longevity of bacterial spores or other resting stages of bacteria I have been carrying on studies of historic and prehistoric materials whose age is reasonably well known and in which large numbers of bacteria might be expected. I started with soils which had been kept in sealed bottles for 25 and 33 years, respectively, and then continued with subsoils which had been in bottles unopened for 65 years. In all these samples living bacteria are very numerous and in great variety and all the soils contained either single-celled green or blue-green algae or both in vigorous condition. I then proceeded to a study of adobe bricks taken from the interior of thick walls in the California missions from structures 112 to 150 years old. All these contained enormous numbers of living bacteria, and the youngest of them also showed single-celled green algae. Following these materials, I turned to some of the Arizona pueblos whose age is definitely known to be no less than 600 years old. From material in the heart of the pueblo walls I isolated many forms of bacteria, and the total numbers, while smaller than those in the mission bricks, are still very high. I proceeded next to examine respectively adobe bricks from pre-Inca pyramids near Lima, Peru, specially collected for me from the interior of the pyramid, and adobe bricks from pre-Aztec pyramids in Mexico, also collected expressly for me under special instructions. The age of the former is estimated by archeologists to be between 1,000 and 1,400 years and that of the latter no less than 800 to 1,000 years. In both of these adobe materials bacteria, while not as plentiful as in fresh soil, are still very numerous and comprise a great variety of forms which grow on "selective" media. Space is too limited in this note to permit of giving the detailed technique employed in these experiments, which will be described elsewhere, but attention is called to the remarkable longevity of both bacteria and of simple algae as they appear, respectively, in these experiments. I may add also that some of the mission walls have been protected from water during all their history, and all my specimens, whether from protected walls or not, are found to be extremely desiccated for the reason that they come from the heart of the wall to which water does not penetrate, as examinations at the end of the rainy season clearly attest.

Many still older materials than those described will be investigated and reported upon later.

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A POSSIBLE CAUSE OF OLD AGE

HEAVY water has a higher boiling point (101.42° C.) than ordinary water. Heavy water also inhibits the growth of seedlings, which seems to indicate that it has an inhibitory effect upon the normal functioning of the protoplasm. As the human body evaporates a large proportion of its water intake, it will in the course of years become enriched with heavy water. This increase in the proportion of heavy water in the body fluids may account for the increasing inhibitory action of the protoplasm during senility.

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REPORTS

RESEARCH IN THE YALE GRADUATE SCHOOL

SEVENTY-FOUR research projects have been undertaken by students already holding the degree of doctor of philosophy or its equivalent, who are enrolled in the Yale Graduate School as research fellows. Nine countries are represented in this group, including England, Germany, Canada, Belgium, China, Czechoslovakia, New Zealand, Norway and the United States. These men and women have been trained for their research at sixty different colleges and universities, and while most of them are working either in the Sterling Memorial Library or the laboratories of the university, some are working in places so remote as the Bishop Museum in Honolulu, the Yale Anthropoid Experiment Station in Orange Park, Fla., the Navajo and Shawnee Indian Reservations and the British Museum.

In addition to the faculty, library and laboratory facilities put at the disposal of research workers, a number of research fellowships to assist this group of scholars have been established. This year forty-one research fellowships with stipends were awarded. In addition, twenty honorary research fellows have been appointed without stipend. Another group of fellows has been sent to work at Yale by educational foundations, including the National Research Council, the Rockefeller Foundation, the American Council of Learned Societies, the Commission for Relief in Belgium, the Commonwealth Fund and the Alumni Association of former German Exchange Fellows.

Fifty-two of the seventy-four fellows are carrying on scientific work, while twenty-two are studying languages, philosophy and the social sciences. Chemistry has the largest group with seventeen working at the Sterling Chemistry Laboratory and five in the lab-

oratory of the Department of Physiological Chemistry.

Richard J. Block, of Scarsdale, N. Y., is carrying on a study of brain proteins in the laboratory of physiological chemistry. Robert O. Bengis, of New Haven, Conn., is studying the chemistry of coffee at the Sterling Chemistry Laboratory; Ebbe C. Hoff, of Lindsborg, Kans., is working on the finer structure of the nervous system and its correlation with nervous physiology, and Helen G. Richter, of New Haven, is making a pathological study of nervous tissues in dogs with a diet deficient in vitamin.

Sterling fellows are investigating the following subjects: Ernest Beaglehole, Wellington, New Zealand, cultural stratification in Polynesia; Robert M. Brick, Ventnor, N. J., at the Hammond Metallurgical Laboratories, grain boundaries as variables in solid equilibria relationships; John M. Bruhn, of Sioux Falls, South Dakota, at the Yale Anthropoid Experiment Station, the relation of basal metabolic rate to lesions in the cerebral cortex; Charles Burnham, of Fort Atkinson, Wis., meiosis in maize plants, and John R. Huffman, of West Haven, Conn., unimolecular homogeneous gas reactions.

Cecil T. Lane, of Montreal, is studying magnetism at the Sloane Physics Laboratory; Saunders MacLane, of Norwalk, Conn., is working in the mathematics department on the topology of algebraic systems, and Normal D. Newell, New Haven, Conn., is working at the Peabody Museum on a study of the late Paleozoic Pelecypode, of the United States.

The theory of electrolytes is being investigated in the Sterling Chemistry Laboratory by Lars Onsager, a Norwegian. Ernest C. Pollard, of Lincolnshire, England, is studying nuclear physics at the Sloane Physics Laboratory.

Julien A. Ripley, Jr., of Oyster Bay, N. Y., is applying scientific methods of research in the social sciences, particularly sociology; Daniel Raffel, of New Haven, Conn., is working at the Osborn Zoological Laboratory on the translocutions of parts of chromosomes of *Drosophila melanogaster* produced by x-rays; Otto L. Tinklepaugh, of New York City, is studying the relation of maturational factors to the social behavior of the chimpanzee and the macaque monkey; Harold Henderson Williams, of Howard, Pa., is studying the possible rôle of cholesterol in fat metabolism.

As Currier fellow in history, Bell I. Wiley, of Halls, Tenn., is collecting material in the South for a study of the Negro in the Confederacy. The new Indiana Fellowship in Anthropology is held by Charles F. Voegelin, of Berkeley, Calif., who is working in the field collecting material among the Shawnee Indians of Oklahoma. Two Bishop Museum fellows are working in the Islands of the Pacific. Albert C. Smith, of New York City, is making extensive botanical collections in a group of Polynesian Islands, and Laura M. Thompson, of Berkeley, Calif., is making an intensive ethnographical survey of the culture of one island in the Lau group.

REPORT OF THE TRUSTEES OF THE BANTING RESEARCH FOUNDATION

THE Banting Research Foundation has now been in active operation for six and a half years, though in the first two years the full capital sum was not available and the number of grants made were few. The capital sum now amounts to about $700,000 and the number of individual grantees has steadily increased. The total number of grants made during the period is ninety-two. These have been distributed to 63 workers in the following universities: Alberta 4, Saskatchewan 2, Dalhousie 8, Queen's 2, Western Ontario 2, Manitoba 16, McGill 26, Toronto 30 and 2 non-university. Some 50 papers have already appeared in scientific publications, while some 15 papers are in press or ready for publication. Several pieces of work are not as yet complete.

In accordance with its charter, the foundation also aids in the support of the Department of Medical Research (Dr. F. G. Banting) and from this source numerous papers have appeared, including ones dealing with the problem of silicosis and of the action of vitamins.

Important papers on the following subjects have been published during the past year by grantees: "On the Functioning of the Thyroid Gland" (A. C. Abbott, Manitoba), "Gastric Secretion" (A. M. Alley, McGill), "Anterior Poliomyelitis" (M. Brodie, McGill), "Addison's Disease" (M. M. Cantor, Alberta), "Fungous Diseases of the Skin" (A. M. Davidson, Manitoba), "Glycogen Metabolism" (G. T. Evans, McGill), "Thorium Oxide and the Reticulo-endothelium" (R. Gottlieb, McGill), "Urate Excretion" (H. C. Graham with E. G. Young, Dalhousie), "The Effect of Choline on Fat Metabolism" (J. M. Hershey and C. H. Best, Toronto), "The Fate of Lactic Acid in the Body" (F. L. Horsfall, Jr., McGill), "On the Function of the Lachrymal Gland" (P. R. McDonald, McGill), "A Study of the Histology of the Human Ovary" (D. Mainland, Dalhousie), "On Obstetrical Forceps" (J. Mann, Toronto), "Cholesterol Metabolism" (J. M. McEachren, Manitoba), "Urinary Antiseptics" (D. R. Mitchell and J. M. Scott, Toronto), "Action of Drugs on the Uterus" (R. A. Moreash and N. B. Dreyer, Dalhousie), "Serum Bilirubin" (F. D. White, Manitoba).

During the past year twenty workers received grants from this fund. The trustees feel assured that the