

"Fred Vlès will be remembered as the greatest biophysicist in Europe, and as the founder and editor of the *Archives de Physique biologique*, of which seventeen volumes were published since 1921. His work on the physical chemistry of cancerous serum is of outstanding importance.

"The same letter also informs me of the heroic death of one of his coworkers, Dr. Reiss, medical officer of an F.F.I. resistance group, killed in action at Chaudesaignes.

"The *Archives* will go on, under the direction of a group of his associates: Professor Vellinger, Professor G. Achard, Dr. Gex and myself."

In a letter dated August 26, 1945, from Munich Dr. W. M. Hoehn, of Kansas City, received the following interesting letter concerning Dr. Wieland, director of the department of chemistry of the Ludwig-Maximilian University in Munich:

I did see Dr. Wieland of Munich—Dr. Geheimat Wieland, former head of the School of Medicine and an authority on hormones to which he gave most of his studies. His case is typical of many of the learned men of this defeated country; I am not saying the treatment was justified as I don't know the whole story, only words in his defense.

Dr. Wieland is a rather small man with a pleasing personality, quite modest and his hair is very sparse; he wears very heavy glasses. I saw him at Starnberg where his friends arranged a meeting with me. He said the authorities had deprived him of his books and would not permit him to work in his laboratory. He has been moved forcibly four or five times and now lives in a single room with his wife, who is a pleasant woman. It

seems to be such a tragic ending to such a learned man—he is highly regarded in this city, every one knows him and those who attended the university and know him personally believe that he is being held under suspicion unjustly. I have heard the story from many sources, but it is best told by one of his students, a Belgian who has studied under him for five years. Briefly it is this: Dr. Wieland was to be given the Goethe Medaille für Kunst und Wissenschaft from the Nazis for his work. He did not wish to accept it as he was not in sympathy with the Nazis' uses of his discoveries and teachings. It was either accept or go to prison; his friends urged him to accept because much of his work was yet to be done and he could continue. The honor was accepted and he became tied up with the National Socialists.

Most of his time is spent now with his wood cutting and winter is coming on.

Dr. Wieland has done a great deal to present basic facts about bile acids, sterols and the opium alkaloids. The fundamental research which has been done in his laboratories has done much toward establishing the structures of these compounds. It is most unfortunate, indeed, that he can not continue work in this field and contribute to the store of fundamental knowledge.

It is instances of this type that will create the great intellectual desert in the European universities. The results will eventually affect the university and industrial life in the United States, since a great deal of the fundamental knowledge was formerly derived from the European universities. Men of Dr. Wieland's caliber are still able to make great contributions to the field of science which will work for universal good.

SCIENTIFIC NOTES AND NEWS

A DINNER was given on October 3 at the Faculty Club of Harvard University in honor of Dr. C. T. Brues, professor of entomology, on the occasion of his retirement with the title emeritus. There was an attendance of eighty. A bound book, containing letters of appreciation and a silver bowl were presented to him. Dr. F. M. Carpenter, who will succeed Dr. Brues as professor of entomology, presided.

THE Remington Gold Medal, conferred each year for work during the preceding year, or culminating over a period of years, judged most important to American pharmacy, has been awarded to Joseph Rosin, pharmaceutical chemist of Plainfield, N. J., in recognition of "contributions to scientific pharmacy and the development of drug standards for protection of the public." The medal commemorates Joseph P. Remington, the nineteenth century pharmacist who made many contributions to research, education and pharmaceutical literature. In naming

Mr. Rosin to receive the medal, the committee on award cited him as "the foremost American authority on chemical reagents."

PROFESSOR HENRY C. SHERMAN and Mrs. Sherman gave on September 25 a luncheon at the Men's Faculty Club of Columbia University in honor of Dr. H. Louise Campbell, who is retiring from her research work in food chemistry.

DR. D. ROBERT YARNALL, president of the Yarnall-Waring Company of Philadelphia, has been elected president of the American Society of Mechanical Engineers for 1945-46.

DR. WILLIAM S. HALL, now eighty-four years old, a member of the faculty of Lafayette College for sixty-one years, has presented his resignation. Dr. Hall, who was head of the department of mathematics, retired in 1934 after serving for fifty years, but he remained clerk of the faculty.

IN a note in the issue of *SCIENCE* for September 28, p. 325, it is stated that Charles E. Lawall had resigned as president of the University of Virginia. This should read the University of West Virginia.

DR. CHARLES F. DEISS, professor and head of the department of geology at Montana State University, has been appointed State Geologist of Indiana, and professor of geology and head of the department of geology and geography at Indiana University.

DR. CARL L. SIEGEL has been appointed to a professorship in the School of Mathematics of the Institute for Advanced Study, of which he has been a member since 1940. He is of German nationality and left his professorship in Göttingen in 1940 because of his opposition to the Nazi regime. Previously he had lectured in Hamburg and had held a professorship at Frankfurt-am-Main.

DR. ANTONI ZYGMUND, one of the leading mathematicians in the field of trigonometric series and a recipient of the Prize of the Polish Academy of Sciences in 1939 for mathematical research, has been appointed professor of mathematics at the University of Pennsylvania. In 1939-40 he was a visiting lecturer at the Massachusetts Institute of Technology. He will join the university in November and will teach classes at both the undergraduate and graduate levels.

DR. C. S. GROVE, JR., for the last four years in the Rayon Department of the E. I. du Pont de Nemours and Company at Buffalo, N. Y., has been appointed professor of chemical engineering at the State University of Iowa.

PROMOTIONS in the sciences of members of the faculty of the Case School of Applied Science, Cleveland, are: To professorships: Dr. Orley E. Brown, mathematics; Dr. Samuel H. Maron, physical chemistry; Dr. Clark O. Miller, chemical engineering; to associate professorships: Dr. Eugene C. Crittenden, physics; Dr. Charles C. Torrance, mathematics; Dr. William von Fischer, chemistry, and Dr. Leonard O. Olsen, physics. Dr. Paul E. Guenther has been made assistant professor of mathematics.

DR. IVAN A. GETTING has been appointed associate professor in the department of electrical engineering of the Massachusetts Institute of Technology. During the war he was head of a division of the Radiation Laboratory at the institute and directed research and development in the general field of the applications of radar to gunnery and associated problems.

DR. LOTHROP SMITH has returned to his work in the division of analytical chemistry at the State University of Iowa after an absence of two years when he was engaged in research work at the laboratory of metallurgy of the University of Chicago, and at Oak Ridge, Tenn.

DR. CARROLL C. PRATT, head of the department of psychology at Rutgers University, has been granted leave of absence to accept an appointment as professor of psychology in the Institute of Philosophy, University of Ankara, Turkey. Dr. Muzafer Sherif, professor of psychology at the University of Ankara, is at present in this country on a two-year fellowship granted by the U. S. Department of State. Professor Pratt will be accompanied by Mrs. Pratt, who has been requested by the Department of State to assist her husband in the study of the history and practice of Turkish music.

DR. RODERICK A. BARNES, formerly instructor and research fellow in chemistry at the University of Minnesota, has been appointed instructor in organic chemistry at Columbia University.

DR. ROBERT E. BUCKLES has been appointed instructor in organic chemistry at the State University of Iowa. For the past two years he has been engaged in work for the National Defense Research Committee at the University of Minnesota.

DR. W. D. TURNER, since 1929 a member of the department of chemical engineering of Columbia University, has resigned to become technical director of Florida Chemical Research, Inc. and Airkem, Inc., manufacturer of the chlorophyll air freshener.

DR. L. W. ROTH, formerly assistant professor in the department of physiology and pharmacology of the University of Colorado Medical School, has joined the department of pharmacology of the Abbott Laboratories in North Chicago.

DR. TORBJÖRN CASPERSSON, of Stockholm, and Dr. K. Linderstroem-Lang, of Copenhagen, have arrived in the United States. They are the guests of the Jane Coffin Childs Memorial Fund and the International Cancer Research Foundation. They plan to attend the Conference on Intracellular Enzymes in Normal and Malignant Tissues which is sponsored jointly by these two organizations.

DR. GILBERT STORK joined on August 27 the scientific staff of Lakeside Laboratories, Inc., Milwaukee, in the capacity of senior research chemist.

ROY INNES, since 1939 a member of the Operational Research Section attached to Fighter Command of the R.A.F., has been appointed general secretary of the British Association of Scientific Workers.

DR. WALTER H. BUCHER, professor of structural geology at Columbia University, is now in Venezuela at the invitation of the Venezuelan Government. In cooperation with Dr. Victor Lopez, of the Venezuelan Geological Survey, Dr. Bucher is engaged in the preparation of a tectonic map of Venezuela which will follow the design of the recently published tectonic map of the United States, and is being pre-

pared through the coordinated efforts of the various oil companies operating in Venezuela and of the Venezuelan Government. The Geological Society of America, in cooperation with Dr. Lopez and the Venezuelan Geological Survey, plans to publish a memoir on the geology of Venezuela to include a large colored geological map of the country. The tectonic map will supplement this project.

THE National Research Council announces that fellowships in mathematics, astronomy, physics, chemistry, geology, paleontology, physical geography, zoology, botany, agriculture, forestry, anthropology and psychology will be available for the year 1946-1947. These fellowships are awarded as a rule to persons under thirty-five years of age who are citizens of the United States or Canada, and who have met all the requirements for the doctor's degree. Applications must be filed on or before December 31, on forms obtainable from the Secretary of the Fellowship Board in the Natural Sciences, National Research Council, 2101 Constitution Avenue, Washington 25, D. C. A handbook describing the fellowships—stipends, conditions and tenure—will be furnished upon request.

DR. EDWIN C. JAHN, professor in the pulp and paper department of the New York State College of Forestry at Syracuse University, has leave of absence to enable him to accept an appointment with the Auxiliary Foreign Service of the Federal Department of State. He will undertake a special study of commercial and economic developments in the pulp and paper industry of the northern European countries. Dr. Jahn will be stationed at Stockholm and will cover the northern European countries, particularly Sweden, Norway and Finland. He is familiar with the area, having studied the chemical and paper industries there during the war, also having held an American-Scandinavian Foundation Fellowship to Sweden some years earlier.

DR. F. D. KEIM has been granted leave of absence from his work as chairman of the department of agronomy of the University of Nebraska. He left Lincoln by plane to New York on July 1 and sailed on the *Queen Elizabeth* for Europe. He is now stationed in the American University in Biarritz, France. This university is one of the two Army University Centers which were established in Europe, the other being at Shrivenham in England. Courses are offered to American service men while waiting for return to the United States. Dr. Keim does not expect to return for approximately seven or eight months.

DR. JAMES A. SHANNON, director of Research Service, Third New York University Medical Division,

the Goldwater Memorial Hospital, and associate professor of medicine at New York University College of Medicine, will deliver on October 25 the first Harvey Lecture of the current series at the New York Academy of Medicine. He will speak on "Chemotherapy in the Human Malaras."

DR. CHESTER S. KEEFER, Wade professor of medicine at the School of Medicine of Boston University, will address a joint meeting of the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine on "Penicillin" at the Palmer House on Friday evening, October 26.

THE National Committee for Mental Hygiene will hold at the Waldorf-Astoria Hotel, New York City, on November 1 and 2 its thirty-sixth annual meeting. A registration of 1,500 or more is expected.

THE University of Tennessee has established a "University Research Council," with Dean Fred C. Smith as chairman, which will coordinate the work of the various research agencies of the university and will promote "an expanded program of research." The council is composed of sixteen representatives from all present research agencies and from a number of the university departments. It is planned to encourage research in all fields and to assist in the growth of the entire research program of the university. The principal functions of the council include the stimulation of a broad functional program of research, the coordination of research projects in progress and the promotion of the application of research findings to the industrial, social and economic problems of the state. The council will also serve as the official body through which gifts and grants-in-aid may be made to the university for research purposes.

A GIFT of \$100,000 to the Georgia School of Technology at Atlanta is being utilized for the purchase of an A-C Network Calculator from the Westinghouse Electric Corporation. Plans are now being completed for an addition costing \$150,000 to the Research Building to house the calculator. Based on the number of circuits and other units, it is believed that it is second only to the calculators of the General Electric in Schenectady, N. Y., and Westinghouse in Pittsburgh, Pa.

JAMES W. ROCKWELL, of Houston, Texas, has made a gift to aid the endowment of the Marvin Lee Graves fellowship in internal medicine. This fellowship, established by the children of Dr. Graves, is designed to assist a young physician of promise in special research and study in internal medicine. It is named in honor of Dr. Marvin Lee Graves, of Houston, professor emeritus of medicine at the University of Texas School of Medicine, Galveston.

A GIFT of \$15,000 has been made by the Harshaw Chemical Co., of Cleveland, to Western Reserve University for the furtherance of research in inorganic

chemistry. The fund will support two fellowships in a three-year program of research under the direction of Dr. Harold S. Booth, professor of chemistry.

SPECIAL ARTICLES

BACITRACIN: A NEW ANTIBIOTIC PRODUCED BY A MEMBER OF THE B. SUBTILIS GROUP^{1,2}

IN the study of the bacterial flora of contaminated civilian wounds in the Presbyterian Hospital Unit (under the direction of the Subcommittee on Surgical Infections, National Research Council), it was found that at times organisms appeared on the blood agar plates following direct plating of the injured tissue that were not recovered from broth cultures made at the same time from the same material. This occurred most frequently when the broth cultures contained a large number of aerobic Gram-positive sporulating rods.

Many of these strains had some degree of inhibiting action on subsequent plantings of the Gram-positive cocci which appeared with them on the direct plate. One strain isolated from tissue debrided from a compound fracture of the tibia was particularly active. We named this growth-antagonistic strain for the patient, "Tracy I." When cell-free filtrates of broth cultures of this bacillus proved to possess strong antibiotic activity and to be non-toxic, further study seemed warranted. We have called this active principle "Bacitracin."

The antibiotic is formed when the strain is grown in shallow layers of tryptone broth, beef infusion broth, Savita or Amigen broth or in a synthetic medium. So far it has not been formed to any appreciable extent in submerged growth. The maximum titer is obtained if the antibiotic is harvested after three to five days incubation at 37° C. A heavy surface pellicle is formed, but the decanted medium contains the antibiotic which can be extracted with normal butanol and concentrated by steam distillation *in vacuo*. Further purification results in a grayish-white powder. It has not been obtained in the pure form to date.

"Bacitracin" is filterable through a Berkefeld or Chamberland filter. It is a neutral substance and is not precipitable from the original harvest by manipulating the pH. It differs in this respect from Gramicidin,³ Subtilin⁴ and Gramicidin S.⁵ It can not

be extracted by ether, chloroform, acetone or ethyl acetate. It is water soluble and withstands heating for 15 minutes at 100° C. without significant loss of titer. It does not hemolyze human or sheep's red blood cells in saline suspension. It is stable in acid solution, but unstable in alkaline solution above pH9. It resists digestion with pepsin or trypsin.

There have been no acute or delayed symptoms of toxicity when the relatively impure material, concentrated by butanol extraction to 50 to 100 times the potency of the original harvest, has been injected repeatedly by the subcutaneous or intraperitoneal routes (mice, guinea pigs) or by the intravenous route (rabbits). There has been no sign of local irritation when such preparations were injected subcutaneously into human volunteers or when applied locally to human infections or on the human conjunctiva. Blood levels have been obtained following human subcutaneous injections.

A standard "unit" for assaying potency has not yet been established. It has been convenient to designate as one "unit" the amount which when diluted 1:1024 in a series of two-fold dilutions in 2 cc of beef infusion broth, completely inhibits the growth of a stock strain of Group A hemolytic streptococcus when the inoculum used to seed the tubes is 0.1 cc of a 10⁻² dilution of an overnight culture in blood broth. The original harvest contains as a rule two to four units per cc. Material has been obtained which assayed ten units per cc when harvested from a synthetic medium. Table 1 gives the dilutions of one unit which result

TABLE 1
BACTERIOSTATIC ACTION OF "BACITRACIN"

Organisms	Dilutions of 1 unit giving complete bacteriostasis
<i>B. hem. streptococcus</i>	
Groups A, B, C, G	512-1024
Group D	16-64
Nonhemolytic streptococcus	0-64
<i>Pneumococcus</i>	
Types I, II and III	512-1024
<i>Staphylococcus aureus</i>	16-64
Other Gram-positive micrococci	16-256
<i>C. welchii</i>	512-768
<i>C. septicum</i>	512
<i>C. sordellii</i>	512
<i>C. histolyticum</i>	128
<i>C. sporogenes</i>	256

in complete bacteriostasis of some of the organisms which have been tested under suitable experimental conditions.

¹ Preliminary report.

² The work described in this paper was done under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and Columbia University.

³ R. J. DuBos, *Jour. Exp. Med.*, 70: 1-10, July, 1939.

⁴ E. F. Jansen and D. J. Hirschmann, *Arch. Biochem.*, 4: 297-309, July, 1944.

⁵ G. F. Ganse and M. G. Brazlini Kova, *Am. Rev. Soviet Med.*, 2: 134-148, December, 1944.