégorie de sciences aux quelles on puisse donner le nom de sciences appliquées. Il y a la science et les applications de la science, liées entre elles comme le fruit et l'arbre, qui l'a porté."*

Part II, on proteins, takes the subject up systematically with interesting chapters on the structure of proteins, and the biological (immunological) reaction of proteins. The remark of Fritz Haber (quoted

above) is substantiated in Professor Gortner's treatment of the proteins and in the introductory quotation from Emil Fischer: *"Da die Proteinstoffe bei allen chemischen Prozessen im lebenden Organismus auf die eine oder andere Weise beteiligt sind, so darf man von der Aufklärung ihrer Struktur und ihrer Metamorphosen die wichtigsten Aufschlüsse für die biologische Chemie erwarten."* Pauli has also laid emphasis on the proteins as the ultimate seat of vital phenomena in saying that "they alone display the specific properties of living matter."

In discussing certain phases of the controversy precipitated by Jacques Loeb, on the relative importance of the H ion, as compared with other ions, on adsorption, degree of peptization and like phenomena, Professor Gortner states that "we have here a lyotropic series . . . the degree of peptization can be due only to a specific influence of the anions, . . . proteins must be considered not alone as complex organic compounds but likewise as colloid micelles, subject to all the varied reactions of a lyophilic system." It is interesting to see the pendulum swing back again to Nägeli's micellae and Hofmeister's series.

The biologist will be particularly interested in the chapter on "The Biological Reactions of the Proteins" since this includes a consideration of phylogenetic relationships as determined by serological reactions.

Part III is on the carbohydrates. It includes sections on photosynthesis and fermentation. Here, as elsewhere, the book shows its special value to the general botanist and zoologist, and again in Part V on plant pigments where the relationship between blood pigments and chlorophyll and the chemistry of color inheritance are considered.

Five chapters on fats, lipides, oils, vitamins (prepared by L. S. Palmer) and enzymes complete the book proper. Eight pages of general reference and two indexes are appended.

In addition to its scientific value—and this can not be overestimated—there is a human, or philosophic side to Professor Gortner's book which is especially fine. In discussing histamine he says, "Toad skin, according to Pliny, was a medicine. Abel showed that it contained a powerful drug. This is an additional instance where one of the old folk remedies was found to be not so foolish as it appeared to be." In many similar remarks one realizes that the author is a man who, though taking his work seriously, still appreciates the uncertainty and the humor in science.

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REPORTS

THE CANCER RESEARCH FUND OF THE UNIVERSITY OF PENNSYLVANIA

THE Cancer Research Fund of the graduate school of medicine of the University of Pennsylvania has received a gift of $210,000 from a philanthropist who does not desire to have his name revealed. It has been realized for some time that progress in cancer research work depends upon the association of the physician, the biologist and the chemist and upon the close cooperation of related clinics and laboratories. And now, as the result of the generous support which has just been given by a philanthropist from whom the Cancer Research Fund will receive $70,000 annually over a period of three years, the school has been placed in a position to carry on the cancer research work along these broad cooperative lines to an extent which heretofore was impossible.

One joint research project has been undertaken in association with the Bartol Research Foundation of the Franklin Institute, which is one of the great physical research institutes of the country, while research work has also been arranged for in association with the American Oncologic Hospital, a cancer hospital at Thirty-third Street and Powelton Avenue.

Plans are being developed for the equipment of a new clinic for modern diagnosis and treatment of tumors in the American Oncologic Hospital, and Dr. George M. Dorrance, professor of maxillo-facial surgery in the school of dentistry of the university, has been appointed chief of the clinic. Dr. Dorrance is assembling a group of specialists of the highest type to serve on the clinic staff, and the American Oncologic Hospital will be developed gradually into an anti-cancer center of the most complete character. Central laboratories of the Cancer Research Fund have been established at 133 S. Thirty-sixth Street, and here a complete tissue culture department is under the direction of Dr. Clarence E. McClung, professor of zoology at the University of Pennsylvania, and Professor David H. Tennent, of the department of zoology of Bryn Mawr College. Professor J. P. M. Volgelaar, of the University of Leyden, Holland, and Dr. Raymond C. Parker, the latter of whom recently was connected with the Kaiser Wilhelm Institute of Biology in Berlin, also have been added to the staff of the tissue culture department, and eight other research workers will be maintained in this department.