analogous to those in common usage. The names would be, most simply, hydrogen-pd; ammonia-pd_2, ammonia-p_2d and benzene-p_2d_4. Professor Whitmore's deuteroneopentane would become neopentane-d.

It is unlikely that this nomenclature will meet all complications, but for the simpler compounds it appears to have advantages and may indeed suggest to others a more perfect solution of the problem.

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THE NEUTRON

THE experiments of Lawrence, Livingston and Henderson on the artificial disintegration of the deuton by the proton show that the mass of the neutron as calculated from these experiments is much smaller than the value assigned to it by Chadwick. If we express this mass difference in energy units, by means of the Einstein relation, then this difference is equivalent to 6 million volts. This difference is much greater than the mean error involved in the two sets of experiments. This indicates either that the relationships used in the calculation of the mass are not valid or that the neutron may have a different mass, depending on the conditions where it exists.

In the light of these experiments on the mass of the neutron and others on the constituents of the beryllium nucleus, our ideas of the stability of the nucleus must be revised. We meet here a similar situation to that which arose in classical electrodynamics when it attempted to account for the stability of the atom. The stability arises not from the binding energy of the particles for one another but from the existence of quantum laws governing the system. If we suppose that the neutrons are held in the nucleus by a type of quantum law and that the binding, if any, plays no rôle, then we can apply Dirac's theory of radiation to the behavior of the neutron, substituting in that theory for the energy and momentum of the photon the appropriate quantities for the neutron. Instead of the atom in various quantum states of excitation we have the nucleus in its various quantum states forming stable configurations—the positron plus the neutron, the proton; the positron plus two neutrons, the deutron and other combinations of positrons and neutrons. The interaction between the positron and the neutron which takes the place in the neutron theory of the interaction between the light wave and the electron is not known as yet. However, experiments on the scattering of neutrons should give us some insight into the type of interaction.

The experiments on the production of neutrons by alpha particles gives neutrons, in many cases, of widely different energies. These sets of neutrons of different energies have been assumed generally to be made possible by the emission of gamma rays from the nucleus, but in the case of beryllium it is difficult to see how any nucleus could emit rays of such great energy. Perhaps, the difference may arise from the production of the neutron occurring by different reactions. For example, in the case of beryllium, we might have as the final products of the disintegration either a neutron and a carbon nucleus or a neutron and three alpha particles.

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OXYGEN AS AN ACCELERATOR IN THE GROWTH OF EMPUSA ON FLIES

WHILE occupied with certain physiological experiments with house flies some time ago the writer accidentally left several flies in an atmosphere of O_2 for a period of several weeks. It was observed at the end of this time that the flies were densely covered with *Empusa*. The growth of the fungus was much more luxuriant than the writer had ever observed before. It seemed probable that the O_2 atmosphere had stimulated the development of the *Empusa*. Consequently, experiments were conducted with more flies to investigate the problem further.

In almost every trial, in which freshly killed or live flies were placed in glass jars with glass stopcocks and the air replaced with O_2, the fungus developed. Some of the flies were so covered with the growth that scarcely any body parts were visible. They gave the appearance of cottony balls.

House flies captured in the spring and placed in O_2 atmospheres did not develop *Empusa*. The experiments were again repeated the following fall with success. It was noted, however, that jars containing the proper moisture developed the best *Empusa* growths. No attempts were made to determine the correct humidity, as the writer was interested only in the O_2 effects. However, it is safe to conclude that O_2 atmospheres greatly accelerate the development of *Empusa* on flies.

Ordinarily a period of one to two weeks is necessary for the *Empusa* to develop in jars of O_2. Calcium chloride tubes can be used in place of jars with glass stop-cocks; in fact any sort of glass container that can be hermetically sealed should be satisfactory.

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THE STIMULATIVE ACTION OF YEAST EXTRACT IN THE RESPIRATION OF RHIZOBIUM

DURING the past two years respiration experiments with the legume bacteria have been conducted in this laboratory with the Warburg technique, special con-

sideration being given to the nitrogen requirements of the organisms. Inasmuch as it was well known that yeast extract stimulated growth of the organisms, this material was included in the studies along with various organic and inorganic compounds of nitrogen, the yeast extract being used in amounts proportional to its nitrogen content. In all the experiments conducted the yeast extract was found to stimulate oxygen consumption, and therefore respiration, to a considerably greater extent than any of the nitrogen compounds used. The extent of respiration was somewhat proportional to the amount of yeast extract in the medium.

In reporting these investigations at the thirty-fourth annual meeting of the Society of American Bacteriologists at Ann Arbor, in December, 1932, and more completely in papers that are now in the process of publication, the conclusion was drawn that the stimulative effect of the yeast extract may have been due, aside from the nitrogen it contained, to other factors which would serve to stimulate oxygen consumption. While no reference has been made in these reports to a respiration co-enzyme in the yeast extract, the suggestion has been offered that the stimulation may have been caused by vitamins, auximones or other similar substances.

In view of these results, the author was unusually interested in the recent report in SCIENCE by Allison, Hoover and Burk,[1] who reported to have found a specific factor which is essential for respiration. In studies with the root nodule bacteria of leguminous plants these investigators found that respiration increased from a small value in the presence of a trace of the factor, to as high as 1,000 cmm O_2 per mg of dry weight per hour at 31° C. in its presence. This factor, considered by them as a respiration co-enzyme, was secured by extracting commercial sucrose with absolute alcohol. It was also claimed that, aside from furnishing readily available nitrogen, the chief rôle of the yeast water in culturing the nodule bacteria is to supply a source of the essential respiration factor.

The conclusions concerning the stimulative action of yeast extract on the respiration of the root nodule bacteria are in agreement with and confirmatory to the results secured in this laboratory. Our work has not as yet been directed toward the characterization and isolation of the stimulative factor, and it has, therefore, not shown the presence in yeast extract of a "specific factor essential to respiration." But the preponderance of evidence points to the conclusion that the beneficial effects of the yeast extract lies chiefly in its content of readily available supply of nitrogen and energy material.

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SOCIETIES AND MEETINGS

INTERNATIONAL GEOGRAPHICAL CONGRESS OF 1934

THE International Geographical Congress of 1934 will be held in Warsaw, Poland, from August 23 to 31, inclusive, under the presidency of Dr. Isaiah Bowman. Organization of the congress is in the hands of a Polish executive committee, of which Professor Eugene Romer is chairman and Professor Stanislas Pawlowski general secretary. The address of the congress and its secretariat is High School of Commerce (Szkola Glowna Handlowa), 6 Rakowiecka Str., Warsaw, Poland.

At a time when financial depression and unfavorable exchange rates may cause some to hesitate about planning participation in the congress, it seems appropriate to review the great advantages to be gained by such participation. Americans who attended the recent congresses in Cambridge (1928) and Paris (1931) and who took part in the interesting and instructive excursions arranged by the local organizing committees found the experience highly profitable.

One of the principal objects of the congress is to bring together, from all parts of the world, the outstanding leaders in all phases of geography. The opportunity to become personally acquainted with these men, to learn about their most recent investigations and to make them acquainted with one's own work is to be highly prized.

At the Cambridge meeting official delegates from thirty-one countries were present. At Paris forty-six countries were represented. Experience shows that in these different countries, with their differing opportunities for pursuing investigations of various phases of geography, there frequently develop marked differences in methods of study and in nature of results secured. The consequent interchange of ideas effected at the congresses is in the highest degree stimulating.

America stands for certain types of work in geography which have been developed in this country to an extent not observed elsewhere. The prestige enjoyed by our work abroad, as well as its progress at home, will be enhanced by its effective representation at the congress. An obligation thus rests upon American geographers to do all in their power to assure effective representation of their science at Warsaw. In view of the fact that American geography is to be honored at the congress by having one

[1] SCIENCE, 78: 217–218, 1933.