

its convenient properties for study by pulse radiolysis. E. Lengfelder (Strahlen-biologisches Institut der Universität, Munich) showed how several synthetic metal-containing complexes also display marked superoxide dismutase activity.

As appropriate for a meeting in Scandinavia significant 'state of the art' papers on DNA by Graslund and G. Ahnström (Wallenberg Laboratory, Stockholm) and positronium (O. Mogensén, Riso Laboratory, Denmark) were presented. The effect of radiation on DNA has been and remains the most important aspect of radiobiology and it is essential that effects of individual free radical reactions, strand breakage, chemical modification and biological effects are examined and correlated. Ahnström emphasised that effects on repair processes could be crucial to radiosensitivity. Radiation damage to DNA prevents enzymic cleavage of oligonucleotides, and suggests a new method for studying radiation effects in DNA (D. Schulte-Frohlinde and C. von Sonntag, Max-Planck-Institute, Mulheim).

The successful application of resonance Raman spectroscopy to pulse radiolysis was a notable achievement of the Riso group (R. Wilbrandt, N. H. Jensen and P. Pagsberg) and details of the structure of (SCN)<sub>2</sub><sup>-</sup> have been determined by its use. The powerful technique of pulse radiolysis is considerably improved by transient detection methods which allow better structural identification. □

## NATURE

### A hundred years ago

In a lately-issued number of the *Proceedings of the American Philosophical Society*, Prof. Cope has given an account of the collection of fishes made by Prof. Orton at various points on the head-waters of the Amazon. Species of the genera *Belone* and *Tetrodon*—characteristically marine forms—are here recorded as having been obtained in these districts 2,500 miles from the mouth of the river—thus showing how far marine animals will penetrate into, and become ultimately acclimatised in, fresh waters.

The existence of the true heath plant in North America was for a long time considered very doubtful, and its detection in New England some years ago is a matter of much interest. The published localities hitherto are Newfoundland, Nova Scotia, and Massachusetts, but, according to the *Bulletin of the Torrey Botanical Club*, Dr Hexamer, of Newcastle, has lately found a few plants of it near Egg Harbour, New Jersey.

From *Nature* 18, 24 October, 682; 1878.

## Producing more food

from W. S. Wilson

THE inexorable increase in the world's population without a commensurate increase in food supplies has prompted a re-examination of production methods, post-harvest care of produce and even the types of food consumed. These considerations were well to the fore at the XXth International Horticultural Congress\*. The wide range of scientific disciplines involved focused on fruit, vegetables, ornamental and amenity plants and post-harvest horticulture. The last was a new feature of these 4-yearly gatherings and reflects the growing concern for quality produce in developed countries and the need to overcome scarcity in many developing countries, including India where per capita consumption of vegetables is only one-third of that recommended by dieticians.

Nowadays vegetables and fruits are survival foods in some countries and health-giving foods in all others. Vegetables provide more carbohydrate, vitamins and minerals per unit area of land than other type of crop. Some, such as the soya bean, are an inexpensive source of protein. A spectacular way of intensifying vegetable and fruit production in some countries was given by E. C. Quisumbing (University of the Philippines) when he described the growth of coconuts under which were growing bananas, under which were grown pineapples beneath which were grown sweet potatoes, all on the same piece of land at the same time. This arrangement resulted in quadrupling the potential yield of the land and increasing the income of the small farmers.

Apart from management aids to increasing production and improvement of produce quality, advances in fundamental knowledge and technological applications which make handling and mechanical harvesting easier, were reported. In the temperate fruit section, the emphasis was on the adjustment of tree density by breeding or hormonal treatment to render the fruit easier to harvest mechanically. This trend is particularly advanced in Australia and New Zealand, countries with small labour forces. Plant breeders have introduced dwarfing characteristics enabling more trees to be grown more productively per hectare. Another method for increasing yield of apple cultivars, described by A. I. Campbell (Long Ashton Research Station, Bristol) was the exposure of dormant scions to gamma irradiation under water to form stable mutants. Physiologists have been able to control growth characteristics

by hormonal regulation. Thus ethylene can be used to increase flowering, offset biennial bearing, prevent pre-harvest fruit drop and advance or delay fruit maturity.

The most important advances in vegetables have also been related to systems methods of production. W. L. Sims (University of California, Davis) outlined a sophisticated system for tomato production involving an integrated breeding programme, uniformly flat seedbeds, simultaneous ripening and a single harvest operation. This system is appropriate to California but other systems applicable to other regions can be devised. For less ambitious objectives crop increases can be achieved by deeper loosening of non-compacted soil or by hormonal treatment of crops to achieve greater lateral proliferation of roots to explore compacted soil. Allied with these measures is a rapid method of forecasting fertiliser requirement such as that described by D. J. Greenwood (National Vegetable Research Station, Wellesbourne, Warwick). This involves assessing inorganic nutrient ions in plant sap with test strips and in the soil filtrate with reagents prepared in tablet form. A notable achievement in vegetable breeding is the production of high protein potatoes (over 10% protein) for use as animal feed in Australia.

The main concern of the section on ornamental plants was to devise the best way of educating the community to appreciate plants, gardens and landscape. For over 300 years botanic gardens have been preoccupied with taxonomy and amenity horticulture. In the future, these institutions and horticultural societies should be more concerned to inject greater diversity into horticulture by, for example, introducing plants from the southern hemisphere into northern countries.

In the post-harvest section a paper by M. A. Perring (East Malling Research Station) on mineral and physiological disorder in apples explained how the physical and chemical composition of apples is influenced by soil type and management, environment and nutrition. In this connection, bitter pit in apples caused by calcium deficiency can be alleviated by dipping the fruits in a calcium chloride solution. Preservation of condition in easily-perishable vegetables can be achieved by covering the crop with low cost polyurethane foam in cool stores.

Australia provided an excellent venue for the Congress, offering a wide range of wild flora alongside a diverse horticulture in which science and technology are complementary. □

W. S. Wilson is Lecturer in Soil Science at Writtle Agricultural College, Chelmsford, Essex.

\* Held on 15-23 August in Sydney and sponsored by the International Society for Horticultural Science.