

Russell's successor was the former meteorological assistant in charge of weather map preparation, H. A. Hunt, who with a study of southerly busters had won the prize instituted by the Hon. Ralph Abercrombie during his visit to Australia. Hunt subsequently became (in 1906) the first head of the new Commonwealth Meteorological Service, created over the protests of the State Meteorological Bureaux as a federal body on the advice of the University of Melbourne.

The foundations of Australian meteorology were thus laid well before Federation and as it were part-time. No less than three Fellows of the Royal Society took part in their creation and honour is due to them for this achievement.

Dr. C.H.B. Priestley, F.R.S., in calling for a vote of thanks from Mr. E.W. Timcke, a former Director of Meteorology, mentioned that the name of Russell, as the first student of southern hemisphere general circulation, had at one stage been considered for the new Commonwealth Meteorology Research Centre. He suggested that the later history of Australian meteorology might also receive some attention and added that these Colloquia were suggested by him in 1948 and eagerly adopted by the then Director of Meteorology, Mr. H.N. Warren. Mr. E.W. Timcke, Warren's successor, in moving the vote of thanks contributed some memories of Stanthorpe's thunderstorm shooting with rockets and of a two pendulum clock designed by Russell which had been on show in the Meteorological Bureau at the start of his work there almost 60 years ago.

U. R.

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PHOTOBIOLOGY AND SOLAR RADIATION

By W. H. Klein

Dr. Klein, Director of the Radiation Biology Laboratory of the Smithsonian Institution, who was in Melbourne to attend the International Solar Energy Society Conference, delivered the first of three talks on this day to the Joint Meteorological Colloquium on radiation topics.

Dr. Klein began with an account of some general aspects of the effects of solar radiation on green plants, drawing attention to their broad spectral response characteristics and the range of light intensities involved in the photo-chemical reactions which occur. The higher intensities were shown to be associated with energy conversion systems and the lower range of intensities with the various regulatory responses. Coloured slides illustrated the kind of morphological changes which occur in plants grown in darkness and those irradiated in various spectral ranges. Dr. Klein then discussed briefly the laboratory procedures and the methods of controlling experimental conditions in the Smithsonian Radiation Biology Laboratories. He outlined the characteristics of "long day", "short day" and "day neutral" plants and illustrated the growth response of a "long day" plant in control rooms with differing red to far red irradiance ratios. Another slide showed the dependence of Wintex barley floral development on day length.

Dr. Klein then moved from a discussion of photobiology to several aspects of the precision radiometry undertaken by his group. He began with some comments on the need for precision selective detectors, refuting the view that the necessary information for this type of work can be determined empirically or theoretically from atmospheric absorption and turbidity parameters. A succession of slides showed the system of six radiometers from which the radiation in various wave bands is determined by subtraction, the data acquisition system and typical results. The latter included the ratios of radiation in various wavelength intervals to each other and to the total radiation on clear and cloudy-days, and as a function of time of day and time of year. One particularly interesting result concerned a marked difference between red to far red ratios observed at the Smithsonian Institution between the April-July periods of 1966 and 1968.

Moving to a more detailed discussion of the problems involved in the calibration of selective detectors, Dr. Klein mentioned work done in collaboration with Eppley Laboratories and illustrated a prototype scanning radiometer still under development. He concluded by pointing to the potential of this work and the instrumentation being developed in clarifying the importance of the sun in controlling the regulatory responses of plants.

In response to a question from the Chairman, Dr. C. H. B. Priestley, concerning the meteorological factors involved in differing red to infrared ratios between the years 1966 and 1968 referred to in the talk, Dr. Klein pointed to differing contents of particulate matter in the atmosphere resulting from extensive construction work upwind of the Smithsonian site in one of the two years. He also mentioned a 15% decrease in incoming normal-incidence clear sky radiation since measurements by Abbot in 1906. Further questions dealt with desirable world-wide networks of spectral measurements, Dr. Priestley mentioning a proposed observational programme at Aspendale. Dr. Klein indicated the cost of a self-contained station in such a network as \$50,000. Dr. G. W. Paltridge queried on the effects of pollution on plants and the speaker replied that pollution reduces plant growth.

Dr. P. Schwerdtfeger asked about the principal biological parameters used and Dr. Klein listed these as:

- (i) fresh and dry weight of the plant,
- (ii) its total length,
- (iii) its flowering response (when it flowers),
- (iv) the number of flowers,
- (v) chlorophyll content.

Further questions and discussion dealt with the problems of calibrating selective detectors, and it was pointed out (Mr. E. L. Deacon) that the determination of Ångström turbidity coefficients would be an interesting by-product of this work.