material belonging to the site of Sinanthropus Pekinensis. According to the report, the material was removed from Peking and taken to Tokyo by the Japanese. In one of his letters to Mrs. Whitmore, the following item is of special interest:

November 8. Such excitement! We have just recovered at Tokyo University a collection of bones and artifacts from the famous Sinanthropus Pekinensis site at Choukoutien, near Peking; also the original records of Davidson Black's research here; also, the complete original plans of the excavation and their financial records, 1927–1938. We want to return all this to its owner, Peiping Union Medical College, and today I'm going to scour around to see how best it can be done.

So far nothing authentic is known of the Sinanthropus material. A representative of the Peiping Union Medical College is in Peking and is making the necessary inquiries. He has been advised by cable to communicate with Dr. Whitmore. A second representative of the college is on the way to Peking. This new message from Tokyo and the earlier one in the newspapers, apparently from the same source, may not refer to the Sinanthropus material as suggested in Dr. Whitmore's letter, but rather to material from the "Upper Cave" of Choukoutien (Upper Paleolithic).

LETTER FROM DR. EDW. MESSIKOMMER

A letter received by Dr. Wm. Randolph Taylor, of the University of Michigan, from Dr. Edw. Messikommer in Switzerland gives some information regarding Central European phycologists, from which the most important sentences may be quoted:

Wie es um die deutschen Kollegen steht, ob sie mit dem Leben davon gekommen sind, noch in Besitze ihrer Bücher, Sammlungen u. s. w. sind, darüber sind wir noch völlig im Umklaren. Es wäre jammerschade, wenn z. B. Hustedt, Krieger, Krasske nicht mehr existeren würden und ihre angefangenen Werke nicht mehr zum Abschlusse bringen könnten. Aus Prag liegen keine erfreulichen Meldungen vor. So soll sich Pascher, nachdem er seine Familie umgebracht hat, das Leben genommen haben. Czurda soll mit seiner Familie deportiert worden sein, weiteres Schicksal unbekannt.

Dr. Taylor states that Dr. Adolph Pascher was the author of many papers, a leading authority on many groups of phytoflagellates, and editor of the widely used "Süsswasserflora Deutschlands u. s. w," in many volumes. Dr. Viktor Czurda studied the Zygnematales in particular. Professor F. E. Fritsch, of Queen Mary's College, reports having heard that Dr. K. Ondraček met the same fate as Dr. Pascher. He studied the physiology of members of the Desmidiaceae.

SCIENTIFIC NOTES AND NEWS

THE Distinguished Service Award for 1945 of the American Medical Association was presented on December 5 to Dr. George R. Minot, professor of clinical medicine at the Harvard Medical School, in recognition of his work on the liver treatment of anemia. The award was made at a dinner given in his honor at the Harvard Club.

MAJOR GENERAL NORMAN T. KIRK, Surgeon General of the Army, has been awarded the Distinguished Service Medal by General Brehon Somervell, Commanding General of the Army Service Forces, in recognition of his "outstanding leadership . . . in directing the largest medical department in the history of the United States Army." In part, the accompanying citation stated, "By careful planning, efficient administration, and dynamic example he made possible extraordinary care for sick and wounded American soldiers . . . care which has never been equalled in any war."

DR. MILTON HARRIS, director of research, Milton Harris Associates, Washington, D. C., has been awarded the Olney Medal by the American Association of Textile Chemists and Colorists. It will be presented at the annual dinner of the association on January 5 at the Hotel Pennsylvania, New York, N. Y., in recognition of outstanding achievement in the field of textile chemistry.

DR. GEORGE B. DARLING, formerly president of the W. K. Kellogg Foundation, who since 1943 has been associated with the Division of Medical Sciences of the National Research Council, first as executive officer of the committees on military medicine and later as vice-chairman of the division, has been appointed executive secretary of the National Academy of Sciences and of the National Research Council.

OFFICERS for the Eastern Pennsylvania Chapter of the Society of American Bacteriologists for 1946 are as follows: *President,* Dr. Harry E. Morton, department of bacteriology of the School of Medicine of the University of Pennsylvania; *Secretary-Treasurer,* Dr. Amedeo Bodi, Jr., Temple University School of Medicine; *Counselor,* Dr. William F. Verwey, Sharp & Dohme Laboratories, Glenolden, Pa.; and *Counselor* (alternate), Dr. James Harrison, department of biology of Temple University.

THE National Malaria Society held its twenty-eighth annual meeting in Cincinnati, Ohio, on November 13–15, conjointly with the Southern Medical As-

sociation. Twenty-four papers were presented at two sessions, one of which was a joint session with the American Society of Tropical Medicine. At the business meeting, the following officers were elected for 1946: *Honorary President,* J. A. LePrince, Memphis, Tenn.; *President,* Dr. Mark F. Boyd, Tallahassee, Fla.; *President-elect,* Mark D. Hollis, Atlanta, Ga.; *Vice-president,* J. A. Mulrennan, Jacksonville, Fla.; *Secretary-Treasurer,* Dr. Martin D. Young, Columbia, S. C.

THE following is a list of those elected as officers and council of the Royal Society at the anniversary meeting held on November 30: *President,* Sir Robert Robinson; *Treasurer,* Sir Thomas Merton; *Secretaries,* Sir Alfred Egerton, Dr. E. J. Salisbury, and *Foreign Secretary,* Professor A. V. Hill. *Other members of Council:* Dr. C. H. Andrewes, Dr. W. T. Astbury, Professor P. M. S. Blackett, Dr. E. C. Bullard, Professor I. de B. Daly, Professor R. A. Fisher, Dr. C. Forster-Cooper, Professor F. E. Fritsch, Dr. S. Goldstein, Professor E. L. Hirst, Professor W. V. D. Hodge, Dr. G. M. Holmes, Professor H. W. Melville, Professor R. A. Peters, Dr. D. R. Pye, Professor S. Zuckerman.

THE University of Illinois College of Medicine began its first three-months refresher course for veterans on November 1 and is taking applications for another course to be given next February. In charge of the program are Dr. Ford K. Hick, associate professor of medicine and assistant dean in charge of postgraduate instruction in medicine, and Dr. Charles B. Puestow, professor of surgery and assistant dean in charge of postgraduate instruction in surgery. Both men have only recently been released from the Army. At the time of release, Dr. Hick held the rank of Lieutenant Colonel and was in charge of the medical service at Mayo General Hospital, Galesburg, Ill., and Dr. Puestow was a colonel and commanding officer of the Twenty-seventh Evacuation Hospital Unit, staffed largely by members of the faculty of the College of Medicine of the University of Illinois.

THE Committee on Scientific Research of the American Medical Association has made the following grants: to Barnett Sure, Arkansas Agricultural Experiment Station, effect of sulfonamides on thiamine and riboflavin metabolism; to A. R. Tunturi, University of Oregon, effect of masking tones on the responses in the cerebral cortex to pulses of pure tones; to Israel S. Kleiner and A. H. Schein, New York Medical College, nutritive value of intact protein compared with the products of its enzymatic and acid hydrolysis; to Leo L. Hardt, Loyola University, Chicago, improvements of flexi-rigid gastroscope, and to David J. Sandweiss, Thomas L. Patterson and Harry S. Saltzstein, Wayne University, Detroit, relation of endocrine glands to gastric secretion.

DR. MARION M. BROOKE resigned in June as associate professor of preventive medicine at the College of Medicine at Memphis of the University of Tennessee, to accept a commission as senior assistant sanitarian, reserve, in the U. S. Public Health Service in charge of the department of parasitology in the newly established Diagnostic and Training Laboratory of the Office of the Malaria Control in War Areas.

DR. W. H. ALLAWAY, of Lincoln, Nebr., has joined the staff of Iowa State College as research assistant professor of soils. He also will serve as agent for the U. S. Department of Agriculture with the Bureau of Plant Industry, Soils and Agricultural Engineering.

JOHN IRVIN HAMAKER, head of the department of biology at Randolph-Macon Womans College, Lynchburg, Va., after forty-one years of service, has retired from teaching with the title emeritus. Before going to Randolph-Macon College he had taught one year at Radcliffe College, two years as graduate assistant at Harvard University, and six years at Trinity College, now Duke University. Paul A. Walker has been promoted from an associate professorship of biology to a full professorship, and succeeds Dr. Hamaker as head of the department. Dr. Walker, before going to Randolph-Macon, was assistant professor of zoology at the University of Connecticut, where he had taught for six years.

DR. ALFREDO BAÑOS, JR., formerly professor of physics and director of the Institute of Physics of the National University of Mexico, has been appointed associate professor of physics at the University of California, Los Angeles. Dr. Baños served during the war at the Radiation Laboratory of the Massachusetts Institute of Technology.

PROFESSOR H. I. SCHLESINGER, professor and executive secretary of the department of chemistry of the University of Chicago, has given up his administrative work in the department as of December 1, in order to devote the greater part of his time to research, writing and to his long-standing interest in the improvement of laboratory instruction in beginning courses in chemistry. Professor Schlesinger served as secretary of the department from 1923 to 1933 under the chairmanship of Professor J. Stieglitz, and as secretary of the executive committee of the department from 1933 to date. During the past few years, he has not only carried the greater part of the administration of the department, but has also been engaged in the direction of a number of important war projects. Professor Warren C. Johnson has been appointed chairman of the department of chemistry effective on December 1. He has been at the University of Chicago since 1927 and during the past five years has been engaged in war projects of the Na-

tional Defense Research Committee and of the U. S. Engineers Manhattan District. During the past two and a half years he has been director of the division of chemistry of Clinton Laboratories, Oak Ridge, Tenn.

DR. WALLACE M. YATER, formerly chairman of the Section on Experimental Medicine and Therapeutics of the American Medical Association, has resigned as professor and director of the department of medicine at Georgetown University School of Medicine, Washington, D. C.

DR. CARL R. FELLERS, head of the department of food technology at the Massachusetts State College, Amherst, has returned to the United States. He was a major in the Army Quartermaster Corps, and for three and a half years has been on duty in the Western Pacific with headquarters at Sydney, Australia. He collaborated closely with the Australian government and scientific agencies in food production and distribution problems for the Allied Military Forces in that area.

PROFESSOR FELIX ALEXANDER VENING MEINESZ, the Dutch geophysicist, is visiting the United States on a special mission on behalf of the Netherlands Prime Minister and the Ministry of Education, Arts and Sciences. He plans to investigate the progress science has made during the war, and to discuss with American scientists an international program for the continuation of scientific collaboration.

DR. HAROLD C. UREY delivered the principal address at the inauguration on December 10 of Dr. James Creese as president of the Drexel Institute of Technology.

THE thirty-second Thomas Hawkesley Lecture of the British Institution of Mechanical Engineers was given on November 16 by Sir Edward Appleton. The address was entitled "The Scientist in War-time." It emphasized the importance of the partnership between the scientist and his service colleague.

DR. GEORGE WALD, associate professor of biology at Harvard University, will deliver the third Harvey Lecture of the current series at the New York Academy of Medicine on December 20. He will speak on "The Chemical Evolution of Vision."

DR. BART J. BOK, assistant director of the Harvard College Observatory, spoke on November 19 before a meeting of the Sigma Xi Club of the Alabama Polytechnic Institute. The title of his address was "International Relations in Science."

PROFESSOR E. V. COWDRY, professor of anatomy at Washington University, St. Louis, and director of research of the Barnard Free Skin and Cancer Hospital, will hold on December 21 a special seminar on carcinogenesis at the Tumor Clinic of the Medical Branch at Galveston of the University of Texas. Professor Cowdry also will be guest speaker at the seminar of the M. D. Anderson Hospital for Cancer Research, Houston, on December 20.

A MEETING devoted to the discussion of atomic energy and foreign policy was held in New York on December 4 by the Independent Citizens Committee of the Arts, Sciences and Professions. Among the speakers were Secretary of Commerce Henry A. Wallace, Dr. Julian Huxley, Dr. Harold C. Urey and Dr. Harlow Shapley.

THE Winter Technical Meeting of the Institute of Radio Engineers will be held at the Hotel Astor, New York, from January 23 to 26. The Radio Engineering Show will open at 4:00 P.M. on January 23. One hundred and twenty-four exhibitors have already taken the hundred and fifty booths originally planned. Efforts are being made to obtain additional space to accommodate a large list of further exhibitors. The annual banquet will be given on Thursday evening, January 24. Dr. Frank B. Jewett, president of the National Academy of Sciences, will be the principal speaker, and Edgar Kobeck, president of the Mutual Broadcasting System, will be the toastmaster. The president's luncheon will be held on Friday, January 25, in honor of Dr. F. B. Llewellyn, the incoming president. L. M. Clement, vice-president in charge of research and engineering of the Crosley Corporation, will be master of ceremonies. The institute will be host at a joint meeting with the American Institute of Electrical Engineers.

MEETINGS of the American Association of Pathologists and Bacteriologists will be held at the University of Chicago on March 8 and 9.

THIRTY-ONE technical sessions have been arranged for February 4 and 5, at the meeting in Cleveland, Ohio, of the American Society of Metals, which will have its headquarters at the Hotel Statler. A series of four educational lectures will be presented on February 7 and 8. The American Industrial Radium and the Radiograph Society will have technical sessions on February 6, 7 and 8 at the Hollenden Hotel. Headquarters for the American Welding Society will be at the Hotel Cleveland. The twenty-seventh National Metal Exposition will be held during the week in the Public Auditorium.

DR. FIRMAN E. BEAR, professor of agricultural chemistry at Rutgers University and chairman of the Department of Soils of the New Jersey Agricultural Experiment Station at New Brunswick, will address the Plant Institute of the Ohio State University on December 10. His topic will be "Intensive Agriculture in New Jersey, and Some Soil-plant Problems Related Thereto." The Plant Institute will hold

a dinner in honor of Dr. Bear at 6 o'clock on the same evening. An hour of conversation following the dinner will be led by Dr. Bear. The topic will be "Soils, Plants, Animals, Man." Dr. Bear was formerly chairman of the department of soils at the Ohio State University.

SPECIAL ARTICLES

MARIHUANA ACTIVITY OF CANNABINOL[1]

IT is generally agreed that cannabinol, the aromatic analog of the hydro-aromatic active principles of hemp oil, is entirely inactive[2] and certainly not responsible for the characteristic pharmacological activity of hemp.[3,4,5,2,6] However, conclusions are valid only within the limits of the underlying test. Bioassay of hemp components and related compounds has been limited by their scarcity and by the toxicity of the solvents necessary to obtain solution. In our earlier experiments[7] done for the purpose of comparing synthetic compounds with the highly potent natural drug principles, there was little interest in a substance when its assay indicated a potency of less than 1/200 that of charas tetrahydrocannabinol. The availability of larger quantities of cannabinol and the finding that propylene glycol is an effective solvent for intravenous preparations have made possible a study of the effects of larger doses.

Two preparations of cannabinol were employed, one (I) a repeatedly recrystallized batch prepared from the outer crust of aged charas[8] (M.P. 75.0–75.5° C),[9] the other (II) a crude synthetic cannabinol.[10,11] The amount available was sufficient for six experiments in dogs. The substances were administered intravenously in concentrated solution in propylene glycol. The results are shown in Table 1. All doses over 12.2 mg/kg produced marked ataxia. The effects are graded from I to IV in accordance with the intensity of effect as described in detail elsewhere.[7] The action was in all respects identical with that of the natural tetrahydrocannabinols. The duration of ataxia varied from two to more than 24 hours according to the dose. The results indicate a potency of about 0.04.[12] The potency of the pure substance (I) may be somewhat higher.

TABLE 1

ATAXIA ACTIVITY OF CANNABINOL IN THE DOG BY INTRAVENOUS ADMINISTRATION IN PROPYLENE GLYCOL

Sample of cannabinol	Weight of animal kg	Cannabinol		Grade of ataxia
		Dose mg/kg	Concentration gm/100 cc	
I	8.98	12.2	62	I–II
I	7.95	18.1	20	III–
II	6.56	32.5	20	IV–
II	7.80	38.5	20	III–IV
I	6.84	52.0	62	III–
I	6.60	254.0	62	III–IV

In view of the high purity of the one and the synthetic procedure by which the other was prepared, the ataxia activity of these specimens must evidently be ascribed to the cannabinol molecule rather than to an impurity. Therefore cannabinol must be included among the compounds having marihuana activity. This signifies that the end-product of the process of oxidative degradation of tetrahydrocannabinol[9] from which the cannabinol of hemp resin results, is not entirely devoid of marihuana activity. The comparatively low potency of cannabinol is of little practical significance, and even the large amounts contained in some hemp oils contribute little to the total activity because of the presence of highly potent tetrahydrocannabinols. However, the activity of cannabinol is of interest from the aspect of the relationship between structure and activity, providing one more example of the fact that under natural conditions there is not necessarily a fundamental difference between aromatic and hydro-aromatic compounds. This agrees with our prior experience that the variations in spatial arrangement due to the presence and position of a double bond in ring A, while having considerable quantitative influence upon the potency, do not determine the presence or absence of marihuana activity.[7] The activity is neither absent when, as shown previously, an aliphatic cyclohexane[13] or -heptane[7] or even a pair of open alkyl chains,[14] nor, as this study shows, when an aromatic ring takes the place of the hydroaromatic ring of the natural or synthetic marihuana-active dibenzopyran derivatives.

[1] Aided by a grant from Abbott Laboratories, Chicago.

[2] A. D. Macdonald, *Nature*, 147: 167, 1941.

[3] F. Bergel and A. R. Todd, *Biochem. Jour.*, 33: 123, 1939.

[4] A. H. Blatt, *Jour. Washington Acad. of Sci.*, 28: 465, 1938.

[5] R. S. Cahn, *Jour. Chem. Soc.*, 1933: 1400.

[6] H. Marx and G. Eckhardt, *Arch. Exp. Pharm.*, 170: 395, 1933.

[7] S. Loewe, in: "The Marihuana Problem." Lancaster, The Jaques Cattell Press. 1944.

[8] From the Narcotics Laboratory, Washington, D. C., through the courtesy of Dr. J. Levine.

[9] J. Levine, *Jour. Am. Chem. Soc.*, 66: 1868, 1944.

[10] R. Adams, B. R. Baker and R. B. Wearn, *Jour. Am. Chem. Soc.*, 62: 2204, 1940.

[11] Through the courtesy of Dr. Roger Adams, Department of Chemistry, University of Illinois.

[12] Synthetic racemic (7,8,9,10-)tetrahydrocannabinol having 1/15 the potency of charas tetrahydrocannabinol was used as a standard, as in previous studies. (See reference 7.)

[13] R. Adams, S. Loewe, B. C. Pease, C. K. Cain, R. B. Wearn, R. R. Baker and H. Wolff, *Jour. Am. Chem. Soc.*, 62: 2566, 1940.

[14] R. Adams, C. K. Cain and S. Loewe, *Jour. Am. Chem. Soc.*, 63: 1977, 1941.