ionization to 282 Å by means of a line source of photons. Mass spectrometric techniques permitted measurement of the cross section of doubly charged xenon and the dissociative ionization of nitrogen and hydrogen molecules. However, the electron-retarding technique was also used to measure the excitation probability for the $^2P_{\frac{1}{2}}$ state of the heavier rare-gas ions.

A new apparatus with greatly improved mass resolution for the study of the photodetachment of electrons from negative ions was described by Bruce Steiner (National Bureau of Standards, Washington, D.C.). An f/1.5 monochromator permits light resolution between 2 Å and 200 Å, and is limited only by the attainment of usable, photodetached electron signals. Various negative ions have been extracted from a hot-cathode arc discharge. In particular, Steiner described the photodetachment of negative ions formed in a SF_6-NH_3 discharge as a function of wavelength. He discussed the absolute cross sections, the threshold energies, and the nature of the transitions involved.

In the opening lecture on electron impact processes, C. E. Kuyatt (National Bureau of Standards, Washington, D.C.) first showed the audience an artist's conception of an electron, the appearance of which left no doubt as to the authenticity and to the reasons for occasional difficulties in their management. Kuyatt then described the basic features of two electron monochromators now in use at NBS. He presented details of the properties of available electron beams, such as current, angular divergence, energy, and energy spread. Studies of the interaction of nearly monoenergetic electron beams with atoms and molecules have led to the observation of striking features including sharp resonances in the total electron-scattering cross section attributed to the temporary formation of highly excited negative ions.

P. Marmet (Laval University, Quebec) reported on a clarification of some electron monochromator problems. He made a distinction between the essential and auxiliary parts of the cylindrical electron monochromator, and emphasized the importance of considering the scattering effect in high electron densities. The proper design of the ionization chamber was discussed and recent results of studies with the Marmet-Kerwin monochromator were presented. Using an electrostatic electron analyzer patterned after this monochromator, M. A. Fineman (General Atomic Division of General Dynamics, San Diego) obtained electron-impact measurements of hydrogen molecules and atoms. He compared the former with reported photoionization measurements and ascribed differences between the two to processes allowed for electron impact but not permitted for photon impact. Some features of the ionization efficiency curve for hydrogen seem to be related to vibrational and rotational structure of the ion. However, most of the structure is obscured by competing processes such as autoionization. The consensus of the speakers was that ionization processes for the simplest of molecules appear to be anything but simple.

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Canadian Plant Physiology

The Canadian Society of Plant Physiologists (La Société Canadienne de Physiologie Végétale) held its annual meeting at the University of New Brunswick, Fredericton, 2–5 June 1965. The program opened with a symposium on problems in marine algal physiology. J. S. Craigie (National Research Council, Halifax) discussed the problems of isolating and identifying excretory products of marine algae from sea water. Compounds excreted by several brown and red algae were identified as condensed polyphenolic substances with properties capable of promoting growth. A derivative of brominated benzyl alcohol, excreted by *Polysiphonia lanosa*, was isolated and crystallized. A pure crystalline extracellular chitan excreted by the diatom *Thalassiosira fluviatilis* was isolated and characterized, and was claimed to be the first recorded evidence for the occurrence of poly-*N*-acetyl glucosamine in the algae. L. Provasoli (Haskins Laboratories, New York) discussed the nutritional requirements of marine algae grown aseptically. Unlike unicellular algae, seaweeds grown autotrophically require a range of vitamins in specific concentrations and ratios for normal morphological development. The growth of *Ulva* and *Monostroma* in aseptic culture was maintained only in the presence of plant hormones and phenolic compounds and by the addition of supernatants containing active substances from a variety of red and brown seaweeds and from several unicellular algae grown aseptically on artificial media. These unidentified, active substances can be extracted with ethanol and are heat resistant. Their ubiquitous production in the sea underlies the significance of external metabolites in the water environment. R. T. Wilce (Amherst, Massachusetts) reported on the survival of algae in the Arctic Sea. Reproductive activity at the end of the winter period and an abundant spring and summer growth were found to depths of 30 meters. The greatest concentration of algal biomass occurred at 15 to 20 meters, where extremely low light intensities were recorded. Survival under these conditions requires either the possession of a highly efficient photosynthetic apparatus or the facility to exist heterotrophically. Evidence for the heterotrophic growth of pigmented algae in deep lakes and unlit caves suggested that these arctic populations also thrived by the heterotrophic utilization of organics from the sea.

Continuing their work on plant photorespiration, G. Krotkov *et al.* (Queens, Kingston) showed a distinction in spruce tissue between photo- and dark respiration, with the latter inhibited by light. W. Turner and R. G. S. Bidwell (Toronto) presented evidence for the enhancement of CO_2 assimilation by leaf blades after the application of 3-indoleacetic acid (IAA). E. R. Waygood *et al.* (Manitoba), working with detached wheat leaves, showed that photophosphorylation could be both restored and enhanced by treatment with benzimidazole, and that the synthetic pathway of nicotinamide adenine dinucleotide (NAD) and NAD phosphate from C^{14}-carbonylnicotinic acid was essentially the same as that reported for animal tissues and microorganisms. The permanent bleaching of *Euglena gracilis* by derivatives of nitrofuran was discussed by D. R. McCalla (McMaster, Hamilton). Other mutagens and radiomimetic agents were used as bleaching agents but only *N*-methyl-*N*-nitroso guanidine proved nonlethal. It was suggested that these bleaching agents damage chloroplast DNA. Continued interest in the biosynthesis of aromatic compounds and phenolase enzyme systems were reported by A. C. Neish *et al.* (Atlantic Regional Laboratory, National Research Council, Halifax). In particular, the biosynthesis of the derivatives of cinnamic acid

as the C_6-C_3 intermediates in lignin formation was discussed. Other biochemical contributions of interest dealt with the synthesis in vitro of glycine and the metabolic utilization of C^{14}-ethanol (E. A. Cossins *et al.*, Alberta). N. E. Good (Michigan) discussed the preparation of several new H-ion buffer systems. They were mostly substituted derivatives of *tris* (hydroxmethyl) amino methane covering the *p*H range from 6 to 8 and were claimed to be superior to both tris and phosphate buffers.

Several speakers described the structure and the effects of environment on plant cells as observed with the electron microscope and the light microscope. A. J. Mia and G. Setterfield (Carleton, Ottawa) reported the synthesis of cell wall material by apposition in Rauwolfia sclereids with H^3-glucose pulse labeling. In a session on translocation in the higher plants, researchers from the Biosciences Division (N.R.C., Ottawa) described the experimental control of C^{14}-sugar movement by changing the node temperature (J. A. Webb and P. R. Gorham) and discussed the distinct lack of evidence demonstrating sugar conduction in the sieve tubes (D. C. Mortimer and M. Suzuki). D. S. Fensom and D. C. Spanner (London, England) reported their measurements of microelectrode potentials in the conducting tissue of *Nymphoides* and *Heracleum*; they had calculated that the electroosmotic efficiency was sufficient to maintain sugar flow through partially blocked pores of the sieve plate.

Exogenously supplied giberellins and IAA strongly influence plant development. E. Schneider and F. Wightman (Carleton, Ottawa) showed IAA-2-C^{14} to be metabolized mainly through conjugation to indoleacetyl aspartic acid, indoleacetyl glucose, and 2-OH indoleacetylglucose in barley seedlings over a 24-hour period. A. Winter and K. V. Thimann (Harvard), however, could find no evidence for conjugate compounds over a 2-hour period in *Avena* coleoptiles, and considered exogenously supplied C^{14}-IAA to be physically bound to a protein fraction. N. A. Andreae (Dept. Agriculture, London) showed that conjugate products were formed, with IAA inactivation, when pea roots were pretreated with an excess of IAA and naphthalene acetic acid. An adaptive period of 2 to 4 hours was necessary before the conjugate products were discerned. 2,4-Dichlorophenoxyacetic acid was not conjugated and remained inhibitory regardless of the pretreatment time. J. I. Toohey and C. D. Nelson (Queens, Kingston) reported two new herbicides derived from a soil bacterium inhabiting old pastures. The compounds were toxic to algae and higher plants but not to insects, fish, or mammals. They were isolated and identified as phenazine-1-carboxylic acid, most toxic to higher plants, and the 2-OH derivative, most toxic to the algae.

Officers of the society elected for 1965–66 were president, G. H. N. Towers (University of British Columbia); vice president, D. Simminovitch (Department of Agriculture, Ottawa); secretary-treasurer, D. Canvin (Queens, Kingston); eastern director, A. R. A. Taylor (University of New Brunswick), western director, M. S. Spencer (University of Alberta).

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Hermaphroditic Fish

Functional hermaphroditism is widespread among the bony fish, but until recently so few coordinated data on the subject have been available that it has been ignored by comparative endocrinologists, behaviorists, and ecologists—all of whom should find among these unusual fish exceptions to prove some of their "rules." That hermaphroditic fish are now beginning to get the attention they deserve, however, was apparent from the conference on intersexuality in fishes held on 20–21 May 1965 at the Cape Haze Marine Laboratory in Sarasota, Florida. Specialists and students from the United States, Germany, and Japan attended. Most of the studies reported dealt with species of fish in which the individual functions both as male and female during its life history. Experimentally induced hermaphroditism and other related aspects of piscine sexuality were also discussed. The conference was appropriately dedicated to two recently deceased pioneers in the field—Umberto D'Ancona and G. J. van Oordt.

Most hermaphroditic fish are marine, and marine fish are notoriously loath to exhibit sexual activity in captivity. Moreover, it has been nearly impossible to collect examples in all the different stages of sexual develop-