lems. He suggests the addition of a codicil so that the law reads "the ratio of small whole numbers or their reciprocals." This addition is not necessary, but it is necessary to omit the word "small" from the ordinary statement of the law so that it reads "the ratio of whole numbers."

This statement of the law takes care of the oxides of nitrogen problem discussed by Professor Vuilleumier. For a fixed weight of oxygen the weights of nitrogen in the several oxides are exactly in the ratio of 60 : 30 : 20 : 15 : 12. The same statement also provides for cases such as palmitic, stearic and oleic acids, where the weights of hydrogen for a fixed weight of oxygen are in the proportion of 16 : 18 : 17. Organic chemistry supplies many such cases.

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THE UNITED STATES BOTANICAL GARDEN

GEORGE HESS, director of the United States Botanical Gardens is retiring (as emeritus?). This is a time when all scientists, botanists in particular, should address their senators asking that the director of the U. S. Botanical Gardens should be a scientist, a botanist, who will make the gardens a Botanical Garden in fact. At present it exists purely for the propagation of plants for friends of congressmen, and for providing decorations for congressional functions.

A scientist could cater to such needs and yet develop a real botanical garden in the national capital. Years ago Dr. Liberty Hyde Bailey asked that either Congress develop a Botanical Garden of that project, or change the name. Nothing was done; it continues to *"fill* orders from congressmen" *without a botanical* background.

This administration seems to be doing things differently—maybe they will follow Bailey's suggestion if it is called to their attention by their scientific constituents.

The gardens are under the direction of the Library of Congress Committee, consisting of A. W. Barkeley, of Kentucky; K. McKeller, of Tennessee; E. Thomas, of Oklahoma; Hattie Caraway, of Arkansas; P. Norbeck, of South Dakota; S. Fess, of Ohio; W. W. Barbour, of New Jersey, and E. Gibson, of Vermont. Letters should be sent to the Senator of your own state.

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REPORTS

MEMORANDUM ON THE ALL-UNION INSTITUTE OF EXPERIMENTAL MEDICINE[1]

PRELIMINARY conferences on the plans of the All-Union Institute of Experimental Medicine have dealt entirely with technical matters on construction, arrangement and equipment. It seems desirable to conclude these conferences with a general statement.

I preface my remarks by calling attention to my own limitations, which are those of one who for many years has taken no personal part in laboratory research, but whose attention has been confined to the planning and administration of medical institutions and to public health work.

Of the general aims of the institute, I can speak only with admiration and approval. No individual, no foundation and no government has hitherto entered the field of experimental medicine with a scheme of equal proportions. The history of scientific medicine is a record of the efforts of mankind to elicit and to explain the facts of life, and to protect itself from danger, discomfort and death. In modern times both hereditary and environmental influences have been intensively studied. In the larger and more advanced states, prior to the world-wide depression, capital was poured into the construction and equipment of institutions dedicated to the study and prevention of disease. The volume of this work in the United States has been enormous. It has been carried on in many laboratories scattered over the entire country. The greatest of these establishments has a comparatively meager program in comparison with the ambitious, comprehensive program of the All-Union Institute of Experimental Medicine, which aims at the eventual command of all the natural and social forces which affect human life.

In the United States, coordinated medical research programs are found chiefly in a few famous institutes and in so-called medical centers, consisting of groups of hospitals whose main object is the treatment of the sick; in these centers, scientific investigation is very largely a by-product, albeit an important one. But, as I have already intimated, no single institution possesses anything like the resources with which it is proposed to equip and endow the institute in Leningrad.

The basic principle of the Leningrad institute might be said to be that of comprehensive, coordinated, biological study. The outlook of isolated laboratory workers, especially those whose attention is concentrated on highly specialized studies, often

[1] Statement prepared at the suggestion of delegates of the U. S. S. R., at the close of a conference in New York City to consider plans for an All-Union Institute of Experimental Medicine at Leningrad.

suffers from want of contact with critical minds engaged in related pursuits. The assemblage in one institution of hundreds of disciplined thinkers and skilled workers promises rich rewards springing from a variety of stimulating associations. Such associations are mentally challenging and corrective. Apart from the theoretical benefits of association, the institute will offer the practical advantages of group investigations, by means of which different angles of the same problem can be simultaneously and stereoscopically illuminated.

Nobody can foretell just what the outcome of the work of the institute will be in volume or in kind. The members of a large laboratory staff are never uniformly talented or resourceful. In any large group of men engaged in a common effort, leadership growing out of the superabundance of vitality or the superior imagination of individuals will inevitably assert itself. It will be particularly fortunate for biological science, if those members of the institute who possess superior native endowment happen to be men or women whose attention is fixed upon problems appropriate to the present and future rather than on scientific problems of waning interest. As biological concepts change, there occurs a corresponding alteration in the value of the different branches of research. Laboratories, once brilliant, have been known to lose their productiveness by adhering too long to types of investigation which, although originally of great significance, have ceased to be important.

Sometimes the peculiar outlook of divisional chiefs has an unlooked-for and desirable effect upon laboratory developments. I have no doubt that at the institute at Leningrad, precautions will be taken to prevent the blighting influence of a too rigid control of the younger workers by leaders, however eminent, whose interests are fixed upon untimely or passing phases of science. I could point to scientific centers in other countries, where there has grown up among those occupying ranking positions an unfortunate sense of self-satisfaction, an inclination to continue in well-worn grooves and a disposition to look with suspicion upon resourceful and original thinkers and workers, who, for personal, social or political reasons, have not commended themselves to those in charge as congenial coworkers. Where the choice of workers is thus influenced, the effectiveness of a laboratory may be seriously impaired. Bureaucratic dangers are encountered in every large organization, and it requires the utmost vigilance to avert them. These observations are made, of course, in a general sense, and must not be interpreted as in any way reflecting on the actual personnel of the institute—a personnel which includes men of great eminence, and one which, from all accounts, is fully qualified to deal with the problems which confront it.

In order to prevent scientific organizations from congealing, such organizations in the United States, England and elsewhere have adopted protective measures such as an age limit or service limit. If too rigidly applied, rules of this kind, which are intended to give youth its fling, may do harm, but if applied leniently where leniency is obviously indicated by the circumstances, they may accomplish a great deal of good. In science more than in any other field, good men whose imaginations are continuing to function must not be cut off in their prime.

I note with interest and with warm approval that in the plan under consideration provision has been made for the assignment of laboratory facilities to visiting scientists from foreign countries. Notwithstanding the great scope of the institute's plan, it is likely that from time to time ideas will spring up outside of Russia, which can be profitably brought into the institute and exploited there, hence the proposal to associate foreign scientists with the regular staff of the institute is extremely prudent. No doubt additional foreign contacts will be sought by sending members of the institute abroad from time to time.

To survey the entire field of biological science and to bring together in one master organization workers in all the related sciences is an entirely logical plan, a plan of which any country might well be proud, and one which is peculiarly appropriate to a socialized state. The actual project is one of such stupendous scope that it staggers the imagination. And yet I have no doubt that it will be viewed with some skepticism by a not inconsiderable group of thinkers who believe that the greatest scientific advances are made, not as the result of large-scale systematically planned research but because of the genius of talented individuals, who, in spite of obstacles of whatever kind, create their own opportunities by sheer personal force. Philosophers of this school of thought will expect to find arid areas in the spreading laboratories of the institute. In the long run, the value of the institute can be justly measured only by the aggregate of its positive accomplishments; if these are great, a few personal failures can be tolerated.

In so large a project as the one under contemplation, it will be difficult to find men of precisely the right quality to fit into every niche in the organization. The institute will need men who can work in both single and double harness. It is fascinating to contemplate a laboratory or group of laboratories which, theoretically at least, will afford a suitable opportunity for every young scientist in Russia who has a real contribution to make. No one knows what science and humanity have lost through the failure of the civilized countries of the world to provide adequate opportunities for all their budding geniuses. Lack of means has crippled opportunity here, and

prejudice or want of sympathetic understanding there. The institute at Leningrad will need plenty of means, which the government is presumably prepared to supply, and an open mind toward all who can serve its purpose.

I do not exaggerate when I say that scientists in the United States look with admiration and with a certain amount of envy upon the All-Union Institute of Experimental Medicine and its magnificent program, and with respect upon a government that is ready to give its support in so liberal a measure to the search for truth and the promotion of human well-being.

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SOCIETIES AND MEETINGS

THE WESTERN SOCIETY OF NATURALISTS

THE sixth annual winter meeting of the Western Society of Naturalists was held at Asilomar, Pacific Grove, Calif., on December 27, 28 and 29, 1933, with Dr. S. C. Brooks presiding. The meetings included three symposia on subjects of special interest and two evening meetings as well as a series of submitted papers.

The first symposium, arranged by Dr. C. V. Taylor, was entitled "Internal Environments in Amphibian Morphogenesis." It included the following papers: "Rôle of the Organizer in the Axial Development of Amphibia," by J. Frank Daniel, of the University of California; "Non-glandular Regulation of Relative Growth in Amphibia," by V. C. Twitty, of Stanford University; "Hormone Action in Amphibian Development," by B. M. Allen, of the University of California at Los Angeles; and "Temperature Gradients in Amphibian Development," by F. G. Gilchrist, of Pomona.

"Environmental Effects on Plants" was the title of the second symposium. It included the following papers: "Environmental Transformation of Bacteria," by W. H. Manwaring, of Stanford University; "Cytogenetic Effects of High Frequency Radiations on Plants," by T. H. Goodspeed, of the University of California; "On the Environmental Modifiability of Certain Plant Forms," by W. M. Heusi, of the Carnegie Institution of Washington; "Distribution of Newfoundland Desmids," by Wm. R. Taylor, of the University of Michigan; and "Influence of Environmental Factors on Smut Infection in Wheat Species," by F. N. Briggs, of the University of California at Davis.

The third symposium, "Growth-promoting Substances," was arranged by Dr. H. M. Evans, of the University of California. It included the following papers: "Growth Hormones in Plants," by F. W. Went, of the California Institute of Technology; "The Preparation and Chemistry of the Growth Hormone," by Dr. Thimann, of the California Institute of Technology; "The Growth Hormone of the Anterior Lobe of the Hypophysis," by M. E. Simpson, of the University of California; and "Relation of Glutathione Concentration to Growth," by H. Goss, of the University of California at Davis.

Dr. T. Wayland Vaughan presented one paper on "Recent Progress in Oceanographic Investigations of the Pacific and Present Trends of Marine Biological Research" and, in the absence of W. E. Allen and W. R. Coe, a second entitled "A Study of Fouling Organisms." Dr. A. E. Hopkins presented certain experimental observations on spawning and setting in the Olympia oyster. The morphological changes of sexual maturity in the salmon, the Alaska herring populations and mortality of the herring were discussed by Drs. F. A. Davidson, G. A. Rounsefell and E. H. Dahlgren, respectively, all of the U. S. Bureau of Fisheries, Seattle.

Certain phases of the life history, morphology and physiology of some species of protozoa were discussed in a series of papers presented by Drs. H. W. Graham, G. H. Ball, A. G. R. Strickland and M. G. Brown, respectively. Dr. Wm. A. Hilton discussed the ratio of nervous tissues to body tissues in a variety of forms. The evidence for the development of ligaments from muscles in the pocket gopher was presented by Mr. J. E. Hill. The antagonistic action of methylene blue to the action of certain respiratory poisons, as determined from experiments on marine eggs, was discussed by Dr. M. M. Brooks. A report on the determination of the non-solvent volume of marine eggs was given by Dr. J. L. Leitch. Dr. A. C. Giese reported on some experimental studies on the factors inducing conjugation in Paramecium. The relation of the redox potential of cell suspensions to cytochrome was discussed by Dr. J. P. Baumberger. Dr. L. R. Blinks presented some bioelectric measurements made on plant cells.

Besides the above papers the following were read by title only: "The Spawning Behavior of the Little Redfish, *Oncorhynchus nerka,* with Notes on Related Species of Salmon," by L. P. Schultz; "Growth Curves of Protozoan Population in Sterile Medium," by Austin Phelps; and "Experimental Studies in Motivation of Sex Behavior in Rats," by C. P. Stone.

Microcinematographs of micrurgical technique and experiments and of cells in the microscope centrifuge