months, the Soo cargo volume for 1955 is estimated at from 107 to 110 million net tons, indicating that this year the tonnage competition between the Soo and the Suez will probably be the closest in history.

ALBERT G. BALLERT

Livonia, Mich.

Structure of Vitamin B_{12}

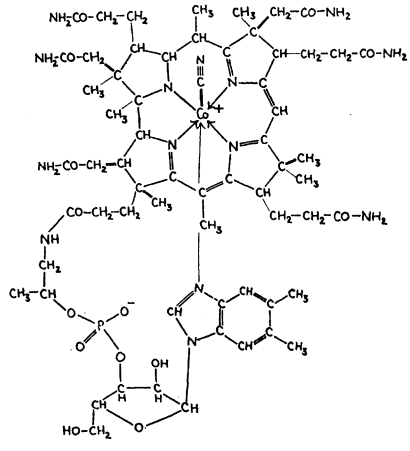
The articles that virtually complete the deciphering of the chemical structure of vitamin B_{12}, first announced in tentative form in 1954, appear in the 20 Aug. issue of *Nature*. The research is reported by the same two groups of biochemists that reported the earlier work. One team of six persons consisted of Dorothy C. Hodgkin, Jenny Pickworth, and J. H. Robertson of Oxford University; K. N. Trueblood and R. J. Prosen of the University of California at Los Angeles; and J. G. White of Princeton University. The other team, also comprised of 6 workers, was made up of R. Bonnett, J. R. Cannon, A. W. Johnson, I. Sutherland, and A. R. Todd, of Cambridge University; and E. L. Smith of the Glaxo Laboratories, Middlesex. Still other groups have aided in the elucidation, in particular the research group at the Merck Laboratories.

The size of these research teams, and their international composition and geographic distribution on opposite sides of the world, speak volumes with regard to the present-day organization of scientific effort. The simultaneous achievement of essentially the same conclusions by diverse methods not only points up the keenness of scientific competition in active biochemical areas, but also affords a vivid example of the way in which scientific knowledge depends on mutual confirmation.

It is by now well known that the essential structure of vitamin B_{12} represents a new type of compound ring structure similar to, and yet significantly different from, the tetrapyrrole ring structure of the porphyrins such as chlorophyll, heme, and the cytochromes. The vitamin B_{12} structure likewise consists of four linked rings each of which is composed of 4 carbon atoms and one nitrogen atom; but each ring has at least one tetra-substituted carbon atom and therefore lacks the typical double-bond structure of the pyrrole ring.

As in the porphyrin structure, the four rings in the vitamin B_{12} molecule are joined by three —C— bridges, but the final, closing linkage that unites rings *A* and *D* is thought to be a direct one. The single cobalt atom of the molecule occupies the center of the tetra-ring structure, like magnesium in chlorophyll and iron in the hemes and cytochromes. It bears a cyanide group; hence the name *cyanocobalomin* is sometimes applied to the vitamin.

Electron density maps and crystallographic data, as well as chemical analysis, now show more detailed features of the attached side chains on the ring. Three acetamide and three propionamide and six methyl groups are attached to the rings and two methyl groups to the carbon bridges. Ring *D* bears another propionic acid side chain, which is combined with a propanolamine residue that forms an ester linkage with the phosphate group of a nucleotide that is also coordinated with the cobalt atom. Both groups agree on the formula $C_{63}H_{90}N_{14}O_{14}PCo$, arranged as shown here.



To work out the details of structure of so complicated a molecule is truly a triumph of scientific ingenuity. It opens the way to greater insight into the metabolic activities of this vitamin that prevents pernicious anemia and which was isolated for the first time only in 1948.—B.G.

News Briefs

■ The Atomic Energy Commission has announced that the Los Alamos Scientific Laboratory will use the Nevada Test Site beginning about 1 Nov. 1955 for a series of experiments to determine the safety of various weapons and experimental devices in the event of accidents such as fires during handling of storage. Laboratory calculations and previous experiments have established a strong probability that such accidents will not cause nuclear detonations, but confirmation through field tests is desired.

There will be detonations of conventional explosive materials. All explosions, even if there should happen to be a nuclear detonation, will be of low explosive force. Because fissionable materials are involved, precautions will be taken; tests will be made only under carefully selected weather conditions. No off-site radioactive fallout problem is anticipated. The explosions may be heard by nearby residents. Because the detonations will take place in daylight, it is improbable that they will be visible off-site.

It is possible that even very low scale detonations such as those planned may release enough radioactive material into the air to affect the very sensitive instruments or processes of certain industries and research institutions. For this reason, the AEC will announce the conclusion of the experiments.

■ Scientists of the U.S. Department of Agriculture's Animal Disease Laboratory on Plum Island, N.Y., report success in growing the virus of foot-and-mouth disease in cultures of swine or bovine kidney cells. This accomplishment, by H. L. Bachrach, W. R. Hess, and J. J. Callis of the laboratory staff, makes possible the use of practical tissue-culture techniques in (i) diagnosis of the disease and identification of the type of virus present; (ii) determination of concentrations of the viruses and antibodies produced in animals; and (iii) large-scale production of the virus for fundamental studies and vaccine investigations.

Foot-and-mouth disease virus has been grown experimentally in other types of cultures by investigators in the Netherlands, but the methods used were not adapted to the measurement of virus and antibody concentrations. The method developed at Plum Island, which has also been independently achieved at a research laboratory in England, permits the rapid enumeration of viruses and antibodies. This work is also the first in which kidney cells from hogs and cattle have been used for routine production of virus in the quantities needed for research purposes. The method is similar to that employed for growing human polio virus for the manufacture of vaccine.

Announcement of work at the Plum Island Laboratory is the first report of research conducted inside the United States on foot-and-mouth disease, a potential major threat to the nation's swine, beef, and dairy herds. Before establishment of this laboratory, no research on foot-and-mouth disease virus was permitted in this country.

■ Robert J. Hasterlik, associate director of Argonne Cancer Research Hospital and a participant in the Geneva nuclear conference, recently reported his impressions of Soviet biology to a meeting of University of Chicago alumni. Emphasizing that contacts with the Soviet biologists who attended the conference might

not provide an accurate picture of all Soviet nuclear medicine, Hasterlik pointed out that basic differences as well as similarities in the American and Soviet approaches could be seen at Geneva.

Soviet biologists have concentrated more on the effects of radiation on the central nervous system than have scientists in this country. They have also devoted much attention to the use of radioactive cobalt-60 in cancer therapy and are installing cobalt units in hospitals across the Soviet Union. They did not report on the use of radiocobalt in rotating therapy.

Soviet scientists have been working for at least 6 years on the use of radiophosphorus in the treatment of such diseases as leukemia and polycythemia vera. In addition, radioiodine is used to study the thyroid gland and radiosodium to measure the circulation time of blood.

More directly committed to practical ends, the Soviet scientists do not appear to be as active as U.S. scientists in the uses of radioisotopes as tracers in studying basic physiological mechanisms, particularly those involving the use of radiocarbon and tritium.

Soviet science in general tends to stress one problem at a time; consequently Soviet research men do not appear to have investigated the wide number of radioisotopes that are at present under study in the United States. No papers on radiation sickness in small animals were presented, nor were there any reports of studies of protective factors in radiation sickness. Hasterlik was impressed with some of the Russian studies on the use of radioisotopes in agricultural research, such as those concerned with the behavior of tagged fertilizers.

Hasterlik reported that Soviet scientists were friendly and eager to discuss scientific problems with colleagues from other countries. The discussions appeared to be free, interesting, and fruitful from the American point of view. In general, the scientific equipment the U.S.S.R. exhibited was comparable to the kind of equipment used in the United States.

■ The first contingent of the British Commonwealth Trans-Antarctic Expedition, led by Vivian Fuchs, will leave Britain on 14 Nov. It will be followed early next year by a New Zealand group that is to be directed by Edmund Hillary.

■ The U.S. Atomic Energy Commission announced recently that it is carrying on its major research effort in controlled thermonuclear reactions at Princeton University and at AEC laboratories operated by the University of California at Los Alamos, N.M., and Livermore, Calif. In addition, there are projects at Oak Ridge, Tenn., and New York University. The over-all program is known as Project Sherwood.

This long-range program, to which reference was made in August during the Geneva nuclear conference, has been under way since 1951; it is directed toward the possibility of controlling the release of the great amounts of energy from reactions involving the fusion of light nuclei.

In essence, the problem is that of heating an appropriate nuclear material (such as deuterium) to temperatures of several hundred million degrees and of confining it somehow at that temperature for a sufficiently long period of time to allow an appreciable portion of the nuclei to fuse together, with consequent release of energy.

Scientists in the News

AUGUST PI SUÑER, Spanish physiologist and director of the Institute of Experimental Medicine at the University of Caracas, Venezuela, has been awarded the 1955 Kalinga prize of £1000 for his work in popularizing science in Spanish-speaking countries. The prize is awarded annually by the United Nations Educational, Scientific and Cultural Organization. It is supported by a grant made by B. Patnaik of the Indian State of Orissa, who established the prize both to recognize competent interpretation of science to the general public and to strengthen links between India and other nations. Kalinga was an Indian empire that was invaded more than 2000 years ago by the Buddhist emperor Asoka. Asoka was so deeply impressed by the horrors of war that he resolved never to wage war again.

This year the jury was composed of Abdel Rahman, professor of astronomy at the University of Cairo; J. L. F. Brimble of the United Kingdom, editor of *Nature*; and Cortes Pla, chief of the Division of Science and Technology of the Organization of American States. Born in Barcelona in 1879, Pi Suñer joined the University of Caracas as a professor of physiology after a career of teaching and research in Spain. In 1922 he received the Achucarro national prize in Spain for his research in the physiology of the nervous system and in 1948 he was awarded the Prix Pourat of the Paris Academy of Sciences for his book, *The Vegetative Nervous System.*

In addition to his scientific work, Pi Suñer is the author of a series of books intended to bring science within the grasp of the layman. Among his works which have been translated into English are *The Bridge of Life* and *Classics of Biology.*

L. J. F. BRIMBLE, editor of *Nature,* returned to London on 15 Oct. after a month in the United States. He visited scientific centers and individual scientists in Boston, Chicago, Ithaca, New York, Princeton, and Washington.

C. B. LARRABEE, long an executive of *Printers' Ink,* will become director of publications for the applied journals of the American Chemical Society on 1 Nov. The new position was created by the ACS board to facilitate coordination of the increasingly complex publishing activities of the society.

Walter J. Murphy, editor of the ACS applied journals since 1943, will become editorial director of the journals. This is also a new position; its title describes Murphy's responsibilities more accurately than that of "editor."

The four journals concerned, which have a combined circulation of more than 150,000, are *Chemical and Engineering News,* weekly news magazine and the society's official publication, and the society's three monthly journals—*Industrial and Engineering Chemistry, Analytical Chemistry* and the *Journal of Agricultural and Food Chemistry.* Larrabee's primary responsibility as director of publications will be that of coordinating the advertising, circulation, circulation promotion, and editorial programs of the four journals.

N. HOWELL FURMAN, professor of chemistry at Princeton University, delivered the seventh annual Friend E. Clark lectures that are sponsored by the Tau Chapter of Phi Lambda Upsilon at West Virginia University. The lectures are given in honor of F. E. Clark, former professor of chemistry and department head at the university. Furman's work is concerned with analytic chemistry, polarography, coulometry, and potentiometric titrations.

EMILE F. HOLMAN has been honored with a *Festschrift* issue of the *Stanford Medical Bulletin* (August 1955). The special issue contains 25 articles contributed by colleagues and former students. Although he is continuing his private practice and research, Holman retired on 1 Sept. as head of the department of surgery at Stanford Medical School.

In addition, a commemorative issue of the *American Journal of Surgery* was recently dedicated to Holman. Presentation was made at a surprise breakfast given by more than 100 associates.

D. J. HANKINSON, former head of dairy industry at the College of Agriculture, University of Massachusetts, has been named head of the new depart-