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In this special issue on Siratro which co-incides with the retirement of its breeder, Mark Hutton, it is appropriate to provide an outline of his career and achievements, and to pay tribute to those personal qualities which have made him a productive scientist and an effective research leader.

A native of South Australia, Mark graduated B.Agr.Sc. from the University of Adelaide in 1933. He spent the first few years of his professional career in his home State, as a Field Officer of the Department of Agriculture until 1936, and as Assistant Plant Breeder at Roseworthy College from then until 1940. This period yielded two publications on wheat quality and afforded him the opportunity to study for his M.Sc. (also from Adelaide) which he obtained in 1941.

Many people who know Mark for his outstanding contributions to tropical pasture science are not aware that his work in northern Australia is his 'second career'. He previously achieved eminence in a quite different field, first as a member and later as leader of the genetics section of the C.S.I.R.O. Division of Plant Industry in the period 1940-1952. In 1951 he was awarded his D.Sc. for his work on vegetable crop genetics. In total he published 35 papers in this field in the period 1943-1958. His work had major and lasting significance for the improvement of these crops.

In the post-war period, Mark switched his interest to the genetics and breeding of temperate forage species with special attention to the principal sown species, phalaris and sub clover. However, this new line of research was cut short by changes of policy within the Division of Plant Industry. In the early 1950s, the Division increased its emphasis on the biological disciplines associated with plant growth, and reduced work more directly related to agricultural problems. Mark found himself out of sympathy with this re-orientation and in 1952 he took the opportunity to transfer to Brisbane where Dr. J. Griffiths Davies, also a refugee from the new regime in Canberra, was building up a research group which was to achieve independence as the Division of Tropical Pastures in 1959.

Jack Davies asked him to develop research on the improvement by breeding of tropical forage plants, and in the expansionist era of the 1950s and early 1960s he was able to build up a six-man team of scientists for this work. Recognising the great importance of pasture legumes both as feed for animals and as agents for the improvement of soil fertility, he directed the main effort into breeding legumes in the genera *Macroptilium*, *Leucaena*, *Desmodium*, *Centrosema* and *Stylosanthes*. Work was also done on grasses in the genera *Setaria* and *Sorghum*. This research has led to a sound understanding of the genetics of these plants and to the release of several valuable cultivars.

It is not necessary to enlarge on Mark's great personal achievement, the breeding of Siratro. The papers in this special issue of this Journal devoted exclusively to Siratro are evidence enough. It is sufficient to say that the development of this outstandingly successful plant, the first bred variety of a tropical forage legume, was entirely due to his initiative and judgement.

In recent years, despite increasing administrative duties, Mark has further improved Siratro and has a number of bred lines of this legume and of leucaena in the advanced testing stage. In the period 1956-1976, he has written 27 papers in the field of tropical forage research covering breeding systems and hybridisation, and genetic aspects of yield, disease resistance, seed production and adaptation to differences in the climatic and soil environment. These papers together with several review articles have established him as the leading authority in this field.

While acquiring this reputation, Mark assumed increasing responsibility for scientific administration and leadership. He had acted as second in charge of the Division of Tropical Pastures for several years before he was formally designated Assistant Chief in 1964, and had already been chosen as the next Chief when Jack Davies died suddenly in March 1969, shortly before he was due to retire.

The period of Mark's leadership was in some respects more difficult than the preceding one. The expansionist era for C.S.I.R.O. was over, and the Division was faced with the task of consolidation after an initial pioneering period. Restructuring of C.S.I.R.O. research in northern Australia in 1973 and 1974 added the Katherine and Kimberley Research Stations to the Division. While these were an invaluable extension to the Division's range of agricultural environments, they brought with them the complexities of administering research in remote locations. Finally the mid-seventies have seen pressure on C.S.I.R.O. resources and some reduction in the number of staff available to support the research.

Despite these difficulties, Mark was steadfast in implementing his philosophy of agricultural research. He considered it essential that the Division should work on real agricultural problems, and that it should keep its applied objectives clearly in mind, no matter how basic some aspects of the work might need to be. He acknowledged the high quality of research carried out by the 'purists', but was contemptuous of the proposition that agricultural problems could be despatched for solution by laboratory scientists who were both geographically and intellectually remote from the real world of agriculture. He believed in going 'basic' whenever necessary, but sought to ensure that the laboratory research was linked with field studies and that the two were complementary. Generally the history of successful agricultural research in Australia has vindicated this approach.

Armed with this philosophy, and despite resource problems, Mark was able to introduce some important initiatives. Even before the transfer of the Kimberley and Katherine Stations, he had begun to diversify into research on crops. With the acquisition of these Stations, he was able to organise new work on the agronomy, ecology and physiology of cereal and legume grains, and on fibre crops. In the pasture research program he closed a number of regional sites in order to concentrate on research in depth which would achieve an understanding of the factors controlling plant performance, and lead to the development of principles which would have general application. Mark's period as Chief also saw increasing sophistication in the Division's research on the physiology, biochemistry, nutrition and genetics of plants and on animal nutrition and legume bacteriology, and an upsurge in interest in the use of new mathematical techniques for data handling. Under his leadership there was a considerable increase in scientific publication by the Division's staff and a steady growth in its reputation, both within Australia and internationally.

Apart from his philosophy of research, what are the personal qualities which have contributed to his success as a scientist and research leader? One of his strengths has been his ability to contemplate and accept change where he thought it justified. Flexibility is one of his favourite words and he showed it in his own career in which he moved from research on cereals to vegetables to temperate pastures and finally to tropical pastures. He taught the value of accepting change to a number of his associates, and more than one profited by the lesson. Another of his important characteristics has been loyalty. He gave loyalty consistently to C.S.I.R.O. as an organisation and as Chief he was a loyal supporter of his staff. With his own high standards he expected a high level of performance from them and in return he was always prepared to fight hard to see that they received appropriate recognition for their efforts.

While Mark usually adopted the orthodox approach and is regarded by some as an establishment figure, he has proved himself quite capable of adopting unconvent-

ional methods when he thought it justified. Back in his Canberra days, he was responsible for the mysterious and unscheduled appearance of two 'do-it-yourself' glasshouses ever afterwards known as 'the Hutton houses'. As Chief he was willing to short circuit the bureaucratic chain when he considered it desirable to go to the top to get the right decision. In recent years, he has occasionally startled gatherings of scientists with terse comment on what he considered to be ridiculous propositions.

But these characteristics apart, Mark's dominating personal quality is undoubtedly his dedication to duty. All his life, he has worked hard and effectively. After he became Chief, he was often to be found in his room at week-ends, catching up on the desk work for which he could not find time through the week while running the Division and keeping up with his own active research program.

This quality of dedication was also evident in his continuing campaign to spread and exchange information on tropical pasture and crop research. Regardless of personal convenience, he always responded positively to invitations from both within and outside Australia to speak or advise on pasture research. These invitations were numerous and took him to many parts of the tropical world. He also went out of his way to welcome and assist overseas scientists and students who wished to visit or train with the Division. Many workers received training in the Division while Mark was Chief, and the hospitality which they all received from him and his wife, Gwen, deserves special mention.

Also in the cause of liaison and information exchange, Mark worked consistently for closer collaboration between his staff and those of the Queensland Department of Primary Industries and the relevant University Departments. As the Division moved into crop research and as the international agricultural research institutes were set up, he fostered good relations with ICRISAT, IITA, CIAT and ILCA and sought to establish positive co-operation with them. In his later years he responded to several invitations to write authoritative reviews on tropical pastures and the role of research in their improvement. In all he wrote 16 such reviews between 1965 and 1976. By all these actions, he broadened his own experience for the benefit of pasture research in Australia, and became recognised as a world figure in tropical pasture science.

Mark's contributions to agriculture and status in the scientific community have been recognised by a number of appointments and honours. In Queensland he was for some years a member of the Faculty of Agriculture Board of the University of Queensland, and an Honorary Research Consultant to its Department of Agriculture. He was President of the State Branch of the Australian Institute of Agricultural Science (A.I.A.S.) in 1964. On the national scene he was A.I.A.S. Federal President in 1966 and was made a Fellow of the Institute in 1967. In 1968 he received the Farrer Memorial Medal and in 1970 he was President of the XIth International Grassland Congress.

Professional societies overseas have recognized his contributions to grassland science by the award of Honorary Fellowships. He was honoured in this way by the Japanese Society of Grassland Science in 1974, the Indian Society of Forage Research in 1976 and the South African Grassland Society in 1977.

As his professional career was dedicated to the use of science to produce practical benefits for agriculture, it is fitting to complete this tribute to him with a quote from a leading primary producer, Mr. Mort Hudson. At the last meeting of the Narayen Research Station Advisory Committee that Mark attended, Mort said of him "That we have been privileged to meet and associate with a scientist of his obvious capabilities, who still retains the humble manner which is so respected by us all, is a reward for which we must be glad. I know that the fulfilment of his years with C.S.I.R.O. by appointment as Chief will have been secondary to the fulfilment achieved by his own knowledge that his path this way has been marked with successes which will be to the lasting benefit of his country and his fellow men".

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