

SOILS NEWS

AUSTRALIAN
SOCIETY
OF
SOIL
SCIENCE
INCORPORATED

No. 40

March 1976

AUSTRALIAN SOCIETY OF SOIL SCIENCE

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SOILS NEWS

The Newsletter of the Australian Society of Soil Science

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Soils News is issued solely to financial members of the Australian Society of Soil Science, and is an informal news service of that body. It is published twice a year. The statements printed in it are not for citation elsewhere, and there are no reprints. Letters, articles, notices, reviews and news items from members are welcome and should be sent to: Mr K.M.W. Howes, Hon. Editor, Soils News, CSIRO Division of Land Resources Management, Private Bag, P.O. Wembley, W.A. 6014.

PRESIDENT'S LETTER

In our last issue of Soils News the award of the Prescott Medal to Professor J.P. Quirk was announced. While I have already written to him offering congratulations on behalf of the Membership of the Society, I would like to do so again publicly. His achievements in his field are well known, and the Society is indeed fortunate in him as in our Medallists, who bring so much credit to us and to our branch of science.

You will read in this issue of the response by the New Zealand authorities to proposals for a joint soil science journal, which might have replaced the Australian Journal Soil Research. Also suggestions that the name 'Australian journal Soil Research might be changed to include the word water do not seem to have been favourably considered by our members or by the Journals Advisory Committee. Both proposals were intended to help improve the circulation to attract more potential authors.

Remembering that the A.S.S.S. was very largely responsible for the establishment of the Journal, I think it is now up to members, through discussion at Branch level, to develop further ideas on the ways in which these problems can be handled. With one of our members representing our views, they can be readily introduced and discussed on the Advisory Council.

Since this is my last Presidents Letter, and Council will soon be moving to N.S.W. I should wish them well during this term of office, and welcome the new President, Dr A.N. Smith of the Department of Agriculture, Wagga Wagga. I also wish to thank the present Council, particularly the Honorary Secretary and Treasurer, for their devoted efforts. The Honorary Editor of Soils News, Malcolm Howes, also must be commended, especially for his efforts to solicit more contributions.

OBITUARY

Dr. K.P.(Keith) Barley, Reader in Agronomy at the Waite Agricultural Research Institute, died at his home on the 23rd October last year at the age of 49. Keith, though he suffered from cancer during the last eighteen months, continued his work in research and teaching until shortly before his death. In July of last year he was awarded the Degree of Doctor of Agricultural Science, the highest award in his field from the University of Melbourne. He joined the Waite Institute as a Lecturer in 1955 after graduating from the University of Melbourne in 1948 and working for several years at the C.S.I.R.O. Deniliquin Laboratory in the Riverina of New South Wales. He also spent a period at Cornell University as a Rotary Fellow.

Dr. Barley was a brilliant scientist who made extensive, highly significant contributions in the understanding of soil-plant relationships. His early work was concerned with agents responsible for regenerating structure in soils, but for many years he was mainly concerned with the root system of cereals and the way in which water and nutrients were taken up by the plant. He devised ways of measuring and simulating root growth and contributed especially to our understanding of the resistance to flow of water in soil and in roots, to the gathering of nutrients by the root network and to the physics of root growth against mechanical impedance of the soil. He was recognised as a world leader in these fields and published some fifty scientific papers including several invited reviews.

Above all Keith was a great teacher. He applied a thoroughly disciplined analytic approach, an originality of thought and a critical attitude to his research and was able to develop these attributes to their capacity in his students. His advice was sought by all on a great range of scientific problems. At one stage he was the soil scientist-agronomist lecturer in Indonesia under the Australian-Asian Universities Cooperation Scheme.

Although Keith was a specialist in soil-plant relationships, he had a great knowledge of agriculture generally and a wide range of interest outside his professional field. He was a founder of the Australian Council of Humanist Societies and also took an active part in forming the South Australian Council for Civil Liberties. He was involved in both these organisations for much of his life. He took an active interest in politics, and was keenly interested in theatre.

Keith will be missed by his colleagues in Adelaide at the Waite Institute and the C.S.I.R.O. Division of Soils and throughout Australia for his quiet manner, his kindness and wise counsel. He is survived by his widow (Ann Levy MLC) and two children.

K.P. BARLEY MEMORIAL

Dear Colleague,

You will be aware of the recent death of Keith Barley, and share with Anne, his children and other friends and colleagues a sense of sadness and loss.

Many of us, with Anne's strong agreement, feel that a remembrance of Keith, associated with student accomplishment, would be an altogether fitting way to perpetuate his notable contributions to agricultural research and teaching.

The University of Adelaide has agreed to establish a Prize in his name within the Faculty of Agricultural Science. We hope that you will join with us in establishing this remembrance to Keith, and will draw this aim to any other of Keith's friends and colleagues. Contributions of \$2.00 or more are tax deductible and cheques should be drawn to "University of Adelaide - K.P. Barley Fund" and sent to:-

The Bursar,
University of Adelaide,
Adelaide, S.A. 5000.

NEWS ITEMS

SUPER SCIENTIST FOR FEDERAL PRESIDENT

The Federal President was seen dashing into a phone box the other day and a few seconds later emerged clad in a scarlet and blue cloak with the monogramme 'SS' on his chest. At least that is one interpretation placed on the way the local newspaper described his appointment as Senior Research Scientist - Analyst with the Department of Conservation and Environment. The journalist was reliably informed that the government had already dubbed him "Super Scientist".

Dr. Mulcahy's appointment brings to an end 22 years service with the C.S.I.R.O. First, with the Division of Soils in Western Australia and more recently with the Division of Land Resources Management. However I am sure that his work will keep him in close contact with his colleagues at C.S.I.R.O.

Dr. Mulcahy's duties with the Department of Conservation and Environment include the analysis of proposed and existing large scale projects in the South-West of Western Australia, to allow prediction of their potential broad environmental effects. Two immediate issues are the Alumina proposals in the Swan Valley and Sand Mining plans for the Hardy inlet, near Augusta. He will also coordinate joint technical and management conferences and working groups to draw up an optimum management programme for the region.

A.S.S.S.I. MONOGRAPH

The Monograph was submitted to the Queensland University Press last May. It has now been costed and the Monograph Committee and Federal Council has agreed to proceed with publication. It is hoped that retail price will be approximately \$20.

I.S.S.S. COMMISSION I, ADELAIDE, AUGUST 23-27.

Modification of Soil Structure

Well over 60 Abstracts have been received for the Meeting, about half coming from overseas authors. Both the Vice-President of the I.S.S.S., Dr. J.A. Toogood and the President of Commission I, Dr. M.F. de Boodt will be attending. Among subjects discussed in the Abstracts are particle arrangements both on a megascopic scale as in soil aggregates and on a microscopic scale as between clay particles and mucigel. Similarly, the stability of inter-particle bonds to shear forces is discussed on the same two scales. Neither is it forgotten that the soil is alive (unusual in Commission I!) Complete papers should be submitted by June 1st.

The Meeting should be of interest to all scientists who wish to manipulate the water transmission, water holding properties, or shear strength of a soil, either to grow better crops, ranging from peaches to grass on golf greens, or to build earthen structures such as dams.

Accommodation has been reserved at St. Mark's College. The cost will be about \$12 a day for dinner, bed and breakfast. Anyone wishing to have further details of the program should contact:

Dr. W.W. Emerson,
CSIRO Division of Soils,
Private Bag No. 2,
GLEN OSMOND, S. Australia 5064.

THE 11th CONGRESS OF THE I.S.S.S.

The 11th ISSS Congress will be held in Edmonton, Alberta, Canada, June 19-27, 1978. Congress headquarters will be the University of Alberta and up to 2000 participants can be accommodated on the campus. Other participants will stay in hotels and motels. The Canadian Society of Soil Science, with generous assistance from the Governments of Canada and Alberta, is working diligently on Congress preparations. Although program planning is still in the preliminary stages, the theme will be "Optimum Soil Utilization Systems under differing climatic Restraints".

There is a great deal of interest in Canadian soils and 16 tours are being planned. Those tours include: one from Eastern Canada (Halifax, Montreal, or Toronto) to Edmonton; Vancouver and vicinity to Edmonton; an Arctic tour; several tours in Alberta including one to the Athabasca Tar Sands; and four to six one-day tours in the vicinity of Edmonton. The tours are being planned to have a broad appeal and there is an agronomist or a forester as co-chairman working with a pedologist for each tour. The tours may be taken before and/or after the Congress. Preliminary tour announcements will be made late in 1976.

I.S.S.S. COMMISSION II, IV AND VII, JERUSALEM, ISRAEL, JUNE 13-18.

APROCHEMICALS IN SOILS

The rapid increase in the agricultural use of chemicals has developed intense scientific activity in each separate field of interest. The exchange of information between members of the above three commissions could stimulate academic research and enrich practical experience.

- Topics: - Surface reactions of agrochemicals in soils: (a) Adsorption of organic agrochemicals in soils; (b) Organo-clay complexes; (c) Surface structure of clay minerals in relation to their chemical activities.
- Movement of agrochemicals in soils: (a) Movement and uptake by plants; (b) Degradation of organic agrochemicals; (c) Mathematical modelling of the dynamics of agrochemicals in soils.
 - Agrochemicals and soil structure.
 - Agrochemicals and pollution; (a) Effect of agrochemicals on the environment; (b) Impact and possibilities of reuse of urban wastes in agriculture; impacts on the soil system.
 - The fate of nutrient applied to the soil (uptake, immobilization, losses).

Information and registration The Secretariat, Agrochemicals in Soils, P.O. Box 16271, Tel Aviv, Israel

I.S.S.S. COMMISSION IV AND V, KUALA LUMPUR, MALAYSIA, AUGUST 2-18

CLASSIFICATION AND MANAGEMENT OF TROPICAL SOILS

This joint inter-congress meeting of Commissions IV and V will be hosted by the Malaysian Society of Soil Science.

- Topics
- Soil genesis, classification and cartography;
Soil genesis; Soil classification and productivity; Soil survey and cartography
 - Fertility and management:
Evaluation of fertility status and fertiliser requirements:
 - (a) Tissue analysis in relation to fertiliser needs
 - (b) Soil analysis in relation to fertiliser needs
 - (c) Fertiliser requirements of (i) rice; (ii) plantation crops;
(iii) other arable cropsSoil management for plantation crops
Soil management for arable crops
Management of problem soils in the Tropics.
 - Land evaluation in tropical areas.

Following the Conference, there would be a post-Conference field tour both in Peninsular Malaysia as well as in Sarawak and Sabah. Emphasis of the tour will be to demonstrate various points of particular relevance to the theme of the Conference and would include soils and crop management aspects.

Information and registration: Malaysian Society of Soil Science, c/o Soils and Crop Management Division, Rubber Research Institute of Malaysia, Jalan Ampang, P.O. Box 150, Kuala Lumpur, Malaysia.

J.A. PRESCOTT MEDAL OF SOIL SCIENCE, 1976

The J.A. Prescott Medal is awarded by the Australian Society of Soil Science Inc. to a person, not necessarily a Society member, who has made an outstanding contribution to Australian soil science. Nominations are judged primarily on the nominee's standing in the research, administrative or teaching fields of soil science. The nominee's work should have had significant effect in one or other of these fields, and would be expected to have had more than usual influence on his colleagues. Neither volume of publication, nor service to the Society are likely to be decisive aspects of the award.

Unsuccessful nominations are not automatically carried forward, but this does not preclude renomination of a candidate.

Nomination Procedure

1. Submission of a candidate for the award shall be accompanied by a supporting case.
2. Each nomination shall be prepared by a nominator and seconder and supported by the signature of three other financial members of the Society.
3. Three copies of each nomination and supporting case shall be submitted in a sealed envelope to the Honorary Secretary of the Society not later than 30th April.

Mailing

Nominations for the 1976 award should reach Dr. N.J. Barrow, Honorary Secretary, Australian Society of Soil Science Incorporated, CSIRO, Division of Land Resources Management, Wembley, W.A. 6014, not later than 30th April, 1976.

Award Committee

Dr. A.J. Peck, Chairman (WA), Mr. G.D. Bowen (SA), and Mr. R.K. Rowe (Vic).

NEWS FROM THE BRANCHES

SOUTH AUSTRALIA

Branch Notes

Two ordinary general meetings were held in the latter half of 1975.

Mr. J.R. Harris, Division of Soils, spoke to members on "Wheat nutrition on calcareous soils" on October 7.

A meeting on November 13, which preceded the presentation of the Prescott Medal, was addressed by Mr. A. Mitchell, Chairman, Soil Conservation Authority, Victoria, on "Conservation in the Seventies".

Personal Notes

It was with deep regret that members of the Branch received the news of the death, on October 23, 1975, of Dr. K.P. Barley of the Waite Institute. Members attending the meeting on November 13 recorded their appreciation of Keith's outstanding personal and professional qualities and his contributions to soil science.

Professor Prescott presented the Prescott Medal for 1975 to Professor J.P. Quirk at a social gathering in Urrbrae House, following the general meeting at the Division of Soils on November 13. The function was well supported and a wine and cheese tasting was enjoyed by some 60 members, wives and other guests.

RIVERINA

Branch Notes

Our April meeting held at Griffith C.S.I.R.O. coincided with a visit by Dr. J. Ritchie of U.S.D.A., Temple, Texas. A previously scheduled talk was deleted to take advantage of this opportunity and Dr. Ritchie spoke on "Evapo-Transpiration Modelling". Mr. John Read (Leeton Research Station) gave a talk entitled "Grass Juice for Pigs". After attending the International Grasslands Congress in Moscow last year Mr. Reed visited research establishments in the U.K. The work on which he spoke involved the use of harvested legume pasture which was crushed, extracting juice. This was then fed to pigs and the residual plant fraction fed to a dairy herd.

Mr. Brian Freeman (Viticultural Research Station, Griffith) discussed "Grape Pigments and Wine Quality" and Miss Robyn Pym (Yanco Agricultural Research Centre) described work done on "Flocculents for Muddy Water".

At the Annual General Meeting at Deniliquin in July, this Branch welcomed its first female office bearer - appropriately in International Women's Year. Mr. E.S. Stannard (W.C. & I.C., Leeton) gave a talk on "Land forms and Vegetation in Western N.S.W."

Dr. S.W. Cowling of C.S.I.R.O. Deniliquin described some of the work being done in the dry areas of the state in his talk "Soil-plant phosphate relations in the Cobar region." * These notes should have appeared in the September issue but it had gone to press before their arrival.)

Our first meeting for the year was at Wagga on 26th September, 1975. Mr Peter Hallows from Gutteridge, Haskins and Davey consulting Engineers, delivered a talk on "Albury-Wodonga and the Murray". With the increasing interest in pollution and the potential threat caused by such a large population centre on the Murray it was enlightening to hear Mr. Hallows' discussion of their studies.

Drs. Kathy Bowner, Emmet O'Laughlin and Barry Steer of the C.S.I.R.O Division of Irrigation Research, Griffith discussed "The theory and practice of weed control in the irrigation system" and Mr. Eric Cuthbertson, Senior Research Officer of the Agricultural Research Institute at Wagga spoke on "Herbicide persistence - bain or blessing."

Our Pre-Christmas meeting was held at Griffith. Mr Tony Blakeney of Yanco Research Centre gave a talk on the milling characteristics of hard and soft wheats. Dr. Alan Heritage who has recently taken up the position of Soil microbiologist at C.S.I.R.O. Griffith delivered a talk entitled "Microbiology of flooded soils". Dr. Ian Willett, also a new recruit at C.S.I.R.O. Griffith, spoke on "Nutritional problems in the Serpentine Soils of north-west Scotland.

The Riverina Branch is organising a conference in Wagga from the 20th to the 22nd May, 1976. Response in terms of contributions and delegates has been encouraging. Conference fees are \$15.00 and anyone wishing to attend should advise the Secretary-Treasurer of the Riverina Branch, Miss Robyn Pym, Yanco Research Centre, Yanco, N.S.W. 2703.

Personal Notes

Mr. J. Read formerly of Leeton Research Station has been transferred to Berrie, N.S.W.

Mr. W.A.H. Molesworth of ICI formerly stationed at ICI Field Station, Griffith, is overseas.

Mr. E. Boerema who has been the rice agronomist with N.S.W. Department of Agriculture at Yanco for 15 years, has taken up an advisory position with the World Bank in Washington.

WESTERN AUSTRALIA

Branch Notes

Professor A. Posner has returned from sabbatical leave at Rothamsted.

Mr. C. Malcolm is also back from the U.K. where he attended a course in environmental pollution.

Professor A. Parker and Dr. G. Aylmore are shortly to go overseas on sabbatical leave.

Mr. P. Ozanne is visiting New Zealand for six months, spending most of this time at the Grasslands Division of D.S.I.R., Palmerston North.

Dr. J.M. Mulcahy has accepted a senior position in the Department of Environment and Conservation of Western Australia where he will be responsible for the analysis of proposed and existing large scale projects in the South of Western Australia to allow prediction of their effects on the environment.

QUEENSLAND

Branch Notes

On the 15th October, Professor, C.W. Rose and Dr. P.R. Stevens of the School of Australian Environmental Studies at Griffith University gave an account of the progress and philosophy of the courses being developed. On the 25th February, Mr. H.S. Briggs spoke on Soil Science in Soil Conservation where he emphasized the problems of research in the State Department when immediate answers are required.

Personal Notes

Dr. C.J. Asher is currently acting Head of the Department of Agricultural at the University of Queensland.

Dr. D.G. Edwards returns to the University in early March following sabbatical at the International Institute of Tropical Agriculture, Nigeria.

Mr. R.C. Bruce will be travelling overseas for three months to visit soil research institutions in Holland, Britain, Ireland, U.S.A. and Canada.

Mr. E.F.N. Murray was unable to ignore an opportunity to return to the Northern Territory as he has left C.S.I.R.O. and joined the Department of Housing and Construction group at Katherine.

Mr. G.D. Hubble and Dr. B.J. Bridge attended the Soil Conservation Conference in Adelaide last November, visiting the headquarters of the Division of Soils at the same time. Mr. Hubble also took his place with the working party on Soil Survey in Canberra where Australia's need for future soil mapping was discussed.

NEW SOUTH WALES

Branch Notes:

The Branch held a General Meeting on 31st October 1975, at which Mr. G.M. Bowman of the Department of Geography, University of Sydney spoke on "Development of Podsol Soils in New South Wales".

On 19th February the Branch held an excursion to the Gerringong - Nowra area of the N.S.W. South Coast, when Branch members with research in progress in this area conducted an 'open day' at the various sites being investigated by them. Unfortunately a wet afternoon cut short the excursion, but members were able to gain an insight into the various projects in progress in this area.

The following day a symposium entitled "Land Resources Evaluation in N.S.W." conjointly sponsored by the School of Geography, University of New South Wales, was extremely well supported by a wide range of workers in this field. (See report below).

Personal Notes:

Professor N. Collis-George is currently on sabbatical leave at the University of Lancaster where he is visiting Commonwealth Professor in the Department of Environmental Sciences.

Mr. G.A. Tregenza has recently transferred from the N.S.W. Soil Conservation Service to the Australian Department of the Environment, as Senior Project Officer.

Symposium On Land Resource Evaluation In N.S.W.

On February 20th, the N.S.W. Branch held a one-day Symposium at the University of New South Wales to bring together people involved in as many aspects of environmental studies in N.S.W. as possible, and to improve communications between them. One hundred and twenty five persons from 17 N.S.W. State Government Departments, 4 C.S.I.R.O. Divisions, 3 Universities, several local authorities and many private consultants attended. The professional interests represented ranged from surveyors, geologists, foresters, soil scientists and conservationists to landscape architects, architects, town planners and local government officers.

The Symposium was open by the Hon. C.M. Fisher, M.L.A., N.S.W. Minister for Lands and Forests; Mr. G.H. Knowles, Commissioner Soil Conservation Service, N.S.W. and Dr. W. Gentle, Forestry Commission of N.S.W. were among the guests.

The morning session was devoted to papers describing the basic ways in which land resource data were collected and presented by N.S.W. organisations. Papers given were - "*Aims and applications of land resource surveys*" by P.A. Burrough, (University of N.S.W.): "*Which Map?*" by F. Urban (Central Mapping Authority): "*The use of computers in resource mapping*" by F. Hoschke (Forestry Commission): "*Geology and land resource evaluation*" by W. Chesnut (Geological Survey): "*The function and format of land inventory surveys*". by L.D. Longworth and K.A. Styles (Soil Conservation Service): and "*Air photograph interpretation in forest resource inventory*" by R. Squire (Forestry Commission).

The afternoon session concerned the application of land resource data to practical land use problems and the question of how resource data users appreciated and made use of the land resource surveys made within the State. Papers given were - "*Physiographic units and land resource data - a user's viewpoint*" by A.D. O'Brien (Dept. Agriculture): "*Evaluation of landscape stability for urban development*" by J.A. Quilty (Soil Conservation Service): "*Land Resource evaluation - a user's viewpoint*" by G. McKenzie (N.S.W. Planning and Environment Commission): "*Maps - their use in environmental studies*" by T. van Kempen (Dames and Moore Pty Ltd): and "*The South Coast Study - an exercise in comprehensive regional land use planning*" by

J.J. Basinski K.D. Cocks, and R.j. Millington (C.S.I.R.O. Division of Land Use Research)

These papers, together with an edited transcript of the lively discussions will be published as soon as possible.

SUMMARIES OF TALKS

HERBICIDE PERSISTENCE - BANE OR BLESSING? (by E.G. Cuthbertson to Riverina Branch)

Herbicide persistence which can be a potential danger in respect of environmental pollution is of immense practical value. Both in the realm of industrially required total vegetation control and in the farm required selective weed control, persistence to some degree is an essential characteristic. Industrially the danger inherent in the presence of weeds - fire hazards for example - is not removed if the vegetation only receives a temporary set back. Growth must be stopped for as long as is economically possible. On the farm maximum yield is possible only when crops are weed free for a shorter or longer period immediately after germination. Because weeds germinate over a period of time and not all at once, herbicide persistence is necessary to stop early re-infestation after the base application of herbicide.

Herbicide persistence varies considerably and, depending on the herbicide used, may be a factor of weeks or years. The main problems then are the potential escape of toxic quantities from the target area into the general environment and the potential build up of toxic residues within the cropping area. Escape from the target area occurs in one of three ways, deep leaching into drainage waters, run off and evaporation. Herbicides are also lost from the soil by uptake in plants and by chemical and microbiological degradations, factors which will affect the rate of loss by the other means.

In all but the most open sandy soils which are the low in organic matter reversible adsorption reduces the concentration of herbicide freely available in the soil water to a very small fraction of the whole - a fraction which decreases with depth. In most cases loss by deep leaching is negligible the great bulk of the herbicide remaining in the surface soil layers. For the same reason loss by run-off also is negligible. On the other hand loss by evaporation may be a significant factor even where herbicide vapour pressure is relatively low. The wick effect of soil capillaries in a drying soil tends to concentrate the herbicide at the surface allowing free evaporation.

Uptake by both susceptible and resistant plants in many instances results in an enzymatic breakdown, and hence loss of herbicide. Within the soil both chemical degradation and microbiological degradation occur, while photodecomposition takes place at the surface, in streams and in the air.

Despite these avenues of loss there is still the problem of build up due to repetitive use of slowly decomposed herbicides. This can be overcome by growing resistant crop or, preferably using different herbicides in rotation, just as one rotates crops.

Herbicide persistence is an important practical tool which, if used as recommended, seems unlikely to seriously damage the environment. The danger seems to lie more with the user than the herbicide.

MINE-WASTE REHABILITATION - PROBLEMS AND APPROACHES (by L.C. Bell to Queensland Branch)

The talk covered the social and physical pressures on mining companies in Australia to carry out rehabilitation of mined areas and the technical limitations to, and the approaches available for, revegetation. Points were illustrated by reference to bauxite, iron ore, coal, rutile and Cu, Ag and Pb mining operations in northern Australia.

Mining companies are under considerable pressure to carry out rehabilitation of mined areas as the quality of life of adjacent populations can be seriously affected by wind and water erosion of waste dumps and the environmental insults which follow these processes. Additionally, mining is only a temporary form of land use, and future generations may be forced to utilize mined areas for such pursuits as agriculture, forestry, recreation or urban development.

Irrespective of a company's long-term objective for mined areas, the immediate concern is stabilization of waste materials against wind and water erosion. Few chemical and physical stabilization methods can compare with the use of vegetation for economy, efficiency and aesthetic value, and many of the major mining companies in Australia are emphasizing the vegetation strategy in their mine waste and rehabilitation programs.

Limitations to Vegetative Stabilization

Climatic - This is a major limiting factor in Northern Australia where mining areas experience a marked seasonality in rainfall and high evaporation and temperatures in summer. Severe constraints are thus placed on the plant species that can be used in rehabilitation.

Physical - Problems are commonly experienced with abrasion of seedlings through wind erosion (Mt. Newman), crusting and restricted permeability to water in fine-textured wastes (Mt. Isa) or low water holding capacity in coarser materials (Frazer Island).

Chemical - Deficiencies of plant nutrients, particularly N and P, are probably the most common limitation to plant growth on mine wastes. Acidity generated by the chemical and microbiological oxidation of FeS_2 is responsible for restriction of vegetative production at Mt. Morgan and Collinsville while the residues of bauxite digestion at Gove and Gladstone have pH values in excess of 10 and, without amelioration, are biologically inert. Salinity (Mt. Isa, Gove, Gladstone) and toxic concentrations of metals such as Pb (Mt. Isa) and Mn (Groote Eylandt) add to the list of inhibitory factors.

Microbiological - Dearth of microorganisms in chemically extracted wastes results in inefficient nitrogen fixation by legumes and retardation of organic matter decomposition in the initial stages of vegetative stabilization.

Amelioration of Wastes

The severity of rehabilitation problems varies from mine to mine due to variations in geology, mine extraction and treatment processes and climate. Each rehabilitation situation therefore tends to be unique. Nevertheless, there is a general problem-solving approach which can be applied to any mine waste rehabilitation program and involves analysis of the mine environment, assessment of properties of existing and potential wastes, glass-house trials and field trials.

Mining companies have traditionally thrust the task of conducting revegetation programs upon engineers. Revegetation systems are biologically complex, however, and ideally require the attention of personnel with specific training in the biological sciences. The agricultural scientist is particularly well suited in this regard. He is qualified not only to participate in the initial assessment of environmental impact of mining but also to define and conduct the research required to achieve stabilization and, if necessary, restoration of the mined landscape.

THE GROWTH OF ALBURY - WODONGA AND ITS EFFECTS ON THE RIVERINA ENVIRONMENT (by P. Hallows to Riverina Branch)

A study was carried out for the Cities Commission to assess the present position and to determine the measures necessary to ensure that the development of the proposed growth centre in Albury - Wodonga has no effects upon the riverina environment on the River Murray. This talk describes some of the more important aspects, including the ecological study, sewerage and water supply for the complex, and planning of the development of the river flood plain.

The area covered by the study extended from upstream of Lake Hume to downstream of Lake Mulwala and included both lakes and the tributaries the Mitta Mitta, Kiewa and Ovens Rivers. A programme of sampling was carried out over 10 months at 14 stations. Parameters determined in addition to the usual physical and chemical ones included the nutrients phosphorus and nitrate-nitrogen, heavy metals, and pesticides. Biological studies included algae identification and counts, and chlorophyll a and productivity determinations.

The principal findings of the study were that the Murray is relatively unpolluted at present. However, Lake Mulwala appears to be bordering on the eutrophic, indicating the need to ensure that nutrient inputs from Albury - Wodonga do not increase significantly.

The basic strategy development involves pumping all sewage to the west of the complex for treatment at two secondary plants north and south of the Murray. The need for tertiary treatment to remove particularly

phosphorus from the effluent is indicated by the trophic status of Lake Mulwala. Land treatment by irrigation of pastures and possibly trees is proposed.

Lake Hume is seen as the source of water for the complex, with offtake either from the lake itself or from the Murray immediately downstream of Hume Dam. Full treatment of the water supply will be necessary in future.

The strategic plan for the development of the floodplain between Albury and Wodonga aimed at providing cohesion between the two centres. The strategy involves the establishment of formal town parks close to the urban centres, and wooded parklands and wilderness parks of high conservation value close to the river.

THE PEDOGENESIS OF A RECENT PODZOL SOIL AT MORUYA HEADS, N.S.W. (by G.M. Bowman to N.S.W. Branch)

The Moruya Heads-Broulee and sand barrier system was studied as parts of a more comprehensive pedological-geomorphological investigation into the development of podzol soils on East Australian Late Quaternary sand ridge systems.

The seaward progradation of the Moruya Heads deposit has been extensively dated by C-14 methods so that it is now known that the podzol soil at the landward edge of the barrier was initiated 6200 years ago, while, near the seaward side it is only 3700 years old. Within this age range over 20 C-14 dates (of marine shell species) have contributed to reliable estimates of the age of the soil at six sampling sites, located along an east-west transect of the barrier.

Thus the barrier provides a temporal framework within which to study the contribution to profile evolution of the factors of soil development, some of which vary minimally along the transect (e.g. parent material, topography) and others quite markedly (e.g. vegetation).

To quantitatively describe the development of the podzol a wide range of analytical techniques was applied to soil samples obtained from each profile at depth increments of 15cms (upper profile) and then 30cms (to the watertable) as well as from pedologically significant features (e.g. horizon boundaries).

Results of these analyses were discussed and it was concluded the Atomic Absorption Spectroscopic determination of the concentration of certain cations in HCl extracts of the soil samples and Scanning Electron Microscopic comparison of the surfaces of sand grains from specific horizons were the most useful monitors of podzol development at Moruya Heads.

Concentration of the cations Fe, Mn, Al and Ca in the soil samples indicated a marked gradation in podzol development across the barrier. This trend was portrayed by means of cation concentration: sample depth curves for each profile, and barrier cross-sections on which the concentration distribution of each cation was shown by isopleths. From this it was possible to objectively determine that sample which best represented each horizon at each site, and the cation concentrations of these samples were plotted against the relevant C-14 determined ages.

The implications of the diagrams in relation to podzol horizon organization and differentiation over time, and the progressive leaching of bases from the profile, were discussed and comparisons with the results of other workers were briefly made.

S.E.M. observations of cleaned quartz sand grains taken from the A2 and B Horizons at each sampling site revealed distinct morphological differences between those grains subject to the podzolization process for 6000 years and those affected for only 3700 years. The most notable contrast was between quartz grains from the A2 horizon. Those from the youngest podzol sites displayed features attributed in the literature to mechanical abrasion by wind and waves but lacked evidence of surface chemical weathering.

In contrast the mechanical weathering features on the sand grains from the oldest soil sites were very much subdued, having been considerably modified by characteristic solution - precipitation phenomena. These included localized amorphous silica coatings on the quartz grains, pronounced solution pits, slight scaling of cleavage plates, solution crevasses and chemically etched 'V-in-V' forms.

B horizon sand grains displayed large, yet isolated, surface accumulations of iron-silica-organic matter that were not removed during HCl cleaning procedures.

It was briefly noted that mobilization features such as those observed on the A2 horizon quartz grains usually only occur on sediments of great age, or where the grains have been subject to intense tropical weathering for a considerable period.

Podzol development at Moruya Heads can therefore be well illustrated by A.A.S. and S.E.M. techniques. Combining these results with those obtained from other C-14 dated barrier systems, and correlating it with data on the other soil forming factors, should result in an empirical model of podzol development useful for both geomorphic and pedologic studies in Eastern Australia.

JOINT AUSTRALIAN - NEW ZEALAND JOURNAL OF SOIL RESEARCH

For some months the Federal Councils of the New Zealand Society for Soil Science and the Australian Society have been negotiating on the possibility of the Australian Journal of Soil Research being replaced by a joint Australian-New Zealand Journal. Both Federal Councils thought the proposal would benefit scientists in both countries and in July and December 1975 the New Zealand Society approached the Director-General of DSIR for approval for such a journal.

The Director-General's reply of January 1976 reaffirmed his view that such a journal was not practicable. His reasons included financial considerations and labour unrest which might be caused by publication of the Journal outside New Zealand.

For the present the proposal for the joint publication has lapsed.

AUSTRALIAN JOURNAL OF SOIL AND WATER RESEARCH?

In December last year Mr Basil Walby (Editor-in-Chief, Australian Journal of Soil Research) wrote to Dr. Mulcahy indicating that he would appreciate the Society's views on the proposed title change for the Australian Journal of Soil Research to include the word 'water'.

The opinion of the Branches was canvassed and the title change received little support. South Australia, Western Australia, Victoria and New South Wales voted against any change. There were some fears that the title suggested might change the present character of the Journal.

WORKSHOP ON INFORMATION SYSTEMS FOR SOIL AND RELATED DATA

This meeting was held in Canberra on 2-4 March 1976 under the auspices of the Working Group on Soil Information Systems of Commission V of the International Soil Science Society. There were 25 participants from all states of Australia plus a leavening of two New Zealanders and one Malaysian. The relatively small number allowed an informal approach and this helped to contribute to the success of the meeting.

The meeting did not deal with databanks per se but rather experiences in the use of various techniques associated with information systems, for the most part computer-based. Thus it did not cover the questions of what data should be collected or for what purposes (which are the province of the soil scientist alone) but rather whether and how we can collect and process data with computer assistance to meet defined objectives more efficiently than by manual handling (the province of the computer scientist in consultation with the soil scientist).

For a given soil information system, whatever its size or scope, internal compatibility of both data and database management system are essential. However, by design, the workshop did not consider the question of compatibility. This is a topic largely separate from that of database management techniques, with political and administrative overtones as well as technical ones.

The workshop covered a range of computer usage from simple to sophisticated, of size of database from a few tens of thousands of characters to several million, and a spectrum of database applications from specialized soil test and soil micromorphological databanks to broad land resource surveys.

The first morning was devoted to three papers which provided surveys of three facets of database management, viz. input, storage and retrieval, and display. With this as background, the 1½ days were used to present and discuss experiences of nine groups of soils people in using computer assistance in handling soils and associated data. Eminent good sense had been shown in most cases in tailoring the information to fit a particular need and not vice versa.

The third day was spent largely in demonstrations of retrieval and manipulation of data from databases which are on the CSIRO computing network, viz. the CSIRO Division of Land Use Research's databases for their "South Coast Project" which constitute a very comprehensive land resources databank, and soil and other land data collected in the course of surveys by the Queensland Department of Primary Industries. This practical note provided a fitting finale for the meeting.

