search on chronic nephritis by Dr. Joseph M. Hayman, Jr., associate professor of medicine.

THERE will be available for the sixteenth International Physiological Congress, to be held in Zurich from August 14 to 18, 1938, several fellowships of $250 each to be awarded by the Committee on International Congresses of the Federation of American Societies for Experimental Biology on the nomination of the councils of the constituent societies of the federation. Applications for these awards should be made to one of the following before January 5, 1938: Dr. A. C. Ivy, secretary, the American Physiological Society, 303 East Chicago Avenue, Chicago, Ill.; Dr. H. A. Mattill, secretary of the American Society of Biological Chemists, State University of Iowa, Iowa City; Dr. G. Philip Grabfield, secretary of the American Society for Pharmacology and Experimental Therapeutics, Harvard Medical School; Dr. Paul R. Cannon, secretary of the American Society for Experimental Pathology, University of Chicago. The awards are subject to the following conditions: Applicants must be under thirty-five years of age and must not have attained university rank above that of assistant professor; each applicant must present the draft of a meritorious paper which he agrees to present to the congress if he receives a fellowship. Applications must be made to the secretary of the society which includes the field of study; applicants need not be members of the federation. Dr. D. R. Hooker, of the Johns Hopkins University, is secretary of the federation.

THE Sigma Xi Committee on Grants-in-Aid, of which W. R. Whitney, Harlow Shapley and Gary N. Calkins are the members, have made the following grants: Professor Alan Arthur Boyden, Rutgers University, $150 for the serological study of the relationship of Crustacea. Professor Leopold Raymond Cerecedo, Fordham University, $250 for the development of a 2-day test for the bio-assay of antineuritic concentrates in mice. Professor Forrest F. Cleveland and Professor M. J. Murray, Lynchburg College, $300 for the Raman effect and molecular structure. Professor Maurice Ewing, Lehigh University, $200 for the geophysical investigations of oceanic basins. Professor George William Hunter, III, Wesleyan University, $250 for studies of the reaction of the host to the penetration of larval parasites. Professor Louallen F. Miller, University of Minnesota, $250 for a study of solar radiation by spherical absorber. Edgar J. Murphy, College of the City of New York, $150 for a study of measurement of x-rays and gamma rays. Professor Jens Rud Nielsen, University of Oklahoma, $200 for a study of Raman spectra and structure of simple polyatomic molecules. Aaron John Sharp, University of Tennessee, $250 for a study of types and distribution of certain bryophytes and spermatophytes.

A DAVID ANDERSON-BERRY GOLD MEDAL, together with a sum of money amounting to about £100, will be awarded in July, 1938, by the Royal Society of Edinburgh to the person who, in the opinion of the council, has recently produced the best work on the nature of x-rays in their therapeutical effect on human diseases. A similar award will be made every three years. Applications may be based on both published and unpublished work. They should be in the hands of the general secretary, Royal Society of Edinburgh, 22 George Street, Edinburgh, 2, by June 1.

DISCUSSION

EFFECTS OF HEAVY WATER ON LIVING CELLS

IN SCIENCE for November 26, under the title "Osmotic Effects of Deuterium Oxide (Heavy Water) on Living Cells," Professor S. C. Brooks reports very interesting experiments which seem to illustrate in living cells the osmotic effect of deuterium oxide deducible from its low vapor pressure. The temporary shrinkage of leaves in deuterium oxide and the hemolysis of D_2O-containing red blood cells when exposed to pure H_2O-salt solution are described. These facts are satisfying corollaries to the lower permeability of erythrocytes to D_2O recently reported independently by both Brooks and Parpart.

In his last paragraph, however, Professor Brooks attempts to illustrate his thesis from the mammalian world by unfortunate examples. Really pure heavy water elicits in mice neither evidences of "thirst" nor "symptoms of distress." In man it produces no "burning sensation" but rather seems to exhibit to some people mild and varying differences in taste from ordinary water.[1]

These contradictions are made advisedly, after nearly three years' experience[2] in the field. Our results have afforded better illustrations of the point made by Professor Brooks. In this laboratory we have, for example, demonstrated in mice that pure heavy water administration causes, on the first day after it is used to replace ordinary water, a definite shift in the water balance to the positive side. This was shown by complete water determinations confirmed by determinations of body weight.[3] A paper now in press[4] illus-

[1] K. Hansen, *Klin. Wochenschr.*, 14: 1489, 1935.
[2] H. G. Barbour, *Yale Jour. Biol. and Med.*, 9: 551, 1937.
[3] H. G. Barbour and Jane Trace, *Jour. Pharm. and Exp. Therap.*, 58: 460, 1936.

trates furthermore the increased tendency of the body to retain water when part of the hydrogen has been replaced by deuterium. A decrease in the insensible water loss relative to the metabolism is described during the period when mice are being raised, either in two days or in five days, to the level of one fifth saturation with D_2O.

It is quite likely, too, that the reversible contraction of *Fundulus* melanophores, which we have also demonstrated,[5] depends partly upon an osmotic factor.

So far as mice are concerned, then, we have yet to find evidence that D_2O "violently" dehydrates living cells. But a number of interesting manifestations of its lower vapor pressure are illustrated by its pharmacological action in mammals.

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THE NON-VOLATILE ACIDS OF THE FRUIT OF NYSSA OGECHE[1]

THE "Ogeechee Lime" appears as a small fruit on the tree *Nyssa ogeche,* which grows in wet ground in the southern states. The fruit which came to the attention of the author was from along the Conoochee River in Georgia. They were light green, olive-shaped fruits, 2.5 to 3.5 cm long with a large single central stone and a thin skin, with cell-walls connecting skin and stone which were firmly attached to the stone, running lengthwise. Forty to 50 per cent. by weight of juice can be expressed by squeezing the fruit. This juice is strongly acidic, but lacks any distinctive flavor. The juice showed about 6 per cent. of acid, calculated as citric. It is said that natives of the regions where they grow use them to make a "limeade" drink and a preserve.

The non-volatile acids were isolated from 100 fruits weighing 637 gm and converted to ethyl esters by the usual method of lead salt precipitation and esterification. A small portion (2 gm) boiled at 150–171° at 10 mm and the remainder boiled at 171–172° at 10 mm (12 gm). The hydrazides of the fractions were prepared. From the low-boiling fraction malic hydrazide, m. p. 176–177° (mixed m. p. 176–177°) was identified. The fraction boiling at 171–172° at 10 mm was citric ester, giving a hydrazide melting at 102–104° when allowed to form spontaneously (hydrated form) and melting at 149–150° when seeded with anhydrous citric hydrazide. It is evident that the principal acid of the Ogeechee lime is citric acid with a small amount of malic.

D. H. WHEELER

[4] H. G. Barbour and Lillie Rice, *Jour. Pharm. and Exp. Therap.*, 1937 (in press).

[5] H. G. Barbour and S. B. Bogdanovitch, *Jour. Pharm. and Exp. Therap.*, 61: 148, 1937.

[1] Food Research Division Contribution No. 348, Bureau of Chemistry and Soils, U. S. Department of Agriculture.

IODOACETIC ACID AND SULFUR METABOLISM

IN view of the suggestions in the literature that iodoacetic acid exerts its inhibitory effect on certain body processes (*e.g.,* absorption, muscle metabolism) by combining with a sulfhydryl compound which may be essential for these processes, experiments have been designed in an attempt to demonstrate *in vivo* a combination of iodoacetic acid with sulfur-containing substances which are of biological importance. Using a technique developed in this laboratory,[1, 2] it has been possible to markedly restrict the growth of young white rats, ingesting a relatively low protein diet, by incorporating suitable quantities of iodoacetic acid in the basal ration. Moreover, the addition of either l-cystine of dl-methionine to the basal diet already containing the iodoacetic acid results in an immediate growth response, and the animals continue to grow at a good rate. This response is striking and appears, to date, to be specific for cystine and for methionine. This study is being actively continued and expanded along the following lines of investigation: (1) To determine the mechanism by which iodoacetic acid appears capable of depleting the sulfur-containing amino acid reserves of the organism; (2) to determine the nature of the *in vivo* combination between iodoacetic acid and these sulfur compounds; (3) to determine the possible relationships of this type of combination to the processes of absorption from the intestine and muscle metabolism.

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AN INTERESTING HOAX PERPETUATED IN AN EARLY SCIENTIFIC BULLETIN

READERS of *Time* for June 7, 1937, were no doubt amused by the article concerning the spider hoax perpetrated by Ralph D. Paine in the 1890's. The article reported that several scientific journals printed the hoax as fact. It may be of interest to know that one of these scientific journals was the *Bulletin of the U. S. Department of Agriculture, Division of Entomology.* The title of the bulletin, which was published in 1897, is "Some Miscellaneous Results of the Division of Entomology." Under "General Notes" on page 82 there is the following sub-head and account:

A NEW DIRECT BENEFIT FROM INSECTS

When Kirby and Spence wrote their chapter on "Direct benefits derived from insects" and recorded the use of insects for food, the use of honey from bees for the same purpose, the use in medicine and the arts and manufacturers of blister beetles, insect galls, Coccidae furnishing lac, wax insects and the silkworm, the time had hardly

[1] A. White and R. W. Jackson, *Jour. Biol. Chem.*, 111: 507, 1935.

[2] A. White, *Jour. Biol. Chem.*, 112: 503, 1936.