structures of these differ merely in the position of the double bond or possibly stereochemically. The lower-rotating form has a very high marihuana activity, many-fold that of purified red oil. The higher-rotating form is less active than the lower-rotating. Both the tetrahydrocannabinols are hydrogenated to a single hexahydrocannabinol of specific rotation $-70°$, which is also physiologically active. It seems probable that the marihuana activity of red oil is due to one or more of these substances.

Several methods have been devised and successfully used for synthesis of tetrahydrocannabinols from simple starting materials. Homologs and analogs are also available through the new procedures. The possible marihuana activity of these compounds is now being tested.

Recently Todd has isolated from red oil in the form of a derivative a substance he calls cannibol. No information regarding its chemical characteristics is yet available.

Haagen-Smit and his coworkers reported a few weeks ago the isolation from red oil of a crystalline compound which has marked physiological activity. No information on the chemistry of the compound has yet been published.

Red oil is obviously a welter of closely related chemical substances very difficult to separate from each other. It is probable in view of the researches under way in the University of Illinois laboratories that one or perhaps more than one active principle exists and that they are tetrahydrocannabinols or closely related compounds. The probability is that the substances isolated by Todd and by Haagen-Smit will be found to be similar to these in character.

Hemp is readily identified when vegetative material is available for study. Tests are also available for identifying extracts of hemp. Reliable, scientific unequivocal methods for identifying one or more active constituents in red oil, however, must await the more extended study of the pure active compounds. Only then also will it be possible to perform quantitative clinical tests in order to obtain more accurate information on the physiological and psychological action of marihuana.

THE ROYAL SOCIETY OF CANADA

By Professor D. A. KEYS
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THIS year the fellows of the Royal Society of Canada were the guests of the University of Western Ontario in London, for their annual meeting from May 20 to 22. The attendance was not as large as last year, but representatives from all parts of Canada attended and presented papers. The university buildings, situated in beautiful spacious grounds outside the city, presented a peaceful contrast to the present conditions in Europe, that visibly affected all who attended the meeting.

The presidential address, "A Study of the Organization and Work of the Royal Society of Canada," was delivered by Dr. H. M. Tory, following a complimentary dinner tendered the fellows, their wives and guests, by the City of London on Monday night, May 20. The president stated that the Royal Society of Canada differed in one respect from the similar society in England, in that it included under its organization all the intellectual movements which were deemed worthy of recognition. Thus with the Natural Science Sections III, IV and V, were associated the Literary Sections, including philosophy, literature, history and economics. After outlining the various contributions of the older sciences and literary fields of knowledge to our present western society, the lecturer concluded with the suggestion that we should at our annual meeting each year have a major symposium dealing in some form with the relations existing between the various sections. Two typical topics suggested were "The Effect of Science upon Literature in the Last Hundred Years" and "The Present State of Controversy between Science and Philosophy."

On the following evening, Dr. R. W. Boyle received the Flavelle Medal of the Royal Society for distinction in scientific subjects, in recognition of his researches, particularly on the development of "Asdics" and his work on ultrasonics. The presentation of the medal was followed by a scholarly lecture delivered by Dr. F. Cyril James, principal of McGill University, on "Science and Society," in which he traced the changes in western society brought about in the four centuries between 1475 and 1875 due to the impact of scientific discovery. He pointed out that the primary function of the social sciences is the charting for society of a course that is most appropriate in the light of the existing fund of human knowledge. Apparently the impact of science on society has not been wholly beneficial; the ethos of western society has not responded to the changes in its material environment, but if we are willing to face the major problem of deciding upon our ideals, the forces that science has placed at our disposal are sufficient to make the attainment of those ideals a practical possibility.

Section III (Chemical, Mathematical and Physical

Sciences) was held under the presidency of Professor J. A. Gray, who delivered the presidential address on "Studies in Beta and Gamma Rays," in which he outlined the early work done in Rutherford's laboratory at Manchester and the subsequent development of the theory of scattering and softening of the Gamma rays on passing through matter. Recent experimental results on the Beta ray spectra and the Gamma rays from Uranium X were presented by Dr. Gray. Five new fellows were elected to the section, Dr. A. N. Campbell, Professor P. E. Gagnon, Professor Gordon Pall, Dr. R. M. Petrie and Professor H. Grayson Smith.

Of the eighty-four papers presented to Section III, twenty-five were by title. Space permits the mention of only a few of those papers presented. Dr. S. A. Hodgson described the seismograph installation at the Lake Shore Mines, Kirkland Lake, Ont., and the results obtained in investigating the possibility of forecasting the rock-bursts which are prevalent in that mine. The results of experiments on the vibrations in aircraft, described by Dr. D. C. Rose, indicated the possibility of improvement in the design of such craft. Dr. J. S. Foster reported that he and his associates had obtained some new results in the Stark Effect, using Cu, Ni, Hg, Zn, Cd and Pb, using fields from 100 to 250 Kv/cm. R. G. Elson, Grayson Smith and J. O. Wilhelm described a new type of calorimeter for determining the specific heats of materials at liquid hydrogen temperatures. Among the results communicated, it was stated that the variation with temperature of the specific heat of manganese can be expressed by a Debye function with a characteristic temperature of 410° and a linear term 0.0042T. A very interesting investigation on the validity of the Ferry-Porter law in normal, enhanced and depressed states of visual sensibility, and the influence of stimulation of the senses of vision, hearing, taste and smell upon the sensibility of the organs of vision were reported by Dr. Frank Allen. It appears that stimulation of one sense causes a periodic rise and fall in another, the results confirming and extending the work of Kravkov. For example, stimulation of the ear by sounds makes red colors appear dimmer and green brighter when no rest interval is allowed, but after a rest interval of 3 minutes, the red appears brighter and the green dimmer. A number of papers on meteorology by the staff of the Meteorological Office were communicated by the director, John Patterson, who exhibited a new radio-sonde instrument by R. C. Jacobsen, now being used by the service. Dr. L. Gilchrist described geophysical results of electrical drill hole coring carried out with the assistance of A. R. Clark, and Dr. D. A. Keys gave the results of a magnetic survey on Calumet Island. Dr. D. K. Froman described a new 12-inch cloud chamber used in a magnetic field for the study of cosmic-ray mesotrons.

Among the fourteen mathematical papers read, Dr. Buchanan spoke on "Second Genus Crossed Orbits," in which he considered a special case of the restricted three-body problem. Dr. R. L. Jeffery gave a paper on the integration of functions in a complete normed sector space, in which he set forth a theory equivalent to that of G. Birkhoff. Dr. Gordon Pall delivered a paper on "Simultaneous Representation in Quadratic and Linear Forms," and among several papers read by Professor Synge, attention is drawn to a new electromagnetic energy-tensor. A direct application of the laws of conservation of energy and momentum leads to the equations of motion given by the Lorentz ponderomotive force, without the radiation term. Dr. W. L. G. Williams communicated the results of an investigation on hyperbolic trigonometry.

In the Chemistry Section Dr. E. W. R. Steacie and his students presented five papers on photosensitized reactions, in which the polymerization of ethylene was investigated, using different wave-lengths in the ultraviolet, and an estimate of the strength of the C–H bond was determined. Dr. P. Gagnon described the synthesis of some new hydrocarbons in the Indene series, and Dr. R. H. F. Manske described the structure of Hunnemanine. A large number of papers were read by Dr. R. H. Clark and his students. An examination of the phenolic constituents of the water soluble ethanolysis products of western red cedar, Douglas fir and western hemlock was made, and the oil isolated from the phenolic constituent in each case on methylation with diagomethane yielded a white crystalline compound with the same melting point as that from spruce and maple woods. Another paper described a method for the synthesis and isolation of glycuronic acid.

Professor Otto Maass was elected president of Section III and Professor J. K. Robertson, the secretary.

The feature of the meetings in Section IV (Geological Sciences) was the excellent address of the president, Professor J. J. O'Neill, on "The Exploitation and Conservation of Mineral Resources in a Balanced Development of Canada." He urged that while the mines are active in Canada's north, bringing men and money into the country, is the time to take preliminary steps toward permanent settlement; otherwise, when mines are exhausted the settlements will be deserted and become "ghost towns." Each district will have to be considered as an individual problem, and study of these problems should be begun at once. Agriculture in the few areas possible, reforestation, to be followed eventually by scientific lumbering, and the development of manufacturing industries near sources of power were some of the possibilities suggested.

Among the twenty-eight papers presented, special mention may be made of one by P. M. Hurley, C. Goodman and R. D. Evans on the investigations of the helium method of age determination. They show that the agreement between the results obtained using samples of pyroxene from specimens is much better than that obtained from determining the age from felspar. It is suggested that pyroxene retains its helium and is more suitable for such age determinations. Dr. J. E. Gill called attention to the unsatisfactory state of fault nomenclature and suggested certain improvements. As a result, a committee was appointed to study the question and report at the next meeting. J. T. Wilson summarized the results of a study of air photographs covering a large belt of the North West Territories. The investigation showed this part of the Canadian Shield to be a mosaic of fault blocks, some having horizontal movements as much as eighteen miles.

The presidential address of Section V (Biological and Medical Sciences), entitled "The Causes of Hybrid Sterility and Incompatibility," was delivered by Professor W. P. Thompson, of the University of Saskatchewan, and stressed particularly the time in the life-cycle at which the causes may operate.

A notable feature of the meeting was the group of papers on fish (and particularly on salmon). Professor A. G. Huntsman described the habits of Atlantic salmon and discussed deaths due to high water temperatures in the rivers of Eastern Canada, while Professor E. M. Walker presented the work of K. C. Fisher and P. E. Elson on temperature preference in Atlantic salmon and speckled trout. W. A. Clemens reported A. L. Pritchard's work on the age of coho and spring salmon of British Columbia and his own work on sockeye salmon in the same region. Attempts to explain the origin of kokane (a variety of sockeye salmon) were made in a paper by W. E. Ricker, reported by R. E. Foerster. The close affinities of the Coregine fishes of Canada with Siberian species were dealt with by J. R. Dymond.

Desiccation in Southern Ontario, as reflected in the decreasing mileage of streams, was the subject of a paper by A. F. Coventry, read by J. R. Dymond. This led to an animated discussion as to the causes of desiccation.

Botanical papers included one by Professor R. B. Thomson on the study of sporelings in the vascular cryptogams as a basis for the interpretation of seedling organization, another by H. B. Sifton on the development of the air spaces in the leaf of Labrador tea, and two by Professor E. H. Moss on interxylary cork in *Artemisia*. Professor G. W. Scarth summarized work on frost and drought resistance carried out with J. Levitt, B. Siminovitch and others and described the changes in the physical state of protoplasm associated with hardening.

James Miller discussed the parts played by the basal and prickle layers of the epidermis in regeneration and neoplasia, and M. L. Barr described the effect on the synapse of axon reactions in motor neurons. C. C. Macklin demonstrated that after over-inflation of the excised lung the internal septa and sheaths of the pulmonary blood vessels are similarly pneumatized. Dr. Benjamin Kropp brought forward much material to demonstrate that in spontaneous and therapeutic abortions structural abnormalities were present in the villus capillaries and villus epithelium. H. Wasteneys, B. F. Crocker and P. Hamilton reported that deuterium-labeled proteins are useful for the study of digestion in the dog. Madge Thurlow Macklin gave evidence that tumors in man have a genetic basis, and Lionel Penrose presented studies on the grandchildren of consanguineous unions. Dr. D. A. Scott discussed the structure of insulin crystals prepared from bison and human pancreases in comparison with those previously prepared from other sources. Dr. Leslie Young described his synthesis aryl hydrogen sulfates *in vitro*.

Drs. Clark, Cleghorn, Ferguson and Fowler demonstrated that adrenal insufficiency results in a decrease in extracellular fluid and in plasma volume, that the percentage decrease of the former is less than the latter and that the decrease in plasma was not sufficient to account for circulatory collapse. Dr. Bram Rose presented evidence to show that in various types of shock there is a decrease in blood histamine. Dr. N. W. Roome advanced further evidence tending to dissociate the sympathetic nervous system from shock due to hemorrhage. Professor F. R. Miller demonstrated the local effects of eserine and acetylcholine on the electrogram of the cerebellar cortex. Dr. P. J. Maloney presented further evidences of the influence of bile salts on the flocculation of toxin. Professor G. B. Reed described a semi-synthetic medium for the production of gas gangrene and tetanus toxins.

E. Horne Craigie described the area of distribution of the middle cerebral artery in birds and the form of the capillary bed of the central nervous system in *Dermophis*. J. McDunnough discussed some marine Coleophoridae, and C. McLean Fraser described hydroids of the Pacific Coast.

Other papers dealt with genetics of size (J. W. MacArthur) and the structure of homotypic and somatic chromosomes (L. C. Coleman).

Principal R. C. Wallace, of Queen's University, was elected president of the society for the ensuing year.