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bulletin

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INTERNATIONALE BODENKUNDLICHE GESELLSCHAFT

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Prof. M. Kutílek, Faculty of Civil Engineering, Technical Univ., Thakurova 7, 166 29 Prague 6, Czechoslovakia.

II. Soil chemistry/Chimie du sol/Bodenchemie
Prof. Dr. Ir. G. H. Bolt, Dept. of Soil Science and Plant Nutrition, De Dreijen 3, 6703 BC Wageningen, Netherlands

III. Soil Biology/Biologie du sol/Bodenbiologie
Prof. Dr. J. C. G. Ottow, Inst. f. Mikrobiologie u. Landeskultur, Justig-Liebig Universität, Senckenbergstrasse 3, D-6300 Giessen, BRD.

IV. Soil Fertility and Plant Nutrition/Fertilité du sol et nutrition des plantes/Bodenfruchtbarkeit und Pflanzenernährung
Dr. N. N. Goswami, IARI, Division Soil Science & Agricultural Chemistry, New Delhi 110012, India

V. Soil Genesis, Classification and Cartography/Genèse du Sol, classification et cartographie/Bodengenetik, Klassifikation un Kartographie
Prof. Dr. A. Ruellan, 66 Rue Condorcet, 75009 Paris, France

VI. Soil Technology/Technologie du sol/Bodentechnologie
Dr. I. P. Abrol, c/o ICAR, Krishi Bhavan, New Delhi-11001, India

VII. Soil Mineralogy/Minéralogie du sol/Bodenmineralogie
Prof. Dr. A. Herbillon, CNRS, Centre de Pédologie Biologique, B.P. 5, 54501 Vendoeuvres-les-Nancy Cedex, France

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Announcement

5TH INTERNATIONAL SOIL CONSERVATION CONFERENCE

Department of Land Development, Bangkok, Thailand, January 18–29, 1988

Background: ISCO has organized four previous meetings, the first in Belgium, the second in United Kingdom, the third in the United States (Hawaii) and the fourth in Venezuela. These conferences have addressed a range of subject matters including erosion rates and impact of erosion and sedimentation. Country reports and case studies have illustrated the need for a greater effort and many simulation models have been proposed to evaluate conservation practices. The 5th Conference will address these issues but in addition, the conference will also attempt to develop a clearer strategy for conservation of land resources by specifically addressing some or all the following topics:

- positive appropriate or effective conservation policies or procedures,
- deficiencies in the range of available research data and technologies, research and training needs for soil conservation,
- establishing mechanisms for interchange of information between institutions and scientists,
- effective means of bringing conservation to the farmers.

Objectives:

1. To report on recent research, investigations and systems approach in erosion control, including sediment transport and watershed management.
2. To evaluate the impact of erosion particularly as it relates to environment degradation and associated social and economic repercussions.
3. To evaluate the constraints to soil conservation practises in developing countries and to develop strategies for more efficient mechanisms for delivery of technology to farmers.
4. To explore opportunities for developing a networks of collaborating institutions for the exchange of information and technologies on soil conservation with the aim of establishing an International Centre for Soil Conservation.
5. Case studies of: successes (failures) in soil & water conservation implementation; soil & water conservation in watershed management; applicable developing country technologies for less developing country transfer.

Activities:

- Presentation of Papers: which will include seven keynote speakers, voluntary papers and a poster session.
- Displays and Exhibitions: comprised of illustrative posters and photographs with also contributions of paintings from school children.
- Study Tours: one-day tour of Bangkok, and a post-conference tour of 5–6 days on a circular route through the northeast, north and eastern provinces of Thailand, during 24–29 January.

NOTICE OF INTENT
Fifth International Soil Conservation Conference

Name and title(s): .....
Address: .....
.....
Institution: .....

☐ I intend to participate in the Conference.
☐ I intend to present a paper/poster on the subject: .....
.....
☐ I intend to participate in the post-conference tour.
☐ I shall be accompanied by: .....
This notice is to be *sent to*: Mr. Sanarn Rimwanich, President ISCO, c/o Dept. of Land Development, Phaholyotin Road, Bangkok 10900, Thailand.

Announcement

INTERNATIONAL SYMPOSIUM ON MANAGING SANDY SOILS

Central Arid Zone Research Institute, Jodhpur, Rajasthan, India, February 8–12, 1988

Background: Sandy soils are widespread the world over and they occur under varied physiographic and environmental situations. A symposium on 'Sandy Soils' was organised by the FAO in Cyprus in 1973. It is an appropriate time now to take stock of the scientific and technological advancements made since then and to benefit from each other's experiences.

Topics:
1. Major occurences, morphological and mineralogical characteristics.
2. Soil water retentivity and water relations; infiltration rate and water movement; soil thermal regimes and water interaction.
3. Mechanical properties and tillage requirements.
4. Water and nutrient management in irrigated and unirrigated sandy soils; biological augmentation of soil fertility.
5. Problem of soil erosion and its control, sand dune stabilisation.
6. Potentialities and limitations of sandy soils of different climatic regions for plant production. Technologies for agroforestry, horticultural crops.
7. Alternate uses of sandy regions – Biosphere reserve, wild life and tourism.

Papers: Research papers on any of the topics listed above are invited from intending participants. Those who return the 'Notice of Intent' will receive instructions for preparing of the manuscript immediately and also the final circular giving a detailed programme of the Symposium. Participants are encouraged to present their contributions in Poster Session. The manuscript of the papers presented in the Poster Session will be included in the proceedings. In addition to the contributed papers, it is proposed to invite a few eminent scientists to highlight the selected themes. It is proposed to preprint the extended abstracts of papers after necessary editing and make a copy available to each registered participant.

Registration fee: US$ 150.00, payable before November 30, 1987. After this date the registration fee will be US$ 175.00.

Field Excursion: It is proposed to organise a post-symposium excursion to acquaint the participants with the scientific and technological problems of management of sandy soils and the endeavours made to rehabilitate the desert region through use of modern technology, including major development works like the command area of the gigantic Indira Gandhi Canal; and the Haryana Agricultural University. The excursion will provide a traverse through fascinating desert landscape and will include visits to places of historic and tourist importance like Jaisalmer located deep in the westernmost part of the desert. The entire trip is likely to be of 5 days duration and costs an equivalent of US$ 250 (with spouse US$ 350).

NOTICE OF INTENT
Symposium on Managing Sandy Soils

Name: .....
Organisation: .....
Mailing Address: .....
.....

☐ I intend to participate in the Symposium. Proposed title of my paper for presentation is:
.....
.....

Date: ..... Signature: .....

This notice is to be *sent to*: Dr. K. A. Shankarnarayan, Director, Central Arid Zone Research Institute, Jodhpur 342 003, India.

Announcement

INTERNATIONAL SYMPOSIUM ON SOLONETZ SOILS; PROBLEMS, PROPERTIES, UTILISATION

Agricultural Faculty, University of Osijek, Yugoslavia, June 15–20, 1988

Program: The first three days (June, 15–17) will be spent in Osijek with the presentation of papers and visit to the experimental field on complex amelioration of the solonetz soils and salt-affected area to Vojvodina. The next three days (June 18–20) will be reserved for an excursion from Osijek to Sarajevo and further to Dubrovnik with the visit to Neretiva valley and presentation of results on amelioration of maritime salt-affected soils.

Topics:
- Solonetz Soils (I. Szabolcs, Hungary).
- The Improvement and Agricultural Use of Solonetz Soils of Sodic Nature (G.P. Petrosian, USSR).
- Solonetz and Solodi Soils of Yugoslavia (M. Adam, N. Miljkovic, N. Plamenac, Yugoslavia).
- Irrigation and Secondary Salinization, Monitoring and Prevention (J.D. Rhoades, USA).
- Cartography and Survey on Salt-Affected Soils and laboratory methods of investigation (Y.C. She, China and I.P. Abrol, India).

Language: The official language of the symposium will be English.

Accomodation: Participants will be accommodated in hotels with single and double rooms.

Costs:
- Participation fee of 250 US$ includes Proceedings of Symposium and visit to experimental field and salt-affected area to Vojvodina.
- Hotel accomodation in Osijek is expected to cost 50 US$ per day.
- Excursion Osijek-Sarajevo-Dubrovnik is expected to cost 250 US$.
- Last date for receipt of full manuscripts and for registration is Dezember 31, 1987.
- Voluntary papers are welcome on 6 pages including tables, figures and references.

NOTICE OF INTENT
Solonetz Soils Symposium

Name: .....
Organisation: .....
Address: .....
.....

☐ I intend to participate in the Symposium.
☐ I intend to participate in the Osijek-Dubrovnik Excursion.
☐ The proposed title of my paper for presentation is: .....
.....
Date: ..... Signature: .....

This notice is to be *sent to*: Dr. M. Adam, Agricultural Faculty, University of Osijek, 54000 Osijek, Tenjska cesta BB, Yugoslavia.

Announcement

8TH INTERNATIONAL WORKING MEETING ON SOIL MICROMORPHOLOGY

San Antonio, Texas, USA, July 10–15, 1988

Topical Program Areas: The following areas are under consideration for inclusion in the scientific program. We would appreciate your inputs and comments regarding interest in these and other areas: Vertisols; Yermosols/Aridisols; Gleysols/Hydromorphic Soils; Soils enriched with carbonates, gypsum and other salts; Micromorphological techniques in teaching and research; Degradation and synthesis of minerals; Micromorphological applications to agronomic and earth sciences; Paleopedology.

Presentations: With the exception of invited papers, all work presented during the meeting is expected to be original and current research – *not* a review of literature or earlier work published elsewhere. No facilities will be available for simultaneous translation of the presentations. Hence, all presentations will be made in English. Both oral and poster type presentations will be included.

Local Arrangements: Current plans are to use air-conditioned dormitory housing, cafetaria service, and lecture room facilities at one of the universities in San Antonio.

Firm commitments on costs are not yet available, but housing and meals will not likely exceed $150 for the 5 days of meetings. The registration fee, which will include the cost of the Proceedings of the Micromorphology Workshop, will not exceed $100 for members and $20 for spouses. An opening reception and a closing banquet or barbeque will be planned as family events.

Field Trips (tentative); costs not yet determined.

A. Northeastern US, 2 days, pre-conference. Piedmont and Tertiary and Quaternary sediments of the Atlantic Coast Plain (Hapludalfs, Hapludults – Cambisols, Luvisols and Acrisols).
B. Northcentral US, 6 days, pre-conference. Glaciated and unglaciated areas of the Midwest (Hapludalfs, Hapludolls, Haplaquepts – Luvisols, Phaeozems and Gleysols.
C. Southwestern US, 6 days, post-conference. Pre-cambrian igneous rocks of the Central Basin; Cretaceous limestone of the Edwards Plateau; Cenozoic deposits of the Coastal Plain. (Argiaquolls, Paleustalfs, Calciustolls, Natrustalfs, Ustochrepts, Pellusterts, Torrerts, Natrargids, Calciorthids and camborthids – Gleysols, Luvisols, Kastanozems, Solonetz and Yermosols).
D. Southwestern US, 2½ days, post-conference. (Torripsamments, Torriorthents, Haplargids, Paleargids, Paleorthids, Calciorthids, Camborthids, Haplustolls, Calciustolls, Argiustolls – Regosols, Yermosols and Kastanozems). Carbonate accumulation sequence.
E. Mid-conference, one day field trip. Mollisols and Vertisols in the San Antonio area.

NOTICE OF INTENT
8th Soil Micromorphology Meeting

Name: .....
Address: .....
.....

☐ I wish to attend the Micromorphology Meeting and to receive the second circular.
☐ I intend to submit a poster paper/a paper with oral presentation, with title: .....
☐ I would be interested in field trips no: .....
☐ I shall be accompanied by: .....
Date: ..... Signature: .....

This notice is to be *sent to:* Dr. Richard Drees, Soil and Crop Sciences Dept., Texas A&M University, College Station, TX 77843, USA.

ISSS Commissions I and II and Working Group MV (co-sponsoring)

Announcement

INTERNATIONAL WORKSHOP ON VALIDATION OF FLOW AND TRANSPORT MODELS THROUGH THE UNSATURATED ZONE

Las Cruces/Ruidoso, New Mexico, USA, May 1988

The workshop will be held at New Mexico State University as part of the Centennial Celebration of this university.

Purpose: to bring together scientists and engineers interested in modelling and field validation of chemical transport through the unsaturated zone. There will be invited speakers as well as voluntary paper contributions.

Main topics:
1. Deterministic modelling and field validation.
2. Flow and transport in spatially variable media.
3. Stochastic modelling and validation.
4. Transport of interacting chemicals in unsaturated media.
5. Concepts of validation.

The workshop should be of interest to persons concerned with soil and groundwater pollution. Soil Physicists, Hydrologists, Engineers, Biologists, Soil Chemists and Geochemists working on one of the above topics are invited to attend.

For further *information*, contact Dr. Peter J. Wierenga, Dept. of Horticulture, Crop and Soil Sciences, New Mexico State University, P.O. Box 30003, Las Cruces, New Mexico 88003, USA.

ISSS Commission II and III **Czechoslovak Society of Soil Science**

INTERNATIONAL SYMPOSIUM 'HUMUS ET PLANTA IX'

Agricultural University, Prague, Czechoslovakia, August 21–26, 1988

Scientific Program: Organizers are inviting papers on the following topics:
1. Interaction between natural and management effects on soil humus state and dynamics.
2. Effect of soil organic matter on the plant physiology and availability of plant nutrients.
3. Impacts of xenobiotic substances on the soil organic matter transformation and its effect on biological detoxification of xenobiotics.
4. Progressive methods in the soil organic matter research.

Abstracts: The call for abstracts will appear in the next circular to be published in September 1987. It will be mailed to all those who request a copy.

NOTICE OF INTENT
Humus et Planta IX

Name: .....
Address: .....
.....
Please send me additional information on the IXth Int. Symposium HUMUS et PLANTA.

☐ I plan to present a paper .....
☐ I plan to present a poster .....
Topic of the contribution (circle): 1 2 3 4

I expect to be accompanied by .....

Return to: Dr. Bohumir Novak, Chairman Organizing Committee HUMUS et PLANTA IX, Research Institute of Crop Production, 161 06 Praha 6, Czechoslovakia.

Announcement

SYMPOSIUM ON LAND QUALITIES IN SPACE AND TIME

at the International Agricultural Centre, Wageningen, the Netherlands, August 22–26, 1988

Aims of the Conference

A critical review of procedures of quantified land evaluation at different scales and the associated data needs. In this context attention will be paid to mapping, (geo)statistics, field technology, simulation modelling and use of information systems. The focus will be on both agricultural and environmental studies.

Scientific Program

The Symposium will consists of five days of presentations covering three main themes in plenary sessions with invited and voluntary papers, poster sessions, discussions groups and computer demonstrations.

The main themes are:

- Land evaluation at different scales;
- Dynamics of land qualities;
- Data Acquisition, processing and quality control.

The terminology used is according to the Framework for Land Evaluation of FAO, 1976.

Poster Sessions and Demonstrations

Part of the scientific program will consist of a comprehensive series of poster sessions and software demonstrations where an intensive exchange of ideas and experiences can take place. The Organizing Committee will provide ample opportunity for poster sessions and software demonstrations. Those participants wishing to present their contribution as posters or software demonstrations are encouraged to do so.

More information concerning the format of abstracts of oral contributions and posters will be given in a circular. Also information will be given about the available hardware for demonstration.

Proceedings and Language

Proceedings of the Symposium will be published after the Symposium. Voluntary papers and posters will be published as extended abstracts.

The official language of the Symposium will be English.

Registration

The registration fee including proceedings, lunches and symposium diner will be about Dfl 400,– (about US$ 200,–).

NOTICE OF INTENT

Symposium on Land Qualities in Space and Time

Name: .....

Address: .....

.....

☐ I intend to participate in the Symposium.

☐ I shall be accompanied by: .....

☐ I intend to present:

☐ an oral contribution ☐ a poster contribution ☐ a software demonstration

Preliminary title of my oral and or poster contribution or software demonstration:

.....

.....

Date: ..... Signature: .....

Please *return this form*, before September 1st, 1987, to IAC-Bureau OCC, P.O. Box 88, 6700 AA Wageningen, the Netherlands. Telex 45888 intas-nl.

Announcement

5th INTERNATIONAL SYMPOSIUM ON SOILS SCIENCE & REMOTE SENSING

Budapest, Hungary, 11–15 April 1988

Programme

The symposium is organized by the Working Group on Remote Sensing of commission V of the ISSS and by the Hungarian Soil Science Society being a part of the Hungarian Society of Agricultural Sciences in Budapest, Hungary. Host is the Research Institute for Soil Science & Agricultural Chemistry of the Hungarian Academy of Sciences.

The Symposium is intended for specialists working with theoretical, experimental and practical aspects of remote sensing application in soil and vegetation inventory.

The following sessions are intended:

I Modeling
II Monitoring
III Mapping
IV GIS & RS

A one-day field trip is included. Furthermore, attention will be paid to the activities of the Remote Sensing Centre of Hungary.

Papers and proceedings

Extended abstracts of the papers (2 pages) should be received by December 1, 1987, the papers (in max 5–10 pages) by January 1, 1988. English will be the working language of the Symposium.

Costs

The registration fee is 175 US$ before January 1, 1988 and 200 US$ after. Payment should be made in US$ in advance by bank cheque or by bank transfer to MNB Budapest, to be credited to account MTESZ MNB 232 90171-2494/WGRS/5 mentioning name or in connection with the registration.

The registration fee includes the proceedings, one-day field trip, welcome party, morning and afternoon coffee.

Accomodation at TOT Hotel (the same as conference building) will be 35 US$ with breakfast, in double rooms, lunch and dinner about 7 US$.

NOTICE OF INTENT

Name & title: .....:.....
Mailing address: .....
☐ I expect to attend the 5th WG/RS Symposium 11–15 April, 1988
☐ I propose to submit a paper entitled: .....
.....
.....
☐ I shall be accompained by:.....
Date: .....*Signature:* .....

This notice of intent should be returned by October 1st 1987 to the Organizing Committee c/o Dr. Ilona Juhasz, MTA TAKI, Dept. of Soil Sci., Herman Ottó 15, H Budapest, Hungary.

Announcement

INTERNATIONAL WORKSHOP ON CLASSIFICATION, MANAGEMENT AND USE POTENTIAL OF SWELL-SHRINK SOILS

Nagpur, India, October 24–29, 1988

Objectives: In this workshop, the characteristics, distribution, taxonomic problems, management and use potential of the Swell-Shrink soils will be discussed. Attention will also be focused on the interrelationship between Vertisols and associated vertic intergrades. A workshop of this type may be an appropriate forum for interaction of different schools on such widely occurring soils in Asia, Africa, Australia and Latin America. This workshop may also act as a forum to key out the definition of swell-shrink soils for the International Reference Base of ISSS.

Topics: The following topical programme areas of Swell-Shrink soils are under consideration for inclusion in the scientific programme. We would appreciate your inputs and comments regarding interest in these and other areas:

- characterization, classification and distribution
- micromorphology and structural aspects
- chemistry and mineralogy
- soil-water-plant relationships
- management under non-irrigated/dryland and irrigated conditions
- soil erosion and conservation
- socio-economic considerations for Vertisol utilization
- crop performance and farming systems
- innovative technologies and systems analysis for improved crop production

Presentations: with the exception of invited papers, all work presented during the Workshop is expected to be original and current research – *not* of a review type or earlier work published/presented elsewhere. No facilities will be available for simultaneous translation of the presentations. Both oral and poster type presentations will be included.

Local Arrangements and Costs: Our current plans are to accomodate the participants in hotels at Nagpur. Nagpur, the geographical centre of India, is the Orange City of 1,200,000 population. It is connected with Bombay, Calcutta, Delhi, Hyderabad and Jaipur by air, and to all major cities by rail. In December, one can expect lots of sunshine and moderate temperatures.

Firm commitments on cost are not yet available, but housing and meals are not likely to exceed $ 50 per day. The registration fee, which will include the cost of the Proceedings of the Swell-Shrink Workshop, will be $ 100 for the participants payable before March 1988. After this date the registration fee will be $ 120 up to September and $ 150 thereafter.

Field Trips: It is proposed to organize a Mid-Congress and a Post-Congress field trip to acquaint the participants in the typical Vertisols and associated vertic intergrades developed on different landscape positions.

NOTICE OF INTENT
Workshop on Swell-Shrink Soils

Name: .....

Address: .....

☐ I wish to attend the Workshop on Swell-Shrink Soils
☐ I shall be accompanied by:.....
☐ I intend to submit a poster paper
☐ I intend to submit a paper for oral presentation
Title of my paper: .....

.....

Date .....Signature .....

This notice is to be *sent before October 1st,* 1987 to: Dr. S. B. Deshpande, Div. of Pedology, Nat. Bureau of Soil Survey and Land Use Planning. Amravari Road, Nagpur-440 010, India.

REPORTS OF MEETINGS
COMPTE-RENDUS DE REUNIONS
BERICHTE VON TAGUNGEN

INTERNATIONAL CONFERENCE ON THE VULNERABILITY OF SOIL AND GROUNDWATER TO POLLUTANTS

Noordwijk, the Netherlands, March 30–April 3, 1987

The conference, co-sponsored by ISSS, was organized by the Dutch National Institute of Public Health and Environmental Hygiene and focused on the vulnerability of soil and groundwater to pollutants with respect to their multifunctional character. Special attention was given to the interaction between top soils and groundwater bodies as well as to the spatial and temporal variability of parameters. A total of 244 participants from 26 countries were stimulated in the exchange of information between specially hydrogeologists and soil scientists by 75 oral presentations and 34 posters. Main topics were: 1) Criteria for protection of soil and groundwater; 2) Monitoring strategies for the quality of soil and groundwater; 3) Vulnerability mapping; 4) Vulnerability in relation to subsurface behaviour of inorganic and 5) organic pollutants and 6) Use of data required for modelling quality of soil and groundwater. The list of discussed contaminants ranged from nitrate, phosphate, heavy metals, organic chemicals and pesticides to acid precipitation. It was emphasized that large-scale soil maps can be used as excellent base in predicting vulnerability. But cooperation between soil scientists and hydrogeologists has to be enhanced in respect to informations about the deeper unsaturated zone. Participants enjoyed a very well organized and substantial conference at the North Sea beach, as well as two informative technical excursions to the Oosterschelde storm surge barrier and to the Zuiderzee polders.

H. Wiechmann, Hamburg, F.R. of Germany

SEMINAR ON SOIL FAUNA IN EGYPT AND IN AFRICA

Cairo, Egypt, April 16–20, 1986

Some 50 scientists from various African and European countries took part in a seminar on resources of soil fauna in Egypt and in Africa, which was held in Cairo (Egypt) in April 1986. The seminar was one of several organized during 1986 to mark the fifteenth anniversary of the Department of Natural Resources (DNR) of Cairo University's Institute of African Research and Studies. The aims of the seminar were to review the present state of knowledge of soil fauna in Egypt and in Africa, to evaluate the work done at the DNR in this field during the past 15 years, and to plan future cooperative work on the soil fauna of Africa. The 26 papers presented at the seminar included accounts of detailed descriptive studies of soil fauna populations, basic studies on soil chemistry and the fate of pesticides, and the role of soil fauna in the maintenance of soil fertility. A session on Survey and Evaluation of Soil Resources in Egypt and in Africa was included.

Seminar participants discussed links with the Tropical Soil Biology and Fertility (TSBF) programme, particularly in respect to a research programme being sponsored by DNR on environmental site characterization by soil fauna in Egypt and Africa. Among the specific recommendations of the seminar was the setting up of an African Soil Biology Association, whose function would be to promote research in African soil biology, to facilitate communication and cooperation among African researchers, and to help in the dissemination of research results.

For further information, contact Prof. Samir I. Ghabbour, Dept. of Natural Resources, Institute of African Research and Studies, Cairo University, 12613 Ghiza, Egypt.

from: InfoMAB no. 6, October 1986.

THE FOURTH EUROPEAN ECOLOGY SYMPOSIUM

Wageningen, the Netherlands, September 8–12, 1986

The Fourth European Ecology Symposium was held in Wageningen, Holland, in Sept. 1986 to consider 'The Ecological Implications of Contemporary Agriculture'.

Approximately 150 delegates attended from 17 countries, most of whom were working on ecological aspects of agricultural systems. There were five sessions – on soils, weeds, pests, flows of water and nutrients through agroecosystems, and on relations between ecosystems in the rural landscape.

The soil session examined how the substrate for agriculture was being treated, with two keynote papers, twelve posters and general discussion. In the first paper Dr P. B. Tinker, Director of Terrestrial and Freshwater Science in the UK National Environment Research Council, examined physical and chemical damage to soils, and in the second Dr E. T. Elliott from the Natural Resources Ecology Laboratory, Fort Collins, Colorado, USA, looked at the living soil and asked 'are we treating it like dirt?' Damage to soils was defined as a diminished ability to bear vegetation and it was concluded that, apart from severe erosion in some places, irreversible damage was being done to soils only by heavy metals, resulting from industrial pollution or unwise use of sewage sludges. Philosophically, there was no agreement that soil damage had occurred if crops still grew on sludge treated soils but with their herbage or produce loaded with heavy elements.

Dr Elliott argued that tillage should be reduced as much as reasonably possible so as to retain effective amounts of organic matter with an active microbial biomass. There was no agreement on what constituted an effective amount of organic matter. The activity of the microbial biomass was related to the macro and micro pore structure of the soil in Dr Elliott's hypothesis; he also believed that use of biocides and heavy metals should be minimised to avoid damage to the soil flora and fauna.

Both speakers concluded that soils require sensitive and careful management matched to their environment and use.

The Symposium accepted that modern agriculture was having, or is about to have, deleterous effects on the environment in many countries. However, the majority of the damaging effects are preventable or reversible at a cost, with the possible exception of heavy metal loads at some specific sites as described by Dr Tinker.

At the end of the Symposium the delegates agreed a press release with the following recommendations:

- the re-evaluation of recommendations for the use of agro-chemicals, especially fertilisers and pesticides. For example, reduction in the top rate of nitrogen fertiliser used in The Netherlands from 400 to 200 kg N ha^{-1} yr^{-1} would be immediately beneficial, especially if combined with changes in grassland management;
- the operation of stricter rules to control the amount and time of application of slurry to agricultural land;
- more stringent rules to reduce the amount of heavy metals, especially copper, added to agricultural land in sewage sludge;
- increased use of biological control agents – use is rising but a problem is that large chemical companies are not able to expand production of the necessary agents, although it is hoped microbial agents will be more available soon;
- that agronomists must be more receptive than in the past to the possible benefits of ecologically based land use plans and that all interested in the health of the countryside must be more precise about the socio-economic consequences of their proposals;
- that every user of land, whether for agriculture, forestry, recreation or nature reserve should share responsibility for the protection of all the other species of plants and

animals which share the globe with man; a continuing agro-ecological symbiosis, with more frequent meetings of agriculturists and ecologists.

Professor C. T. de Wit brought the Symposium to an end by analysing some of the dilemmas facing agriculture in the world and especially in the Netherlands and other parts of Western Europe. He thought that, ideally, the purposes of agricultural policy should be to restore the equilibrium of the market, to decrease social economic differences between less- and well-endowed regions and to maintain and strengthen the function of agriculture with respect to the environment. The instruments and policies to achieve these ideals should include a downwards adjustment of prices so that the total export subsidies equal total input levies, temporary use of quotas and set-aside programmes, more EEC responsibility for structural and financial development in member countries and a special EEC tax on food to pay for the execution of the agricultural policies. The better endowed regions should bear the main burden of the necessary adjustments in production since it was not morally justifiable to export our problems.

His assessment concluded that 16 M ha of good quality arable land in the EEC must be taken out of agricultural production, but he was unable to present definitive suggestions as to how this retired land should be used. He believed there would be no 'big solutions' but the operation of a wide and diverse range of 'little crops' or novel enterprises and alternative land uses tailored to the needs and wishes of individual family groups. He thought farmers should be set goals and aims and paid on their achievement by ways of their own choosing; all hectarage payment should be abolished. No further land improvement should be subsidised.

The meeting provided a unique forum for ecologists, agriculturists, foresters and nature lovers to meet and to discuss objectively the conflicts between land use and environmental protection which loom so large in present day considerations. It is hoped that the next meeting planned for Italy in 1989 to consider 'Populations and communities affected by heavy metal pollutants' will build on the cooperative multidisciplinary atmosphere generated in the Netherlands.

P. Newbould, Penicuik, Scotland

INTERNATIONAL SYMPOSIUM ON FERTILIZER SULPHUR REQUIREMENTS AND SOURCES IN DEVELOPING COUNTRIES OF ASIA AND THE PACIFIC

Bangkok, Thailand, January 27–31, 1987

The need for plant nutrient sulphur in Asia and the Pacific was brought to the forefront recently in Bangkok, Thailand, at an international symposium that was attended by speakers and 165 participants from over 35 countries, representing governments, international organizations, and industry.

Sulphur deficiencies in the soils of Asia and the Pacific are increasing dramatically. This is directly linked to the very substantial increases in food production that these regions have experienced in recent decades. To achieve these much higher crop yields, higher fertilizer inputs have been required, and fertilizer consumption in Asian and Pacific countries has increased extremely rapidly, surpassing consumption in North America, and even approaching European levels of usage. Mr. R. J. Morris, Director of Agricultural Programs at The Sulphur Institute in Washington, D.C., pointed out in his opening address that, since the growth in fertilizer use has been predominantly in high-analysis nitrogen and phosphate fertilizers which are essentially sulphur-free, the record-breaking crop yields that result are removing ever-increasing quantities of sulphur from the soils.

Participants at the symposium discussed the growing requirement for sulphur in

agriculture in the region, as well as technical and economic aspects of the availability of this important plant nutrient to Asian and Pacific farmers. In addition, the symposium also covered marketing and distribution of sulphur fertilizers, as well as the educational and promotional programs required to familiarize both industry and farming communities with the importance of sulphur as a part of sound agricultural practice.

The closing session of the symposium concluded that sulphur deficiencies in the region are widespread, but not widely recognized. To begin rectifying this serious problem, the participants recommended that the sulphur values of fertilizers be reported and included in fertilizer consumption, production, and import statistics. They also recommended that appropriate extension and training programs be started, and that research programs be established to delineate sulphur-deficient areas and their sulphur requirements more precisely.

Robert J. Morris (Director of Agricultural Programs, The Sulphur Institute, 1725 K Street, N.W., Washington, D.C. 20006, U.S.A.)

FIRST INTERNATIONAL WORKSHOP ON SOIL PHYSICS AND SOIL MECHANICS

August 11–13, 1986, Hannover, F.R. of Germany

The objective of this 1st International Workshop was to facilitate an exchange of views on interdisciplinary work in soil physics and soil mechanics, in order to obtain more detailed theoretical information about the process of structure formation and the interaction of differently structured soils with water and external forces.

The Organizing Committee consisted of Prof. Dr. R. Horn (University of Bayreuth, Fed. Rep. of Germany), Prof. Dr. M. F. de Boodt (State University, Ghent, Belgium) and Prof. Dr. J. Drescher (University of Hannover, Fed. Rep. of Germany). The Workshop was hosted by the Lower Saxony Academy for Geosciences (NAG), together with the German Society of Soil Science (DBG), and the German Geotechnical Society (DGEG). The Workshop was held in the Alfred-Bentz-Haus, Stilleweg 2, 3000 Hannover-Buchholz, the seat of the Institute of Geoscience and Natural Resources (BGR) and the Geological Survey of Lower Sanoxy (NLB).*

The Workshop was attended by 50 research workers, the majority of which (29) came from the Federal Republic of Germany. Other participants came from Australia (2), Belgium (1), Canada (1), Chile (1), China (1), Denmark (1), the Netherlands (2), USA (4), Sweden (2) and Switzerland (6). For two days, this international group of experts in soil physics and soil mechanics discussed the changes in soil structure as affected by natural forces and human activities, and the ensuing changes in soil physical and mechanical properties. The third day, on the way to Hamburg (13th Congress of the International Society of Soil Science, ISSS), a field trip was made to sites near Ohlum and Wenzendorf/Buchholz, where the effect of ameliorative tillage (deep loosening) and tile drainage on soil physical properties and crop growth was demonstrated.

The programme of the first two days consisted of lectures and poster presentations on 1) Soil Erosion, 2) Soil Compaction, and 3) Reaction to Loading (see Appendix No. 1). A volume of abstracts of the majority of the lectures and posters was distributed among participants on their arrival at Hannover. The Proceedings of this 1st International Workshop on Soil Physics and Soil Mechanics, which will contain the list of participants, the full text of the lectures, edited versions of the posters presented, and the results of the discussions will appear by the end of 1986.

After each lecture and during the poster presentations, ample time was available for discussions; after conclusion of the third lecture sessions a prolonged general discussion was held. It was concluded that of late, with respect to the understanding

of the process of soil compaction and the prediction of its effects on soil structure, considerable progress has been made, especially in the Federal Republic of Germany. It was felt that close cooperation between research workers in soil physics and soil mechanics will produce useful results in the near future. For establishing a global survey and mathematical modeling of the soil compaction problem, this cooperation may be considered essential. In view of the effects of the soil fauna on soil structure formation, soil biologists could make very valuable contributions to solving the problem of soil behaviour as affected by external forces.

An important decision was to hold a second International Workshop on Soil Physics and Soil Mechanics in September 1988 in St. Paul (MN, USA), to be organized by Prof. Dr. W. E. Larson, Dr. R. R. Allmaras (St. Paul) and Dr. W. B. Voorhees (Morris, MN).

With respect to the future status of the group assembled in Hannover, the general opinion was that probably the group could best operate under the umbrella of ISSS. Therefore, it seemed attractive to join the Working Group on Pedotechnique (PT) of Commission VI (Soil Technology) of ISSS, which was founded in 1982 during the 12th ISSS Congress at New Delhi, India. However, a decision was postponed, pending further discussions with the Chairman and the Secretary of ISSS Working Group PT and the ISSS Council.

C. van Ouwerkerk, Haren Gn, the Netherlands

WORKSHOP ON SOIL AND WATER CONSERVATION ON STEEP LANDS

San Juan, Puerto Rico, March 22–27, 1987

This workshop was the inaugural meeting of the World Association of Soil and Water Conservation (WASWC) and was co-organized by the Soil Conservation Society of America. Its purpose was to provide an opportunity for participants to share their experiences with implementing agricultural development projects on steep lands in which soil and water conservation is a targeted component and to document those principles which determine the success or failure of such projects. The Workshop's activities included several general sessions, discussion groups, a preconference field trip and a one day tour, during the week, which highlighted some of Puerto Rico's soil and water conservation efforts on a variety of land uses.

The discussion groups, near the end of the week, were designed to extract as much information as possible from participants whose experiences involved croplands, pasture lands, tree crops, and/or nonfood crops for 'dry' as well as 'wet' conditions. Group conclusions spanned the biological, physical, economic and social factors which must be integrated to build successfull farming systems and the criteria which should be met to assure the achievement of desirable conservation outcomes. Among the major points of concern, the following stood out:

1. Farm productivity, rather than conservation per se, should be the primary target of the agricultural development enterprise; soil and water conservation is a very critical requirement for sustaining and stabilizing the produtivity of land resources on steep lands.
2. Instead of the commonly practiced top-down approach, a bottom-up approach, in which farmer participation is instrumental in conceptualizing, designing, and implementing conservation measures is a must for incorporating desirable components of traditional systems, a necessary requisite of project success, and an assurance of farmer's acceptance and continued commitment to project objectives. An early role must be played by economists and social workers to assure the economic feasibility and cultural compatibility of proposed project designs.

3. Soil and crop management and not massive engineering structures, should receive the highest priority in designing effective systems. Structural measures which are used instead of, rather than as a complement to, agronomic measures are likely to fail. Development projects are too often attracted by the high visibility and a 'measurability of achievement' associated with engineering structures and unattracted by the hard work and elusiveness of improved soil and crop management.
4. Despite the great diversity of climates and soils on steeplands, the concept of 'matching' has been grossly underutilized in many past and existing projects. Two specific facets of this concept must be emphasized in agricultural production projects – (a) the matching of site characteristics and land capability with an appropriate, protective land use system, (e.g. perennial vegetation is needed on steeplands particularly those with strictly seasonal rainfall), and (b) the matching of specific design criteria with climatic and soil characteristics of the development site (e.g. terracing is incompatible with shallow soils and when designed for total rainfall infiltration is an impractical expectation for situations with high amounts and intensity of precipitation where drainage is necessary). Naturally, a reliable, quantitative resource inventory and predictive tools are needed for such effective matching.
5. Principles, and not practices, are transferable from old to new situations. Existing predictive models, most importantly the universal soil loss equation, are fully or partially empirical with a data base that is derived from croplands with 'normal' slopes and temperature cropping practices. Extrapolating the use of such models to tropical steeplands requires carefull verification. In the long term, process-based models which are not site-specific, should be used for determining potential runoff and erosion in a given location, designing of applicable conservation measures, and quantifying conservation management targets.
6. Few projects whose mission includes erosion and runoff control do in fact determine whether this objective is achieved and, if so, monitor the longevity of desired effects. Depedence on 'implied' applicability of results from small research plots alone is erronous as it ignores the fact that erosional processes express themselves very differently at field or catchment scales. The need for effective maintenance of existing conservation measures or modifying their design in future projects can only be determined by quantitive monitoring of their effectiveness. Lack of monitoring allows design or implementation flaws to go unchecked thus causing even more serious field erosion and defeating the purpose of expensive investments.

The intended output from the workshop consists of two publications; the first a volume of invited papers on case studies and the second a manual for guiding the design of conservation-effective agricultural production systems.

The organizing committee, under the leadership of Dr. W. C. Moldenhauer (Executive Secretary to WASWC) is to be complimented for the well conceived conference program and the sustained pace in deploying the efforts of participants towards achieving the stated purpose and objectives.

Samir A. El-Swaify, Chairman, Subcommission C, Hawaii, USA

INTERNATIONALES SYMPOSIUM ÜBER SALZ- UND ALKALIBÖDEN UND IHRE NUTZUNG DURCH AUFFORSTUNG

Februar 1987, Karnal/Haryana, Indien

Das Problem der Bodenversalzung bildet ein aktuelles Beispiel für die erforderliche vielfältige internationale Zusammenarbeit in einem weitgesteckten Forschungsprogramm. Das Salzproblem berührt viele der traditionellen wissenschaftlichen Disziplinen. Um diese verschiedenen wissenschaftlichen Interessen zu koordinieren, hat die Regierung Indiens gemeinsam mit dem indischen Forschungsrat für Landwirtschaft

(ICAR) und der *Subkommission für Salzböden der Internationalen Bodenkundlichen Gesellschaft* vom 16.–20. Februar 1987 in Karnal/Indien ein weltweites Symposium abgehalten. Ähnliche Salzboden-Symposien haben 1969 in Erevan/Sowjetunion, 1973 in Kairo/Ägypten, 1978 in Edmonton/Kanada und 1986 in Hamburg stattgefunden. Im indischen Zentralinstitut für Salzbodenforschung in Karnal im Bundesstaat Haryana wurden während des Symposiums insgesamt 34 Referate gehalten und diskutiert, vor allem über die Charakteristik, Genese und Klassifikation, Diagnostik, Methodologie und Physik von Salz- und Alkaliböden, über Salzanreicherung, Salzdynamik, Salzauswaschung, Meliorationsmethoden, Probleme der Wasserqualität und Salztoleranz von Bäumen.

Während des Symposiums wurde eine fachwissenschaftliche Exkursion durchgeführt. Zum Teilnehmerkreis gehörten Wissenschaftler, Vertreter der F.A.O., Vertreter der Landwirtschaft, der Wasserwirtschaft und der Industrie vor allem aus Indien, der Sowjetunion, aus Ungarn, Afghanistan, Pakistan, Australien und Westeuropa.

Bei den besichtigten Böden in Haryana handelt es sich um Alluvialböden, die durchweg aus den Ablagerungen der Flüsse des Indus- und Ganges-systems bestehen, die das Verwitterungsmaterial aus dem Himalaja und seinen Vorbergen bringen und in der Ebene ablagern. Die alluvialen Böden sind schichtig gelagert. Innerhalb des meist sandigen Profils finden sich vielfach sandig-lehmige, lehmige und lehmig-tonige Schichten. All diese Böden können als mehr oder weniger starke Salz- und Alkaliböden angesprochen werden. Die Salze stammen entweder aus den bodenbildenden Mineralen, die bei der Verwitterung Na-, Mg- und Ca-Salze freigeben, oder dem salzhaltigen Grundwasser, in das die Salze durch Verwitterung und Auslaugung der stark salzhaltigen Gesteine gelangen oder schließlich aus salzhaltigem Bewässerungswasser. Die Böden besitzen meist eine starke alkalische Reaktion und erreichen pH-Werte über 10. Bei hoher Konzentration leicht löslicher Salze kommt es zur Bildung von weißen Salzausblühungen, oft sogar zur Entstehung dicker flächenhafter Salzkrusten. Alkaliböden mit einer elektrischen Leitfähigkeit von 4 mmhos/cm und einem Na-Anteil an der Austauschkapazität von mehr als 15% zählen zu den bewässerungsunfähigen Böden, da sie eine schlechte Wasserdurchlässigkeit und Durchlüftbarkeit besitzen und beim Austrocknen steinharte Krusten und polygonale tiefe Schrumpfrisse aufweisen. Vom Gesichtspunkt landwirtschaftlicher Nutzung aus gesehen besitzen diese Alkaliböden in ihrem natürlichen Zustand nur geringen Wert, denn sie tragen häufig nur Dornstrauch-, in extremen Fällen reine Halophytenvegetation. Zur Melioration dieser Böden ist eine chemische Behandlung notwendig. Hierzu kommen in Indien Gips und Pyrit zur Anwendung. Es kommt darauf an, daß das austauschbare Na durch Ca ersetzt wird. Wegen der geringen Löslichkeit von Gips in Wasser sind große Wassermengen notwendig. Der hohe Wasserbedarf birgt aber die große Gefahr der sekundären Bodenversalzung in sich. So konnten zwar durch Meliorationsmaßnahmen auf Alkaliböden in Haryana Weizen- und Reiserträge von 60 dt/ha geerntet werden, durch die übermäßige Bewässerung ist jedoch das salzhaltige Grundwasser seit 1965 von 18 m Tiefe bis auf 1,5 m u. Fl. im Jahre 1984 angestiegen. Das hat zur Folge, daß die neuen Bewässerungsflächen mit Entwässerungsgräben versehen werden müssen.

Durch Drainage der Felder kann eine ständig wachsende, für die Pflanzen schließlich toxische Salzanreicherung in den Böden zunächst verhindert werden. Wichtig dabei ist, daß das Röhrensystem tief genug – mindestens 1,8 m – unter der Bodenoberfläche liegt, um auch in Trockenperioden ein Aufsteigen des salzhaltigen Grundwassers in den Wurzelraum der Pflanzen auszuschließen.

Damit sind die Schwierigkeiten mit den Salzen aber nicht gelöst, sondern nur verlagert, denn das in immer größer werdenden Mengen anfallende Brackwasser mit einem durchschnittlichen Salzgehalt von 3 500 ppm muß 'irgendwohin' abgeleitet werden. Konzeptionen, die die direkte Ableitung des Drainagewassers mittels Kanal- und Pumpsystemen ins Meer vorsehen, stoßen auf mannigfaltige ökologische, ökonomi-

sche und politische Hindernisse. Da aber auch derartige gigantische Projekte die Schwierigkeiten nur teilweise überwinden, wird seit einigen Jahren versucht, Salz- und Alkaliböden aufzuforsten, um die Salzbalance auf Dauer zu sichern.

Mit dem Bevölkerungswachstum ist in Indien die Nachfrage nach Brennholz stark gestiegen. Soll die Gefahr, daß die ursprünglichen Waldgebiete nicht oder nicht mehr überbenutzt werden, zumindest gemildert werden, so muß der Anbau schnell wachsender Baumarten rasch und wesentlich ausgedehnt werden. Im Norden von Indien, wo weite Gebiete wegen der sekundären Versalzung als landwirtschaftlich völlig wertlos verlassen werden mußten, wurden Problemböden versuchsweise mit robusten trockenheits- und salztoleranten Baumarten (Acacia auriculiformis, Casuarina, Prosopis juliflora, Acacia nilotica, Eucalyptus u.a.) bepflanzt. Die ersten Ergebnisse sind ermutigend.

Es war die einhellige Meinung aller Symposiumsteilnehmer in Karnal, daß es unumgänglich sein wird, neue oder bisher vernachlaßigte Produktionsmöglichkeiten auf Salz- und Alkaliböden zu erschließen. Es gibt noch Hunderte von Baumarten und Pflanzenarten, die wenig beachtet und meist nur lokal oder kaum mehr genützt werden. Diese Pflanzen stellen ein Reservoir dar, auf das in Zukunft vermehrt zurückgegriffen werden muß. Da weltweit jährlich 10 Mio. ha durch sekundäre Versalzung landwirtschaftlich wertlos werden, wurde angeregt, ein internationales Institut zu gründen, das sich verstärkt mit der Entwicklung und Verbreitung förderungswürdiger trockenheits- und salztoleranter Bäume und Pflanzen befassen soll. Das Zentrale Salzinstitut in Karnal bietet für derartige weltweite Forschungsaufgaben ausgezeichnete Voraussetzungen.

J. Breburda, Giessen, F.R. Germany

GRANTS FOR SCIENTIFIC MEETINGS ORGANIZED IN DEVELOPING COUNTRIES

The Third World Academy of Sciences, with generous funds provided by the Dipartimento per la Cooperazione allo Sviluppo of the Italian Ministry of Foreign Affairs and by the Canadian International Development Agency, is willing to consider applications for Grants to support scientific meetings to be held in Developing Countries.

The purpose of the Grants is to encourage the organization of Regional and International Scientific Conferences, Workshops and special meetings in the Third World.

Scientific Institutions and Organizations in Third World Countries holding meetings in their countries may apply for Grants to cover the traveling expenses of lecturers from abroad and/or young scientists from the region.

Organizers of International Conferences being held in Developing Countries may apply for Grants to assist with travelling expenses of eminent scientists from Developing Countries, the expenses of principal speakers who are unable to obtain sufficient funds from other sources or travelling expenses for young promising scientists from the region.

Applications should be made on forms to be obtained from the office of the Executive Secretary at the address below, and should state the relevance of the activity to the development of science in the country/region. Special consideration will be given to those meetings which are likely to benefit the scientific community in Developing Countries and to promote regional and international cooperation in developing science and its application to the problems of the Third World.

The closing dates for application are 1 June and 1 December.

Address: The Office of the Executive Secretary, The Third World Academy of Sciences (TWAS) c/o International Centre for Theoretical Physics (ICTP), P.O. Box 586, 34100 Trieste, Italy.

FURTHER ECHOS FROM THE 13th CONGRESS' TOURS
D'AUTRES ÉCHOS DES EXCURSIONS DU 13ème CONGRÈS
WEITERE BERICHTE ÜBER STUDIENREISEN DES 13. KONGRESSES

Tour E: SOILS AND LANDSCAPES IN SOUTHERN GERMANY.

At 22,00 hours, August 20, 1986, about 25 participants boarded a sleeper train in Hamburg for the trip to Stuttgart to attend the Post Congress Tour E. Early next morning breakfast was eaten at the Haupt Bahnhof in Stuttgart, and after a short tour of the city, the excursion to study soils and landscapes in southern Germany began. The excursion was from August 21 through 25, 1986, and areas visited included the Black Forest, cuestas of the Baar, Gäu, Keuper hills, and Swabian Alb, and Oberschwaben. These areas are in a mesic-frigid tension zone with mean annual soil temperature ranging from 6 to 9 °C. Precipitation ranges from 700 to 800 mm in the Gäu and Oberschwaben areas to over 2000 mm on the ridge lines of the Black Forest.

The soils studied were predominantly wet and included Alfisols (Luvisols), Inceptisols (Cambisols), Mollisols (Phaeozems), Spodosols (Podzols), and Ultisols (dystric Planosols). Twenty-seven profiles were examined for which detailed soil descriptions and data were available. Several other stops and general agriculture. At each of the profile sites Professor Schlichting presented excellent lectures on the genesis, classification, and use of the soils which the sites represented, except for the sites in the Southern Black Forest where Professor Zöttl led the discussions. Interest was keen, as indicated by the fact that it was difficult to pry the participants away from the sites so the excursion could stay on schedule.

While traveling by bus between sites, Dr. Bleich kept the participants, attention by describing both the natural and cultural history of the areas.

The organizers as well as the participants can look back to a very successful tour. Even though we may have got more than our fair share of rain it did not dampen our spirits.

J. Witty, Washington, D.C., U.S.A.

Tour A:
SOILS AND LANDSCAPES IN SOUTHERN AND NORTHERN GERMANY

The route of Tour A (August 3-12, 1986) traversed the central part of West Germany from the Northern Limestone Alps in the south to the Baltic Sea Coast in the north. There were some 35 participants from 16 countries, namely, Australia, Belgium, Burkina Faso, Canada, Finland, France, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, UK, USA and West Germany.

On the first day of the tour, the participants in a very comfortable motorcoach started from Munich to the south-east. The bus, passing through the fluvio-glacial gravel plain of Munich and the terminal moraine landscape of Würm Ice Age, carried them into Kloaschau Valley (ca. 1000m a.s.l.) south of Bayerischzell in the Mangfall Mountains. In this humid sub-alpine region, where slope moraine deposits derived from Triassic dolomite constitute main parent materials, topography and vegetation are playing an important role in pedogenesis: Tangelrendzina develops on coarse stony deposits under Erico-Rhodododendretum, while under Aposerio-Fagetum Moderrendzina develops on middle to upper slopes and Alpine Iron-Humus Podsol on middle slope summit. After visiting the farm of Mr. Stadler, an Alpine farmer, the bus climbed up to his summer grazing meadow located below tree line, where problems concerning the effects of grazing and winter sports on vegetation and soil were discussed.

On the second day, the bus took the direction to the north of Munich and drove through the famous hop-growing district 'Hallertau' into the partially loess-loam covered Upper Bavarian Tertiary Upland Hills characterized by the asymmetrical valley of periglacial origine. Braunerde (Cambisol) derived from loess-loam on gentle hillslope and optimal P and K fertilization trials under intensive agriculture (wheat, barley and corn) were demonstrated at the experiment field at Kreutenbach. Then we visited a profile of Parabraunerde (Luvisol) in the State Forest District at Högelwald near Augsburg, where interdisciplinary acid rain experiments under Norway spruce stands have been carried out. Passing by the Ries Depression formed by meteorite impact almost 15 million years ago, we went up to the Hesselberg (689m a.s.l.), an

outlier of Upper Jurrassic, where a multiple but regular soil association of Pelosol, Podsol-Braunerde and Mullrendzina were demonstrated. This association is mainly caused by the regular stratification made up of alternating claystones, sandstones, marl and limestones. From the top of the Hesselberg the participants enjoyed the beautiful landscape in the broad valley plain where farmlands are finely located by the 10 years efforts of the Group Land Consolidation. After a short sightseeing at the small but famous mediaeval town of Dinkelsbühl, the bus arrived at Crailsheim in the cuesta region of middle Triassic rocks.

On the third day, we visited the experimental field for land improvement at Raboldhausen located on a flat mountain ridge, where Pelosol-Pseudogley derived from illitic marl (Upper Triassic) and its subsoiled variety were demonstrated. After studying a profile of Grauer Pseudogley from loess under Norway spruce near Langenburg, we proceeded further to a Roman fortification, where a microtoposequence of Pseudogley-Parabraunerde, Parabraunerde-Pseudogley and Grauer Pseudogley has been clearly developed from loess covering the ruin. When we reached Heidelberg, it was already dark, but most of the participants strolled along the riverside of the Neckar enjoying a night view of Alt Heidelberg.

The field study of the 4th day began with the survey of a soil catena under conifers and beeches near Heiligkreuzsteinach in the hilly sandstone (Buntsandstein) area of the Southern Odenwalt. Here, Podsol with lessivage on the slopes and Basenarme Braunerde (Dystric Cambisol) in shallow slope depressions developed from solifluction deposits which are mixtures of loess and Mesozoic sandstone containing some volcanic glass. After enjoying a wine test at a traditional vineyard 'Schloß Janson' in Bockenheim of Wine Street, we visited a brickwork pit in Wallertheim where fossil Chernozems are distributed on mighty loess deposits of Late Würm (=Weichselian) covering the residual Weisbach Terraces over Oligocene sandy marl.

On the fifth day the bus entered into Hesse occupying the midway position between North and South Germany. At Echzell in the hilly loess landscape of the Wetterau, which is one of the most productive parts of these landscapes, a profile of Tschernozem-Parabraunerde (Mollic Luvisol) under the dry and warm climate was demonstrated. The dominant crops in this area are root crops and cereals (sugar beets, wheat and barley) and we made an inspection of the farm of Mr. H. G. Eichermann. Then the bus approached the Vogelsberg, the largest coherent European basalt region. In a former bauxite quarry of Lich, Red Paleosol (Acrisol) formed under subtropical to tropical climate during late Miocene to early Pliocene, then destructed by erosion and solifluction during the Pleistocene. In the afternoon the bus went up to the Upper Vogelsberg, where Braunerde with high humus content under grassland at Rebgeshain and Lockerbraunerde under Norway spruce at Kohlerwald were demonstrated. According to the Japanese participants, the morphology as well as the chemical and physical properties of the latter soil are quite similar to that of Acid Brown Forest soils derived from volcanic ash in Japan.

In the morning of the 6th day, in the Muschelkalk region around Göttingen, the participants studied the limestone soil association beginning with Rendzina on high plateau and ending with Terra fusca downslope of the plateau. After studying a profile of typical Parabraunerde on thick loess layer near Friedland bordering East Germany, we visited a Tschernozem at Asel about 10km to the north of Hildesheim. In the evening we arrived at Hannover located on the border between the German Highlands and the North German Plain. We visited the garden of Herrenhausen Park where a jet of water illuminated by light was brightening high up in the dark sky.

The next day, after a field lecture by Prof. B. Meyer on the moraine and fluvioglacial landscapes of the Saale (=Riss) glacial and the traditional soil management, we saw soils on fluvioglacial sands such as deeply cultivated Eschboden with periglacial phenomena underneath (drop soil) and sandy Braunerde with lamellae at Ramlingen. In the afternoon, Podzol-Gley, Gley-Podsol and Raseneisenstein Podsol developed on Pleistocene sands were demonstrated and a house whose walls are made of the Raseneisenstein (iron ore). After visiting the monastry of Wienhausen we reached Cell.

On the 8th day, the participants had the opportunity to see how human activities affect soil development either in good or in bad directions: Bänderparabraunerde (sandy Luvisol with thin clay bands) developed on the Pleistocene melt water sands under natural oak-birch forest at Otter, while under heath vegetation at Wesel, caused by litter removal from the forest, a Humus-Iron Podsol developed which again has been improved by the deep plough cultivation producing higher yield of maize than on Tschernozems. Wesel is a part of the Lüneburg Heath where the heather (Calluna and Erica) were in full bloom and the surface was covered with a reddish-violet carpet of them. On the other hand, in wide valley lowland between the high plains, Gley-Podsol develop under Ericetum tetralicis. In the afternoon, the participants in a small train of trucks trailed by Diesel locomotive proceeded into the raised bog area of Ekelmoor, where a peat layer more than 250 cm thick has been accumulated since 3420 B.C. on a fossil Podsol profile. After studying different forms of peatland cultivation, especially German Sand-Mix-cultivation and its results in Königsmoor to the south of Ekelmoor, a ferry-boat carried our bus across the estuary of the Elbe river from Wischhafen into Schleswig-Holstein.

The 9th day of the excursion was devoted to the survey of the marshland soils of Southern Dithmarschen north of the mouth of the Elbe. In the Wadden area outside the Neufelderkoog (diked 1924), Schlickwatt and Salzmarsch were demonstrated. Schlickwatt is still under the influence of seawater and only pioneer plants like halophytes are grown. Salzmarsch (Gleyo-Salic Fluvisol) characterized by parallel stratification of fine sand, silt and clay is in the process of maturation and is used for geese and sheep grazing. Inside the dike where the process of maturation has been completed Kalkmarsch (Gleyo-Calcaric Fluvisol) devel-

ops, saturated with exchangeable Ca and forming the most productive soil of Schleswig-Holstein. After visiting the mixed farm with cabbage of Mr. H. Heesch, Dwogmarsch (Fluvi-Thionic Gleysol) with strong sulphur accumulation and Humusmarsch (Thionic-Humic Gleysol) with extremely acid subsurface horizons were demonstrated in the old marshland diked about 1000 years ago.

The last day of the tour, our bus set out from the Hanseatic city Lübeck for the Brodten young moraine region facing to the Baltic Sea. We saw Pseudovergleyte Parabraunerde (Orthic Luvisol) from boulder marl on plateau, Banderparabraunerde (banded Luvisol) from glacio-fluvial sand on bag slope covering the marl, degraded Gley-Schwarzerde (Gleyic Phaeozem) from solifluction deposits in small depression and Niedermoor (Eutric Histosol) overlying Kalkgytta from lake sediment in hollows. These soils constitute a catenary sequence on the 'Brodten–Cliff' area. Here the participants were caught for the first time throughout the tour in a shower accompanied by strong wind from the Baltic Sea. By the time they visited Evershof-farm, the shower changed to heavy rain, but they were invited into the house of Mr. D. Halske, the farmer, and were entertained by his family with warm hospitality. When the bus arrived at the entrance of CCH in Hamburg, it was 6 o'clock in the evening and the rain had already stopped.

The number of soil profiles demonstrated during the tour amounts upto more than 48, through which the participants were able not only to understand the historical interrelation between man and soil, but also to learn the achievements of long years of research work by German soil scientists. It has really been a very instructive as well as enjoyable tour. I would like to express on behalf of the participants our hearty gratitudes to our Tour leaders, Prof. K. Stahr, Prof. H. P. Blume, Prof. B. Meyer and Prof. H. Kuntze, who guided us and explained with great enthusiasm. Thanks are also due to all the other German colleagues for the hard work they did in preparing and making this excellent and enjoyable tour.

S. Nagatsuka, Tsukuba, Japan.

Excursion N: DE HAMBURG AU DANEMARK ET A LA SUEDE

Elle a été organisée par les associations danoise et suédoise de la science du sol. Un petit guide très bien rédigé et illustré nous a donné toute information utile concernant cette excursion. Suivie par 36 congressistes de 16 nationalités différentes, cette excursion était sous la conduite éclairée d'éminents professeurs tels que M. Olsson, K. Dalsgaard, N. K. Jacobson, L. Peterson et K. Rasmussen.

L'itinéraire Hambourg-Krusa-Ribe nous a montré des podzols placiques et orthiques sur des sables glacio-fluviaux de la dernière glaciation.

Ribe-Romø-Tonder-Vejle: le Jutland, formé surtout de dépôts marins et saumâtres quaternaires, possède des terres marécageuses et salées, des fluvisols quelquefois sulfatés acides en profondeur bien mis en valeur par des polders.

Vejle-Askov-Århus-Singstrup-Grenå-Ebeltoft: nous avons vu principalement des acrisols et luvisols sur moraines glaciaires. Une toposéquence de luvisols sous hêtres a été particulièrement intéressante grâce à une étude très approfondie faite pour le Programme biologique international. Dans les marais asséchés de Kolindsund nous avons examiné des gleysols à sulfures en profondeur, et enfin sur la falaise calcaire de Sangstrup des phaeozems luviques et des rendzines.

Traversée de l'île Sealand: Slagelse-Copenhague-Helsingør: podzols et luvisols sur dépôts glaciaires.

Excursion en Suède: Hälsingborg-Ljungby-Halmstad-Hälsinborg. Les Suédois nous ont montré différents types de podzols sur moraines glaciaires et sous vieilles plantations de pins de Norvège. Une très bonne étude de l'acidification de ces podzols au cours des ans nous a été présentée et l'influence des pluies acides a été évoquée.

Durant toute cette excursion nous avons aussi été particulièrement intéressés par l'utilisation de ces sols: aménagement complet du Jutland par polder, assèchement de marais au danemark, visites de fermes expérimentales de Højer et d'Askov, d'une ferme d'élevage où l'accueil fut particulièrement sympathique, visite du bureau danois des données sur les terres avec traitement par ordinateur. Tout montre une maîtrise parfaite des sols et de leur utilisation.

J. Riquier, Villeneuve-Loubet, France

ACTIVITIES OF THE COMMISSIONS AND WORKING GROUPS
ACTIVITÉS DES COMMISSIONS ET GROUPES DE TRAVAIL
TÄTIGKEIT DER KOMMISSIONEN UND ARBEITSGRUPPEN

ISSS Commission V

CONSULTATION ON AN INTERNATIONAL REFERENCE BASE FOR SOIL CLASSIFICATION (IRB)

Following up on the decisions taken at the Hamburg Congress of the ISSS, in August 1986, Prof. A. Ruellan, Chairman of Commission V convened a meeting at FAO in Rome, on 3–4 February 1987, to discuss the future of the IRB effort initiated in 1980.

The participants in this meeting were:
R. W. Arnold (USA), T. Boyadgiev (Bulgaria), J. H. Bruin (FAO), R. Dudal (Belgium), H. Eswaran (USA), F. Fournier (Unesco), M. F. Purnell (FAO), B. G. Rozanov (USSR), A. Ruellan (France), R. Sant'Anna (FAO), E. Schlichting (F. R. Germany), and W. G. Sombroek (ISSS-ISRIC). The following persons had also been invited but were not able to attend: M. Camargo (Brazil), A. McKeague (Canada/Tanzania), K. Kyuma (Japan), M. Lathan (IBSRAM), and L. Shishov (USSR).

The consultation was opened by Mr. G. M. Higgins, Director of the Land and Water Development Division of FAO which hosted the meeting at its headquarters in Rome. He stressed the importance of land evaluation based on an internationally recognized system of soil classification with a view to conduct an effective intensification of agricultural production in developing countries and avoid the risks of land degradation. Mr. Higgins recalled that the IRB had been launched by FAO and Unesco in 1980 and he welcomed that this activity was now being carried forward by the ISSS. FAO would continue to contribute to this programme within the limits of its resources.

The meeting reached a consensus on the following points:
- The IRB should facilitate international efforts to share knowledge and experience about soil resources among soil scientists and between soil scientists and potential users.
- IRB should foster an internationally uniform approach to classifying and characterizing soils.
- IRB should streamline survey methods by determining the levels of generalization to be used at different scales and for different purposes.
- IRB should promote the use of pedological data which characterize soil resources in terms of their potential and management requirements.

Differences of opinion, however, arose as to the work which IRB should actually carry out:
- a first tendency advocated the construction of an internationally recognized system of soil classification, an approach which was followed by the Sofia meetings.
- a second tendency favoured to give priority to a more uniform characterization of soils, the selection and definition of diagnostic criteria and the standardization of soil descriptions.
- a third option was to give major attention to the relationship between soil classification and mapping and to the construction of map legends either in terms of soil taxa, soil sequences or soil landscapes.

The meeting thoroughly discussed these various issues. It felt that the subjects of classification, characterization and mapping were in fact closely related. It recognized that a common system for agrotechnology transfer is badly needed, and that a common

denominator is required to overcome geopolitical subdivisions of the world's soil cover. It was pointed out that soil science was at a serious disadvantage with other natural sciences by not having reached an international agreement on the classification of its subject matter. Hence IRB's work should move in the direction of preparing for an international soil classification reference framework.

It was decided that maximum use should be made of the material prepared by the three Sofia meetings (1980, 1981, 1983), the IRB Working Group, the FAO/Unesco Soil Map of the World, the ICOMs of the SMSS and the results of soil correlation which took place at a number of national and international fora in the last few years.

It was agreed that the separations made at the highest level should be based on the effects of major soil forming processes (or of the absence of soil formation) as reflected by diagnostic attributes (diagnostic horizons, diagnostic properties, single characteristics). The next categorical level would reflect the effects of secondary processes or of the degree of expression of the major processes.

The meeting agreed upon the major soil forming processes which will be the basis for separating major soil groupings at the highest level of generalization.

It was proposed that a first draft of the definition of the major soil groupings and of their diagnostic attributes be prepared by Prof. Dudal and be sent to the participants in the meeting for comments and amendments.

The meeting decided that the further work on the IRB programme will be organized as follows:

- the IRB programme will be conducted by Commission V under the responsibility of the Commission's Chairman.
- the Chairman of Commission V will be assisted by a core group consisting of Prof. Dudal, Prof. Schlichting and Dr. Sombroek.
- the overall implementation of the IRB programme will be entrusted to an extended core group comprising the Commission's Chairman (Prof. Ruellan), the Commission's Vice Chairmen (Dr. Eswaran, Prof. Kyuma and Prof. Rozanov), a representative of FAO (Mr. Purnell) and of Unesco (Dr. Fournier), and the three members of the core group (Prof. Dudal, Prof. Schlichting and Dr. Sombroek).
- Prof. Dudal will serve as the Secretary of the IRB programme.
- a number of selected contributors will be asked to work out in more detail the definitions of the major soil groupings and of the relevant diagnostic attributes, to make proposals for a further subdivision at a second (and possibly third) level, and to establish correlation with soil units in existing main soil classification systems. Suggestions for names of contributors were put forward at the meeting. A final selection will be made by the core group and the persons concerned will be contacted by the Chairman.
- the IRB programme will be conducted through a series of meetings (of the core group, the extended core group and the Commission) and through correspondence.
- the core group will meet at ISRIC, Wageningen on 1 and 2 June 1987, and the extended core group at the Faculty of Agricultural Sciences, Leuven on 12, 13 and 14 January 1988.
- a first draft of IRB proposals will be presented at the intercongress meeting of Commission V planned to be held in the USSR in 1988.

Address of the Secretariat: Prof. Dr. R. Dudal, Faculty of Agricultural Sciences, K.U. Leuven, 92 Kardinaal Mercierlaan, B-3030 Leuven, Belgium.

SOIL HORIZON DESIGNATIONS

Twenty years ago, in Bulletin No. 31, a report appeared from a working group on soil horizons which met at the invitation of the International Society of Soil Science under the chairmanship of the late Professor F. A. van Baren. As a result of their deliberations, the horizon designations used in the legend and nine volumes of the FAO/Unesco Soil Map of the World were decided upon. These designations appeared subsequently in the FAO (1977) Guidelines for Soil Profile Descriptions and have been adopted by most soil survey organisations throughout the World.

However, some soil scientists have expressed reservations, or even outright opposition, to the use of the A B C system of horizon designations. In the development of the USDA Soil Taxonomy, Guy Smith (1986) stated that 'We found it necessary to get away from designating a given horizon B or C by substituting the definition of, say, the oxic horizon'. Despite such reservations, there are few soil scientists who are able to discuss soils without reference to the horizon nomenclatures which has been in use for the last hundred years. Even those most committed to the concept of diagnostic horizons find the designations useful in communication and discussion and only FitzPatrick (1980) managed to avoid their use by the expediency of creating over 70 'reference horizons'.

A review of current practices in the use of soil horizon designations is being carried out at ISRIC in Wageningen by its guest researcher Dr E.M. Bridges (UK) with the intention of producing a discussion document which will trace the development of soil horizon designation systems, ascertain areas of agreement and dis-agreement, examine areas of difficulty in the application of designations, and to examine the possibilities for maintaining or developing the present ABC system. At the same time, alternatives to the ABC system will be considered and their merits evaluated.

Early in 1987 those soil survey organisations whose addresses are listed at ISRIC were circularised, asking about their use of soil horizon designations. Publication of this issue of the 'Bulletin' is an opportunity to thank all those Soil Surveys who have replied, and to encourage those who have yet to do so. Apologies to any organisations which have not been contacted, your comments are equally welcome, as are those of interested pedologists in universities and research organisations. Please send your observations as soon as possible to Dr. E. M. Bridges c/o ISRIC, P.O. Box 353, 6700 AJ Wageningen, Netherlands.

References:

- FAO, 1977: *Guidelines for Soil Profile Description,* 2nd Edition, FAO Rome.
- FitzPatrick, E. A., 1980: *Soil*, Longman.
- Smith, G. D. 1986: The Guy Smith Interviews: *Rationale for Concepts in Soil Taxonomy*, SMSS Technical Monograph No. 11, S.C.S., U.S. D.A.

ISSS Subcommission B

MULTILINGUAL TRANSLATION OF THE TERMINOLOGY USED IN THE 'HANDBOOK FOR SOIL THIN SECTION DESCRIPTION'

A well defined unambiguous and simple terminology is absolutely necessary as a tool for communication between scientists. A uniform and internationally accepted terminology becomes more and more important, and even inevitable in a world where communication between scientists of different countries is mucht easier than it was a few decades ago. Having this in mind, the International Soil Science Society founded

in 1969 a Working Group on Soil Micromorphology, in view of elaborating an internationally acceptable classification and terminology for the description of soil thin sections. As a result, the 'Handbook for Soil Thin Section Description' was published in 1985 by Bullock et al. The efforts made by this group to come to a uniform nomenclature could be partially annihilated however, when for a same term several different translations would be given by different authors. In fact, many terminologies, which were not multilingual from the early beginning, suffer from this ambiguity, especially where very subtile differences have to be expressed by several more or less synonymous terms (e.g. relative and related patterns). This is still more important at the level of data storages.

In order to avoid these difficulties, the authors of the Handbook expressed the wish to have as soon as possible an 'official' translation, at least, in the official Unesco languages. Several members of the above mentioned working Group were contacted, as well as some younger scientists, in order to prepare the translations given below. A most usefull tool for this work has been the 'Glossary of soil micromorphology' (Jongerius and Rutherford, Eds., 1979), prepared by the same working Group.

Following translations were prepared up to now: Dutch, French, German, Portuguese, Spanish, and Russian.

The translations are given in the following order: Dutch, French, German, Portuguese, Spanish and Russian, which had to be put on the last place for technical reasons of printing. In the French translation, the gender of the substantives is indicated (f or m). The number following the english term refers to the page in the Handbook were it is defined. In some cases, synonyms are given. For practical and didactic reasons the terms are not arranged in alphabetical order, but according to the different chapters and subchapters of the handbook. Some examples are:

Concepts

arrangement (17): schikking/assemblage (m), arrangement (m), Anordnung/arranjo/disposición/ организаци
soil fabric (17): bodemmaaksel/organisation (f) du sol (m), assemblage ou fabrique (f) du sol/Bodengefüge/ tessitura do solo/contextura or fábrica de suelo/микростроение почвы
fabric unit (17): maaksel eenheid/unité (f) d'organisation (f), d'assemblage (m), de fabrique (f)/Gefügeeinheit/unidade de tessitura/unidad de contextura o fábrica/ элемент микростроения
partial fabric (17): deelmaaksel/organisation (f) partielle, assemblage (m) partiel, fabrique (f) partielle/Teilgefüge/tessitura parcial/contextura o fábrique parcial/частичное микростроение
soil structure (18): bodemstructuur/structure (f) du sol (m)/Bodemstruktur, -gefüge/estrutura do solo/estructura del suelo/ почвенная структура

Shape

euhedral (28): euhedrisch, idiomorf/automorphe/automorph, idiomorph/euédrico/euhedral; idiomorfo/ идиоморфный (аутоморфный)
subhedral (28): subhedrisch, hypidiomorf/subautomorphe, hypidiomorphe/hypiodiomorph/subeuédrico/ subhedral, hipidiomorfo/ гипидиоморфный
anhedral (28): anhedrisch, allotriomorf/xénomorphe/allotriomorph/anédrico/anhedral, alotriomorfo/ аллотриоморфчые (ксеноморфные)

Orientation and distribution

distribution (34): verdeling/distribution (f)/Verteilung/distribuição/distribución/распределение
orientation (33): orientatie/orientation (f)/Orientierung/orientação/orientación/ориентация
basic (distribution) (35): fundamentele/de base (f)/Grund- (Verteilung)/básica/básica/ полосчатое
referred (33): referentieel/référentieel/référée/bezogen/referenciada/referida/ условно-относительное

The full list has been published as a Technical Note in volume *36*(3), 1986 of the Journal **'Pedologie'**, of which the address is: Belgian Society of Soil Science, Krijgslaan 281, B-9000 Gent, Belgium.

G. Stoops (ed.), Gent, Belgium.

ISSS Working Group LI

LAND EVALUATION INFORMATION SYSTEMS

Objectives for the Period 1986–1990:

- To promote the study and integration of land evaluation procedures and techniques with modern techniques of computerized information management, to develop quantitative estimates of alternate land use possibilities.
- To investigate the application and integration of land evaluation techniques and farming system research, to develop sustainable agricultural production systems for tropical and temperate areas.
- To disseminate information on validated technologies through newsletters, publications, expert meetings and a referenced documentation service.
- To strengthen national and regional land evaluation and land use planning institutions and networks, by organizing training seminars and workshops.

Activities for the Period 1986–1990:

- Develop and maintain a mailing list of researchers and practitioners in land evaluation and information processing.
- Initiate a newsletter for dissemination of information on activities and progress in land evaluation and information processing.
- Initiate a registry of validated user-friendly software packages for land evaluation, including decision algorithems, transfer functions, crop yield and other models and geographic information systems.
- Organize a meeting between land evaluation and farming systems experts, to investigate the application of these technologies for the development of environmentally sustainable, agricultural production systems.
- Participate in national and regional workshops and training sessions as organized by local organizations.

The officers of the working group are:
Chairman: Dr. J. Dumanski, Land Resource Research Centre, Agriculture Canada, Ottawa, Canada K1A OC6
Secretary: Dr. A. Zinck, ITC 350 Boulevard 1945, P.O. Box 6, 7500 AA Enschede, The Netherlands

ISSS Working Group PT

PEDOTECHNIQUE

Objectives

The general objectives of ISSS Working Group PT may be defined as: furthering the development of engineering interpretations of soil surveys on the basis of data on relevant mechanical soil properties.

The sphere of action is confined to agriculture and, within agriculture, to the mechanical effects of pressures exerted by tractors, machines and implements and the consequences to mechanical soil properties of natural processes (rainfall, wind, freezing/thawing, wetting/drying, etc.).

The main point of interest of working Group PT is the soil's mechanical properties, i.e., its behaviour as an 'engineering material', or a substance that can be 'processed'. Studying the influence of climate, groundwater regime, farming system, etc., should

have a place among the activities of the working Group, but should not be the focussing point. However, determination of differences in mechanical behaviour of soils as a consequence of different tillage systems could give an interesting link with 'pure' tillage research.

Proposed plan of action

1. Inventory of field and laboratory methods used to describe and determine soil parameters related to soil mechanical behaviour, with a view to standardize these methods, or at least to make results comparable.
2. Inventory and measurement of soil mechanical properties, and definition of the optimum degree of compaction, with emphasis on 'regional variation' due to soil type, climate and farming system. Presentation of the data in the form of setting sheets, modules or moisture-pressure-volume diagrams.
3. Measurement of soil behaviour due to tillage (soil surface roughness, aggregate size distribution) and field traffic (rut depth, pressure distribution under wheels, compaction and deformation), coupled with the measurement of soil mechanical properties (see 2.).
4. Sponsoring a session on Pedotechnology at the 11th Conference of the International Soil Tillage Research Organization (ISTRO), 11–15 July 1988, in Edinburgh, Scotland, which will be organized by an ISTRO Committee on Pedotechnology. The session could have the theme 'wheel traffic pedotechnology' and could include a poster session on 'display of tillage characteristics of typical soils'.
5. Participation in the 2nd International Workshop on Soil Physics and Soil Mechanics, which will be held in September 1988 in St. Paul, MN, U.S.A.
6. Organizing a Symposium on Pedotechnique at the 14th Congress of ISSS, August 1990, in Kyoto, Japan.
7. Exchange of lists of relevant literature, reports and reprints of papers on pedotechnology.

Execution

You are kindly invited to participate in the execution of the proposed plan of action of Working Group PT by taking the following steps:

sub 1. Send descriptions of field and laboratory methods to Dr. A. Canarache (Bucharest), who will compile them and forward the compilation to the membership of the working group, with recommendations for standardization.

sub 2 and 3. Send relevant data to Prof. Dr. R. Horn (Bayreuth), who will summarize them and forward the summary to the membership. An accurate description of the layout of the experiments and the measuring methods used should be included.

sub 4 and 5. Send proposals for papers and poster presentations to the Secretary of the Working Group before 1 September 1987.

sub 6. Send ideas with respect to the organization and content of the Symposium, and the way it should be announced to the Secretary of the Working Group before 1 January 1988.

sub 7. Add the names and addresses of the members of Working Group PT and of relevant ISSS officers to your mailing list.

(based on notes by an ad-hoc Committee consisting of Dr. A. Canarache, Bucharest – Romania; Prof. R. Horn, Bayreuth – F.R. Germany; Dr. A. J. Koolen, Wageningen – Netherlands; and Mr. W. B. Voorhees, Morris – USA).

Address of the secretariat: Mr. C. van Ouwerkerk, c/o Institute for Soil Fertility, P.O. Box 30003, 9750 RA Haren – GN, The Netherlands.

ISSS Working Group HP

HISTORY, PHILOSOPHY AND SOCIOLOGY OF SOIL SCIENCE

You may be interested to know...

To commemorate the 100th anniversary of *V. V. Dokuchaev's* (1846–1903) pioneering book Russian Chernozem (1883) at least five papers were published during 1983/84 evaluating his work and impact on soil studies: by E. Ehwald in East Germany, J. Boulaine in France, and L. N. Aleksandrova and E. N. Mishutin in the Soviet Union.

A major work on the history of soil science was also published in the Soviet Union, by *I. A. Krupenikov* in 1981, Nauka Press, Moscow, 327 pp. and reviewed in Pochvovedeniye, 1982, No. 3.

Prof. J. Boulaine published in 1985 the second volume of his Materials on the History of Pedology, as No. 16 of SOLS at the Institut National Agronomique, Paris-Grignon, this time including a chronology of main events in soil science and a supplement to the first list of biographies. He is also preparing a history of french pedology.

Roy W. Simonson has concluded his series on Historical Aspects of Soil Survey and Soil Classification (with emphasis on the USA) in Agrotechnology Transfer No. 1 (1985) and No. 2 (1986). An extended version of Part I was now printed in Soil Survey Horizons 27:1, Spring 1986.

John P. Tandarich of the University of Illinois, Urbana-Champaign, has prepared a travelling exhibit honoring *Dr. Curtis Fletcher Marbut* (1863–1935). A special issue of Soil Survey Horizons 26:1, Spring 1985, was devoted to the life and work of Marbut, with contributions by a number of authors and old associates.

On the occasion of the 50th anniversary of the Deutsche Bodenkundliche Gesellschaft in 1976 the society published an illustrated brochure (27 pp) by *Prof. Fritz Scheffer* recounting the history of the German Soil Science Society 1926–1976.

On the *40th Anniversary of FAO* and its AGL Services in 1985, the Land and Water Development Division published a special number of its Land and Water Technical Newsletter (47 pp), with contributions by many past and present Division workers recounting its past, present and future activities.'

The earth science writings of *Wolfgang Goethe* (1749–1832), after whom the mineral goethite is named, continue to be reported on by soil scientists and geologists: H. Sticher in Zeitsch. Pflanzenern. u. Bodenkunde, 1982 (vol. 145: 623–630), W. S. Baldridge, in Amer. Scientist, 1984 (vol. 72: 163–167) and in lectures by Prof. Emeritus Diedrich Schroeder, Kiel.

According to Dr. Wolfgang Ziehen, Frankfurt, the first illustrated soil profile was depicted in the geological maps of *Guettard and Monnet* in their 1780 'Atlas et description mineralogique de la France' (cf. Aufschluss, 1982, vol. 33: 389–393).

Dr. Ziehen also published a facsimile and annotated translation into German of a 1572 discourse on 'lapidus sabulosis' by *Thomas Erastus* (1524–1583), German-Swiss savant and Professor of Medicine in Heidelberg and later of Ethics in Basel), which he believes to be what we today would call rhizomorphic nodules of a para-rendzina soil, and are thus the first descriptions of calcic horizons in excavated soil profile pits. The white nodules, which became harder and paler upon exposure and drying were used as curative powder for external application on broken limbs.

D. H. Yaalon, Jeruzalem, Israel

NEWS FROM THE NATIONAL AND REGIONAL SOCIETIES
NOUVELLES DES ASSOCIATIONS NATIONALES ET REGIONALES
BERICHTE DER NATIONALEN UND REGIONALEN GESELLSCHAFTEN

GOLDEN ANNIVERSARY OF THE SOIL SCIENCE SOCIETY OF AMERICA

The national soil science society of the USA celebrated the first 50 years of its existence on December 2, 1986, in New Orleans, during the 78th Annual Meeting of the combined American Society of Agronomy (ASA), Crop Science Society of America (CSSA) and Soil Science Society of America (SSSA). These annual meetings, with a massive attendance of about 4000 home and foreign scientists, are major events for the advancement of agronomy and soil science. This year's theme was 'Agronomy, adjusting to a global economy'. A very apt subject, drawing attention to the rather sudden and drastic changes taking place worldwide. From a situation of chronical food shortages in many parts of the world, to a situation where a global glut of food is arising. From shortages that barely could be offset by surplus production in the USA, Western europe and other temperate-zone countries to a saturation where food subsidies are being dismantled and more attention is being directed to protection of the current and sustainable use of land. In short, a shift from maximising crop production to optimising production. this aspect was very frankly introduced in keynote address at a special ASA-CSSA session, by G. Edward Schuh, Director of Agriculture and Rural Development of The World Bank in Washington.

The Soil Science Society of America itself, in addition to a host of technical Sessions by its various Divisional presentations, had several special Golden Anniversary Symposia at the New Orleans meeting, anticipating on Future Developments respectively in Soil Physics; Soil Chemistry; Soil Microbiology and Biochemistry; Soil Fertility

Dr. Ralph McCracken speaking on 'Soils and Civilisation' at the Golden Anniversary Banquet of the SSSA. At right Dr. John Pesek, SSSA President 1986.

SSSA Award Winners. Front, l. to r.: Eugene Kamprath, Jeffry Fuhrmann and Donald Nielsen. Back, l. to r.: Surajit K. De Datta, James Allrichs and John A. Stewart.

International Soil Science Award Winner Dr. S.K. De Datta of IRRI-the Philippines, with the Secretary-General of ISSS.

and Plant Nutrition; Soil Classification, Genesis and Morphology; Soil and Water Conservation and Management; Forest and Range Soils; Fertilizing Technology and Use; and Soil Mineralogy. Other symposia concentrated on Soil Information Systems of the Future; Soil Structure – Myth or Measurable; Soil Surface Chemical Transport Modeling; Modern Instrumentation in Soils and Sediments; Application of Integrated Resource Inventories for Managing Forest and Range Ecosystems.

Interesting Recollections of the early days of Soil Science in the US were presented by Dr. Walter H. Gardner (on soil physics), by Dr. Roy W. Simonson (on soil survey) and Dr. Larry P. Wilding (soil genesis and classification). Already in 1902/1906 there were american booklets on soil survey, and an American Soil Survey Workers/Association (with US + Canadian membership) existed well before 1976, separate from a Soils Section of the American Society of Agronomy.

Between the formal meetings there were poster sessions. They received less attention than they deserved, and at the Meeting it was decided that they should be upgraded in quantity, quality and prominence in line with trends at scientific meetings elsewhere (for instance at the Hamburg Congress of ISSS). Division 5 pedologists had a chance to see a number of soils in the field during a mid-meeting one day tour of the Coastal Marshes in Massachussets, a two days Soil- Geomorphology Pre-convention Tour of Louisiana, and a forest-and-Range Soils Post-convention Tour on Mississippi.

The culmination of the festivities was the golden Anniversary Banquet of SSSA during the evening of December 2nd, chaired by the current President of the Society Dr. John Pesek. The invited guests Dr. J. F. Dormaar as President of the Canadian Society of Soil Science, and Dr. W. G. Sombroek as Secretary-general of ISSS, delivered short congratulating speeches, highlighting the tremendous contribution of the US soil scientists to the development of the subject over the past 50 years, both nationally and internationally. Dr. Ralph Mc Cracken of the Soil Conservation Service of the US Department of Agriculture then delivered the major address, entitled 'Soils and Civilisation'. This was followed by the presentation of a number of the annual Awards, respectively to Drs. *Jeffry J. Fuhrmann* of the Univ. of Delaware (Emil Truog Award), *Marion L. Jackson* of the univ. of Wisconsin (Boyoucos Distinguished Career Award), *Walter H. Gardner* formerly of Washington State University (Distinguished Service Award), *James W. Biggar* and *Donald R. Nielsen* of the University of Davis, California (Research Awards).

Four new awards were initiated by the Society: The Applied Research Award was conferred upon *Eugene J. Kamprath* of North Carolina State University, the Professional Service Award to *John A. Stewart* of the Agronomic Programs for the International Minerals & Chemical Corp; the Education Award to *James L. Ahlrichs* of Purdue University, and the International Soil Science Award to *Surajit K. De Datta* of the International Rice Research Institute (IRRI) in the Philippines. Also, a total of sixteen active members of the Society received the honor of Fellow.

In closing, the new President-elect of the Society, Dr. Dennis R. Keeny (University of Wisconsin at Madison) was introduced by the incoming President Dr. Larry L. Boersma (Oregon State University).

The Soil Science Society of America, with its approximately 6600 individual members, was recently admitted as an affiliate member of the American Association for the Advancement of Science (AAAS). It can look back upon a very successful and enjoyable golden anniversary, and look forward to another fifty years of major contribution to the well-being of people in the USA and the world at large.

W. G. Sombroek

Soil Science Society of Sri Lanka

The 1986 Annual Session of the Soil Science Society of Sri Lanka was held at the Department of Soil Science of the University of Peradeniya. Seven scientific papers on different topics of Soil Science were presented. At the occasion a General Assembly of the Society was held, in which the new office bearers for the year 1986/1987 were nominated and elected.

President:	Dr. S. L. Amarasiri
Vice President:	Mr. P. Krishnarajah
General Secretary:	Dr. A. N. Jayakody
Treasurer:	Dr. L. G. G. Yapa
Editor:	Dr. R. B. Mappa
Auditor:	Dr. S. S. Somasiri
Committee Members:	Dr. W. D. Joshua, Dr. G. Keerthisinghe, Dr. K. Wickramasinghe, Mr. M. Jeganathan, Mr. A. R. Dassanayaka, Mr. D. M. Jinadasa.

Main objectives of the Society are:
- to promote advancement of soil science in Sri Lanka
- to foster contact between workers in all branches of soil science
- to disseminate knowledge pertaining soil science.

The Society also publishes the Journal of the Soil Science Society of Sri Lanka annually. A handbook on Fertilizer Recommendations was published recently.
Furthermore, the society organizes bimonthly seminars inviting local and foreign experts and organizes an annual field trip.

Address of the Society: Soil Science Society of Sri Lanka, Dept. of Soil Science, University of Peradeniya, Peradeniya, Sri Lanka.

Persatuan Sains Tanah Malaysia

The Malaysian Society of Soil Science (MSSS) elected its new Board Members on March 19, 1987. The board now has the following members:

President:	Dr. Hj. Noordin Hj. Wan Daud
Vice President (Peninsular Malaysia):	Dr. Chan Yik Kuan
Vice President (Sabah):	Mr. Donson Simin
Vice President (Sarawak):	Mr. Ahmad Hj. Ebon
Honorary Secretary:	Dr. Zaharah Abdul Rahman
Assistant Honorary Secretary:	Mr. Eddie Chew Keong Lye
Honorary Treasurer:	Dr. Alias Husin
Assitant Honorary Treasurer:	Dr. Ng Ai Peng
Immediate Past President:	Dr. Mok Chak Kim
Committee Members:	Dr. Peter Lim Kim Huan, Dr. Mohd Khanif Yusop, Dr. Jalaluddin Jipelos, Mr. K. Selvadurai.
Coopted Members:	Dr. Mohd Zaki Ghazalli, Dr. Razley Mohd Nordin, Dr. Zainol Eusoff, Mr. Daud Chinta.

Address of the Secretariat: P.O. Box 12644, 50784 Kuala Lumpur, Malaysia.

Societatea Nationala Romana Pentru Stiinta Solului

A number of three volumes edited by the Rumanian National Society of Soil Science (SNRSS) and containing the papers of the XIIIth Conference of the Society have lately been printed. The Conference took place from 27 to 31 August, 1985 at the Agronomic Institute in Timisoara with 'Melioration of heavy and compacted soils affected by water excess from the Banat region' as the main topic; about 300 Rumanian soil scientists took part, as well as experts from the Federal Republic of Germany, Greece, Iraq, the Netherlands, USA, Yugoslavia and Hungary. Most presentations were on soil physics and technology (SNRSS vol 23A). They point out the important progress achieved on the mathematical modelling field regarding soil water balance irrigation, soil drainage, reclamation of salt-affected soils and sandy soils, and also on the thorough recognition of the processes of soil changes under intensive-agriculture conditions and of the measures for preventing soil degradation processes mainly entailed by compaction.

The papers on soil chemistry, soil mineralogy, soil biology, soil fertility and plant nutrition are recorded in the second volume (23B): problems regarding the thorough recognition of the chemical processes and of the soil geochemical and mineralogical fund as related to the intensification of chemical substances in agriculture; aspects of soil enzymology, pesticide interactions and mesofauna activity; the economic use of amendments and fertilizers, control of the plant nutrition status by plant analysis, prognosis of the exchangeable phosphate evolution using mathematical modelling, and microelement agrochemistry.

The third volume (SNRSS 23C) contains papers on the recognition of heavy soils, on soil genesis and evolution, on soil resources distribution, and on their productive capacity evaluation in the form of agricultural land rating. Also the contributions at a special symposium on 'Soil Protection and Pollution Control' are included.

At present the Officers of the Rumanian Society are the following:

Chairman:	Dr. Corneliu Rauta
Vice Chairmen:	Dr. Cristian Hera, Dr. Ion Nitu, Dr. Irian Vintila
Secretary-General:	*Dr. Dumitru Teaci*
Members:	Dr. Andrei Canarache, Dr. Nicolae Florea, Dr. Gheorghe Stefanic, Dr. Gheorghe Gata

Chairmen of the Commissions:
Commission I (Soil physics and technology): Dr. Andrei Canarache
Commission II (Soil chemistry and mineralogy): Dr. Gheorghe Gata
Commission III (Soil biology): Dr. Gheorghe Stefanic
Commission IV (Soil fertility and plant nutrition): Dr. Cristian Hera
Commission V (Soil genesis, classification and cartography): Dr. Nicolae Florea

Address of the Secretariat: ASAS, Bd. Marasti 61, sector 1, Bucuresti, Rumania.

New Zealand Society of Soil Science

Following an election at its biennal General Meeting, held on 27 November 1986, NZ SSS Officers and Council for the next two years are as follows:

President:	R. Lee	Council:	I. B. Campbell, M. J. S. Floate,
Vice President:	J. P. C. Watt		P. E. H. Gregg, A. Haystead,
Past President:	P. J. Tonkin		P. D. McIntosh, H. K. J. Powell
Secretary:	L. J. Hume		
Treasurer:	T. W. Speir		

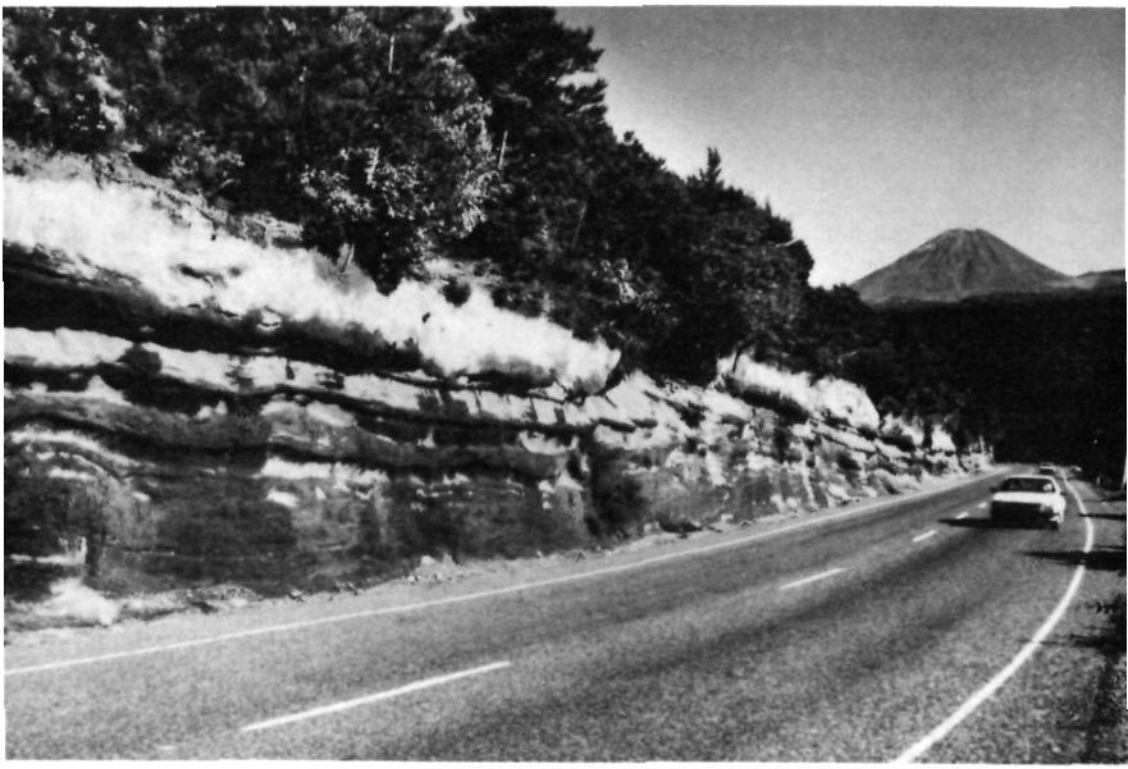
The New Zealand Society of Soil Science is producing a comprehensive book on the soils of New Zealand, which will be of interest to soil scientists around the world. This is the Society's current major project.

New Zealand's islands are packed with landscapes of all types – volcanic, alluvial, glacial, mountainous, hilly and coastal. Most of the wide range of soils that mantle these landscapes are young and soil processes and development are readily followed through topo-, climo-, and chrono-sequences. Soils are formed in loess, volcanic ash and rocks, sedimentary and metamorphic rocks, and peat in a climate which ranges from sub-tropical in the north to sub-Antarctic in the south.

The author, Dr. Les Molloy, is a soil scientist at the New Zealand Soil Bureau, who has specialised in land use and environmental issues. He has a wide knowledge of the New Zealand landscape and has written a number of books on natural history and the conservation of land resources. Many ISSS members will remember him as Secretary-General of the 'Soils with Variable Charge' Inter-Congress meeting in Palmerston North in 1981. His approach in the book is to relate soils and their development to the landscapes in which they form, and to trace the use of soils from the time of the arrival of the first Polynesian settlers over 1000 years ago to the intensive agriculture and forestry of today.

The technical title of the book is 'Soils and Landscapes of New Zealand'. The tentative popular title is 'Mantle of Rongo' referring to Rongo, the Maori diety of cultivated foods and soil husbandry. The book will be a high quality production and will be lavishly illustrated with over 250 colour photographs, diagrams and maps. It will include 100 colour photographs of the full range of New Zealand soil profiles.

Further up-to-date information about the book and its availability can be obtained from the Secretary, NZ Society of Soil Science, c/o NZ Soil Bureau, DSIR, Private Bag, Lower Hutt, New Zealand.



Ash from recent eruptions of andesitic volcanoes provides the parent material for a significant proportion of soils of the North Island, New Zealand.

Australian Soils Conference, 1988

The Australian Society of Soil Science will hold its next 4-yearly National conference from May 8–15, 1988 in Canberra. The conference organisers would welcome participation by soil scientists from outside Australia, particularly by members of the International Society of Soil Science.

Abstracts on any aspect of soil science will be accepted, but special sessions are being organised on topics including soil acidity, soil management in conservation farming, soil problems of the humid and semi-arid tropics, biological amelioration of infertile soils, and recent developments in soil mineral characterisations. The deadline for receipt of abstracts is November 1, 1987.

1988 is Australia's Bicentenary year and a wide range of special activities are planned throughout the country to celebrate this event. It is therefore an ideal time to incorporate business with pleasure and make that long-awaited visit to australia.

Address of the Society: ASSS Inc., CSIRO, Division of Plant Industry, P.O. Box 1600, Canberra A.C.T. 2601, Australia.

Sociedad Mexicana de la Ciencia del Suelo

The Nexican Society of Soil Science elected its new board members on November 26, 1986. The Board has now the following members:

Presidente:	Dr. Octavio Pérez Zamora
Vice presidente:	M. C. Javier Z. Castellanos Ramos
Secretario General:	Dr. Andrés Aguilar Santelices
Tesorero:	M. C. Josefina Paredes Gonzalez
Secretario Técnico:	Dr. Jorge Baus Picard
Secr. de Relaciones Publicas:	M. C. Valentin Vazquez Aguilar
Secr. de Eventos Nacionales e Internacionales:	Dr. Isabel Cortés Flores
Vocales:	M. C. Carlos Ortiz Solorio, M. C. Enrique Salazar Sosa.

The 25th anniversary of the Society will be celebrated on Nov. 11–14, 1987 and the National Gongress will take place in Zacatecas, Zac., during those days.

Address of the Secretary: Apartado 45, Chapingo, México.

African Soil Science Society

At the 8th annual general meeting of the Soil Science Society of East Africa, held at Makarere University in Kampala, Uganda, december 1986, the interim Executive Committee of the newly formed African Soil Science Society (see Bulletin 70 pages 40–41) met to discuss progress made since Hamburg and to prepare for the first All-Africa Soil Science Congress.

Upon invitation of the Minister of Agriculture of Uganda, it was decided to hold the Congress at Kampala in december 1988 with the theme 'Soil degradation in Africa – a challenge to human population growth'. Financial support for local arrangements and participation by African soil scientists is being sought from several UN Specialized Agencies and bilateral International Development Organizations. Dr. M. G. A. Raziq (Sudan/Saudi Arabia) is acting chairman of the Interim Committee and the *address* of the general coordinator is:

Prof. J. Y. K. Zake, ASSS, c/o Dept. of Soil Science, Faculty of Agriculture, Makerere University, P.O. Box 7062, Kampala, Uganda.

APPOINTMENTS, HONOURS
NOMINATIONS, DISTINCTIONS
ERNENNUNGEN, AUSZEICHNUNGEN

Dr. Kenneth M. Pretty, president of the Potash & Phosphate Institute of Saskatoon, Canada, was elected Honorary Professor of the Institute of Soil Science of the Academia Sinica at Nanjing, P.R. of China.

Dr. Robert Brinkman, of the Wageningen Agricultural University has been appointed Chief, Soils Branch, Land and Water Development Division of FAO, Rome.

Prof. Dr. Parker F. Pratt, past-president of the Soil Science Society of America, upon his retirement from the University of California, Riverside, was appointed Director of the U.S. Salinity Laboratory, also at Riverside, Ca, USA.

Dr. Larry Boersma, Professor of Soil Science at Oregon State University and current President of the Soil Science Society of America, was elected at Fellow of the American Association for the Advancement of Science (AAAS).

Dr. Alfredo Zinck of Venezuela was appointed Professor in Soil Science at the International Institute for Aerial Survey and Earth Sciences (ITC) in Enschede, the Netherlands.

Dr. Nico van Breemen and **Dr. Johan Bouma** were appointed Professor at the Dept. of Soil Science of the Wageningen Agricultural University, on the subjects of respectively 'ecopedology' and 'soil inventory and land evaluation'. Upon retirement of **Prof. Dr. Frank Moormann** per August 1st, 1987, the Chair of Soil Science at Utrecht University will be abolished.

Dr. I. P. Abrol, current Chairman of ISSS Commission VI, was appointed Deputy Director General (SAE) of the Indian Council of Agricultural Research (IARI) in New Delhi, India.

NOTEWORTHY

King Baudouin International Development Prize

The King Baudoin Foundation will award the King Baudouin International Development Prize for the fith time in autumn of 1988. Past laureates were: Prof. Paulo Freire, Brazil; the CGIAR, Washington; Dr. A. Ariyaratne, Sri Lanka; Dr. Walter Plowright; the International Foundation for Science, Sweden.

The purpose of the prize is to reward persons who, or organizations which, without regard to national origin, have made a substantial contribution toward the development of the Third World or toward the cooperation and good relations among industrialized and developing countries and among their peoples. Particular importance shall be attached to activities having a multiplier effect and to activities that enable the peoples of the Third World to work for their own development.

The amount of the prize is 4 million Belgian francs (approximately US$ 100.000).

Nominations should be sent to the Secretariat of the King Baudouin Foundation before September 30, 1987. The Prize will be awarded by the Board of Directors of the Foundation on the advice of a selection committee. A large number of Belgian and foreign persons and organizations will be invited to nominate candidates: scientific academies, international or regional organizations working in the development field and university teachers whose teaching or research is development-related.

The Regulations of the Prize, which contain all relevant details, can be obtained from: the Secretariat King Baudouin Foundation, rue Brederode 21, B-1000 Brussels, Belgium; or from Belgian diplomatic or consular posts.

IN MEMORIAM

Dr. J. A. Prescott, Honorary Member of ISSS (1890–1987)

James Arthur Prescott left the field of soil science physically on 6 February, 1987, in Adelaide, Australia, his contribution in the field has ensured that his name and standing will not, – at least for many more years to come.

Prescott and his family arrived in Australia from Cairo in September 1924, a well-travelled wel-qualified Lancastrian highly recommended by the Director of Rothamsted Experimental Station, Sir John Russell, and astutely selected by the Vice Chancellor, Professor William Mitchell, as the foundation Waite Professor of Agricultural Chemistry in the University of Adelaide to fill one of the two senior appointments at its new Agricultural Research Institute. He arrived, he remained. He retired from the Institute, its Professor of Agricultural Chemistry and its highly regarded second Director, thirty one unbroken years later. During that time, of which the last seventeen years as Director, he and his colleagues at the Waite Institute made a most significant contribution to the development and understanding of the Australian agricultural and related the field of soils that his position is unique.

Prescott's place in the annals of soil science extends far beyond the boundaries expected in professional research and teaching in agricultural chemistry; he has for years been regarded, and justly so, as the founder of modern scholarly soil science in Australia. For so long as the name Red-brouw Earth survives for the Great Soil Group recongnised and described by him and his colleagues, his name is likely to be remembered in Australia with it. As a beginning, a great commemorative seminar entitled 'Red-brown Earths of Australia' was held at the Waite Institute in honour of his 90th birthday on 7 October, 1980.

By the time Prescott arrived in Adelaide there was an accumulation of eighty years of chemical and physical data on Australian soils, and great agricultural interest in learning now soil fertility could be improved or restored – hence the decision for a Waite chair in agricultural chemistry; and there were records of soil surveys and pedological studies done over the previous fifty years. He arrived with a formal background in chemistry, and the intellectual stimulus of association with men in the forefront of science – men such as Perkin, Weizmann, Rutherford, Ostwald, and Arrhenius; he had the stimulus of Sir John Russell's leadership at Rothemsted, and the practical experience of an eight year stint supervising agricultural laboratory and field work in Egypt. He arrived into an informed perceptive expectant research environment; he had the intellect and intelligence to identify what kinds of work should next be done, the vigour, the will and the temperament to pursue it. His persuasive but calm and (as exemplified by his precisely neat handwriting all his life) very careful leadership initiated the infrastructure that is Australian soil science today. Part of that structure is the CSIRO Division of Soils.

Prescott was asked to join, less than two years after his arrival, a CSIR committee seeking a solution to problems of salinity and waterlogging in the Murray Valley irrigation area. He lost no time in making recommendations and taking action; within six months, on 1 May 1927, the CSIR Soil Investigation Section was formed at, and in

co-operation with, the Waite Institute, under Prescott's leadership and direction. The effectiveness of the work prompted CSIR to upgrade the Section to a Division in 1929, with Prescott as an active participant and its first Chief. He held the two appointments of Chief of the CSIR(O) Division of Soils and Professor of Agricultural Chemistry until 1947, by which time he had also been for nine years both Director of the Waite Institute and chairman of the CSIR committee on Oenological Research that led to the establishment, also at the Waite Institute, of the Australian Wine Research Institute. He handed the Division of Soils over to his colleague and first-appointed officer, John K. Taylor, in 1947. The pubblication in 1983 of 'Soils: an Australian viewpoint', a 928 page book written very largely officers of the Division of Soils, is surely testimony to his leadership in selecting and directing staff during the Divison's formative years. Those who knew him and who know his work may well accept as not too great a stretch of imagination that Prescott in effect wrote a first draft of the book when he published, as CSIR Bulletin 52, 'The soils of Australia in relation to vegetation and climate' half a century before; to this could be added Bulletin 177 (1944) 'A soil map of Australia'.

Prescott published extensively, and over many years; his first scientific paper was published in 1914, his last singleauthor paper, for which he travelled to the USSR *at the age of 83 to research original sources, was published in 1977.*

The Australian Society of Soil Science features somewhat curiously in the Prescott story. Throughout his professional life he had been a participating member of appropriate professional societies. He was elected to fellowship of the Royal Society of South Australia in 1925 just after his arrival, he was a member of its Council for three periods ending in 1968 that totalled 23 years, of which one was as President and seven were as editor of its Transactions, and he was awarded its Verco medal in 1938.

In recognition of his service he was made an Honorary Fellow in 1964. He was accorded the high honour of Fellowship of the Royal Society, London, in 1951. He joined the International Society of Soil Science as a Foundation Member in 1924, and was made an Honorary Member of it at its 8th Congress in Bucharest in 1964.

The Australian Society of Soil Science's Council invited him in 1961 to accept Honorary Life Membership. He accepted, and attended its meetings with great regularity for the next 25 years thereafter, even being present at a meeting of the South Australian branch in 1985.

In 1971 the Society founded the J. A. Prescott Medal of Soil Science '..in recognition of Emeritus Professor J. A. Prescott as a leader in founding the scientific study of the soil in Australia... and to hnour his many achievements in soil science and agroclimatology, and his extensive contribution to Australian agriculture as a scientist and administrator...'

C. B. Wells, Glen Osmond, Australia
(abridged from ASSS 'Soil News' '71)

Professor Dr. Heinrich Rohdenburg (1937–1987)

It is with deep regret that we have to announce the untimely death of Professor Dr. Heinrich Rohdenburg, Professor of Physical Geography and Landscape Ecology at the Technical University of Braunschweig, West Germany, after a brief but tragic illness.

Professor Rohdenburg was well known to members of the International Soil Science community, not only for his wide-ranging work on the relations between Pleistocene landforms, climate and soil formation and his work on the landform-soil relations of the Mediterranean and West Africa, but also for the journal CATENA, which he and his wife Margot started in 1973, when he was Professor of Tropical Geography at the University of Giessen. Under his able leadership, CATENA grew steadily in stature as an interdisciplinary journal linking geomorphology, hydrology and soil science. Today, CATENA is accepted as a front-line journal of international quality, and is a cooperating journal of the international Society of Soil Science.

Professor Rohdenburg was born on 27 January 1937 in Stade. He studied Chemistry, Botany, Zoology, Geology, Physical Geography and Soil Science at the Universities of Hamburg, Würtzburg, Innsbruck and Göttingen, and gained his doctorate in Göttingen under Professor von Mortensen with a thesis entitled 'Die Muschelkalk-Schiftstufe am Ostrand des Sollings und Bramwaldes – eine morphogenetische Untersuchung unter besonderer Berücksichtigung der jungquartären Hangformung'. During the late 1960's he studied the löss formation in Poland, East Germany, Czechoslovakia and the USA. During this period he also worked in West Africa; this work was to culminate in his 'Habilitationschrift' entitled 'Hangpedimentaion und Klimatwechsel als wichtigste Faktoren der Flächen – und Stufenbildung in den wechselfeuchten Tropen and Beispielen aus West Afrika, besonders aus dem Schichtstufenland Südost-Nigerias'. He also made scientific visits to Portugal, Spain, the Central Sahara, Congo-Kinshasa and Brazil.

Heinrich (Heiner) Rohdenburg was appinted to the newly established Chair of Physical Geography and Landscape Ecology at the Technical University of Braunschweig in 1976. Here he started to build up a new and unique quantitative interdisciplinary approach to the problem of how materials and solutes are transported over and through landscapes. With his broad background in the field sciences and his basis scientific training, he was one of the first to attempt the quantitative modelling of dynamic processes of erosion and water movement in the landscape. To further these studies he set up the project 'Wasser- und Stoffdynamik in Agrar-ökosystemen', which is a special collaborative program financed by the German Research Society. Since its initiation, more than 50 scientists from several major German Institutes have collaborated in this well-funded research program, which has attracted interest from many scientists in other countries.

Heiner Rohdenburg's unfortunate and early death is a severe blow to the interscipllinary work that he encouraged and that involved so many others. His prolific publications are a testimony of his endeavours. We have not only lost a pioneering scientist, but also a warm and humane colleague and friend.

The International Society of Soil Science extends its deepest sympathies to Mrs. Rohdenburg and her family and is extremely grateful for her brave decison to continue publishing CATENA.

P. A. Burrough, Utrecht, the Netherland

Professor M. P. Nemes (1910–1986)

M. P. Nemes, former professor of soil science at the Agricultural Institute in Cluj-Napoca, and head of the Soil Science Section in Cluj of the Romanian Academy of Science, member of the International Society of Soil Science, died on 22 July 1986.

Prof. M. P. Nemes was born in June 5, 1910 at Cojocna, Cluj, Romania. As a graduate of the Faculty of Natural Sciences of the University of Cluj in 1934, he carried out high school teaching in Turda between 1934–1945.

His 30 years appointment at the Agricultural Institute in Cluj (1945–1975) was a valuable activity of promoting soil science in the Transylvanian agriculture. As the head of the Soil Science Section, Cluj branch of the Academy, Prof. M. P. Nemes directed the research of Transylvania soils.

Author or co-author of more than a hundred scientific papers, his work covered a wide research field: soil mapping, chemistry and physics of soil, genesis and classification, and age dating by pollen analyses. His main contributions refer to the soils of the Transylvanian Plain and the Aquseni Mountains.

Born organizer, he was the leader of many conferences and symposiums which led to the affirmation of soil science in Romania.

As reward of his scientific and organizing activity he received many awards. Among them, 'Ion Ionescu de la Brad' Award of the Romanian Academy of Science (*1963*).

Though a retired person his interest and love for the same problems continued as before. For his helpfulness and cooperation, as well as for his achievements in research, teaching and organizing activity, he will long be remembered.

Victor V. Pop, Cluj-Napoca, Romania

Centenaire de la mort Jean-Baptiste Boussingault (1802–1887)

Ce Victor Hugo de la Science a été géologue, mineur, officier d'Etat-Major, professeur d'Université, agronome, physiologiste, métallurgiste, météorologue, alpiniste, etc... etc... gamin de Paris et grand bourgeois reçu au palais des Tuileries, compagnon de Bolivar et membre du *Conseil d'Etat, fiancé de l'héritière des mines d'émeraudes de Colombie et marié à celle* des mines de pétrole de Pechelbronn, le manuel anglais d'agronomie porte sa photographie en frontispice (un français!!) et les russes portent encore des toasts en son honneur...

Elevé entre le boulevard Saint-Michel et la rue Saint-Jacques, quasi autodidacte, élève exceptionellement brillant de l'Ecole des Mines de Saint-Etienne, remarqué par Gay-Lussac, Humboldt et le baron Thénard, il passe 10 ans en Colombie. Précurseur des coopérants français du XXème siècle, il est explorateur, colonel de l'Etat-Major de Bolivar et dirige l'exploitation de mines d'or... d'une compagnie anglaise. Enfin il explore les volcans de la Cordillère des Andes et, sur les flancs du Chimborazo, il est le premier alpiniste à dépasser 6.000 mètres (1831).

Revenu en France, Doyen de la Faculté des Sciences de Lyon, maître de conférences de chimie à la Sorbonne, professeur de chimie agricole au Conservatoire des Arts et Métiers, membre de l'Académie des Sciences (1839) et de la Société National d'Agriculture (1842), il aborde tous les domaines de la chimie agricole. C'est lui qui a posé le problème du cycle de l'Azote, imaginé les équivalents fourragers, étudié le métabolisme de l'engraissement des animaux, créé la première station agronomique et les essais au champ, posé correctement en terme de rendement le problème de l'assimilation chlorophylienne, analysé des milliers de végétaux et de produits agricoles, contribué à la mise au point de la nomenclature chimique, et pendant ses études, son séjour américain et les vacances de la fin de sa vie amélioré la métallurgie des métaux précieux et des aciers spéciaux...!!! Un personage extraordinaire!

J. Boulaine, Plaisir, France

INTERNATIONAL RELATIONS
RELATIONS INTERNATIONALES
INTERNATIONALE VERBINDUNGEN

ICSU

Special Committee for the Geosphere-Biosphere Programme (IGBP) established

The Executive Board of the International Council of Scientific Unions at its recent meeting held in Paris, appointed a Special Committee for the International Geosphere-Biosphere Programme (SCGB) on the advice of a Nominating Group, which met in Paris in December 1986. The Executive Board has also approved the recommendation of the Nominating Group that Professor J. J. McCarthy be named as Convenor of the SCGB. The list of Committee members is as follows:

J. J. McCarthy (Convenor)	(U.S.A.)	V. M. Kotlyakov	(U.S.S.R.)
		T. Nemoto	(Japan)
B. Bolin	(Sweden)	H. Oeschger	(Switzerland)
M. L. Chanin	(France)	S. I. Rasool	(U.S.A.)
P. Crutzen	(F.R.G.)	T. Rosswall (Executive Director)	(Sweden)
E. S. Diop	(Senegal)		
S. Dyck	(G.D.R.)	J. S. Singh	(India)
J. A. Eddy	(U.S.A.)	V. A. Troitskaya	(U.S.S.R.)
W. S. Fyfe	(Canada)	B. H. Walker	(Australia)
R. Herrera	(Venezuela)	J. D. Woods	(U.K.)
		D. Ye	(China)

The request of the President of ICSU for nominations from ICSU family members and associated international organizations dated 23 September 1986, met with an overwhelming response. The Nominating Group had to consider over 200 excellent proposals. In making its recommendation, the Group took note of the need to have a scientifically, as well as geographically, well-balanced SCGB. It also considered the need for a strong commitment of time from the Committee members and thus did not propose for membership persons currently holding high office in either ICSU Unions of Committees. It is hoped, however, that all ICSU Scientific and National Members will have a close working relationship with the SCGB. In accordance with ICSU Rules, the Committee will have a rotating membership.

For general information on the IGBP programme see ISSS Bulletin 84/2, pages 51–52 and 86/2, pages 47–48. The starting date of activities is likely to be early 1989.

Cooperation between ICSU and the Third World Academy of Sciences

The Executive Board of ICSU, following the recommendation of a special Study Group as well as a Resolution of the 21ste General Assembly calling for increased contacts between ICSU and the scientific community in developing countries, has approved of a number of specific cooperative activities between ICSU and the Third World Academy of Sciences (TWAS).

ICSU-TWAS Lectureship Programme

Under this joint programme, ICSU and the TWAS will finance the travel of scientists from any part of the world (North and South) to give scientific lectures in developing countries. The ICSU-TWAS Lectures will be asked to prepare and present two types of lectures in each country: a lecture in his/her specialized field and a lecture

of interest to a general public. ICSU and TWAS have agreed to identify Lectures to be selected to participate in this scheme as well as possible host institutions in developing countries. ICSU and TWAS will provide the travel costs of the Lecturers and the host institutions will be expected to provide local costs.

Preparations and Publication of a Directory of Institutions in Developing Countries

ICSU and TWAS will collaborate in the compilation of a computerized data bank of major scientific institutions active in the Third World. Such a data bank will lead to a publication of a Directory to be periodically up-dated and re-issued. The TWAS will take the major responsibility for preparing this Directory and ICSU members are aksed now to provide information about scientific institutions with which they are familiar in developing countries.

Provision of Books and Journals to Developing Countries

As the TWAS already has an important programme in this area, ICSU has decided not to launch its own special programme, although as stated in the Newsletter, a small group of the Executive Board Members and the Executive Secretary of TWAS are continuing to discuss what more ICSU can do to help bridge the information-gap in developing countries.

For further information about this programme, please contact R. Dalafi, Third World Academy of Sciences, c/o International Centre for Theoretical Physics, P.O. Box 586, 34100 Trieste, Italy.

ENVIRONMENT LIAISON CENTRE

The Environment Liaison Centre (ELC), an international non-government organization (NGO) based in Nairobi, Kenya, works to strengthen communication and co-operation among the thousands of NGO's throughout the world that are working to promote responsible human actions regarding the environment and development.

ELC is part of the global effort to protect the earth's ecosystem for human welfare, and for sustainable use and equitable distribution of resources. It also serves as a link between NGO's and the United Nations Environment Programme.

ELC provides small grants to qualified third world NGO's, publishes booklets, books, and monographs dealing with specific sustainable development concerns, and produces a bi-monthly journal, **Ecoforum**, and a bi-monthly newsletter, **News Alert**. Publications are available in English, Spanish, and French.

For information, contact: Environment Liaison Centre, P.O. Box 72461, Nairobi, Kenya.

INTERNATIONAL FEDERATION OF AGRICULTURAL RESEARCH SYSTEMS FOR DEVELOPMENT (IFARD)

IFARD was formally established in 1979. Its President is Mr. J. W. Sadikin (Indonesia) and the secretariat is located at the International Service for National Agricultural Research, one of the CGIAR institutes. IFARD held its second convention at Brasilia in 1986, which coincided with the First International Meeting of National Agricultural Research Systems. The Convention issued a formal declaration on the promotion of national agricultural research in developing countries, known as 'the IFARD Brasilia Declaration 1986', the text of which can be obtained from the secretariat: IFARD, c/o ISNAR, P.O. Box 93375, 2509 AJ the Hague, the Netherlands.

MEETINGS, CONFERENCES, SYMPOSIA
REUNIONS, CONFERENCES, SYMPOSIUMS
TAGUNGEN, KONFERENZEN, SYMPOSIEN

Meetings etc. marked with*, are organized or (co)-sponsored by ISSS, implying that participation with support from the ISSS Fellows Fund can be considered (for details on the Fund, cf. Membership List 1986, page 154.

Les réunions, etc., marquées d'un astérisque (*) sont organisées ou (co)-financées par l'AISS, ce qui implique qu'il y a possibilité d'y participer avec un financement du Fond pour Aspirants de l'AISS (voir détails dans la liste des Membres de 1986, page 154).

Tagungen usw, versehen mit (*) werden organisiert bzw (mit)finanziert von der IBG, was bedeutet daß die Möglichkeit gegeben ist sich zu beteiligen mit finanzielle Unterstützung aus der IBG Stipendien (für Einzelheiten siehe Mitgliederverzeichnis 1986, Seite 154).

Las reuniones, etc, marcadas con un asterisco (*) son organizadas o (co)-promovidas por la SICS, implicando la posibilidad de participar con el apoyo del Fondo para becarios de la SICS (ver detalles sobre el Fondo en la Lista de Socios, 1986, p. 154).

ISSS, as an associate member of the International Council of Scientific Unions, subscribes to the principle of free movement of bona fide scientists; patronage or sponsoring will therefore automatically be withdrawn if the country of venue denies or purposely delays visa awarding to any ISSS member who wishes to participate in the meeting concerned.

International Symposium on Ecology of Arable Land – Perspectives and Challenges, Uppsala, Sweden, June 6–12, 1987.
Information: Ms. A. C. Lundquist, Dept. of Microbiology, Swedish University of Agricultural Sciences, S-75007 Uppsala, Sweden.

2nd International Workshop on the Behavior of Pollutants in Porous Media, Bet Dagan, Israel, June 14–19, 1987.
Information: Dr. Zev Gerstl, Institute of Soils and Water, ARO, the Volcani Centre, P.O. Box 6, Bet Dagan 50–250, Israel.

3rd International Congress on Applied Mineralogy, Orléans, France, July 6–10, 1987.
Information: Secretary ICAM'87, Lab. de Minéralogie Appliquée, B.P. 6749, 45067 Orléans Cedex 2, France.

International Conference on Measurement of Soil and Plant Water Status, Logan, Utah, USA, July 6–10, 1987.
Information: R. J. Hanks, Dept. of Soil Science and Biometeorology, Utah State University, UT 84322-4840, USA.

4th International Symposium on Iron Nutrition and Interaction in Plants, University of New Mexico, Albuquerque, USA, July 7–10, 1987.
Information: Dr. L. L. Barton, Dept. of Biology, Univ. of New Mexico, Albuquerque, NM 87131, USA.

31st Congress of the International Union of Pure and Applied Chemistry (IUPAC)
Sofia, Bulgaria, July 13–18, 1987.
Information: Dr. T. West, Secretary General IUPAC, Macaulay Inst. for Soil Research, Craigiebuckler, Aberdeen AB9 2QJ, Scotland.

21st Brazilian National Soil Science Congress, Campinas, SP Brazil, July 19–25,1987 (coinciding with the centenary celebrations of the Instituto Agronomico de Campinas – IAC)
Information: Antonio C. Moniz, SBCS, Caixa Postal 28, 13001 Campinas (SP), Brazil

14th International Botanical Congress, West Berlin, FRG, July 24-August 1, 1987.
Information: Dr. W. Greuter, Kön.-Luise-Strasse 6–8, D-1000 Berlin (West) 33, FRG.

12th Congress of the International Union of Quaternary Research (INQUA), Ottawa, Canada, July 31-August 9, 1987.
Information: Dr. Alan V. Morgan, Dept. of Earth Sciences, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.

International Symposium on Erosion & Sedimentation in Pacific Rim Countries, Corvallis, Oregon, USA, August 3–7, 1987 (IAHS and IUFRO).
Information: Dr. R. Beschta, Dept. of Forest Engineering, Oregon State University, Corvallis, OR 97331, USA.

International Symposium on the Dynamics of Land Use Systems, Asahikawa, Hokkaido, Japan, August 8–12, 1987 (IGU).
Information: Y. Himiyama, Inst. of Geography, Hokkaido University of Education, 9-Hokumoncho, Asahikawa 070, Japan.

19th General Assembly of the International Union of Geodesy and Geophysics, (IUGG), Vancouver, Canada, August 9–22, 1987, with Symposia and Workshops by the International Association of Hydrological Sciences (IAHS) on Forest Hydrology and Watershed Management; Irrigation and Water Allocation; Methods of Runoff and Stream Slow Simulation; Estimation of Areal Evapotranspiration; Origin and Evolution of Sedimentary Basins, etc.
Information: G. D. Young, CNC/IAHS, Inland Water Directorate, Environment Canada, Ottawa, Ontario, K1A OE7, Canada.

33rd Annual Convention of the Canadian Society of Soil Science, ('Land Management in a Changing World'), Ottawa, Canada, August 16–19, 1987.
Information: CSSS Conference, Tour and Conference Center, Commons Building, Carleton University, Ottawa, Ont K1S 5B7, Canada.

International Conference on Steepland Agriculture in the Humid Tropics, Kuala Lumpur, Malaysia, August 17–20, 1987 (Malaysian Society of Soil Science, with Malaysian Agricultural Research & Development Institute MARDI).
Information: Dr. Z. Abdul Rahman, MSS, P.O. Box 12644, 50784 Kuala Lumpur, Malaysia.

Unesco-UNEP International Congress on Environmental Education and Training, Moscow, USSR, August 17–21, 1987.
Information: Mr. V. Kolybine, Ed/STE, Unesco, 7 place de Fontenoy, 75700 Paris, France.

International Symposium on Pland Roots and their Environment, Uppsala, Sweden, August 1987.
Information: Dr. H. Persson, Dept. of Ecology and Environmental Research, University of Agricultural Sciences, Box 7072, 75007 Uppsala, Sweden.

9th International Biophysics Congress, Jerusalem, Israel, August 23–28, 1987.
Information: Dr. J. Tigyi, Secretary-general IUPAB, Inst. of Biophysics, Medical University, Izigeti ul 12, 7640 Pécs, Hungary.

Conference on Livestock and the Improved Management of Dark Clay Soils in Africa, Addis Abeba, Ethiopia, August 31–Sept. 4, 1987.
Information: S. Jutzi, ILCA, P.O. Box 5689, Addis Abeba, Ethiopia.

22nd Congress of the International Association of Hydraulic Research (IAHR); with Seminar on Transport of Contaminants in Groundwater. Lausanne, Switzerland, August 31-September 4, 1987.
Information: Mr. W. H. Graf, EPFL Laboratoire d'Hydraulique, 1015 Lausanne, Switzerland.

International Symposium on the Protection of Water Quality from Harmful Emissions, with special regard to Nitrate, Balatonfüred, Hungary, September 1–4, 1987 (CIEC).
Information: Hungarian Soc. of Agricultural Sciences, Kossuth Lajos tér 6–8, 1055 Budapest 5, Hungary.

13th Congress of the International Commission on Irrigation & Drainage (ICID) Rabat, Morocco, Sept 15–19, 1987.
Information: Secretariat ICID, 48 Nyaya Marg, Chanakyapuri, New Delhi 11, India.

Symposium on Mineral Nutrients in Tropical Forest & Savanna Ecosystems, Stirling, Scotland, U.K., September 8–12, 1987.
Information: Dr. J. Proctor, Dept. of Biological Science, Univ. of Stirling, Stirling, FK9 4LA, Scotland.

8th International Symposium on Environmental Bio-Geo-Chemistry (ISEB), Nancy, France, September 14–18, 1987.
Information: Dr. Jacques Berthelin, Centre de Pédologie Biologique, CNRS, B.P. 5, 54501, Vandoeuvre-les-Nancy Cedex, France.

***5th International Meeting on the Submicroscopy of Undisturbed Soil materials,** Aberdeen, Scotland, September 14–18, 1987 (Cosponsoring by ISSS Subcommission B).
Information: Dr. W. J. Hardy, Dept. of Mineral Soils, The Macaulay Institute for Soil Research, Craigiebuckler, Aberdeen, AB9 2QJ, Scotland.

6th Intenernational Conference on Heavy Metals in the Environment, New Orleans, USA, September 15–18, 1987.
Information: Heavy Metals Secretariate, CEP Consultants Ltd., 26 Albany Street, Edinburch EH1 30QH, United Kingdom.

International Symposium on Agrohydrology, Wageningen, the Netherlands, September 29–October 1st, 1987.
Information: IAC-OCC, P.O. Box 88, 6700 AB Wageningen, the Netherlands.

International Congress on Terminology and Knowledge Engineering (INFOTERM), Trier, FRG, September 29–October 1, 1987.
Information: Dr. U. Clesius, Universität Trier, Postfach 3825, D-5500 Trier, FRG.

International Symposium on Biotechnology at Soil Fertility Increase, Bratislava, Czechoslovakia, September 1987.
Information: Dr. Pavol Bielek, Research Centre of Soil Fertility, Vrakunska 29, 83421 Bratislava, Czechoslovakia.

International Symposium on Nutrient Management for Food crop Production in Tropical Farming Systems, Univ. Brawijaya, Malang, Indonesia, October 19–24, 1987. (cooperation IB-Haren and KIT-Amsterdam, the Netherlands, and IITA, Nigeria).
Information: Mr. J. van der Heide, Institute for Soil Fertility, P.O. Box 30003, 9750 RA Haren, the Netherlands.

Symposium on the Aerial Application of Pesticides in Forestry, Ottawa, Canada, October 20–22, 1987.
Information: K. Charbonneau, National Research Council of Canada, Montreal Road, Ottawa, Ont. K1A OR6, Canada.

International Conference on Groundwater Contamination, Use of Models in Decision-making, Amsterdam, the Netherlands, October 26–29, 1987.
Information: Dr. G. Jousma, c/o TNO Corporation Communications Dept., P.O. Box 297, 2501 BD The Hague, The Netherlands.

14th International Congress of Biochemistry (IUB), Prague, Cezechoslovakia, October 1987.
Information: R. L. Hill, Biochemistry Department, Duke University Medical Center, Durham, NC 27710, USA.

International Symposium on Interaction between Ground Water and Surface Water, Lund, Sweden, October 1987.
Information: Dr. J. C. Rodda, Secretary General IAHS, Inst. of Hydrology, Maclean Building, Crowmarsh Gifford, Wallingford, Oxfordshire, OX10 8BB, England.

Annual meeting of the Soil Science Society of America, Atlanta GA, USA, November 30-December 4, 1987.
Information: Dr. R. F. Barnes, ASA-CSSA-SSSA, 677 South Segoe Road, Madison WI 53711-1086, USA.

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***5th International Soil Conservation Conference,** Bangkok, Thailand, January 18–29, 1988 (ISCO; cosponsoring by ISSS Subcommission C).
Information: Mr. Sanarn Rimwanich, President ISCO, c/o Dept. of Land Development, Phaholyotin Road, Bangkok 10900, Thailand.

***International Symposium on Managing Sandy Soils**, Jodhpur, Rajasthan, India, February 8–12, 1988. (ISSS Commission VI).
Information: Dr. K. Shankarnarayan, Central Arid Zone Research Institute, Jodhpur 342003, India.

International Rangeland Development Symposium, Corpus Christi, Texas, USA, February 15–19, 1988.
Information: Dr. James A. Tiedeman, Cooperative Extension, 129 Johnson Hall, Washington State Univ., Pullman WA 99164-6412, USA.

International Conference on Agricultural Engineering 1988, Paris, France, March 2–6, 1988.
Information: Dr. Francis Sevila, CEMAGREF, B.P. 5095, 34044 Montpellier Cedex, France.

***5th International Symposium on Remote Sensing for Soil Survey,** Budapest, Hungary, April 11–15, 1988.
Information: Mrs. Dr. I. Juhasz, Research Institute on Soil Science & Agricultural Chemestry, Herman Otto ut 15, 1022 Budapest, Hungary.

International Symposium on Water Resources Management and Protection on Tropical Areas, Havana, Cuba, May 8–12, 1988.
Information: Cuban IHP Committee, p.o. Box 6053, Havana, Cuba.

Australian National Soils Conference, Canberra, Australia, May 8–15, 1988.
Information: National Soils Conference, c/o Australian Convention and Travel Service, G.P.O. Box 1929, Canberra, ACT 2601, Australia.

International Symposiums on the Hydrology of Wetlands in Semi-arid and Arid Regions (IAH and IAHS), Sevilla, Spain, May 9–13, 1988.
Information: Dr. Pablo Arambarri, Instituto de Recursos Naturales, Apartado 1052, 41080 Sevilla, Spain.

6th International Congress on the Study of Bauxite, Alumina and Aluminium, (ICSOBA), Sao Paulo, Brazil, May 11–20, 1988.
Information: Prof. A. J. Melfi, VI ICSOBA Congress, Inst. Ashonômico en geofisico, Caixa Postal 30.627, 01051 Sao Paulo, Brazil.

7th International Congress on Soilless Culture, Flevohof, the Netherlands, May 13–21, 1988.
Information: Secretariat ISOSC, P.O. Box 52, 6700 AB Wageningen, the Netherlands.

***International Workshop on Validation of flow and transport models for the Unsaturated Zone,** Las Cruces/Ruidoso, New Mexico, USA, May 23–26, 1988 (Cosponsoring of ISSS Commissions I and II and Working Group NV).
Information: Dr. P. J. Wierenga, Dept. of Horticulture, Crop & Soil Sciences, N. M. State University, Las Cruces, NM 8803, USA.

***International Symposium on health problems in connection with radioactive radiation from fertilizing soils and rocks,** Oslo, May 26–27, 1988 (Norwegian Academy of Science and ISSS Working Group SG).
Information: Prof. J. Låg, c/o Norwegian Academy of Science and Letters, Drammensvn 78, 0271 Oslo-2, Norway.

6th IWRA World Congress on Water Resources: Water for World Development, Ottawa, Ont., Canada, May 29-June 3, 1988.
Information: P. J. Reynolds, inland Waters Directorate, Environment Canada, Ottawa, Ontario, Canada K1A-OE7.

International Symposium on the Hydrology of Wetlands in Temperate and Cold Regions, (IAHS, IPS and Unesco), Joensuu, Finland, June 6–10, 1988.
Information: Prof. S. Mustonen, National Board of Waters & Environment, PB.250, 00101 Helsinki 10, Finland.

International Workshop on Hydrology of Mountainous Areas (cosponsoring Unesco and IAHS), Vysoké Tatry, Czechoslovakia, June 6–11, 1988.
Informatin: Dr. L. Molnar, Czechoslovak Committee for Hydrology, Trnavska 32, 82651 Bratislava, Czechoslovakia.

***International Symposium on Solonetz Soils; problems, properties and utilization,** Osijek, Yugoslavia, June 15–20, 1988 (ISSS Subcommission A).
Information: Dr. M. Adam, Agricultural Faculty, 54000 Osijek, Tenjska cesta BB, Yugoslavia.

3rd International Symposium on Genetic Aspects of Plant Mineral Nutrition, Braunschweig, FRG, June 19–23, 1988.
Information: Dr. M. Dambroth, Inst. of Crop Science and Plant Breeding, FAL, Bundesallee 50, D-3300 Braunschweig, F.R. of Germany.

Symposium on Amazonia, Deforestation and possible Effects at the 46th International Congress of Americanists, Amsterdam, the Netherlands, July 4–8, 1988.
Information: Prof. Paulo R. Leopoldo, Fac. De Ciencias Agronômicas, UNESP, Caixa Postal 237, 18600 Botucatu SP, Brazil.

***8th International Meeting on Soil Micromorphology,** San Antonio, Texas, USA, July 10–15, 1988 (ISSS Subcommission B).
Information: L. P. Wilding, Department of Soil and Crop Science, Texas A & M University, College Station, TX 77843, USA.

11th Conference of the International Soil Tillage Research Organization (ISTRO), Edinburgh, Scotland, July 11–15, 1988. Theme: Tillage and Traffic in Crop Production.
Information: Dr. B. D. Soane, President of ISTRO, Scottish Institute of Agricultural Engineering (SIAE), Bush Estate, Penicuik, Midlothian EH26, OPH, Scotland.

7th North American Forest Soils Conference, Vancouver, Canada, July 24–28, 1988.
Information: Prof. G. F. Weetman, Dept. of Forest Sciences, Univ. of British Colombia, 23567 Main Mall, Vancouver BC, V6T 1W5 Canada.

5th International Conference on Permaforst, Trondheim, Norway, August 2–5, 1988.
Information: The Norwegian Institute of Technology, Studies Administration, N-7034, Trondheim-NTH, Norway.

International Conference on Dryland Farming, Amarillo/Bushland, Texas, USA, August 15–19, 1988.
Information: Dr. B. A. Stewart, USDA Conservation and Production Research Lab., P.O. Drawer 10, Bushland, TX 79012, USA.

***9th International Symposium Humus et Planta,** Prague, Czechoslovakia, August 21–26, 1988.
Information: Dr. B. Novak, Research Inst. for Crop Production, Drnovska 507, 16101 Praha 6-Ruzyne, Czechoslovakia.

26th International Geographical Congress, Sydney, Australia, August 22–26, 1988.
Information: B. Thom, Dept of Geography, Institute Building, University of Sydney, Sydney 2006, Australia.

International Symposium on Manganese in Soils and Plants, Waite Agricultural Research Institute, Adelaide, Australia, August 22–26, 1988.
Information: Mrs Sue Moore, Univ. of Adelaide, North Terrace, Adelaide, SA 5000, Australia.

***International Symposium on Land Qualities in Time and Space,** Wageningen, the Netherlands, August 23–26, 1988 (ISSS Working Groups MV and LI).
Information: Ir. A. Bregt, Symposium Secretary, c/o Dutch Soil Survey Institute, P.O. Box 98, 6700 AB Wageningen, the Netherlands.

***10th International Soil Zoology Colloquium,** Bangalore, India, August 1988 (ISSS Subcommission D and IUBS).
Information: Dr. G. K. Veeresh, Dept. of Entomology, University of Agricultural Sciences, Hebbal, Bangalore 560 023, India.

International Symposium on Modelling Soil-Water-Structures Interactions, (IAHR), Delft, the Netherlands. August 28-September 23, 1988.
Information: SOWAS'88, c/o KIVI, P.O. Box 3024, 2500 Gk, the Hague, the Netherlands.

Symposium on Mechanical Properties of Soils related to Soil Tillage and Field Traffic, Minneapolis/St. Paul, USA, September 1988. (ISSS Working Group PT).
Information: Dr. R. R. Almaras, Dept, of Soil Science, University of Minnesota, 439 Borlang Hall, 1991 Upper Baford Circle, St. Paul MN 55108, USA.

***International Workshop on Classification, Management and Use Potential of Swell-Shrink Soils,** Nagpur, India, October 24–29, 1988.
Information: Dr. S. B. Deshpande, Div. of Pedology, National Bureau of Soil Survey and Land Use Planning, Amravati Road, Nagpur – 440 010, Maharashtra, India.

3rd International Rangeland Congress, New Delhi, India, November 7–11, 1988.
Information: Dr. Panjab Singh, Indian Grassland and Fodder Research Institute, Jhansi 284 003, India.

***1st All-Africa Soil Science Society Congress,** Kampala, Uganda, December 5–10, 1988.
Information: Prof. J. Y. K. Zake, general coordinator, ASSS, c/o Dept. of Soil Science, Fac. of Agriculture, Makerere University, P.O. Box 7062, Kampala, Uganda.

***1st Symposium on Paddy Soil Fertility,** Cheingmai, Thailand, December 6–13, 1988 (ISSS Working Group PS).
Information: Dr. Samarn Panichapong, Secretary ISSS Working Group PS, c/o Land Development Department, Phaholyothin Road, Bangkok 10900, Thailand.

***International Meeting on Nutrient Dynamics of the Soil-Plant Interface,** Stuttgart-Hohenheim, F. R. Germany, 1988 (ISSS Commissions IV and III, and Working Group RZ).
Information: Prof. Dr. H. Marshner, Institut für Pflanzenernährung, Fruwirtstrasse, D-7000 Stuttgart-Hohenheim 70, F.R.G.

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***International Conference on the Multi-purpose Use of Soil Survey Information,** with a special **Workshop on Land Evaluation for Improved Small-holder Farming Systems,** Nairobi, Kenya, 13–23 March, 1989. (ISSS Commissions V and VI, and Working Group LI, in cooperation with East African Soil Science Society and SMSS).
Information (general): Mr. S. Wokabi, Acting Head, Kenya Soil Survey, P.O. Box 14733, Nairobi, Kenya; (for Workshop programme:) Dr. J. Dumanski, LRRC, Central Experimental Farm, Ottawa K1A 0C6, Canada.

3rd Scientific Assembly of the International Association of Hydrologic Sciences, (IAHS), gBaltimore, USA, May 10–19, 1989.
Information: Dr. A. I. Johnson, Organising Committee, 3rd IAHS Assembly, 7474 Upham Court, Arvada, CO 8003, USA.

***International Conference on Soil Compaction as a Factor determining Plant Productivity,** Lublin, Poland, June 5–9, 1989 (ISSS Commission I).
Information: Prof. J. Glinski, Institute of Agrophysica, Krakowskie Przedmiescie 39, 20–076 Lublin, Poland.

***International Conference on Soil Conservation and Environment,** Bratislava, Czechoslovakia, May 29–June 2, 1989 (Cosponsoring ISSS Commission I and Subcommission C).
Information: Prof. J. Hrasko, Research Centre of Soil Fertility, Vrakunská 29, 82563 Bratislava, Czechoslovakia.

28th International Geological Congress, Washington DC, USA, July 9–19, 1989.
Information: Secretariat Int. Geol. Congress. P.O. Box 1001, Herndon, Virginia 22070, USA.

***International Meeting on Rock Weathering and Soil Mineralogy,** Strasbourg, France, July 1989 (ISSS Commission VII, with AIPEA).
Information: Dr. A. Herbillon, CNRS, Centre de Pédologie Biologique, B.P. 5, 54501 Vendoeuvres-les-Nancy Cedex, France.

11th International Plant Nutrition Colloquium, (ICPN), Wageningen, the Netherlands, July 30-August 4, 1989.
Information: Dr. M. L. van Buisichem, Dept. of Soil Science and Plant Nutrition, WAU, P.O. Box 8005, 6700 EC Wageningen, the Netherlands.

9th International Clay Conference, (AIPEA), Strasbourg, France, August 28–September 2, 1989.
Information: Dr. Helène Paquet, Institut de Géologie, 1 rue Blessig, 67084 Strasbourg, France.

2nd International Conference on Geomorphology, Frankfurt/Main, FRG, September 3–9, 1989. Theme: 'Geomorphology and Geo-ecology'.
Information: Prof. Dr. A. Semmel, Inst. für Physische Geographie, Universität Frankfurt, Postfach 11 19 32, D-6000 Frankfurt/Main 11, F. R. Germany.

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10th Congress of the International Union of Pure and Applied Biochemistry, (IUPAB), India, August 1990.
Information: J. Tigyi, Secretary IUPAB, Institute of Biophysics, Medical University, Szigeti ut 12, 7643 Pécs, Hungary.

14th Congress of the International Commission of Irrigation and Drainage, (ICID), Rio de Janeiro, Brazil, August 1990.
Information: Secretariat ICID, 48 Nyaya Marg. Chanakyapuri, New Delhi 11, India.

****14th INTERNATIONAL CONGRESS OF SOIL SCIENCE,** Kyoto, Japan, August 1990.
Information: Dr. K. Kumazawa, Japanese Society of Soil Science and Plant Nutrition, 26-10-202, Hongo 6-chome, Bunkyo-ku, Tokyo 133 Japan.

5th International Congress of Ecology, Kanagawa-Kyoto, Japan, August 23–30, 1990.
Information: Dr. F. B. Jolly, Chairman INTECOL, c/o Institute of Ecology, University of Georgia, Athens, Georgia 30602, USA.

INTERNATIONAL TRAINING COURSES/COURS INTERNATIONAUX DE FORMATION/INTERNATIONALE FORTBILDUNGSKURSE

LONG COURSES (more than three months duration):

Post-graduate Courses in the Application of Aerospace Photography and other Remote Sensing Techniques in Natural Resource Survey, ITC, Enschede, the Netherlands

One-year courses, starting in September/October in several fields of earth sciences and land resources, e.g. soil survey (with specialisation possibilities in soil erosion and conservation; land evaluation, and remote sensing); geological survey; water resources surveys with emphasis on watershed management and conservation or on groundwater resource surveys, aerospace surveys for applied geomorphology with emphasis on environmental studies and natural hazard surveys, enqueering geological surveys, forest surveys and forestry for rural development; rural and land ecology survey; survey integration for resources development; land information systems for rural applications.

Possibility of follow-up to 1–1½ year M.Sc. course and further Ph. D. studies. The ITC also offers, among others, courses in Cartography at technician, technologist and post-graduate level.

Some of the courses may be followed at the ITC sister institutes in Bogota-Columbia or Dehra Dun-India.

Information: ITC Student Registration Officer, P.O. Box 6, 7500 AA Enschede, the Netherlands.

MSc-Course in Soil Science and Water Management, Wageningen, the Netherlands

This 2-year course, leading to an MSc-degree, provides an academic training directed towards subjects which are of direct importance for agricultural development. One of the following three programmes may be chosen: Land Evaluation and Agropedology; Soil Fertility and Soil/Plant analysis; Water Management (Irrigation, Drainage, Agrohydrology).

Admission requirements: BSc-degree in Agronomy or related disciplines, fair knowledge of the english language. An entrance examination forms part of the selection procedure.

Total costs, including board, lodging, insurance, books, fees and excursions about Dfl 55,000.– per two years. A restricted number of fellowships is available for applicants from developing countries through the Netherlands Embassies.

The next course will start in august 1987. Applications (with copies of BSc-degree, Academic Transcript etc.) not later than January 1st, 1987.

Wageningen University also offers english-language 2-year MSc-courses in respectively: animal production and aquaculture; management of agricultural knowledge systems; crop science, and tropical forestry.

Information: Director of Studies of MSc-Courses, P.O. Box 37, 6700 AA Wageningen, the Netherlands.

Post-graduate Courses in Soil Science, Univ. of Reading, Dept. of Soil Science, U.K.

1) *MSc Course in Soil Science*

Programme: A one- or two-year course with options in:

a) Pedology and Soil Survey based on the principles of pedology with emphasis on soil genesis, the conduct of soil surveys, and case studies from a wide range of countries and environments;

b) Soil Chemistry and Fertility based on the mineralogy and chemistry of soils, management of soil fertility and fertilizer use, and special problems of acid, alkaline, saline, waterlogged soils, soils of variable charge; emphasis on practical work;

c) Soil Water Management based on physical principles of soil/plant water relations and agricultural meteorology; emphasis on field problems in rainfed environments and field measurements of water supply.

2) *MAgrSc Course in Soil Science* – programme of work over two years on principles of soil science and soil management, soil chemistry, microbiology, physics, pedology and soils survey with emphasis on applications to agricultural problems. First year serves as introductory year to MSc courses.

3) *MPhil and PhD programmes are available*

4) A new course is expected to start in October 1988 embracing the analysis of natural resources based on agro-ecological zones, and land use planning.

Information: The Secretary, Department of Soil Science, University of Reading, London Road, Reading RG1 5AQ, England.

International Post-Graduate Course in Soil Science, Ghent, Belgium

A two-year course, leading to a M.Sc. degree in soil science, is open for candidates with a B.Sc. or B.A. degree in earth sciences, agronomy, or a comparable qualification. The first year consists of introductory studies; the second year is devoted to advanced courses and research work in preparation of a thesis. Two options are possible: (1) soil genesis and classification and (2) soil physics and chemistry.

A one-year course, consisting partly of introductory and partly of advanced courses, leads to a diploma of advanced studies in soil science.

Both courses are given in English, but French is also accepted as communication language. The lectures start the second week of October. A restricted number of scholarships for students from developing countries is available through the Belgian Embassies.

Ph. D. and postdoctoral research programmes can be arranged.

Information: The International Training Centre for Post-Graduate Soil Scientists, State University of Ghent, Krijgslaan 281, B-9000 Ghent, Belgium.

Post-graduate Training Courses in Soil Science and Plant Biology, Granada/Sevilla, Spain

This 7 month course, starting in January each year and open for non-european post-graduate students, intends to provide the participants with an indepth knowledge in the cultivation of agricultural crops. Language of the course is Spanish.

Information: Dr. M. Lachica, Estacion Experimental del Zaidin, Avenida de Cervantes, Apdo. 419, Granada, Spain.

International Course on Land Drainage, IAC, Wageningen, the Netherlands

The annual international course on Land Drainage (1988–27th course), given from August to December, has the objective to provide the physical and agricultural backgrounds of drainage systems. The course is offered jointly by the International Agricultural Centre and the International Institute for Land Reclamation and Improvement (ILRI).

Other annual courses at IAC are: International Course on Dairy Cattly Husbandry (March-June), International Course on Applied Plant Breeding (March-June), International Potato Course (April-July), International Course on Rural Extension (June-July), International Course on Plant Protection (July-November), International Course on Vegetable Growing (August-November). Occasionally ad-hoc courses are organized in different subjects. IAC acts as a host to the International Course for development oriented Research in Agriculture (ICRA: January-August).

Information: The director, IAC, P.O. Box 88, 6700 AB Wageningen, the Netherlands.

International Course in Hydraulic Engineering, Sanitary Engineering, in Hydrology and in Environment Science and Technology, Delft, the Netherlands.

The International Institute for Hydraulic and Environmental Engineering IHE offers international courses in Hydraulic Engineering (6 branches), Sanitary Engineering (2 branches), Hydrology and in Environmental Science and Technology. These courses are intended to transfer experience and know-how in sciences and technologies related to water and the environment to professionals especially from developing countries, holding at least a first degree of a recognised university and several years of work experience.

The 11-month study programmes start in the third week of October and offer lectures, laboratory work, workshops, project work and field studies. The courses are conducted in english at IHE in Delft. Tuition fee Dfl 5,000.–, contribution for field trips in and outside the Netherlands, approximately Dfl 1,500.–, health and accident insurance premium approximately Dfl 770.–.

Information: The Registrar for IHE, c/o NUFFIC, P.O. Box 90734, 2509 LS The Hague, The Netherlands.

M.Sc. and Post-graduate Diploma Courses in Agricultural Engeneering and Land and Water Management, Silsoe College, Cranfield Institute of Technology, England

The course in Soil and Water Engineering is designed for graduates (or equivalent) in engineering, agriculture and other subjects who are interested in agricultural development and are keen to learn how engineering skills can be applied to agricultural problems at field or farm level, in the UK and overseas.

Within the MSc programme there are opportunities to take as alternatives to the general course, specialist options in: drainage and reclamation; irrigation engineering; and soil conservation.

Duration: 1 year (2 year programme available for those not qualified for direct entry to the MSc).

The course in Irrigation Water Management is designed to provide the technical, economic and management skills required by those involved in the operation and management of irrigation schemes.

Duration: 1 year (2 year programme available for those not qualified for direct entry to the MSc).

The course in Land Resource Management and Planning is designed to meet the needs of those working or intending to work in land resource survey and evaluation or rural and agricultural planning, as planners or land use officers or in project teams.

Duration: 1 year (2 year programme available for those not qualified for direct entry).

The course Applied Remote Sensing is being offered in response to the increased need for trained specialists in interpretation and analysis of sensor information to achieve improved management of the earth's resources.

The programme is designed for graduates (or the equivalent) working or intending to work in the UK or overseas in natural resource development or in other fields where the application of remote sensing can effect improvements in the management of resource development.

Duration: 1 year (2 year programme available for those not qualified for direct entry).

All courses start in October each year and lead to a M.Sc. degree or postgraduate diploma. Also specialist short courses are available, in the UK and elsewhere.

Information: The Student Recruiment Executive, Silsoe College, Silsoe, Bedford MK45 4DT, England.

M.Sc. Course in Resource Assessment for Development Planning, University of East Anglia, Norwich, England

A one-year course combining instruction in the techniques of soil survey, land evaluation and land use planning with a study of the application of natural resource information in development planning.

Information: Dr. David Dent, School of Environmental Sciences, University of East Anglia, Norwich NR4 7TJ, England.

Cours de 3e cycle en Protection de l'Environnement, EPFL, Lausanne, Suisse

L'Ecole polytechnique fédérale de Lausanne (EPFL) organise depuis Janvier 1986 un cours de 3e cycle en protection de l'environnement. Le cours a une durée de 15 mois et est subdivisé en deux parties indépendantes: une formation générale de 6 mois (étude théorique) et un travail de recherche individuel (étude pratique) d'une durée de 9 mois dans l'une des orientations suivantes: protection des sols; écologie des polluants; génie biologique; génie sanitaire et de l'environnement; gestion des eaux.

Le programme est offert aux titulaires d'un grade universitaire scientifique ou technique d'établissement supérieur suisses ou étrangers de niveau comparable au diplôme de EPFL. Structuré en modules d'enseignement, le programme permet, à ceux qui le désirent, de conserver une activité professionnelle à temps partiel en étalant la durée des études théoriques sur deux années.

Information: Prof. L.Y. Maystre, Inst. de génie de l'environnement, EPFL-Ecublens, CH-1015 Lausanne, Suisse.

Diplôme d'Etudes Approfondies (D.E.A.) de Pédologie, Paris, France

Ce D.E.A. a pour objet de former les étudiants à l'étude de la nature, la genèse, la répartition et le fonctionnement des sols par les méthodes propres de la pédologie, associées à celles de la physicochimie des interfaces, de l'hydrodynamique des milieux poreux, de la géochimie de surface, de la géodynamique externe, de la biologie et de l'écologie.

Cette formation de haut niveau débouche sur la recherche en Science des Sols, et aussi dans un certain nombre de domaines qui lui sont associés: agronomie, production agricole et forestière, aménagement, environment et conservation des sols.

Information: Secrétariat du DEA de Pédologie, Laboratoire de Géologie-Pédologie, Institut National Agronomique, 16 rue Claude Bernard, 75231 Paris Cedex 05, France.

Cours post-universitaire sur l'Aménagement intégré des Territoires, Paris/Montpellier/Toulouse, France

A Paris les enseignements s'organisent autour de trois thèmes: écologie et développement, agronomie et aménagement, et économie et sociologie du développement. A Toulouse, les enseignements apportent les bases nécessaires en cartographie, photo-interprétation, biogéographie, écologie végétale et hydrobiologie. A Montpellier, on étudie les problèmes d'aménagement dans un contexte régional.

Information: Commission française pour l'Unesco, 42 Avenue R. Poincaré, 75116 Paris, France.

International Course on Land Water Development, Cairo, Egypt

This 5-month course is designed to cover the theoretical and practical aspects of land and water development with a wide range of subjects, such as fundamentals of soil science, land reclamation, planning and execution, irrigation principles and development, etc.

Information: The Director, The Foreign Agricultural Relations Department, Ministry of Africulture, Dokki, Cairo, Egypt.

Curso Internacional de Fertilidad de Suelos y Nutricion Vegetal, Madrid, Spain

The object of the course is to instruct participants in how to deal with problems of soil fertility and plant nutrition. Three years technical experience in research or industry is desirable and candidates should be graduates in Agronomy, Chemistry, Biology or Pharmacy. The next course places emphasis on fruit trees and horticultural crops.

During the course the following subjects are given: the fertility of soils; the nutrition of plants; the soil-plant relation; cultivation techniques; production and use of fertilizers; special crops. Language of the course is Spanish and its duration five months.

Information: Secretaria del Curso Internacional de Fertilidad de Suelos y Nutricion Vegetal, Serrano 115 bis, 28006 Madrid, Spain.

International Course in Irrigation Engineering, K.U. Leuven, Leuven, Belgium

The program is a joint initiative of the Faculties of Agricultural Sciences and Civil Engineering of the Catholic University at Leuven. The purpose of the program is to train agricultural and civil enginers in advanced irrigation and management of irrigated land. Special emphasis is put on quantitative approaches, for which computer facilities are available. All courses are given in the English language. The course includes lectures, exercises and project design, and a study tour to Southern Europe.

Two types of programs, a 1- and a 2-year cycle, are available. Applicants for the 2-year MSc-program must possess BSc-degree in agriculture or in civil engineering. During the 2nd year of their study the graduate students are requested to do an individual research project (thesis). Qualified participants will be awarded a degree of Master in Irrigation Engineering. Applicants for the 1-year postgraduate program must possess a MSc-degree in agriculture or in civil engineering or an equivalent degree. The diploma of Engineer in Irrigation will be awarded to those candidates that complete the examination tests successfully.

Both programs start on the first monday of October.

Information: Course Coordinator, Irrigation Engineering, Kardinaal Mercierlaan 92, B-3030 Leuven (Heverlee), Belgium.

Cursos de Postgrado Desarrollo de Recursos de Aguas y Tierras, Merida, Venezuela

The objective of the course, leading to a M.Sc. degree, is to train the participants in developing the land and water resources within the social economical and cultural conditions of Latin-America and the Carribbean. The following courses are given: 'Riego y Drenaje de Suelos Agricolas', 'Planificacion y Desarrollo de los Recursos Hidraulicos', 'Obras Hidraulicas'. The duration of the courses is six trimesters and the language Spanish.

Information: CIDIAT, Apartado 219, Merida, Venezuela.

M.Sc. Degree in Arid Land Studies, Lubbock, Texas, USA

The course provides training in land use planning in arid regions, environmental studies and social and cultural aspects of various fields concerning arid lands. The programme offers broad based interdisciplinary courses and specializations on sciences or engineering of arid lands of social sciences and humanities of arid and semi-arid lands.

Information: Dr. Idris R. Traylor, International Center for Arid and Semi-Arid Land Studies, Texas Tech. University, Lubbock TX 79409, USA

MSc Programme in Agricultural Engineering, Nairobi, Kenya

Two-year programmes of study leading to the degree of MSc in Agricultural Engineering (including soil and water engineering) or MSc in Land and Water Management are offered. Candidates should have a BSc in Agricultural, Mechanical or Civil Engineering or equivalent qualifications.

Informations: Dept. of Agricultural Engineering, Kabete Campus, P.O. Box 30197, Nairobi, Kenya.

Courses at the International Irrigation Course, Bari, Italy

A 1-year Diploma course provides training in the field of planning, development and use of irrigation and drainage systems and methods, oriented to the Mediterranean Area and developing countries. The course is given in English, French and Italian.

A 1-year **M.Sc.** course offers the possibility of specialization in irrigation to students who have completed the Diploma course with an 'a' (excellent) or 'b' (very good) assessment.

Information: The Director, Mediterranean Agronomic Institute (M.A.I.), Via Ceglie 23, 70010 Valenzano (Bari), Italy.

Post-graduate Course in Soil Science, Maracay, Venezuela

This course is aimed to prepare students and professionals at the levels of M.Sc. and Ph.D., with capabilities for creating, planing and executing work on basic and applied research in Soil Science, and to relate research with management, conservation and use of soils in tropical environments.

These objectives are obtainable through a set of basic and optative courses, and the completion of individual research work.

The official language is Spanish, but a broad instrumental knowledge of English is required.

Information: Universidad Central de Venezuela, Facultad de Agronomia, Comision de Estudios para Graduados, Curso de Postgrado en Ciencia del Suelo, Avda. Principal el Limon, Apartado Postal 4579, Maracay, Estado Aragua, Venezuela.

M.Sc. Course in Soil Conservation, Institute of Irrigation Studies, University of Southampton, U.K.

A 12-month course covering the disciplines involved in soil erosion and land reclamation. The course is designed to give students a sound knowledge of the physical, agricultural and socio-economic aspects of soil conservation.

Information: The Academic Registrar, The University, Southampton SO9 5NH, U.K.

Post-graduate Training Course in Soil Science, Agricultural University, Aas, Norway

This 10½ months course, starting in August each year and open for candidates with B.Sc.Ag. or B.Sc. degree from developing countries, is aimed to provided theoretical and practical training in the field of soil science and is sponsored by the Norwegian Agency for International Development (NORAD) which provides fellowships to the students.

The course leads to a post-graduate diploma. NORAD, however, provides fellowships to students from East Africa for completion of M.Sc. degree at any recognised university in East Africa provided they have successfully completed the diploma course at Aas.

The course program covers a number of subjects, such as soil physics and management, soil fertility and plant nutrition, soil chemistry, soil survey, soil classification and soil resources, soil analysis, general and soil microbiology, soil and water engineering, radio-isotopes techniques in soil and plant research, and statistics. The language of the course is English.

Information: Mr. D. Guttormsen, Coordinator International Post-graduate Program in Soil Science, Box 40, 1432 Aas-NLH, Norway.

Formation Spécialisée en Agrométéorologie, Arlon, Belgique

Les cours sont dispensés à Arlon, à la F.U.L., à partir du 15 septembre de chaque année. Ils s'étendent sur une période de 12 mois pour l'orientation longue préparatoire à la Maîtrise en Science de l'Environnement et sur une période de 6 mois, à partir du 10 janvier pour l'orientation courte préparatoire au Certificat en Agrométéorologie.

Information: Fondation Universitaire Luxembourgeoise, 140 rue des Déportés, 6700 Arlon, Belgique.

Training course in Soil and Plant Analysis, at the Royal Tropical Institute, Amsterdam, The Netherlands

A 6 month course designed for non-graduate laboratory assistants with an emphasis on practical work. It aims to give participants the necessary skills needed for the most frequently required soil and plant material analyses and for the technical management of small and medium size laboratories engaged in such activities.

The course is based on a number of internationally recognized analytical methods and procedures used for soil mapping, soil fertility assessments, etc. together with recommendations for the proper use of fertilizers. It includes practical training, theoretical background studies and special subjects.

Information: The Course Coordinator, Soil and Plant Analysis, Royal Tropical Institute (KIT), 63 Mauritskade, 1092 AD Amsterdam, The Netherlands.

International Course on Range Management and Extension, Logan, USA

The international Range Management and Extension Shortcourse is a six month nondegree training course to provide knowledge and experience in the fields of range management and extension.

The shortcourse is taught annually. Participants should plan to arrive in Logan in the last week of March. The course will conclude the last week of September.

Information: Michael K. Freeman, Conference and Institute Division, Utah State University, Logan Utah 84322-5005, USA.

Interuniversity Post-graduate Programme in Hydrology, Free University of Brussels, Belgium

First year: leading to a Diploma in Hydrology or a Certificate.

Second year: leading to a Master's degree in Hydrology.

The programme is located at the Faculty of Applied Sciences, Free University Brussels (VUB) in Brussels and is supported by the Universities of Antwerp, Ghent and Leuven.

Courses start in the Faculty of Applied Sciences on September 1st of each year. English is the medium of instruction. Students who obtained a Bachelor's degree (BSc. or Eng.) or its equivalent (Licence) will be considered for admissions.

Information: Prof. Dr. Ir. A. van der Beken, Director of the Hydrology Programme, Laboratory of Hydrology, Vrije Universiteit Brussel, Pleinlaan 2, B-1050 Brussels, Belgium.

Course in Biological Nitrogen Fixation, Puerto Rico, USA

Graduate level course which takes place, alternate years 1987, 1989, etc. and where the language is Spanish.

Information: Dr. E.C. Schroder, Dept. of Agronomy and Soils, College of Agricultural Sciences, Univeristy of Puerto Rico, Mayaguez, Puerto Rico 00708, USA.

M.Sc. in Conservation of Soil Fertility, Canterbury, England

MSc course for students with biological, chemical or agricultural background. 6 months course work and 6 months independant research project.

Information: Dr. R. G. Burns, Biological Laboratory, University of Kent, Canterbury, Kent CT2 7NJ, U.K.

Programme for Ph.D. in Environmental Chemistry and Technology, Lublin, Poland

This Ph.D. programme for specialists in Environmental Chemistry and Technology is offered at the Technical University of Lublin.

Information: Prof. Lucjan Pawlowski, Dept. of Environmental Chemistry and Technology, the Technical University of Lublin, Lublin, Poland.

Course in Remote Sensing, Image Processing and Applications, Dundee, Scotland

Twelve-month taught course on 'Remote Sensing, Image Processing and Applications' is offered by the Physics department. A 9-month Diploma course in 'Digital Mapping and Remote Sensing' is also offered.

Information: Dr. W. M. Young, Carnegie Laboratory of Physics, University of Dundee, Dundee DD1 4HN, Scotland, U.K.

SHORT COURSES (duration less than three months):

Courses in Soil and Plant Analysis. University of Reading, England

One or more six-week courses in Soil and Plant Analysis are held annually in Reading, England during the summer (April-September) The courses are offered jointly by the Department of Soil Science, University of Reading (Prof. Alan Wild) and the Tropical Soils Analysis Unit of the Land Resources Development Centre, ODA (Mr. Richard Baker).

The courses are aimed at giving experienced, practising analysts in soil science and plant nutrition greater understanding of the management of a modern agricultural analytical laboratory, including building design, sampling procedures, general and specific analytical techniques, simple instrument maintenance and interpretation of data. At least fifty per cent of the course is spent on practical work and visits to agricultural laboratories of major commercial companies and research. The fee will cover accommodation which will be in Halls of Residence at the University.

Information: Dr. A. A. Jones, Department of Soil Science, University of Reading, London Road, Reading, RG1 5AG, England.

International Course on Soil Reference Collections, ISRIC, Wageningen, the Netherlands

This six-weeks course is organized by the International Soil Reference and Information Centre in cooperation with Unesco. It responds to requests by organizations planning to set up national soil reference collections. The training includes taking and impregnating soils; the display of soil monoliths; the presentation of data and information in an exhibition; the use of the material for purposes of soil correlation, education, and rural planning.

The course is held every other year; the next one will be in May-June 1989.

Information: The Director, ISRIC, P.O. Box 353, 6700 AJ Wageningen, the Netherlands.

Course in Irrigation and Soil Management, Bet Dagan, Israel

This 2-month post-graduate course focusses on the basic problems of water and soil properties, plant-soil-water relationship, irrigation technology, crop water requirements, salinity problems in irrigation and economic considerations in irrigation designs.

International course on Use of Agro-Chemicals in Arid and Semi-Arid Regions, Bet-Dagan, Israel

This Post-graduate course is held at the Volcani Center, Bet-Dagan, from May 2nd to June 24th, 1988.

The main topics of this course are: Behaviour of agro-chemicals in soils; Use of organic and inorganic agro-chemicals; Methods of application; Fertigation and chemigation, wheat control and soil sterilization.

Information: Dr. K. M. Schallinger, Scientific Coordinator, The Volcani International Courses, P.O. Box 6, 50250 Bet Dagan, Israel.

Cours de Formation Specialisée sur les Aménagements de Terrain, Le Havre, France

Ce cours de formation est destiné aux étudiants qui désirent s'orienter vers les Sociétés de Développement intégré, les plantations, la mise en place d'opérations de terrain, les Instituts de Recherche appliquée et tout le secteur agro-commercial de l'irrigation. Il comprend des études de microbiologie générale et de microbiologie du sol, de géologie, de pédologie, de topographie et d'hydrologie et irrigation.

Information: ISTOM, CHCI Quai George V, 76600 Le Havre, France.

Courses in Project Planning, Bradford, England

These 3-month courses are designed for overseas participants who have responsibility for the identification, preparation, appraisal and implementation of projects. The course programme includes: Agricultural and Rural Project Management; The planning and appraisal of agro-industrial projects; Agricultural Project Planning.

Information: The Director, Project Planning Centre for Developing Countries, University of Bradford, Bradford, West Yorkshire BD7 1DP, England.

College of Soil Physics, Trieste, Italy

The course is intended for students and professionals with varied backgrounds in engineering, agriculture and environmental sciences. It will cover Physical properties of Soils, The Soil-Water-Plant-Atmosphere continuum and Soil and Water Conservation. Adequate knowledge of English necessary for this course which is open to scholars from countries who are member of United Nations, IAEA or Unesco.

Information: International Centre for Theoretical Physics, College on Soil Physics, P.O. Box 586, I-34100 Trieste, Italy.

Courses in Agricultural and Rural Development by the USDA and US Universities

4-8 weeks courses are offered in Agriculture and Rural Development.

Soil Testing, Soil Classification and Fertility Management (8 weeks), Irrigation Problems and Practices (8 weeks).

Other courses are available in Resource Development of Watershed Lands, Water Management and Runoff Farming Methods for Small Scale Agriculture, Tree Establishment in Arid Areas for Fuelwood and Conservation, and Range Management and Forage Production.

Information: Val Mezainia, Ph. D., Director, International Training Division, USDA/OICD, Washington, D.C. 20250-4300, U.S.A.

Short Course on Climate and Desertification, International School of Climatology, Erice, Sicily, Italy.

This international Course, devoted to 'The Climatological Aspects of Desertification: Facts, Theories and Methods' will be held at the Ellore Majorana Centre for Scientific Culture, Erice-Trapani, Sicily, Italy, in October annually. This interdisciplinary course is open for graduate and post-graduate students in environmental sciences. Some fellowships are available.

Information: Dr. R. Fontechi, Course Director, Commission of the European Communities, Environment Research Programmes (DG12), Rue de la Loi, 200 B, B-1049 Brussels, Belgium.

Short Courses on Irrigation and Drainage, Utah, USA

A number of short courses (3-6 weeks) in English and Spanish are organized each year by the International Irrigation Center. The Courses include a large number of subjects in the field of irrigation and drainage, and also soil and water conservation.

Information: International Irrigation Center, UMC 83-B, Utah State University, Logan, Utah 84322.

IV Curso Internacional de Riego Localizado, Tenerife, España

El curso se celebrara en el Centro Regional de Investigacion y Desarrollo Agrario del Instituto Canario de Investigaciones Agrarias, sito en Valle de Guerra, en el Norte de la Isla de Tenerife.

Programa del Curso: Septiembre-Noviembre 1987:

I. Relaciones Agua-Suelo-Planta-Atmosfera; II. Caracteristicas mechanicas e hidraulicas de los componentes de una instalacion; III. Calculos hidraulicos; IV. Manejo y evaluacion de instalaciones; V. Diseno de Instalaciones; VI. Ejemplos.

Informacion: I.N.I.A. Direccion técnica de Relaciones Cientificas, Cursus Internacionale, José Abascal, 56, 28003 Madrid, Espana.

Courses at the International Fertilizer Development Center, Muscle Shoals, USA

Two and three-week courses held annually in USA and other centers. Topics covered:

1. Data Collection, Analysis and Projection in Fertilizer Sector Studies;
2. Statistical and Economic Analysis of Fertilizer Experimental Data;
3. Use of Microcomputer for Fertilizer Sector Operations;
4. Training programme on Effective use of Fertilizer*;
5. Fertilizer Quality Control Training Programme;
6. Fertilizer Marketing Management Training Programme;
7. Regional Fertilizer Marketing Training Programme*.

Courses held in Muscle Shoals, Alabama, USA except for those marked * which are held in Africa, Asia and Latin America. Languages offered are English, French and Spanish.

Information: International Fertilizer Development Centre, P.O. Box 2040, Muscle Shoals, Alabama 35662, USA.

Courses at the International Atomic Energy Agency, Seibersdorf, Austria

Sponsored training courses on use of isotope techniques in soil research and plant nutrition, e.g. use of N-15 in Soil Science and related disciplines.

Applications must be made through official channels (Ministry of Foreign Affairs, National Atomic Energy Authority, UNDP or Ministry of Agriculture).

Information: IAEA Headquarters, Joint FAO/IAEA Division, Vienna International Center, Wagramerstr. 5, P.O. Box 100, A-1400 Vienna, Austria.

Training Course on Soil Erosion and its Control, Yengling, China

The International Research and Training Centre for Erosion and Sedimentation (IRTCES) sponsors this course which is planned for September and October 1987.

Information: D.W. Sanders, AGLS, FAO, Via della Terme die Caracalla, 00100 Roma, Italy.

Courses at the University of East Anglia, Norwich, UK

Short training courses (8 weeks) offered by Overseas Development Group on 'Management and Implementation of Agricultural Research', and 'Irrigation in Development Planning'. Other courses in public sector project evaluation; computing for planning and development; nutrition, agriculture and rural development; and Population Census Geography are offered.

Information: The Course Director, Overseas Development Group, University of East Anglia, Norwich NR4 7TH, U.K.

Training Course in Soil Survey, Classification and Management, Central Luzon State University, Philippines

CSLU are offering 2 month courses for post graduate scientists in land use classification and management for improved crop production including soil characterization, environmental analysis and crop suitability assessment. The Philippines offers these courses as part of the TCDC scheme and the dates of the courses can be arranged as needed.

Information: The Technical Secretariat, Inter-Agency Technical Committee on TCDC c/o The Policy Coordinator Staff, NEDA Building Amber Avenue, Pasig, Metro Manila, Philippines.

Course in Soil and Plant Analysis, Ibadan, Nigeria

The objective of the 5-week course is to train senior laboratory technicians and technologists in the management, methodology, instrumentation and techniques for soils and plant analysis with special emphasis on soils and crops of the tropical regions. This course will be conducted in 1988 from 4 January–5 February.

Information: H. Gasser, Director Training, IITA, Oyo Road, PMB 5320, Ibadan, Nigeria.

NEW PUBLICATIONS
NOUVELLES PUBLICATIONS
NEUE VERÖFFENTLICHUNGEN

Titles of new publications are listed here for information. Orders can not be handled by the ISSS Secretariat but should be placed through a bookstore or directly with the publishers. Nearly all publications mentioned can however be viewed at the seat of the Society, c/o the International Soil Reference and Information Centre (ISRIC) in Wageningen, the Netherlands.

Les titres de nouvelles publications sont mentionnés à titre d'information. Le Secrétariat de l'AISS ne peut pas traiter les commandes, celles-ci doivent être adressées à une librairie ou directement aux éditeurs. Presque toutes les publications mentionnées peuvent toutefois être inspectées au siège. L'AISS, p/a Centre International de Référence et d'Information Pédologique (ISRIC) à Wageningen, Pays-Bays.

Die Titel neuer Veröffentlichungen sind hier zu Information angeführt. Bitte richten Sie Ihre Bestellungen nicht an das IBG Sekretariat sondern an den Buchhandel oder direkt an die Verlage. Fast alle Veröffentlichungen sind jedoch zu besichtigen an der Stelle der IBG, p/A Internationales Bodenreferenz und Informations Zentrum (ISRIC) im Wageningen, Holland.

Rice Newsletter, International Rice Commission. Special Issue, vol. 34, no. 2. FAO, Rome, 1986, 326 p.

This special issue contains the proceedings of the 16th session of the International Rice Commission, held in Los Baños, Philippines in June 1985. It is entitled 'Rice: Progress Assessment and Orientation in the 1980's', and has contributions in the following sections: rice production: policy and implementation (3 papers); adoption, spread and production impact of modern rice varieties (4 papers); prospects for some new technologies in rice (12 papers); and diversification of rice production (8 papers). Summary versions in French and Spanish are available separately.

Requests to: Executive Secretariat of the International Rice Commission, Plant Production and Protection Division, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy.

Heat and Mass Transfer in the Plant-Soil-Air System. Russian Translation Series 29. S. V. Nerpin and A. F. Chudnovskii. A. A. Balkema, Rotterdam, 1986, 355 p. ISBN 90-6191-446-9. Originally published in Russian in 1984.

In the present monograph an attempt has been made to examine all the major processes of energy and mass transfer that occur in the three-component system: plant-soil-near-surface air. These are in fact the processes that determine the state and conditions of the external environment of the cultivated field. Special attention is devoted to estimation, analysis and, wherever possible, prediction of the dynamics of the factors responsible for moisture and salt exchange, heat transfer, radiation, gas exchange and nutrient exchange in the two plant growing media: soil and air.

Naturally, so multifaceted and complex a problem cannot be treated exhaustively. Many important exchange processes have not been discussed. These are mainly the ones associated with the biochemical and microbial processes in the soil. The physiological aspects of the problem, especially the processes of photosynthesis, are only briefly considered.

The book is intended for agronomists, agrometeorologists, biologists, soil scientists, physicists and mathematicians, and also for senior students at institutions of higher education in agriculture and meteorology.

Price: Dfl. 85.00.

Orders to: A. A. Balkema, P.O. Box 1675, 3000 BR Rotterdam, The Netherlands. In U.S.A. and Canada: A. A. Balkema Publishers, P.O. Box 230, Accord MA 02018, U.S.A.

Earth: The Stuff of Life. Firman E. Bear, second edition, revised by H. W. Pritchard and W. E. Akin. University of Oklahoma Press, Norman and London, 1986, xviii + 318 p. ISBN 0-8061-2002-9 (hardbound).

What is soil? Can Earth feed an evergrowing population? What effect does acid rain have on plants? How does crop rotation foster an abundant harvest? These and other questions concerning soils and their relation to the growth of plants, animals, and man are investigated in this revised edition of Firman E. Bear's classic treatise on soil, originally published in 1962.

This updated edition retains the author's readable style and incorporates new information on geology, agriculture, population, land management, air and water pollution, hazardous-waste disposal, and climate.

This book considers the problems of soil conservation in the light of present-day practices. It tells about soils in relation to the growth of plants, animals, and human beings. A plea for sensible conservation of our renewable natural resources, it is also a discussion of planet Earth. This popular introduction to soil science is written with the lay-person in mind, but it will also interest professional botanists and other life scientists. An expanded and updated list of supplementary readings provides avenues for further studies.

Price: US$ 19.95.

Orders to: University of Oklahoma Press, 1005 Asp Avenue, Norman, Oklahoma 73019, U.S.A.

Groundwater Management: the use of numerical models. Second edition. Water Resources Monograph 5. P. van der Heijde, Y. Bachmat, J. Bredehoeft, B. Andrews, D. Holtz and S. Sebastian. American Geophysical Union, Washington 1985, 180 p. ISBN 0-87590-314-2; ISSN 0270-9600.

Numerical modeling of groundwater is a relatively new field which was not extensively pursued until the mid-1960's. Since that time, significant progress has been made in the development and application of numerical models of groundwater-related resources management Management is here defined to include planning, implementation, and adaptive control of policies and programs related to the exploration, inventory, development, and operation of water resources containing groundwater. In spite of this progress, gaps still exist between the need for and the existence and actual use of groundwater models in management. The closing of these gaps can serve to improve the management of groundwater resources.

The present monograph contains a detailed examination of the intrinsic strengths and deficiences of existing groundwater models, as well as consideration of a variety of other factors or circumstances which are not directly related to the models but which affect model use. Those models which management needs but does not have are identified and the reasons why management does not use certain of the available models are examined.

The subject of discussion is groundwater models and their applications in the management of water resource systems. Attention is focused on the kinds of models that have been developed and their specific and general role in management. The availability of the models and the information, data, and technical expertise needed for their operation and use are also discussed.

Price: US$ 14.00; prepayment required.

Orders to: see below.

Hillslope Stability and Land Use. Water Resources Monograph 11. R. C. Sidel, A. J. Pearce and C. L. O'Loughlin, editors. American Geophysical Union, Washington, 1985, 140 p. ISBN 0-87590-315-0. ISSN 0270-9600.

This book, intended for resource managers and students of erorion, emphasizes the natural factors affecting slope stability, including soils and geomorphic, hydrologic, vegetative, and seismic factors and provides basic information on landslide classification, global damage, and analytical methods. The effects of various extensive and intensive land management practices on slope stability are discussed together with methods for prediction, avoidance, and control. Examples of terrain evaluation procedures and land management practices are presented. It has the following chapters: Significance of soil mass movement; Major types of soil mass movement; Slope stability analysis; Natural factors affecting slope stability; Effects of land management on soil mass movement; and Predicting, avoiding, and controlling soil mass movement.

Price: US$ 16.00. Prepayment required.

Orders to: American Geophysical Union, 2000 Florida Avenue, N.W., Washington, DC 20009, U.S.A.

Agricultural Research Centres – A World Directory of Organizations and Programmes. Eighth ed., 2 Volumes. Longman, Harlow, 1986, 1137 p. ISBN 0-582-90033-6.

The directory seeks to provide a comprehensive guide to the organizations throughout the world which conduct or finance substantial research and development programmes into agriculture, veterinary medicine, horticulture, fisheries and aquaculture, food science, forestry, botany, zoology, and relevant ancilliary disciplines such as plant production, animal production, soil science, irrigation and drainage, environmental studies and land use.

Research is defined in broad terms and includes basic and applied research, investigative and development work. Organizations listed include official research centres, educational organizations with research capabilities and activities, industrial firms and their research and development centres, and independent centres.

The present edition includes details on about 8000 laboratories. The titles of establishment index and the subject index both allow the reader to locate the relevant organization profiles. The directory is arranged by countries in alphabetical order. Each country chapter comprises research establishment and research funding organizations arranged in alphabetical order in the language of that country. For countries which do not use the roman alphabet, the title is given in English translation.

Each centre of research has been given a separate entry. Some centres of research have subsidiary bodies administered by them, and these form part of their listing. Examples are universities with several relevant departments of laboratories and official research centres with several field stations. This valuable compilation is a useful reference tool for research workers, administrators, educationists and librarians.

Price: £ 210.00.

Orders to: Longman Group Ltd., Longman House, Burnt Mill, Harlow, Essex CM20 2 JE, England. In U.S.A. and Canada: Gale Research Comp. Book Tower, Detroit, MI 48826, U.S.A.

Methods for Chemical Analysis of Soils. New Zealand Soil Bureau Scientific Report 80. L. C. Blakemore, P. L. Seale and B. K. Daly. New Zealand Soil Bureau, Lower Hutt, 1987, 103 p. ISBN 0304-1735.

This publication is a comprehensive account of the chemical analytical methods being used by the New Zealand Soil Bureau. It gives the preparation of reagents, analytical procedures and calculation of results, for the characterization and fertility assessment of soil samples including pH, C, N, P, CEC, reserve nutrients, extractable Fe, Al and Si, soluble salts, calcium carbonate and sulphur. Special attention is given to the use of the auto-analyzer.

Price: US$ 25.00, incl. surface postage.

Orders to: Information Officer, NZ Soil Bureau, DSIR, Lower Hutt, New Zealand.

Proceedings of the Hungarian-British Joint Seminar. Session B. Soil Fertility, Budapest, April 1984; and Proceedings of the Seminar on Technologies for Sustainable Agriculture, Budapest, September 1984. Agrokemia es Talajtan (Agrocchemistry and Soil Science), I. Szabolcs, editor-in-chief. Vol. 34, 1985, Supplement, 210 p.

The first part of this journal volume contains 18 papers. The British papers were focused on the prediction of crop nutrient requirements and on its practical aspects. The Hungarian contributions covered a wide range of subjects: the agro-ecological potential of Hungary, various aspects of fertilizer use, soil biology and crop production issues.

In the second part, with 7 articles, the Hungarian participants of the seminar outlined the problems facing the country, while the American and West European contributors discussed practical possibilities of organic agriculture.

Requests to: Prof. I. Szabolcs, editor-in-chief, Agrokemia es Talajtan, P.O. Box 35, H-1525 Budapest, Hungary.

Micromorphologie des Sols, Réunion Internationale de Micromorphologie des Sols; Soil Micromorphology, International Working-Meeting on Soil Micromorphology, Paris, 1985. N. Fedoroff, L. M. Bresson and M. A. Courty, editors. Association Française pour l'Etude de Sol, Plaisir, 1987, 686 p. ISBN 2-903643-15-7.

This publication contains the proceedings of the 7th International Working-Meeting on Soil Micromorphology of the Sub-Commission of Soil Micromorphology of the ISSS. Because of the absence of a journal specifically dealing with this aspect of soil science, the Proceedings of this, and of former meetings of the Sub-Commission, constitute an up-to-date account of the present state of soil micromorphology. The proceedings contain 96 articles, a number of them having been updated after the meeting, in the following subjects: techniques and methodologies in soil microscopy (13 papers), genesis and behaviour of soils in tropical regions (10 papers), ditto in mediterranean and arid regions (11 papers), ditto in temperate regions (11 papers), interactions between living organisms, organic and mineral components and the soil fabric (9 papers), the application of micromorphology to the effect of cultivation (10 papers), relationships between soil fabric and physical and mechanical behaviour of soils (12 papers), and palaeopedology-geomorphology-archaeology (18 papers). Part of the papers is in English, a part in French, and carry a full abstract in the language other than that of the presentation.

The book is very-well illustrated with many black and white photographs and some colour plates.

Price: FF 450, including postage.

Orders to: Dr. N. Fedoroff, INA-PG, Dépt. des Sols, F-78850 Thiverval-Grignon, France.

The Greenhouse Effect, Climatic Change, and Ecosystems. SCOPE 29. B. Bolin. B. R. Döös, J. Jäger, and R. A. Warrick, editors. John Wiley & Sons, Chichester, New York, 1986, xxxi + 541 p. ISBN 0-471-91012-0.

The problems of the increasing atmospheric carbon dioxide concentration and possible future climatic changes have attracted considerable attention in recent years. A number of assessments of this problem have been made by national groups, notably in the United States. The problem is clearly an international one and an assessment at the international level therefore seems desirable to serve as a basis for discussion and possibly, at some stage, for the development of an action plan. The present analysis is aimed at serving such a purpose and is the result of an agreement between UNEP, WMO and the International Council of Scientific Unions (ICSU), the organizations which jointly implement the World Climate Programme.

In the present assessment the following major questions have been considered: how much CO_2 has been and will be released into the atmosphere as a result of fossil-fuel combustion? What are the natural sources and sinks of carbon (the global carbon cycle) and what projections can be made of future atmospheric CO_2 concentrations? What are the expected increases of other greenhouse gases that affect the Earth's radiation budget? How will global and regional climates change as a result of increases in CO_2 and other greenhouse gases? When and how will climatic changes be detected? It is possible to design climate scenarios which can be used for climate impact studies? What changes of sea level can be expected as a result of a warming of the atmosphere?; and what are the responses of terrestrial ecosystems to direct effects of an increased atmospheric concentration of CO_2 and climate change?

For each one of these questions one or a few scientists have been asked to summarize our present knowledge and, in doing so, also to present the main uncertainties and controversial opinions that exist. These contributions have been exposed to critical reviews by panels of scientists in respective fields who have expressed their views either during panel, meetings, by correspondence or in direct personal contact with the authors. The aim has been to arrive at analyses of the different aspects of the problem areas that describe current knowledge in a balanced and well-documented manner.

With the presentation as a background the UNEP/WMO/ICSU International Conference on the Assessment of the role of carbon dioxide and of other greenhouse gases in climate variations and associated impacts was held in Villach, Austria, in October 1985.

Included in the present volume is also the Conference Statement from the conference at Villach, which is aimed at serving the nations of the world and the international organizations concerned in their further attending to the problem of possible future man-induced changes of the global climate.

Price: £ 56.00.

Orders to: John Wiley & Sons, Baffins Lane, Chichester, West Sussex, England PO19 1UD; or: John Wiley & Sons, *605 Third Avenue, New York, NY 10016, U.S.A.*

State of the World 1987. A Worldwatch Institute Report on Progress Toward a Sustainable Society. L. R. Brown, project director. W. W. Norton & Comp., New York and London, 1987, 268 p. ISBN 0-393-30389-6 (paperback), 0-393-02399-0 (hardback).

This book, the fourth in this annual series, assesses worldwide progress toward achieving a sustainable society. This issue examines human-caused disruptions of global chemical cycles; evaluates the worldwide reappraisal of nuclear power; profiles the accellerating urbanization of the world's populations; discusses the shift to reliance on markets in a growing number of countries; and advocates new initiatives in recycling materials and raising agricultural productivity. Again, a provocative picture of the globe!

Price: US$ 9.95, paperback ed.

Orders to: W. W. Norton & Comp., 500 Fifth Avenue, New York, NY 10110, U.S.A.; or: 37 Great Russell Street, London, WC1B 3NU, England.

The Potential of Agroforestry for Soil Conservation. Part I Erosion Control. ICRAF Working Paper 42. A. Young, International Council for Research in Agroforestry, Nairobi, 1986, 68 p.

This draft version is produced with the aim of seeking comments and suggestions for improvement, prior to publication in book form, together with reviews of the maintenance of soil fertility and carbon cycling under agroforestry systems. The present publication, on agroforestry in erosion control, reviews trends in soil conservation research and policy. Attention is given to predictive models, the importance of soil cover, land evaluation, effects of erosion on land productivity, and economic and policy aspects.

The impact of agroforestry on erosion is reviewed with respect to effects of trees on the causative factors of erosion, and examples of agroforestry practices in erosion control. The different lines of evidence are summarized in terms of the probable effectiveness of specified agroforestry practices as a means of erosion control. The combination of a high apparent potential with sparse data means that there is a clear need for research. The objectives and design of research are discussed.

Requests to: Prof. A. Young, ICRAF, P.O. Box 30677, Nairobi, Kenya.

Properties and Management of Forest Soils. Second edition. W. L. Pritchett and R. F. Fischer. John Wiley & Sons, New York, Chichester, 1987, xv + 494 p. ISBN 0471-89572-5, hardbound.

Mounting pressures for more intensive and diverse uses of forest lands have been generated by worldwide population increase, reductions in the forest land base, and increases in the costs of acquiring and owning land. As a consequence of these pressures, significant advances have been made in forest management during the last two decades, especially in reforestation technology and soil management in short-rotation fiber production forests. The use of genetically superior planting stock, intensive seedbed preparation, chemical control of pests, and correction of nutrient deficiencies are common practices in coniferous and exotic forests.

The growing awareness of the important role of forest soils in the total forest ecosystem makes it increasingly necessary to understand forest soil properties as they relate to modern management practices. Foresters need to know what happens to the soil and to the environment when stands are clear-cut harvested; when fires sweep through our forests; when sites are intensively prepared by blading, discing, or bedding; and when chemicals are used to control pests or to correct nutrient deficiences. Changing techniques in forest management and the public's attitude toward silvicultural operations are rapidly converting foresters from generalists to specialists, and forest soil is one of the areas in which there will be an increasing demand for specialists.

While the basic principles of soil science apply to forest soils as well as to agricultural soils, there are a number of fundamental differences between silviculture and agriculture that result in striking differences in the importance of specific soil properties and in soil management practices. For example, the continual deposition of leaves and other debris creates a kind of organic mulch on the surface of forest soils, which results in a more stable microclimate and provides conditions for a wider spectrum of soil animals differences in chemical, physical, and biological properties of the two groups of soils.

This revision of the 1979 edition of this textbook updates information on the fundamental properties and processes of forest soils, with particular reference to the application of basic soil science to silviculture. It is written primarily for advanced undergraduate and graduate students, majoring in soils, natural resource management, or related disciplines, and as a source of current information for the practicing forester.

The chapters are grouped into two broad areas. The first 12 chapters deal with some basic principles of soils, soil properties, and soil-tree relationships, and the second 10 chapters apply these principles to forestry conditions and the management of forest ecosystems.

Price: £ 53.75.

Orders to: John Wiley & Sons, Baffins Lane, Chichester, West Sussex, England, PO19 1UD; or John Wiley & Sons, 605 Third Avenue, New York, NY 10016, U.S.A.

The Wetlands and Rice in Subsaharan Africa. A. S. R. Juo and J. A. Lowe, editors. International Institute of Tropical Agriculture, Ibadan, 1986, 318 p.

This publication contains the proceedings of an international conference on the utilization of the wetlands of rice production in tropical Africa, which was held in Ibadan in November 1985.

Tropical subsaharan Africa has a total of 200 million ha of wetlands that exist in the form of small inland valleys, river floodplains, inland basins, and coastal wetlands. At present, an estimated 3 million

ha of these lands are used for cultivation of rainfed lowland rice and there are few irrigated paddies.

Yet the development of the wetlands for the cultivation of rice and other food crops could be a major step toward solving the food crises that has resulted from the erratic rainfall during the past decade coupled with the badly degraded soils that have reduced yields of food crops in the uplands.

To millions of Asians, rice is the ultimate food crop. Under tropical conditions with sufficient water and fertile soils, two or three crops can be grown in a year with sustainable yields of 3–5 t/ha. In fact, intensive rice cultivation has meant food sufficiency for many of the world's most densely populated countries.

In subsaharan Africa, too, rice could be intensively cultivated, given careful attention to technical, environmental, and socioeconomic constraints. This book discusses recent advances in research and development of the wetlands and rice as well as the feasibility of adapting some of the Asian rice-growing techniques to African conditions.

The greatest challenge to wetland development and rice production in Africa is technology transfer. Invited papers from Nigeria and Sierra Leone attempted to address this complex issue, the former emphasizing the long-term investment in human and physical infrastructure and the latter calling for improvement of upland and valley bottoms as a whole farm unit.

Price: US$ 15.00.

Orders to: IITA, P.M.B. 5320, Ibadan, Nigeria.

Nourrir Demain les Hommes. A. Sasson. Unesco, Paris, 1987, 757 p. ISBN 92-3-202083-1.

Alors qu'à la suite des excellentes récoltes du début des années 80 plusieurs pays industrialisés regorgent d'excédents agro-alimentaires, de nombreux pays d'Afrique subsaharienne, victimes de sécheresses successives, souffrent de disette, et la malnutrition continue de sévir dans beaucoup d'autres. Une situation aussi contrastée ne peut être comprise qu'en la replaçant dans le fil de l'évolution de la production agro-alimentaire des dernières décennies ainsi que dans le contexte des changements de l'économie mondiale. Cette évolution ne peut être non plus dissociée de celle qui caractérise la nutrition des hommes, c'est-à-dire l'ensemble des relations entre l'être humain et ses aliments.

Nourrir les six milliards et demi d'hommes de l'an 2000, c'est espérer voir s'étendre les bienfaits de la 'révolution verte' des années 60 et 70 ainsi que les progrès réalisés dans l'accroissement de la production agro-alimentaire. C'est aussi croire dans les promesses de la 'révolution biotechnologique' pour les années 90. C'est, enfin, renforcer la coopération internationale en matière d'autosuffisance alimentaire et d'aide au développement agricole.

Cet ouvrage de synthèse, rédigé à l'intention d'un large public, et notamment des enseignants et des étudiants, apporte des données scientifiques et techniques pertinentes sur la nutrition et l'alimentation des hommes, en prenant en considération l'environnement économique, social et culturel des diverses populations concernées. Car aujourd'hui, ces problèmes ne peuvent être abordés que dans une perspective pluridisciplinaire, parce qu'ils se situent dans un contexte de valeurs et de contraintes, étroitement liées à l'environnement socio-culturel.

Prix: FF 195.00.

Ordres à: Les Presses de l'Unesco, 7, Place de Fontenoy, F-75700 Paris, France.

Proceedings 1st Symposium on the Humid Tropics, November 1984, Belém, Volume 1, Climate and Soil. EMBRAPA/CPATU Documentos 36. Belém, 1986.

Generally speaking, the humid tropics have soils with low natural fertility where the main agricultural activity is based on shifting cultivation. The largest forested areas of the world are found in the humid tropics, the forest being the most important renewable resource.

The humid tropical areas are spread over four continents: Africa, Asia, South-Central America and Oceania, and include 63 countries and small islands.

The 1st Symposium on the Humid Tropics emerged from the necessity to collect the maximum possible amount of information – presently available in a scattered manner – on natural resources of the humid tropics and technologies for rational utilization of these resources for agricultural production.

A very significant response from the scientific and technical community to this effort can be observed from the fact that 312 papers were submitted to the Symposium with the participation of 700 researchers from Brazil and from 23 other countries.

In general, the papers give valuable technical and scientific information on resources such as soil, vegetation, climate and fauna, on agricultural technology, especially with reference to annual, semi-perennial and perennial crops, pasture and animal production and forestry, and on bio-socio-economic factors related to the use of these resources.

The Proceedings consist of six volumes as follows: (I) Climate and Soil; (II)Flora and Forestry; (III) Temporary Crops; (IV) Perennial Crops; (V) Pasture and Animal Production; and (VI) Multidisciplinary Themes (in total about 3500 p.).

Prices (for all six volumes): South and Central America: US$ 50.00; North America and Europe: $ 60.00. Asia and Africa: $ 70.00, including mailing charges.

Orders to: EMBRAPA-CPATU, Setor de Informação e Documentação, C.P. 48, 66.240 Belém-Pará, Brazil.

Thomas Erastus: Epistola de natura, materia, ortu atque usu lapidis sabulosi qui in Palatinatu ad Rheinium reperitur/Besileae 1571/. (Facsimile, new German translation, annotated and introduced by Wolfgang Ziehen, as contribution to history of soil science on 400th anniversary of Thomas Erastus' death). Scientia Verlag, Aachen, 1984, 99 p.

Encyclopedias list the Swiss savant Thomas Erastus (1524–1583) as physician, theologian, and philosopher. He was Professor of Medicine in Heidelberg and later of Ethics in Basel. But he was evidently also a keen observer and student of nature. On the 400th anniversary of his death, Wolfgang Ziehen of Frankfurt published this little book with a facsimile version of a little known 1572 Latin discourse 'Letter on the nature, composition, origin and use of Lapidis Sabulosi' by Thomas Erastus, together with a new translation into German, and copious annotations and comments.

Various interpretations of the term 'lapis sabulosus' were offered. According to W. Ziehen an accurate translation into German is difficult. From the descriptions, study of maps and of his visit to the described area of Rhein-Palatinate district, where they were found by Erastus, he concludes that the 'lapidis sabulosi' are calcareous nodules present in Pararendzina soils on calcareous sands or sandstone. The irregularly shaped, up to several centimeters large, nodules increase in quantity with depth, and become harder and paler upon exposure and drying, but sometimes are coated by a dark crust.

A description of their occurrence and assumed origin in the soil is provided and this might be, according to W. Ziehen, the first description of a nodular or calcic horizon in an excavated soil profile pit.

Renaissance age nature and science writings may contain more observations which pertain to various soils and their properties. We are thankful to W. Ziehen for making this contribution to the history of soil science available to a wider public.

Price: DM 35.00

Orders to: Scientia Verlag, Aachen, Fed. Rep. of Germany.

D. H. Yaalon, Jerusalem

Geomorphology and Land Management. Supplementband 58 Zeitschrift für Geomorphologie/Annals of Geomorphology, O. Slaymaker and D. Balteanu, editors. Gebr. Borntraeger, Berlin, Stuttgart, 1986, 190 p. ISBN 3-443-21058-9. ISSN 0044-2798.

These papers are a representative sample of the forty six papers presented at the Sixth Symposium of the I.G.U. Commission on Field Experiments in Geomorphology held in Romania in 1983.

Each symposium held by this I.G.U. Commission – Paris (1978), Krakow (1979), Kyoto (1980), Exeter-Huddersfield (1981), Rio de Janeiro (1982) and now Bucuresti (1983) – has demonstrated the distinctive characteristics of the geomorphological community in the host country. None more so than this Romanian meeting. The theme of management, which had always been implicit in earlier meetings of the Commission, was made explicit for the first time. Not only were we addressed by geographers and geologists but colleagues from the Institute for Studies and Design of Land Reclamation Projects and from the Academy of Agricultural and Forestry Science were an integral part of the meeting.

The structure of the volume is in three parts. In part one, factors influencing runoff availability, with a view to modelling and prediction of runoff generation are discussed. Land management depends to a significant extent on our ability to predict moisture surplus zones and this section demonstrates why. Part two addresses questions of solute and sediment production, under 'natural', man-modified and experimental conditions. The response of soil conservation measures is discussed. Finally, part three considers some of the distinctive land management issues associated with mass movement. In particular, problems related to regions with great relief mobility are discussed with an emphasis on the need to differentiate management strategies for every basin and even for every slope.

Price: DM 97.00.

Orders to: Gebr. Borntraeger Verlagsbuchhandlung, Johannesstrasse 3A, D-7000 Stuttgart 1, F.R.G.

Soil Fertility and Organic Matter as Critical Components of Production Systems. SSSA Special Publication Number 19. Soil Science Society of America, American Society of Agronomy, Madison, 1987, ix + 166 p. ISBN 0-89118-782-0.

Understanding the science of organic matter in the soil has progressed greatly in recent years. Growing interest arises from rapidly developing changes in soil management. The present publication examines the science of managing and raising crops; specifically the dynamics of organic matter in the soil and its role in soil fertility. It represents the current theories of researchers concerned with soil fertility and organic matter as critical components of production systems. The chapters provide information on understanding the complex interactions between physical and biological soil factors, climatic factors, and farm management. Specifically, the publication, (1) documents the important role of soil, climate, and management in the prediction of nutrient availability and use, (2) describes controls on nutrient cycling and organic matter dynamics, and (3) considers approaches for advisory services to use new technologies and to integrate information on organic matter dynamics and nutrient availability into models of crop production systems.

Price: US$ 22.00, plus $ 0.75 per book on all orders outside the U.S.A. Prepayment required.

Orders to: SSSA, ASA Headquarters Office, Att. Book Order Dept., 677 South Segoe Road, Madison, WI 53711, U.S.A.

Proceedings of Geographic Information Systems Workshop, Atlanta, April 1986. American Society of Photogrammetry and Remote Sensing, Falls Church, 1986, 426 p. ISBN 0-937294-74-8. Order no. 628D-1.

The workshop covered Geographic Information Systems (GIS) data input, system design and implementation, the use of microcomputer in GIS, reports on GIS currently in use in the fiels of education, resource management, environmental assessment applications; costs and benefits of GIS technology. The volume contains four contributions on soil science applications.

Price: US$ 50.00. Prepayment required.

Orders to: American Society for Photogrammetry and Remote Sensing, 210 Little Falls Street, Falls Church, VA 22046, U.S.A.

The Role of Microorganisms in a Sustainable Agriculture. J. M. Lopez-Real and R. D. Hodges, editors. AB Academic Publishers, Berkhamsted, 1987, x + 246 p. ISBN 0-907360-10-6.

Microorganisms in their capacities as decomposers, nutrient recyclers, symbionts or pathogens, play a crucial role in all agricultural systems. They are, however, of special relevance to the biological/organic approach where the natural processes they effect and affect are not short-circuited by the use of agrochemical inputs. A conference to examine the roles of microorganisms in such agricultural systems was held at Wye College, in September 1984. It was attended by more than one hundred delegates from thirty countries.

The aims of the conference were two-fold. On the one hand to enable practitioners of biological farming to hear and read about the important role that microorganisms play in agro-ecosystems; and on the other hand, and possibly more importantly, for microbiologists and related scientists to consider microbial activity not just in the context of 'agriculture' but in terms of a sustainable agriculture – a system of food production which aspires to resource efficiency and enhanced environmental quality. Eight keynote speakers presented papers covering a diverse range of topics – from soil structure and organic waste recycling to nitrogen inputs and biological control – a clear enough indication to the general reader of the crucial and pivotal role that microorganisms play in such an approach to agriculture.

Price: £ 29.50.

Orders to: AB Academic Publishers, P.O. Box 97, Berkhamsted, Herts. HP4 2PX, England.

Introductory Pedology (Soil Genesis, Survey and Classification). J. L. Sehgal. Kalyani Publishers, New Delhi, 1986, xv + 287 p.

This textbook is written for students in agriculture and forestry in general and soil science in particular. It deals with basic information on pedology, starting with soil forming factors and processes, then chapters on soil classification, soil survey and mapping, soil evaluation, and soils of India. Most examples are taken from Asia and Iraq.

Price: Rs. 120.000.

Orders to: Kalyani Publishers, 4863/2B Bharat Ram Road, 24 Daryaganj, New Delhi 110 002, India.

Classification and Diagnostics of Soils of the USSR. Russian Translations Series 42. V.V. Dokuchaev Institute of Soil Science. Translated from Russian by S. Viswanathan. A. A. Balkema Publishers, Rotterdam, 1987, 297 p. ISBN 90-6191-465-5.

This useful reference book is a manual on soil examination and classification for soil surveyors in the USSR and was published in 1977. It includes for more than 50 soil types recognized in the classification, a short description with main occurrences in landscape and regions, the diagnostic characteristics, and division in (facies) subtypes, general and species. No keys are given.

Price: Dfl. 95, US$ 48, £ 30.50.

Orders to: In U.S.A. and Canada: A. A. Balkema Publishers, P.O. Box 230, Accord, MA 02018, USA. Elsewhere: A. A. Balkema Publishers, P.O. Box 1675, 3000 BR Rotterdam, The Netherlands.

Saline Environment and Plant Growth. Plant Growth and Development Monograph Series No. 4. S. K. Sharma and I. C. Gupta. Agro Botanical Publishers (India), Bikaner, 1986, 173 p. ISBN 81-85031-13-4.

Salinity and sodicity are becoming increasingly serious problems as soils and waters of less and less desirable quality are being exploited in arid and semi-arid zones for increasing agricultural production to cope up with the rising population. Irrigation projects introduced without due provision for drainage, have been causing serious waterlogging problems, increasing the dimension of salinity and sodicity problems in soils and waters. Most of the salt affected soils and saline waters, qualified conventionally as wasteland and waters, cannot be left unattended or discarded anymore due to serious pressure of population and environment. Fortunately, recent advancements made in the disciplines of reclamation and management of salt affected soils and saline waters have shown that most of the wastelands and waters can be utilised profitably provided that basic principles of soil-water-plant relationships are understood properly and practised judiciously.

The primary objective of this monograph is to provide a critical review of the up-to-date research information on the subject of saline environment and plant growth with special reference to mechanism of salt injury and salt resistance in plants. It will be useful for research workers and those engaged in practical management of soils.

Price: Rs. 150.00; US$ 25.00.

Orders to: Agro Botanical Publishers (India), Old Ginnati, Bikaner, 334 001 Rajasthan, India.

Loess Letter 1–10, Reprints. Ian Smalley, editor, Geo Books, Norwich, 1987. ISBN 0-86094-218-X.

Loess Letter, from its inception in April 1979, has proved to be a remarkably successful communication experiment. Since early issues are not anymore available, the reprinted collection from Loess Letter 1 to 10 (October 1983), is opportune.

Price: £ 15.00.

Orders to: Geo Books, Regency House, 34 Duke Street, Norwich, U.K. NR3 3 AP.

Advances in Soil Science. Soviet Pedologists to the 13th International Congress of Soil Science. Nauka, 1986, 288 p.

In line with the tradition, all papers presented by USSR soil scientists at the ISSS Congress in Hamburg, have been printed in one volume. The texts of 44 presentations are included, all in English. Much attention is paid to changes in soil caused by anthropogenic impact.

Requests to: All-Union Society of Soil Science of the USSR, Dokuchaev's Soil Institute, Pyzhevsky per. 7, 109017 Moscow, USSR.

Development of Rainfed Agriculture under Arid and Semiarid Conditions. Proceedings of the Sixth Agriculture Sector Symposium. T. J. Davis, editor, The World Bank, Washington, 1986, 412 p. ISBN 0-8213-0817-3.

These Proceedings are the sixth in a series of records of Agriculture Sector Symposia presented at the World Bank beginning in 1980.

The theme of the present publication was chosen as being a critical subject area for about 70% of the world's farmers and a subject on which less has been accomplished in terms of achieving productivity gains in world agriculture. This fact coupled with the recent droughts in Africa make the subject even more timely.

The substance of the Symposium began with an assessment of Bank's experience in rainfed agriculture. Other papers covered principle divisions of the teme including the environment, the technology, institutions and policy issues in rainfed agriculture. In addition three sessions were held which focussed on work in semi-mechanized systems, small scale water conservation, and sorghum and millet breeding.

Orders to: Distributors of World Bank publications throughout the world. In case of difficulties: The World Bank Headquarters, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A.

Nitrogen Fluxes in Intensive Grassland Systems. Developments in Plant and Soil Sciences 23. H. G. van der Meer, J. C. Ryden and G. C. Ennik, editors. Martinus Nijhoff Publishers, Dordrecht, 1986, 124 p. ISBN 90-247-3309-X.

In recent years, several advances have occurred in our understanding of the transformations and losses of nitrogen from grassland systems. This is particularly important in view of the inherently low efficiency of nitrogen utilization in animal production and the substantial increase that has occurred in inputs of nitrogen of grassland. This volume contains a selection of revised and updated papers presented at an EEC Workshop in Wageningen, in 1983. The processes affecting the utilization of nitrogen are dicussed, in particular the impact of the ruminant on the nitrogen cycle in grassland. Emphasis is given to movement of nitrogen into and out of the soil organic matter and to processes of nitrogen loss, including leaching from grazed swards and emission of nitrogeneous gases to the atmosphere. Strategies to improve overall efficiency of utilization are discussed in several papers.

Price: Dfl. 95.00.

Orders to: U.S.A. and Canada: Kluwer Academic Publ. Group, 101 Philip Drive, Norwell, MA 02061, U.S.A.; U.K., Ireland and Middle East: Falcon House, Queen Square, Lancaster, England LA1 1RN; elsehwere: P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

On-farm Agronomic Trials in Farming Systems Research and Extension. P. E. Hildebrand and F. Poey, Lynne Rienner Publishers, Boulder, 1985, xvi + 162 p.

The roots of the technological revolution in agriculture of the past century can be traced in the history of scientific discovery and the development of university research and training programs. Dramatic improvements in production per hectare and per farm, however, are a comparatively recent phenomenon. The first major breakthroughs occurred in the biological sciences with the development of hybrid maize in the 1930's, followed by the expanding use of complete fertilizers and improved weed and pest control technology following World War II. Scientific knowledge in the basic and applied Agricultural sciences continues to advance at an accelerating rate and is the basis for confidence that food and fiber production can keep pace with growing world demand.

In the present book the authors have synthesized and elaborated on the work of a team of agricultural and social scientists expert in farming systems research and extention (FSR/E). This handbook is a step toward a methodology of technology development, and does three things: (1) it presents the role and philosophy of on-farm research in FSR/E activities and describes a logical sequence for technology development; (2) it presents the most-used statistical procedures in simple, easy-to-follow steps. This is a service for technicians who are often isolated and would like to or must analyze their own data; and (3) it presents new ideas and methods for analyzing agronomic data obtained without the effect of usual experiment station controlled conditions.

Price: £ 13.50.

Orders to: Francis Pinter Publ., 25 Floral Street, Convent Garden, London, England WC2E 9DS.

The European Community – Farming. Map, scale 1:4 million, size 75 × 105 cm. Commission of the European Communities, Brussels, 1987.

This map shows for the 12 countries of the EEC the agricultural land; mountain and hill areas where farming is necessary to preserve the landscape; less-favoured areas, with lands of low productivity, where farming is necessary to prevent ever more people leaving; and small areas with specific handicaps. Furthermore, statistical tables on farmland, farm holdings, farming work force, agriculture productivity and output.
Orders to: Office for Official Publications of the European Communities, B.P. 1003, Luxemburg.

Sulfur in Agriculture. Agronomy 27. M. A. Tabatabai, editor. American Society of Agronomy, Crop Science Society of America and Soil Science Society of America, Madison, 1986, xviii + 668 p. ISBN 0-89118-089-3. Hardbound.

Sulfur is one of the essential elements for plant and animal growth and reproduction. Usually it is designated as one of the secondary fertilizer nutrients in a system that classifies nitrogen, potassium, and phosphorus as primary fertilizer nutrients. Generally, it has not been found to be deficient for plant growth as frequently or to as serious a degree as for the latter three elements named.

The importance of sulfur in the nutrition of animals is related, in large part, to its presence in the sulfur-containing amino acids, which themselves are essential to animal growth and development and are synthesized by plants and rumen microorgansims, but not by monogastric animals. For animal nutrition it is important that each amino acid is supplied at adequate levels independent of the others. Different plant sources tend to vary in concentration of these amino acids; for example, soybean oil meal tends to be low in methionine.

Elemental sulfur and reduced sulfur compounds are readily oxidized by soil microorganisms. Hence, sulfur most commonly occurs in the form of the sulfate ion in solution or as to sulfate salt when precipitated in well-aerated soils. Under poorly aerated conditions sulfur compounds may be reduced with the formation of hydrogen sulfide, precipitated as metal sulfides, or may be deposited as elemental sulfur in or below the soil profile.

The management of sulfur supply in agricultural soil is complicated by these properties of the element. It is further complicated by the fact that fossil fuels frequently contain compounds of sulfur and, upon burning, oxides of sulfur are released into the atmosphere to be deposited often at significant distances from the source.

The present monograph seeks to elaborate the various aspects of sulfur to be considered from the plant agriculture point of view. It presents an authoritative summary of the present state of knownledge of sulfur and its availability for crop production as well as its importance in animal nutrition. It includes chapters on chemistry, biochemistry, and microbiology of the cycles; biochemistry in plants; plant and animal nutrition; stable isotope abundance variations in nature; forms and reactions of organic and inorganic compounds in soils, sulfur in the atmosphere, precipitation and irrigation waters and its effects on soils and plants; sulfur deficiencies around the world; plant response to sulfur in different regions of North America and the tropics; use of sulfur compounds as soil amendments; measurement of sulfur in soils, plants, atmosphere, and waters; availability indexes; fertilizer sources and economics of fertilizer use; and world reserves of sulfur.
Price: US$ 52.00 plus $ 0.75 per book on all orders outside the U.S.A. Prepayment required.
Orders to: ASA, CSSA, SSSA Headquarters Office, att. Book Order Dept., 677 South Segoe Road, Madison, WI 53711-1086, U.S.A.

Cassava in Shifting Cultivation. A systems approach to agricultural technology development in Africa. L.O. Fresco. Royal Tropical Institute, Amsterdam, 1986, 240 p. ISBN 90-6832-013-0.

Although aggregated data for Africa show a declining food availability per head, these do not adequately reflect the diversity in performances between crops and regions. This volume presents a case study from the Kwango-Kwilu region in central Zaire. In this area, cassava production has increased considerably in the last thirty years and has kept pace with or even surpassed population growth, despite socio-economic and agronomic disincentives. The author reviews the evolution of cassava production in the region, and its agronomic effects. Cassava, cultivated as a key component of a shifting cultivation system, allows great flexibility in cultural practices. The expansion of cassava onto marginal soils, the increased presence of cassava in crop rotations and associations, and the reliance on female labour explain much of the production growth. At the same time, however, cassava yields have declined and the shifting cultivation system is rapidly breaking down. Past and present research efforts on cassava are discussed with a view to determining strategies for agricultural technology development. The relevance of this study lies in its detailed analysis of changes in shifting cultivation as well as in its method of analysis. It draws upon ecological system analysis and, to a lesser extent, on farming systems research, and present a systems framework that allows the integration of technical and socio-economic aspects of crop production which has wide application.

This volume results from a collaborative agreement between the Department of Tropical Crop Science of Wageningen Agricultural University and the Royal Tropical Institute and is published in the newly established series Development Oriented Research in Agriculture by the Royal Tropical Institute.
Price: Dfl. 39.00.
Orders to: Publication Dept., Royal Tropical Institute, Mauritskade 63, 1092 AD Amsterdam, The Netherlands.

Nouvelles Publications de la FAO

Emploi des engrais dans les systèmes de cultures multiples. Bulletin FAO Engrais et Nutrition Végétale 5. FAO, Rome, 1986, 197 p. ISBN 92-5-201407-1 (also available in English).

Une Consultation d'experts sur l'emploi des engrais dans les systèmes de cultures multiples s'est tenue à New Delhi en février 1982, avec la participation de spécialistes éminents.

Une synthèse des documents présentés lors de la session technique figure dans le présent rapport, ainsi que les conclusions et recommandations de la Consultation. Afin d'éviter le répétion des références utilisées pour chaque document, on trouvera à la fin du rapport une bibliographie globale.

Les Oligo-éléments. Bulletin FAO Engrais et Nutrition Végétale 7. J. C. Katyal et N. S. Randhawa. FAO, Rome, 1986, 88 p. ISBN 92-5-201445-4 (also available in English).

Malgré les progrès accomplis dans l'utilisation des engrais pour accroître la production végétale, la quantité d'oligo-éléments exportée chaque année du sol est encore de 2 à 6 fois supérieure à celle qui est appliquée sous forme d'engrais minéraux avec ou sans autres éléments fertilisants. Certains des éléments fertilisants exportés sont remplacés par ceux qui se trouvent dans la paille, le fumier, etc., mais il est probable qu'en moyenne le bilan reste négatif. Ceci est particulièrement vrai dans les pays les moins développés.

L'emploi des engrais courants n'assure pas un apport régulier d'oligo-éléments au sol, et l'application de ces seuls éléments risque de provoquer des déséquilibres entre leurs divers groupes ou entre ces éléments considérés séparément. En outre, de nombreux facteurs contribuent à l'épuisement accéléré des disponibilités en oligo-éléments dans les sols.

Les carences occultes en oligo-éléments sont beaucoup plus répandues qu'on ne l'estime généralement. Certains problèmes que l'on peut aujourd'hui considérer comme purement locaux peuvent très bien s'aggraver en peu de temps et, faute d'être bien étudiés et diagnostiqués à temps, gagner des superficies étendues et créer des contraintes importantes et complexes à la production.

Reconnaissant la complexité du problème, la FAO a organisé en 1979, à New Delhi, un séminiare national sur 'l'efficacité et l'application des oligo-éléments en agriculture', en vue de collationner et d'étudier les résultats des nombreuses recherches menées dans ce domaine. Le séminaire a, entre autres, recommandé la publication d'un ouvrage pratique visant à transférer la technologie au profit des agriculteurs.

Le présent bulletin a donc été rédigé dans une langue simple afin d'aider le personnel de terrain à diagnostiquer correctement les carences en oligo-éléments et à les corriger. Les données fournies ne s'appliquent pas à un lieu précis: elles sont destinées à apporter des indications élémentaires utiles dans un grand nombre de cas.

La conservation et l'aménagement des sols dans les pays en développement. Bulletin Pédologique de la FAO 33. FAO, Rome, 1987, 98 p. ISBN 92-5-200430-0 (also available in English).

Ce Bulletin, publié d'abord en anglais en 1977, rendait compte des travaux de la Consultation d'experts sur la conservation et l'aménagement des sols dans les pays en développement. La présente traduction contient l'introduction, les recommandations et une sélection de documents techniques.

Depuis cette Consultation, la FAO a continué de mettre l'accent sur la nécessité de conserver les terres agricoles productives et de sauvegarder les zones qui risquent de se dégrader en raison de la mauvaise utilisation des terres, de leur surexploitation ou de l'incurie de la population, en appliquant des mesures qui en préserveront et en amélioreront la productivité. A cette fin et en vue de stimuler l'intérêt pour ce problème et de sensibiliser l'opinion à la nécessité d'agir dès maintenant, la FAO a publié la Charte mondiale des sols qui appelle l'attention des hommes politiques, des planificateurs et des techniciens sur les principes et directives d'action destinés à conserver et à utiliser avec discernement la terre et ses ressources.

Application des systèmes fixateurs d'azote dans l'amélioration et l'aménagement des sols. Bulletin Pédologique de la FAO 49. Y. A. Hamdi, FAO, Rome, 1986, 180 p. ISBN 92-5-201261-3 (also in English and Spanish).

En raison de l'accroissement continu du coût et de la rareté des engrais minéraux résultant de l'utilisation d'énergie fossile à prix élevé, le recyclage organique et la fixation biologique de l'azote ont connu un regain d'intérêt afin d'améliorer la fertilité et la productivité du sol.

La FAO a tenu un rôle prépondérant à cet égard, y compris la parrainage d'une série d'importantes réunions internationales pour promouvoir l'utilisation des matières organiques et des engrais biologiques.

La Séminaire à Alexandrie en 1978 a recommandé une plus ample promotion de la recherche, du développement, de l'application et de la diffusion de l'information disponible sur les divers aspects de la fixation biologique de l'azote, y compris les systèmes symbiotiques du Rhizobium/légumineuse et de l'Azolla/algue bleu-vert, et des bactéries libres fixatrices d'azote et des algues bleues.

Le présent Bulletin passe en revue les écrits traitant du sujet et fournit des informations sur les caractéristiques, la production et l'utilisation des engrais biologiques en agriculture.

Bien que certaines méthodes décrites soient en continuelle amélioration, il est souhaité que cette compilation des divers aspects de la fixation de l'azote regroupés dans ce Bulletin présentera intérêt et aide, non seulement pour les chercheurs, mais aussi pour les vulgarisateurs et les planificateurs concernés par le développement accru et le perfectionnement de ces systèmes naturels pour l'amélioration et l'aménagement des sols des différentes zones agro-écologiques du monde.

Commandes à: points de vente des publications de la FAO, ou à la Section distribution et ventes, FAO, Via delle Terme di Caracalla, 00100 Rome, Italie.

Root Crops Production and Research in the Caribbean. Proceedings of a Regional Workshop, Gaudeloupe, July 1985. CIP, IITA, UNECLAC and CIAT, 1986, 233 p. ISBN 84-89206-63-5.

The objectives of the workshop were: the identification and definition of common regional problems limiting the development of root crops in the region; evaluation of the potential for further development of root crops; and the development of a programme for regional network activities including research exchange training, and technology transfer. The main part of the proceedings contains country reports on root and tuber crops. The last chapter provides an overview from the whole region, with a listing of constraints to the production and marketing of these crops, research being carried out, training facilities. The formation of a Regional Research Network is envisaged.

Orders to: Centro Internacional de Agricultural Tropical (CIAT), Apartado Aéreo 6713, Cali, Colombia.

Amelioration of Soil by Trees – A Review of Current Concepts and Practices. R. T. Prinsley and M. J. Swift, editors. Commonwealth Science Council, London, 1987, 181 p. ISBN 0-85092-300-X.

In view of the need to establish sustainable vegetation on 'problem' soils in many areas of the tropics with severe food shortage, the Commonwealth Science Council held a workshop in Lucknow, in March 1986. This activity is part of the CSC project in Agroforestry. This project implements the following recommendations: (1) to extend and expand agriculture on suitable land; (2) to give priority to methods of reducing soil erosion; and (3) to carry out studies in order to understand the physical, biological and socio-economic factors limiting yield and production with a view to enhancing yield.

The major objective of this workshop was to formulate a collaborative programme of research within the tropical zone. This programme will be concerned with the development of management methods within agroforestry systems for the improvement of 'problem' soils through the use of trees. The present publication contains the proceedings and recommendations of the workshop.

Price: £ 6.00.

Orders to: Commonwealth Science Council, Commonwealth Secretariat, Marlborough House, Pall Mall, London SW1Y, England.

The Sensitivity of Natural Ecosystems and Agriculture to Climatic Change. Research Report 85-1. M. L. Parry, editor. International Institute for Applied Systems Analysis (IIASA), Laxenburg, 1985, 152 p. Reprinted from Climatic Change vol. 7, 1985.

In 1983 a conference on 'the sensitivity of ecosystems and society to climatic change' was held in Villach. Its purpose was to assess the impact of climatic change on the sensitive margins of agriculture and of natural terrestrial ecosystems, with particular emphasis on climatic changes that might result from increases in atmospheric CO_2. Consideration was also given to former climatic fluctuations, both long- and short-term, that have had a measurable impact on agriculture and ecosystems.

The conference began with a plenary session, which considered recent progress in modeling possible climatic changes due to increased atmospheric CO_2. It then divided into two parallel workshops – on climate impacts in cold and in semiarid regions. A short report on the meeting as a whole was published by WMO in 1984. In addition, an IIASA Summary Report (SR-84-1) describes the deliberations, observations, and recommendations of the workshop on cold regions. The present report brings together eigth papers that ultimately arose from those discussions in the 'cold' workshop at Villach. In most cases they report the results of preliminary experiments relating to climatic change, and represent the outcome of a piece of 'pilot' research by IIASA for UNEP to test the research methodology before applying it in a wider context. This reports marks the completation of IIASA's pilot study.

Price: US$ 11.00. Prepayment required.

Orders to: Publications Dept., IIASA, A-2361 Laxenburg, Austria.

Soil Aeration and its Role for Plants. J. Glinski and W. Stepniewski. CRC Press, Boca Raton, 1985, 240 p. ISBN 0-8493-5250-9. Catalogue no. 5250 KD. Hardbound.

In this book the term 'soil aeration' is used with a wide meaning including all the related aspects such as soil air composition and its role for plants and the processes of absorption, production, and transfer of gases in soil. The part of the soil aeration connected with oxygen distribution in soil and its availability for microorganisms and plant roots will be called 'soil oxygenation'.

Soil aeration is a complex subject. Soil air composition is a resultant effect of biological and chemical processes of uptake and evolution of gases on the one hand and of the physical processes of their transport on the other. Plant response to soil air depends, however, not only on the air composition but also on the other related chemical, physical, and biological soil processes which are significant for plants.

The problem of soil aeration or its particular aspects have been discussed in a number of reviews, but a more precise, factual treatment of this subject is needed. The aim of this book is to provide a comprehensive review of all aspects of the problem and of the methods used in connection with it.

It is based on investigations carried out by the Institute of Agrophysics in Warsaw and the study of about 800 publications. Although primarily directed to researchers in soil aeration, it may also be of importance to teachers and students in agronomy, soil physics, soil chemistry, soil biology, ecology, and plant physiology.

Price: US$ 103.00; outside U.S.A. US$ 118.00.

Orders to: CRC Press, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431, U.S.A.

Ecology of Biological Invasions of North America and Hawaii. Ecological Studies 58. H.A. Mooney and J. A. Drake, editors. Springer-Verlag, New York, Berlin, Heidelberg, 1986, xvii + 322 p. ISBN 0-387-96289-1 (U.S.A. ed.); 3-540-96289-1 (Fed. Rep. of Germany ed.). Clothbound.

The diversity of the earth's climates superimposed upon a complex configuration of physical features has provided the conditions for the evolution of a remarkable array of living things which are linked together into complex ecosystems. The kinds of organisms comprising the ecosystems of the world, and the nature of their interactions, have constantly changed through time due to coevolutionary interactions along with the effects of a continually changing physical environment.

In recent evolutionary time there has been a dramatic and ever-accelerating rate of change in the configuration of these ecosystems because of the increasing influence of human beings. These changes range from subtle modifications caused by anthropogenically induced alterations in atmospheric properties to the total destruction of ecosystems. Many of these modifications have provided the fuel, food, and fiber which have allowed the expansion of human populations. Unfortunately, there have been many unanticipated changes which accompanied these modifications which have had effects detrimental to human welfare including substantial changes in water and air quality.

Through evolutionary times there have been organisms, such as migratory birds and animals, which transcended the climatic boundaries of a given ecosystem unintentionally carrying with them individuals and propaguees of other species. People have increased this interchange many-fold, often when the natural ecosystems were most vulnerable. It has now become clear that in many cases these interchanges have not had the intended effect and further they have been accompanied by many accidental interchanges, some of which have had desastrous economic and environmental impacts.

SCOPE has established an international programme to investigate the ecology of biological invasions. The present volume is based on a symposium which was held in Asilomar, California, in October 1984 to explore biological invasions into North America and Hawaii and provides a critical review of current knowledge of the ecology of invasion. Among the topics covered are: (1) the impact of biological invasions on economically important crop ecosystems as well as on natural ecosystems; (2) methods for control of invaders; (3) site characteristics promoting invasions and system impact of invaders; (4) modelling the invasion process; and (5) directions for future research.

Price: DM 148.00.

Orders to: Springer-Verlag, Tiergartenstrasse 17, D-6900 Heidelberg, Fed. Rep. of Germany; or: Springer Verlag, 175 Fith Avenue, New York, NY 10010, U.S.A.

The Handbook of Environmental Chemistry. Volume 3, Part D, Anthropogenic Compouds. Springer-Verlag, Berlin, Heidelberg, New York, 1986, 248 p. Hardbound. ISBN 3-540-15555-4 (Fed. Rep. of Germany ed.); 0-387-15555-4 (U.S.A. ed.).

For an introduction on the Handbook of Environmental Chemistry and contents of earlier Volumes, see Bulletins 63, page 69 and Bulletin 67 p. 72.

Volume 3 of the series deals with anthropegenic compounds, their chemical backgrounds, production methods and information about their use, their environmental behaviour, analytical methodology and some important aspects of their toxic effects. The present fourth part contains contributions on cellulose, asbestos, carbon black, creosobe, elemental phosphorus and molybdenum.

Price: DM 188.00.

Orders to: Springer-Verlag, Tiergartenstrasse 17, D-6900 Heidelberg, Fed. Rep. of Germany; or: Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, U.S.A.

Farbatlas Ernährungsstörungen bei Kulturpflanzen. W. Bergmann. VEB Fischer Verlag, Jena, 1986, 306 p.

The second enlarged edition of the Coloured Atlas of Nutrient Inbalances in Cultivated Plants published in 1976 is the excellent pictoral information on several symptoms of either deficiency or toxicity of macronutrients and trace elements in various plants. The book contains 945 colour pictures showing changes in growth and development of plants under severe and medium nutrient deficiencies, and provides, in many cases, the information on the nutrient content of plant tissues as well as on the kind of soil and some soil data (e.g. pH, clay and organic matter content). The author describes the following elements: N, P, S, K, Ca, Mg, B, MO, Cu, Fe, Mn, Zn, Cd, Ni, Tl, Al, Cr and Pb. Symptoms of inbalance in the content of these elements are presented for crop plants, flowers and trees in temperate and (sub)tropical climates. Toxicity symptoms caused by gaseous compounds such as SO_2, NH_3, NO_x, HCl, Cl_2 and HF are also described.

The book comprises two parts. Part I describes basic physiological functions and most common symptoms of their disorders. The review of leaf analyses and average micronutrient contents of some main crop plants are also given. Part II includes colour photographs of arable fields, pot experiments, plant and parts of the plants. Each picture has a description in German, English and Russian.

This unique, handy and highly informative book treating aspects of plant nutrition and plant intoxication will meet the requirements of a wide range of users.

Price: DM 72.00.

Orders to: VEB Gustav Fischer Verlag, Villengang 2, DDR-6900 Jena, German Dem. Republic.

A. Kabata-Pendias, Pulawy

Soils of the World. Wall Chart. P. Lof, compiler; J. van Baren, editor. Prepared by Elsevier and ISRIC with cooperation of FAO and Unesco. Elsevier Science Publishers, Amsterdam, 1987, size 86 × 135 cm. ISBN 0-444-42575-6.

This useful wall chart present high quality colour photographs of 106 soil profiles (size 19 × 3 cm) arranged according to FAO-Unesco Soil Map of the World Legend. Each profile is labelled with the name according to the national classification systems of the U.S.A., Canada, England and Wales, Federal Republic of Germany, France and Australia (two schemes).

This attractive chart is suitable for use by students and scientists and an aid to teaching, research, and self-study.

Price: 1 copy US$ 15.00 or Dfl. 45.00, including packing and postage; 10 copies US$ 104.50 or Dfl. 235.00. Lower rates for 50 and 100 copies.

Orders to: Elsevier Science Publishers, P.O. Box 211, 1000 AE Amsterdam, The Netherlands; or: 52 Vanderbilt Avenue, New York, NY 10017, U.S.A.

Field Measurement of Dinitrogen Fixation and Denitrification. SSSA Special Publication 18. R. D. Hauck, editor. Soil Science Society of America, Madison, 1986, 115 p. ISBN 0-89118-780-4.

Many approaches have been taken to accurately measure or estimate N gain by plants and soils via biological dinitrogen fixation or N loss from soils via denitrification. The number and variety of the approaches attest to the difficulty of quantifying gaseous N exchanges between the atmosphere and plant-soil systems.

With a few exceptions, most attempts to quantify biological N_2 fixation or denitrification by direct means under field conditions are of recent origin. Although the methods used often have provided data that appear to be reasonable estimates of N gain or loss, none of the methods are entirely satisfactory. Moreover, lack of an absolute reference standard is a major obstacle in evaluating their reliability.

Six of the articles published here focus on two techniques that are being used by an increasing number of scientists to investigate biological N_2 fixation or denitrification. Three chapters discuss the isotope-dilution technique for estimating biological N_2 fixation, and three discuss the acetylene blockage technique for estimating denitrification. Both techniques employ the use of assumptions for data interpretation that may not be readily apparent. For those interested in using data obtained from these methods, but not directly involved in these research areas, discussion of the advantages and limitations of the two methods highlighted here would seem of value.

Price: US$ 18.00. Prepayment required.

Orders to: SSSA Headquarters Office, Attn. Book Order Dept., 677 South Segoe Road, Madison, WI 53711, U.S.A.

Manual of Aerial Photography. R. Graham and R. Read. Butterworth, Sevenoaks, 1986, 368 p. ISBN 0-240-51229-4.

This book fills a specific reference and instructional need for all who are concerned with aerial survey. It covers all the essentials of aerial photography, with emphasis on aerial survey.

Practical information is allied to theory throughout, and the latest developments in the field are discussed; including photographic technology, optical theory, remote sensing, multi-spectral photography (MSP), and the use of microlight aircraft. The text is supported by numerous diagrams and photographs, and a glossary of terms is complemented by two appendices of societies, companies and suppliers who service the profession. It is written for all aerial photographers, earth scientists, civil engineers, cartographers, urban planners and photogrammetrists.

Price: £ 36.00.

Orders to: Butterworth, Borough Green, Sevenoaks, Kent TN15 8PH, England.

Clés de la Taxonomie des Sols. Monographie no. 13, Service d'Assistance Technique pour l'Utilisation des Sols (SATUS), 1986, 347 p. ISBN 0-932865-06-2.

En décembre 1986, la traduction française des 'Keys to Soil Taxonomy' a été publiée par l'Université Cornell pour le compte des SMSS, organisme financé par le US Dept. of Agriculture. Cette traduction intégrale a été faite sous la direction du Dr. A. van Wambeke, Professeur à Cornell University, Ithaca, NY. Elle est le fruit d'un travail d'équipe composée de pédologues belges pour la plupart. Le texte français a été complété par un index français-anglais et anglais-français, ainsi que par les triangles texturaux et un index renvoyant aux définitions des termes utilisés.

Pour les pays en voie de développement, l'ouvrage est gratuit et peut être obtenu par l'intermédiaire du repésentant de l'AID ou du Dr. H. Eswaran, SMSS Program Leader, SCS, USDA, P.O. Box 2890, Washington, DC 20013, U.S.A.

Prix: US$ 8.00.

Commandes à: International Soils, Dept. of Agronomy, Bradfield Hall, Cornell University, Ithaca, NY 14853, U.S.A.

J. Lozet, Wanze

Berichte XIII. Congress der IBG/Transactions XIIIth Congress of the ISSS/Comptes-rendus du XIII[e] Congrès de l'AISS. Hamburg, 13-28.8.1986. 4 Volumes, 1986, 1801 p.; 2 Volumes 1987.

The first four volumes contain the texts of the plenary papers (vol. 1, 128 p.) and the extended summaries of all papers presented (vol. 2-4, 1673 p.). The majority is in English; papers in other languages also carry an English abstract.

The fifth and sixth volume contain the symposia papers. For more information, see Bulletin 70.

Price: For all 6 volumes Dfl. 75.00 or US$ 40.00, incl. packing and surface postage. Prepayment required.

Orders to: see below.

Soil Map of the European Communities 1:1 000 000. Dir.-Gen. for Agriculture Coordination of Agricultural Research. Commission of the European Communities, Luxembourg, 1985, 9 sheets and explanatory text of 124 p. ISBN 92-825-5428-7.

The map is presented as seven sheets with two sheets of legend. The legend comprises each of the 312 map units, which consists of associations of soil units. Each association is composed of a dominant soil and of associated soils and inclusions. The soil units are those adopted for the FAO/Unesco Soil Map of the World.

The accompanying explanatory text of over 120 pages gives details of: the preparation of the map; classification and definitions of soil and map units; climate, geology and vegetation; description of the soil associations; land use and suitability; profile descriptions and analytical data. For more information, see the enclosed brochure.

Price: Boxed set with maps folded to A4 size, Dfl. 250,– DM 220,– or US$ 130,– including surface mail postage. Flat maps in roll, text separate, Dfl. 280,– DM 250,– or US$ 145,– including postage. Prices only apply when ordered at ISRIC. Prepayment required.

Orders to: see below.

Soil Map of Middle Europe 1:1 000 000. International Society of Soil Science, Wageningen, 1985. 1 sheet and explanatory text of viii × 124 p.

This publication is based upon the above mentioned map, plus the soil maps of Austria and Switzerland, which are not contained in the EEC map. It follows the system adopted for the Soil Map of the European Communities.

The explanatory booklet not only contains all of the information in the booklet of the EEC map, but also has a listing of the Austrian and Swiss soil data.

Price: Dfl. 55,– DM 50,– or US$ 30,– including surface mail postage. Prices only apply when ordered at ISRIC. Prepayment required.

Orders to: ISRIC, P.O. Box 353, 6700 AJ Wageningen, The Netherlands.

World Resources 1987. An Assessment of the Resource Base that Supports the Global Economy. International Institute for Environment and Development and World Resources Institute, Washington. Basic Books Inc., New York, 1987, xiii × 369 p. ISBN 0-465-09239-X (paperback); 0-465-09238-1 (cloth). ISSN 0887-0403.

For a review of World Resources 1986, see Bulletin 70, p. 76. The present second edition of an annual series is not an updated version of the 1986 edition but rather a companion volume. Different topics are discussed within the same broadly-defined framework.

It contains four main sections: Part I, Perspectives; Part II, World Resources Reviews; Part III, World Resources Issues; and Part IV, World Resources Data Tables. Any method of organization tends to separate issues into digestible pieces, but doing so raises the danger of losing sight of their interconnectedness. It is these interconnections that make natural resource issues so complex. In several areas of the book an attempt is made to cut across standard discussions such as atmosphere, freshwater, and wildlife to make these critical connections. Part I highlights these connections to stress some of the major themes that run through the book. In Part II, chapters on 'Global Systems and Cycles', 'Policies and Institutions' are designed to provide a cross-cutting look at the issues covered by the other chapters.

'Global Systems and Cycles' looks across the narrower boundaries of other Part II chapters to examine the connections between, for example, the earth's atmosphere and its oceans. Each year, this chapter will also look at one of the major biogeochemical cycles essential to life – this year the carbon cycle. A new chapter in Part III examines the persistent problem of hazardous wastes, one of the most serious environmental issues facing industralized countries. Another looks at several successful projects in sub-Saharan Africa in a search for the keys to sustainable development of agriculture.

'Food and Agriculture', examines trends in cash crops and food crops in the developing world and the environmental impacts of increasing agricultural production in the developed world.

As in last year's edition, Part IV contains data for 146 countries on the extent, condition, use, and value of many of the natural resources analyzed in Part II. In addition, this section includes two other chapters on 'Basic Economic Indicators' and 'Land Use and Cover'. Overall, about half the data tables are new this year; the other half update last year's tables. Again, a wealth of data, which will be of considerable value to a wide range of people.

Price: US$ 16.95.

Orders to: World Resources Institute, Publications, P.O. Box 620, Holmes, PA 19043-0620, U.S.A. In Europe: Int. Inst. for Environment and Development, 3 Endsleigh Street, London WC1H ODD, England.

Dictionary of Agrophysics. Polish-English and English-Polish. R. Debicki and J. Glinski. Polish Scientific Publishers, PWN, Warsaw, 1986, 396 p. ISBN 83-01-06952-X.

Dictionnaire d'Agrophysique. Polonais-Français et Français-Polonais. J. Glinski, editeur. Editions Scientifiques de Pologne, PWN, Warsaw, 1985, 258 p. ISBN 83-01-05945-1.

The development of agrophysics necessitated the preparation of these two dictionaries. Both cover words and technical terms occurring in physical processes of the soil-plant-atmosphere system and with physical properties of its components.

Price: Zl. 300 for each copy.

Orders to: OR PAN, Palac Kulturi i Nauki, Warszawa, Poland.

Climate Impact Assessment. Studies of the Interaction of Climate and Society. SCOPE 27. R.W. Kates, J.H. Ausubel and M. Berberian, editors. John Wiley & Sons, Chichester, New York, 1985, xxiv + 625 p. ISBN 0-471-90634-4. Hardbound.

This is the first comprehensive handbook of climate impact assessment. The growing climate consciousness, both popular and scientific, which began in the 1970s, was sparked by a series of extreme climate events and related disruptions, and by scientific speculation on increased climate variability and possible climate change. The pace and degree of change are under debate, but it is widely agreed that at least one change, a long-term global warming derived from the enrichment of the atmospheric content of the 'greenhouse' gases, is underway. There is also emerging scientific consensus that human-induced alterations in the chemical consituents of the atmosphere can lead to large regional, and even global, changes of the atmosphere in the form of more acidic rain and greater ultraviolet radiation.

Within the time period of the projected global average warming, sustained variations of climate will occur in many places, and lesser periods of favourable or unfavourable climate will occur in most places. Where these changes are very large – the extremes greater than usual – where people and places are vulnerable, or where human activity meshes poorly with natural opportunity, significant climate impacts are likely to occur. This book addresses the important issues of how to identify, study and respond to such impacts, i.e. adjusting to changing climate, coping with extremes and matching human needs to climate endowment. The book will be of interest to atmospheric scientistists, resource economists, environmental scientists, geographers, ecologists and agricultural scientists.

Price: £ 49,95; or US$ 71,43.

Orders to: John Wiley & Sons, Baffins Lane, Chichester, West Sussex, P019 1UD England; or: John Wiley & Sons, 605 Third Avenue, New York, NY 10016, U.S.A.

Sustainable Development of the Biosphere. W.C. Clark and R.E. Munn, editors. Published on behalf of the International Institute for Applied Systems Analysis (IIASA). Cambridge University Press, 1986, 491 p. ISBN 0-521-32369-X.

Mankind has often degraded the local and even the regional environment. Only recently, however, has the possibility been envisaged that local actions could lead to irreversible global changes.

There are few historical analogies to guide us on the consequences of global changes, and the predictions of simulation models are rather uncertain. How then is society to respond? This is a typical high-impact, low-probability risk management problem for which the stakes are very high indeed.

Within this context, the IIASA Feability Study on Sustainable Development of the Biosphere was formulated in early 1983. The framework has the following points: (1) To synthesize in policy terms our understanding of global ecological and geophysical systems as they are linked with industrial and resource development activities; (2) To characterize the issues of global environmental change in terms of their ability to inhibit or promote regional development; (3) To explore institutional and organizational designs for more effective international research, policymaking, and management, concerning interactions between environment and regional development.

These ideas were elaborated at a meeting in 1985. The consensus was that it was timely and, indeed, urgent to begin a long-term research investigation of the sustainable development of the biosphere – in the context of resource management.

The overview papers presented were subjected to very wide ranging reviews. These papers are contained in this volume, together with a number of commentaries written later. The authors have provided a new perspective on resource development in a world of ecological uncertainty and surprise.

After an overview of the subject, themes for a research programme, based upon the other chapters in this books, are discussed. Part two has 5 chapters on human development, part three 4 chapters on the world environment, part four 4 chapters on social response, and part five has 3 contributions on usuable knowledge.

Taken together these papers provide an interesting review of our present understanding of long-term, large-scale interactions between environment and development and outline what steps should next be taken for a human well-being to the greatest extent possible, while assuring that the improvements are ecologically sustainable over the long run and on a global scale. It is clear that soil scientists have an important role to play.

Price:

Orders to: Cambridge University Press (CUP), The Edinburgh Bldg, Shaftesbury Road, Cambridge CB2 2RU, England; or: CUP, 32 East 57th Street, New York, NY 10022, U.S.A.

Chemistry of clays and clay minerals. Mineral Society Monograph No. 6. A.C.D. Newman, editor. Longman Scientific and Technical, Harlow, 1987, 480 p. ISBN 0-582-30114-9.

This book of monographs by specialist authors deals with the chemistry of clays at large. That is, not only clay minerals sensu stricto are discussed but also the structurally and genetically related primary layer silicates as well as the usually accompanying non-silicate oxides and hydroxides in the clay fraction. The chemistry includes both the composition of the minerals and their physicochemical behaviour in natural and technological processes. This may best be expressed by the nine chapter titles: 1. The chemical constitution of clays; 2. Non-silicate oxides and hydroxides; 3. Dispersion and flocculation; 4. Cation exchange equilibria in clays; 5. The interaction of water with clay mineral surfaces; 6. Catalytic properties of clay minerals; 7. Thermal, oxidation and reduction reactions of clay minerals; 8. Reactions of clays with organic substances; 9. Petrologic phase equilibria in natural clay systems.

This well-documented book giving the state-of-the-art should be welcomed as an advanced contribution to students, teachers and researchers in both the pure and applied branches of clay science.

Price: £ 48.00.

Orders to: Longman Group, Longman House, Burnt Mill, Harlow, Essex CM20 2JE, England. Published in the U.S.A. by John Wiley & Sons, 605 Third Avenue, New York, NY 10016.

L. P. van Reeuwijk, Wageningen

The Rhizosphere. Advanced Series in Agricultural Sciences 15. E. A. Curl and B. Truelove. Springer-Verlag, Berlin, Heidelberg, New York, 1986, x + 288 p. Hardbound. ISBN 3-540-15803-0 (Fed. Rep. of Germany ed.); 0-387-15803-0 (U.S.A. ed.).

Plant growth and development are controlled largely by the environment of the root-soil interface or rhizosphere, and environment which the root itself helps to create by the exudation of chemical compounds that affect microbial activity. The plant root and the rhizosphere was a major topical feature of the first International Symposium on Factors Determining the Behavior of Plant Pathogens in Soil held at Berkely in 1963. The proceedings was published under the title Ecology of Soil-Borne Plant Pathogens. Since that time, several other international efforts, either on the root-soil interface specifically or on topics relating to the root environment, have provided a wealth of valuable information basic to promoting the culture of healthier, more productive plants.

For the writing of this book, inspiration has come, in large part, from 10 years of cooperative rhizosphere research in association with leading scientists participating in a regional effort within the southern United States. The authors have attempted to bring together in this work the major aspects of rhizosphere research and the principles of rhizosphere ecology for benefit of developing young scientists and technologists, as well as for the established professional researcher and teacher.

The authors have revealed many of the gaps in our knowledge which are yet to be filled. For meaningful contributions to be made in the future the need for refined technology and a multidisciplinary pooling of expertise by soil microbiologists, phytopathologists, soil physicists and chemists, plant physiologists, and zoologists should be clearly evident.

Research scientists are challenged to seek answers leading to improved crop production through intensive study of rhizosphere phenomena that may interact with soil- and foliar-applied pesticides, fertilizers, biological control agents for root disease, and other elements of cropping practices.

Price: DM 228.–.

Orders to: Springer-Verlag, Tiergartenstrasse 17, D-6900 Heidelberg, Fed. Rep. of Germany; or: Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, U.S.A.

Volcanic Ash. G. Heiken and K. Wohletz. University of California Press, Berkeley, Los Angeles and London, 1985, 246 p. ISBN 0-520-05241-2.

Volcanic ash deposits are found throughout the entire geologic record. Pyroclastic rocks are present as layers in metamorphic rocks over a billion years old, interbedded with sedimentary rocks deposited throughout Paleozoic and Mesozoic time, and in recent deposits only a few years old. Many of these deposits have served as the source or host of a variety of mineral resources such as uranium, lithium, copper, and diamonds. Volcanic ash is also an important soil constituent in many areas of the world.

The characterization of volcanic ash and its relationship to eruption phenomena have been of interest to scientists since the time of Aristotle. Interest in this subject was renewed during the mid-1800s when European naturalists began studying volcanic fields in the Mediterranean, South America, and Indonesia. With the invention of the scanning electron microscope (SEM), a full range of pyroclast sizes could be investigated and chemical changes on grain surfaces measured. Used in conjunction with optical microscopy and the electron microprobe, the SEM allows to begin systematic characterization of volcanic ash.

The present atlas provides descriptions of volcanic ash from different eruption types, sequences of ash layers, and weathered and metamorphosed ash. Divisions of eruption, and therefore ash types are based upon the mechanism of ash formation and the chemical composition of the ash. The numerous samples that are presented typify each known type of explosive eruption and its ash deposits.

This is a reference work for those interested in the identification of volcanic ash and its physical properties.

Orders to: University of California Press, Berkeley, CA 94720, U.S.A.

Anatomy, Physiology and Psychology of Erosion. IFIAS Monograph No. 1. E. G. Hallsworth. John Wiley & Sons, Chichester, New York, 1987, 176 p. ISBN 0-471-91212-3. Hardback.

In this remarkable book on the linkage between biophysical and socio-economic factors of soil erosion, the author, past-President of the ISSS and Project Director of the International Federation of Institutes of Advances Study (IFIAS) Save Our Soils (SOS) programme between 1979 and 1985, maintains that most soil erosion which has occurred since the beginning of Quaternary time has been caused by damage to the vegetative cover as a result of man's activities. He examines the methods used long ago to keep erosion under control and shows that these traditional methods concur with modern scientific approaches to erosion control. The socio-economic factors which may restrict the adoption of modern techniques are then considered, based upon the results of a survey of more than 10,000 small farmers. Physchological reasons for the reluctance to accept modern techniques are also considered. The author concludes by proposing guidelines for decisionmakers which might lead to more successful adoption of modern methods in future.

This book should be read by soil conservationists, agriculturalists and geographers.

Price: £ 26.50 or US$ 45.20.

Orders to: John Wiley & Sons, Baffins Lane, Chichester, West Sussex P019 1UD, England; or: John Wiley & Sons, 605 Third Avenue, New York, NY 10016, U.S.A.

Drip Irrigation Manual. S. Dasberg and E. Bresler. International Irrigation Information Center Publication No. 9. IIIC, Bet Dagan, 1985, 95 p. ISBN 965-298001-3.

Drip irrigation has come of age. After the initial excitement and high hopes raised by the pioneers of the system in the early seventies, the time has come for a balanced assessment of the merits and potentials of drip irrigation.

The purpose of this manual is to place a practical tool in the hands of potential users and designers for the application of the drip system. In the first chapter a general review on the scope, potential and limitations of the system is given. The second chapter describes the components of the system – stressing the different kinds of emitters and their characteristics. In the third chapter the pattern of water and solute movement from emitters through the soil is reviewed. Chapter 4 gives the principles of system design – determining emitter spacing according to emitter discharge and soil properties, the choice of the appropriate emitters, and determination of tube diameters of laterals and mains. Care has been taken to present simple procedures, so that a user not previously familiar with the drip system can make the right decisions based on the principles set forth previously. Chapter 5 gives an overview of the experience gained in more than a decade of drip irrigation application in orchards, field crops and vegetable production. The last chapter provides a detailed example of system design, demonstrating the usefulness of this manual.

Orders to: IIIC, P.O. Box 49, Volcani Center, 50250 Bet Dagan, Israel; or IIIC, c/o IIE attn. J. R. Murray, 809 United Nations Plaza, New York, NY 10017, U.S.A.

Methods of Soil Analysis. Part 1. Physical and Mineralogical Method, Second edition. Agronomy Monograph No. 9 (part 1) A. Klute, editor. American Society of Agronomy and Soil Science Society of America. Madison 1986, 1188 p. ISBN 0-89118-088-5.

This is an extensively revised and expanded successor of the well-known first edition published in 1965 and edited by Dr. C. A. Black of which more than 13.000 copies have been sold worldwide. During the past 20 years there has been substantial progress in the development of physical and mineralogical measurements. The study of transport processes in soil in relation to environmental quality concerns has brought about an increased interest in the application of methods of physical measurement to cope with the inherent spatial variability of natural soils. In addition, techniques of measurement of physical and mineralogical properties of soils have generally been improved.

The second edition consists of 50 chapters prepared by 71 authors and coauthors. Four chapters deal with statistical subject matter, including a new chapter on geostatistical methods applied to measurements in soils. Eight chapters focus on various mineralogical methods (including treaties on ESR, NMR and electron microprobe), and 8 chapters describe methods for evaluation of the soil matrix and its structure. Methods for assessing the energy status of soil water, hydraulic conductivity and diffusitivity of soils, intake rate, and water retention of soils described in 16 chapters. There are 5 chapters on methods for study of the soil solutes, and 5 chapters on methods for study of the soil gas phase. This revision and expansion, particularly of the physical aspects, could not leave the subject coverage unaffected and a number of soil parameters and techniques went off the stage, notably shear strength, bearing capacity, stress distribution, reflectivity, long-wave radiation and electron diffraction.

The updated edition of Part 2 was published in 1982 (announced in vol. 64 of this Bulletin) and with the present updating of Part 1 a most useful modern comprehensive reference work in soil analysis has become available.

Price: Part 1, $ 60.00; Part 2, $ 36.00; Parts 1 & 2, $ 82.00. Add 75 c per book on all orders outside the United States.

Orders to: SSSA, ASA Headquarters Office; Attn: Book Order Department: 677 South Segoe Road; Madison, WI 53711-1086, U.S.A.

L.P. van Reeuwijk, Wageningen.

Land Use Policy. October 1986. **Special issue on Land use in Africa.** A.K. Biswas and L.A. Odero Ogwel, guest editors. Butterworth Scientific, Guildford.

During the past decade, the various African countries have faced a series of crises. Now, with high and accelerating population growth, and low and declining efficiency in the use of resources, Africa faces a long-term trend of decline. Since agriculture still accounts for 41% of the Gross Domestic Product, formulation and implementation of efficient land use policies are prerequisites if the long-term trend is to be reversed.

In this issue, specially commissioned papers examine key topics in Africa's land use problems and suggest the policies needed for their resolution.

Issues examined includes i.a.

- the relationship between population growth and land use;
- the increase in number of domestic animals and the resultant land degradation due to overgrazing;
- the accelerating problem of deforestation due to increasing demand for agricultural land, firewood requirements and commercial logging without re-plantation;
- the decline in rainfall which initiated the present drought and famine;
- irrigation and streamflow conditions and farming systems.

Price: £ 21.00.

Orders to: Mr. Peter Lake, The Sales Department, Butterworth Scientific Limited, P.O. Box 63, Westbury House, Bury Street, Guildford, Surrey GU2 5BH, England.

Thermal Properties of Soils. Series on Rock and Soil Mechanics, vol. 11. O. T. Farouki. Trans Tech. Publications, Clausthal-Zellerfeld, 1986, xiii 136 p. ISBN O-87849-055-8.

Soil Thermal properties are of great importance in many engineering projects and other situations where heat transfer takes place in the soil. For example, they are of great importance in the design of roads, airfields, pipelines or buildings in cold regions as well as underground power cables, hot water pipes or coldgas pipelines in unfrozen ground. They are also important in such fields as agriculture, meteorology and geology.

This monograph deals with the thermal properties of soils and the factors influencing them. An attempt is made to provide a framework in which these various factors and their effects may be placed. The problem of heat transfer in soils is very complicated. To understand it one must subdivide it into constituent elements and facets. A study of each of these should show its relative importance and the contribution to the soil's behavior. The interactions between the different factors need to be elucidated, leading eventually to an overall comprehensive and comprehensible view. Analysis is thus followed by synthesis.

This monograph also considers the various mechanisms of heat transfer in soils and the methods of measuring a soil's thermal conductivity. The different methods of calculating this quantity are described and their predictions shown detail and compared against reliable experimental results. In this way these methods are evaluated to determine their validity under different conditions.

Since the book was written as a basic comprehensive text dealing with fundamental thermal properties of soils in general, it is of potential use to all scientists and engineers who are interested in any aspect of the thermal behaviour of soils, not just those involved in cold regions work.

Orders to: Trans Tech u Publications, P.O. BOX 266, D-3392 Clausthal-Zellerfled, Fed. Rep. of Germany; or: 16 Bearkskin Neck, Rockport, MA 01966, U.S.A.

Ecology in action. A slide package presentation on integrated approaches to environment research and management. MAB, Unesco, Paris.

The Man and Biosphere Programme (MAB) of Unesco is an international intergovernmental programme of environmental research and training which was designed to improve the use and management of natural resources. From its inception in 1971, the communication of technical research results to different user groups-resource managers, specialists, teachers and the general public – has been integral part of the programme.

With this in mind, the poster exhibit 'Ecology in Action' was prepared to help mark the Tenth Anniversary of the Programme and review what had been accomplished during its first 10 years. The 'Ecology in Action' exhibit comprises 36 posters which present a synthesis of the results of many technical projects in non-technical language understandable to many sectors of the public. This slide-text package based on the exhibit has been prepared in response to the request of many governments and institutions to have an alternative format of the exhibit, which would be especially suitable for teaching purposes.

This package contains 60 slides with accompanying text presented in 5 chapters.

1) a general introduction to the MAB concept, 'Research for land using planning'; 2) a section on the ecosystems of the humid and sub-humid tropis, 'The tropical forest – a rich but fragile resource'; 3) a section on the world's marginal lands – arid, semi-arid and mountainous 'Marginal Lands – coping with and taking advantage of constraints'; 4) a section on urban growth and planning, 'Cities as ecological systems'; and 5) a section on the need to preserve the ecological diversity of our planet, 'Conservation – How, Where, Why?'.

Each chapter is preceded by a one-page photograph description of the slides and posters included in that chapter. Thus, these sections can be used either together or separately, as individual chapters for presentation devoted to specific topics such as tropical forests, cities, or conservation, etc.

Orders to: MAB Secretariat, Unesco, 7 Place de Fontenoy, F-75700 Paris, France.

Album Gleb Polski (Album of Polish soils) Polskie Towarzystwo Gleboznawcze Eze, L. Krolikowski et al. Pantswowe Wydawnictwo Naukowe, 1986, 167 p. ISBN 83-01-00317-0.

This album contains 61 colour photographs of soil profiles and landscapes, and an introduction to Polish soils and their geography. For all profiles are given: description of site and soil, chemical and physical properties. Most text is in Polish, but a translation into English of many words, facilitates its profitable use by non-Polish speaking soil scientists.

Price: Zloty 700.00.

Orders to: Polish Soil Science Society, U1 Wisniowa 61, 02-520 Warszawa, Poland.

Man: the Key to Conservation. MAB Audiovisual Series 3. Slide show presentation, with explanatory booklet and cassette. MAB, UNESCO, 1985.

This slide-tape contains 55 colourslides, a 20-minute cassette and a booklet containing the script and instructions for use. Other series are: Man and the humic tropics (series 1); and Man and Mountains (series 2); and Man in arid lands: nomads in transition (series 4).

Price: FF 220.

Orders to: UNESCO, 7 Place de Fontenoy, F-75700 Paris, France.

Mechanisms of Ion Transport in Soils. H. M. Selim, H. Fluehler and R. Schulin, editors. Special Issue Geoderma, Volume 38 nos. 1–4. September 1986. Elsevier, Amsterdam, Oxford, 1986, 322 p. ISSN 0016-7061.

These proceedings contain the papers presented at the 'Workshop on Mechanisms of Ion Transport in Soils' which was held in Zürich, May 1985. The objective of the workshop was to discuss topics related to ion transport mechanisms in soils. The workshop was used as a platform for scientists from various disciplines to exchange ideas and present state-of-the-art knowledge on ion exchange phenomena and transport of ions in porous media. Among the disciplines represented at the workshop were soil physics and chemistry, chemical engineering, hydrodynamics, water chemistry, hydrology, civil engineering. Other papers investigated the retention or movement of specific reactive species including pollutants such as Cr, Cd, Hg, PO_4, atrazine.

In addition to the microscopic and macrosopic scale of laboratory experiments, megascale models for simulating water quality of catchment runoffs were presented.

Some contributions addressed model applications to problems of industrial as well as municipal disposal of heavy metals, radionuclide mobility, as well as fertilizer leaching under different agricultural management practices.

Emphasis of the workshop was placed on mathematical modeling of ion transport and exchange processes, on ion chromatographic theory as applied to soils, on the significance of soil heterogeneityon the macro as well as on the microscale, and on non-equilibrium effects due to rate-dependent source/sink mechanisms. General chemical aspects addressed were the chemical equilibrium speciation in the soil solution, soil surface reaction mechanisms and the quasi-thermodynamic concept of ionic activity coefficients as applied to the solid phase of soils.

Price: Dlf. 267.00.

Orders to: Elsevier Science Publ., P.O. Box 211, 1000 AE Amsterdam, The Netherlands; or: 52 Vanderbilt Avenue, New York, NY 10017, U.S.A.

Proceedings Second International Symposium on Spatial Data Handling, Seattle, July 5–10, 1986. Commission on Geographical Data Sensing and Processing, International Geographical Union, Williamsville, 1986, ix + 627 p.

At the first International Symposium on Spatial Data Handling, held in Zürich, Switzerland, in August 1984, the participants strongly endorsed the concept of a continuing series of meetings which would be limited in size and which would address the multidisciplinary, scientific aspects of geographic information systems and spatial data handling. This is the second of the Symposia in the series and an examination of the papers contained in these Proceedings clearly reveals the growing interest in both the new applications of existing technology.

One of the major goals of the Symposium is to permit the scientific and technical workers in the field to meet and discuss in depth the critical scientific issues which underlie the future development of the spatial data handling area.

The computer-based handling of spatial or geographic data forms a common bond between researchers in a number of different disciplines. Geographers, cartographers, geologists, oceanographers, computer scientists and others are called upon at one time or another to manipulate and display large data sets containing explicit coordinate information. This multidisciplinary symposium is oriented toward the technical and scientific aspects of spacial data handling and is designed to bring together researchers with common interest in this area.

The third symposium will be held in Sydney, Australia, in August 1988 in conjuction with the international Geographical Congress.

Price: US$ 40.00, including surface mailing.

Orders to: Commission on Geographical Data Sensing and Processing, P.O. Box 571, Williamsville, NY 14221, U.S.A.

The Guy Smith Interviews: Rationale for Concepts in Soil Taxonomy. SMSS Techn. Monograph 11. G. D. Smith. Edited by T. R. Forbes, reviewed by N. Ahmad et al. Soil Management Support Service and Dept. of Agronomy, Cornell University, 1986, xiii + 259 p., plus addendum on two microfiches. ISBN 0-932865-05-4.

This monograph has been compiled from a series of interviews given by the late Guy D. Smith.

The Guy Smith interviews were first started by Dr. M. Leamy of New Zealand. In 1976, Dr. Leamy and staff of the Soil Bureau of New Zealand conducted a series of interviews with Dr. Smith. The articles from the early interviews originally appeared in various volumes and issues of the New Zealand Soil News. Later, these and other interviews and articles were reprinted in Soil Survey Horizons. The publication Guy D. Smith Discusses Soil Taxonomy, a compilation of the soil Survey Horizons articles summarized these early interviews by Guy Smith.

The considerable interest shown in these interviews was the impetus necessary for the Soil Management Support Services (SMSS) to continue this effort. In 1980 and 1981, SMSS arranged a series of interviews.

The format of the interviews were similar at each place. All interested persons were invited and were free to ask questions on all aspects of Soil Taxonomy. However, the coordinator of the interviews at each place also developed a list of major subject matter areas for discussion. Both the questions and answers were taped and reproduced.

Although the intent was to cover as much of Soil Taxonomy as possible, Dr. Smith's failing health forced the termination of the interviews in late 1981. Dr. Smith, did not have an opportunity to review the transcipts and consequently the transcipts on microfiche are reproduced with only some editorial changes.

After transcription of the original interviews, the editor assigned title and subject index words to each of the questions and answers of all the interviews. The listing of these index words appears on the final pages of this monograph. The interviews were then completely taken apart and reorganized. Segments of interviews covering the same subject were then grouped together into chapters similar to Soil Taxonomy and printed out. These interview segments carried supplementary index words and also references to the original interview and question number. The raw chapters compiled from the segments were then distributed to various technical reviewers, soil scientists, for a review and reorganization. The reviewers were asked to put together the various segments into a text without changing the meaning that Guy Smith originally intended nor to add any statements that were't specifically given or implied in the interviews.

The recompiled and edited versions were then returned to the editor at Cornell. The final document contains a table of contents, the main body which follows the topics of Soil Taxonomy, and an index which includes a listing of questions and interviews, and key words. This cross-referencing should help those readers who want to study the exact words and context of the interviews themselves.

Price: US$ 12.00 (softcover); $ 25.00 (hardcover), plus $ 1.00 for overseas mail.

Orders to: International Soils, Dept. of Agronomy, Bradfield Hall, Cornell University, Ithaca, NY 14853, U.S.A. This publication is available at no charge in developing countries through: Dr. H. Eswaran, Program Leader, SMSS, P.O. Box 2890, Washington, DC 20013, U.S.A.

An Introduction to Soil Science. Second edition. E. A. FitzPatrick. Longman, Harlow, co-published in the U.S. with John Wiley, 1986, xiii + 255 p. ISBN 0-582-30128-9 (UK ed.), 0-470-20670-5 (U.S.A. ed.).

With the growing awareness of the environment, more and more interest and attention is being given to soils, including the use of soil as a medium for plant growth and as a natural and national resource. This book aims to provide a straightforward introduction to the understanding of the nature and properties of soils.

Three key chapters cover the factors of soil formation, processes in the soil system and the properties of soils, each outlining the working of the soil system at the macro and micro level. An extensive section on soil fertility and land use follows, in which the common practices are given, as well as many of the dangers associated with the improper use of land. Nutrient deficiencies and toxicities in plants and animals are discussed, and full-colour photographs accompany a description of the various soils that occur on the earth's surface. The final sections of the book cover soil maps and mapping and include an insight into the modern techniques of infrared photography, false colour and multispecial scanning. Terminology from the FAO system, as well as the USDA-system, is used throughout.

The author has produced as well-balanced and comprehensive guide to soil science that will be value to a wide range of people with serious interest in the subject. Primarily directed at students at advanced and undergraduate levels, it will also be used by geographers, biologists and agriculturalists, as well as anyone concerned with conserving our environment.

Price: £ 7.95; US$ 21.95.

Orders to: Longman Group, Longman House, Burnt Mill, Harlow, Essex CM20 2JE England; or to: John Wiley & Sons, 605 Third Avenue, New York, NY 10158, U.S.A.

Horticultural Research International. Pudoc, Wageningen, 1986, 903 p. ISBN 90-6605-332-1.

This is the fourth, revised and extended edition of the successful directory on horticultural institutes, their scientists and activities. It contains about 1500 institutes and 16650 scientists, from 63 countries. It also carries an index of names of places and an index of names of research workers.

Price: Dfl. 300.00 or US$ 150.00.

Orders to: Pudoc, P.O. Box 4, 6700 AA Wageningen, The Netherlands.

Trace – Element Contamination of the Environment. Second, revised edition. D. Purves. Elsevier Science Publishers, Amsterdam, New York, 1985, xii + 244 p. ISBN 0-444-42503-9.

The first edition of this book appeared in 1977. Since then, there has been an explosion of interest in almost every aspect of research in environmental pollution. The aim of this new edition however, remains the same i.e. to evaluate the global biological consequences of dispersal of trace elements, originally mined from localized limited deposits, in the environment.

The book will be invaluable as a reference source covering this field of interest for a wide range of people (environmentalists and conservationists, those concerned with management of resources and waste disposal, and agricultural chemists and soil scientists).

Price: Dfl. 150.00.

Orders to: Elsevier Science Publishers, P.O. box 211, 1000 AE Amsterdam, The Netherlands; or to: Elsevier Science Publishers, P.O. Box 1663, Grand Central Station, New York, NY 10163, U.S.A.

JARQ. vol 20, no. 2, September 1986. Special Issue on **Behaviour of Nitrogen in Paddy Soils and Rice Plants.** Tropical Agriculture Research Center (TARC), Japan, ISSN 0021-3551.

A period of 20 years is the length of time reasonably required for any activity to gain an internationally well-accepted and recognized reputation. The JARQ (Japan Agriculture Research Quarterly) is a case in point, with its unique role in distributing valuable information on research findings and practical experience obtained in Japan in the field of agricultural technology. The present circulation of each issue numbers 2.200 copies sent to more than 80 countries.

The 20th anniversary of the JARQ is marked by the present publication of a Special Issue on the use of ^{15}N for studies on behaviour of nitrogen in paddy soils and rice plants. It contains articles in the analysis of heavy nitrogen, dynamics of nitrogen in paddy soils, nitrogen physiology in rice plants, and on the agronomy of nitrogen.

Requests to: TARC, Ministry of Agriculture, Forestry and Fisheries, Yatabe, Tsukuba, Ibaraki, 305 Japan.

A Handbook of Silicate Rock Analysis. P. J. Plotts. Blackie and Son Ltd., Glasgow, 1986, 600 p. ISBN 0-216-91794-8. Hardback.

This book presents a comprehensive treatment of the important techniques for analysis of silicate rocks and minerals. It makes available all the necessary information that will be required to begin a programme of analysis. The author discusses methods of sample preparation for each technique. Individual techniques are described in detail, including instrumentation, comparative sensitivities, detection limits and methods of calibration. Emphasis is placed on choosing the correct technique for effective multielement analysis and considerable attention is paid to accounting for and correcting interference effects. There are bibliographies at the end of each of the 20 chapters. With the emphasis throughout on practical applications and implementation this volume is designed for postgraduates and advanced undergraduates in geochemistry, analytical chemistry and geology who require a comprehensive guide to the subject.

Price: £ 128.00.

Orders to: Blackie & Son Ltd., Bishopsbriggs, Glasgow, G64 2NZ, U.K.

Sulphur Research and Agricultural Production in India, 2nd edition. H.L.S. Tandon. Fertilizer Development and Consultation Organisation, New Delhi, 1986, x + 76 p. ISBN 81-85116-02-4.

The first edition of this publication appeared less than 2 years ago. This second edition has been updated and additional information has been incorporated. India is at present the fourth largest user of chemical fertilizers in the world, and all those interested in agricultural production would certainly be interested in seeing that this report is used most efficiently and in a balanced manner. The present status report is based on a study of about 250 papers, out of which 200 are cited.

Price: US$ 18.00, including airmail charges.

Orders to: see below.

Phosphorus Research and Agricultural Production in India. H.L.S. Tandon. Fertilizer Development and Consultation Organisation, New Delhi, 1987, xii + 160 p. ISBN 81-85116-01-6 (softcover); 81-85116-03-2 (hardcover).

This comprehensive status report on phosphorus in Indian agriculture is based on the study of about 1200 publications, 558 of which are mentioned. The broad objective of this study is to examine the use-pattern of fertilizer P and to take stock of available research information on P in Indian Agriculture. Through the consolidation and interpretation of such data, it is intended to provide:

1) an up-to-date integrated picture of the role which P can play increasing crop yields; 2) an account of technologies (both proven and potential) through which P can be used more efficiently; 3) an analysis which can provide the basis for scientific management of increasing quantities of P in the coming years; and 4) a state-of-the-art-report which may assist in identifying priorities for future research and development efforts.

Price: US$ 30.00 (softcover), $ 43.00 (hardcover), including airmail charges. Prepayment required.

Orders to: Fertilizer Development and Consultation Organisation, C110, Greater Kailash I, New Delhi 110048, India.

The Indian Journal of Agricultural Sciences. Cumulative Index Volumes 1–54 (1931–1984). Compiled by D. C. Ojha. Deepak Publishers, Jodhpur, 1986, 487 p.

The Indian Journal of Agricultural Sciences was started in 1931. The main purpose of this journal is to transmit the results of agricultural research to the workers engaged in the fields of agriculture, animal husbandry, soil science, forestry, horticulture, floriculture, etc.

It has become almost impossible for researchers to keep abreast with new results and latest developments in their respective fields of specialization without the suitable help for information retrieval. In order to overcome this difficulty the present comprehensive index of the contents of the journal was prepared. It covers a period of 54 years and is divided into a subject index and an author index. The subject index has further been classified into more than 150 subjects covering the disciplines of agriculture and its allied subjects. In all 5433 entries are given.

Price: Rs. 350,– in India, US$ 70.00 elsewhere.

Orders to: DK Agencies, H-12 Bali Nagar, New Delhi 11015, India.

The Savannas, Biogeography and Geobotany, Monica M. Cole. Academic Press, London, Orlando, 1986, xvii + 438 p. ISBN 0-12-179520-9.

Savanna vegetation comprises a continuous grass stratum usually with trees and/or shrubs exhibiting similar structural and functional characteristics. It includes plant communities of diverse floristic composition and varying physionomy from pure grasslands, parklands and low tree and shrub savannas to open deciduous woodlands, thicket and scrub. Tropical savannas cover some 23 million km^2 between the equatorial rain forests and the mid-latitude deserts and semi-deserts. They clothe about 20% of the earth's, land surface, 65% of Africa, 60% of Australia, 45% of South America and about 10% of India and Southeast Asia. The areas they occupy embrace the greater part of the world's undeveloped and underdeveloped lands. Despite the vast extent, wildlife resources and present and potential importance of these areas for domestic stock and crop production, however, the relationship between the tropical savanna vegetation and environmental conditions are less well understood than those of most other ecosystems.

The tropical savannas are characteristic of areas with a strongly seasonal summer rainfall regime and a dry period lasting from four to seven or eight months in the cooler season. The distinctive categories of savanna occupy similar soils and are associated with similar distinctive landforms in each continent, where characteristic savanna landscapes may be recognized. In the last two decades, research in different fields undertaken singly or collaboratively by biogeographers, ecologists and palynologists, zoologists, ornithologists and entomologists, pedologists and geomorphologists, agronomists, foresters and wildlife conservationists has promoted effective comparison of similar environments and facilitated unterstanding of comparable problems. Hence an objective assessment of the relative importance of the factors influencing the distribution and origin of the savannas is now possible.

This well-written and illustrated book provides a framework within which the relationships between the distribution of the major categories of savanna vegetation, the vegetation associations and the plant communities within them and the environmental conditions can be understood, and the precise relationships between the vegetation and the interplay of individual environmental parameters can be investigated and evaluated.

Price: US$ 79.50.

Orders to: Academic Press, 24–28 Oval Road, London NW1 7DX, England; or: Academic Press, Orlando, FL 32887, U.S.A.

Contaminated Soil. J. W. Assink and W. J. van den Brink, editors. Martinus Nijhoff Publishers, Dordrecht, Boston, 1986, 923 p. ISBN 90-247-3267-0 (hardback)

Soils may become contaminated with a wide range of industrial waste products, particulary on derelict land in urban areas. Soil contamination is a subject which has rapidly come to the fore during the last five years, adding a new dimension to the problems of land restoration. This book contains 109 papers which were presented at a conference in Utrecht, in November 1985 (Conference report, ISSS Bulletin No. 68 p. 14–15).

An opening section stresses the importance of satisfactory investigation and assessment followed by selection of the appropriate remedial action within the available financial resources. The remainder of the book is presented under seven major headings: behaviour of contaminants in the soil, impact on public health and the environment, the role of central and local government, site assessment and analysis, remedial action and risk assessment, safety, and case studies illustrating a range of remedial actions.

The behaviour of contaminants in the soil will be influenced strongly by the nature and properties of the soil itself. Soil scientists will recognise many of the problems as the authors describe their struggles to account for soil heterogeneity, the behaviour of heavy metals, the movement solvents and the degradation of soil. Several papers resort to mathematical modelling in their attempts to explain the movement of fluid contaminants.

The impact of soil contaminants upon the human population is dealt with in a number of papers. In most cases, little is known about the toxicology of contaminants within the soil, so any threshold figures must be tentative. In the absence of any others, the figures for soil pollutants used by the Ministry of Housing, Physical Planning and Environment of the Dutch Government are of great interest. A figure is given below which soil may be considered to be free of contamination, another figure represents a thresh-

old above which further investigation should be initiated and when a third figure is exceeded a clean-up operation is imperative.

Site assessments using various techniques are described including chemical physical and biological analysis and remote sensing methods. Many papers draw attention to the dangers for workers involved in site reclamation, especially from toxic chemicals, gaseous emissions and underground fires. These problems and many others are described and discussed in the case studies.

Normal soils must be the baseline against which contamination must be judged. Many of the methods of analysis used by soil scientists may be used or adapted for analysis of contaminated soils. There is also an urgent need for soil scientists to effectively contribute to this area of study. As is inevitable in a collection of conference papers the contributions are variable in quality and the quantity of information presented. Despite this shortcoming the editors and publishers are to be commended for drawing attention to a significant problem. Although prohibitively expensive to buy, the content of this book is of interest to all applied soil scientists.

Price: Dfl. 500,00; $ 197,50; £ 138.50.

Orders: Kluwer Academic Publishing Group, P.O. Box 322, 3300 AH Dordrecht, The Netherlands, In the U.S.A. and Canada: Kluwer Academic Publishers, 190 Old Derby street, Hingham, MA 02043, U.S.A. In U.K. and Ireland: MTP Press, Falcon House, Queen Square, Lancaster, U.K. LA1 1RN.

E. M. Bridges, Swansea

The Roots of Catastrophe, The 1972 Case History. R.V. Garcia and P. Spitz, editors. Pergamon Press, Oxford, New York, 1986, 211 p. ISBN 0-08-025825-5.

The third volume in the series of Drought and Man contains case studies used in the long in-depth study set up by the International Federation of Institutes for Advanced Study (IFIAS) and the Aspen Institute following the Sahel drought. They consider areas in Latin America, particularly northeast Brazil, the case of Tanzania, and discuss colonial disjunction in Sahelian countries. The presentation of each chapter has been written with the purpose of introducing the subject within its proper context and, at the same time, showing how each study confirms the structural 'crisis' explained in the project.

Price: £ 35.00; US$ 50.00.

Orders to: see below.

Dry Area Agriculture: Food Science and Human Nutrition. D. F. Nygaard and P. L. Pellett, editors. Pergamon Press, Oxford, New York, 1986, 384 p. ISBN 0-08-033996-4.

This publication is an attempt to capture two rather independent themes. The first is a presentation of the proceedings of a workshop where discussions were aimed at indentifying economic development problems, particularly in rural areas, and surveying the status and effectiveness of efforts of researchers and development agencies to find solutions to these problems. The second is a recording of the results of a conscientious effort to foster a dialogue among a multidisciplinary group of people. General topics include malnutrition, hunger, food policy, nutrition, genetic improvement, food production and harvesting.

Price: £ 28.50 or $ 40.00.

Orders to: Pergamon Press, Headington Hill Hall, Oxford OX3 OBW, England; or: Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A.

Intermediate Statistics for Geographers and Earth Scientists. R. B. G. Williams. MacMillan Education Ltd., Houndmills and London, 1986, x + 361 p. ISBN 0-333-35274-2. ISBN of associated STATCALC software: 0-333-39598-0.

The present work is offered as a companion to 'Introduction to Statistics' by the same author which was published in 1984. It explains more advanced statistical techniques than its predecessor, including analysis of variance, curvilinear and multiple regression, and covariance analysis. Numerous worked examples are provided which are drawn from the fields of geography, planning and the earth sciences. The final chapter discusses some of the more controversial aspects of statistics, in particular the logic of significance testing.

Although this book is a continuation of 'Introduction to Statistics', it can be read quite independently by anyone with a knowledge of the basic techniques of statistics. The text was originally developed as background reading for a course at the University of Sussex, and has been much modified as a result of experience of teaching the subject. Only a limited knowledge of mathematics is required. It is written for both class teaching and private study.

Software programs that implement many of the statistical techniques discussed in this book are available on disc for the BBC microcomputer (STATCALC). These programs are written in BASIC and are fully listable. In contrast to this book, the emphasis of the programs is on carrying out calculation rather than explaining the techniques. The programs assume that users are sufficiently familiar with the techniques to decide which ones are appropriate for analysing their particular data sets, and also are knowledgeable enough to interpret the results of the analyses. All the programs have been tested and run successfully on a wide range of research data.

Price: £ 10.50. Companion volume: ISBN 0-333-0000-0. Associated software STATCALC, ISBN 0-333-39598-0.

Orders to: Macmillan Education Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, England.

Aspects of Loess and loess-derived. Slope Deposits: an Experimental and Micromorphological Approach. H. J. Mücher. Thesis, University of Amsterdam, 1986, 267 p. ISBN 90-6787-004-8.

Loess deposits cover almost ten percent of the continental area of the world. Due to the excellent properties of loess for agriculture and its applications, mainly in the brick industry, it is an important deposit. However, loess is not fertile in warm arid regions with a precipitation of less than about 250 mm/year.

Loess has received much attention from the earliest farmers and soil scientists, and from scientists of various other disciplines studying the genesis and properties of loess deposits. This has resulted in a very extensive literature on various aspects of loess.

Natural and anthropogenic deforestations and the introduction of agriculture, resulted in (accelerated) erosion. This erosion could result in the disappearance of all fertile loess deposits, if no measures are taken. Because of the danger of accelerated erosion, many investigators have focussed attention on the properties of loess about which information is relevant to the development of appropriate conservation methods. To investigate the events which have led to the present distribution of redeposited material and soils, in addition to information on the physical properties of the loess, it is also desirable to be able to distinguish loess which has been transpored after eolian deposition from that which is still in situ.

Because of its fine grain-size composition and homogeneous structure the recognition of redeposited loess is macroscopically not always possible in the field.

It is important to be able to differentiate between slope deposits, and soil and weathering products which in are in situ. Micromorphological analysis can provide evidence of soil formation in situ, which is not visible in the field. In addition to the information which can be obtained about type of soil formation and evidence of transportation, micromorphological investigations of slope deposits can contribute to the reconstruction of environmental conditions during sedimentation.

The aim of this study is threefold, i.e.: to establish criteria for the identification of redeposited loess-derived materials; to find micromorphological characteristics of the various types of redeposited loess-derived materials, in order to identify their mode of formation; and to demonstrate how micromorphological analysis can be applied to field studies, involving environmental reconstruction.

Requests to: Physical-Geography and Soil Science Laboratory, University of Amsterdam, Dapperstraat 115, 1093 BS Amsterdam, the Netherlands.

Hillslope Processes. A. D. Abrahams, editor. The Binghamton Symposia in Geomorphology: International Series, no. 16. George Allen and Unwin. Boston, London, 1986, xiv + 416 p. ISBN 0-04-551102-0. Hard-bound.

Hillslopes occupy most of the land surface of the Earth. In areas of erosional topography the entire landscape, except the valley floors, consists of hillslopes. Consequently, hillslopes are a major focus of research in geomorphology. The study of hillslope is essential not only in order to understand better the natural landscape but also for numerous practical reasons, such as controlling soil erosion and sedimentation on agricultural lands and mitigating the hazard posed by landslides. Geomorpholoogists have studied hillslopes since the latter part of the 19th century, but until the late 1950s their research focused almost exclusively on morphology. During the past 30 years, however, there has been a growing interest in hillslope processes, and today research on processes dominates this branch of geomorphology.

Hillslope processes are also studied in a variety of disciplines other than geomorphology. Moreover, studies within geomorphology owe a considerable delt to and are often closely linked with these other disciplines, which include hydrology, pedology, agricultural engineering, civil engineering, and engineering geology. Thus the study of hillslope processes is truly an interdisciplinary science. At the heart of this science is geomorphology: insofar as it is concerned with both hydraulic and gravitational processes, it alone seeks to integrate the more specialized knowledge generated by the other disciplines.

Because the scientists conducting research on hillslope processes work either within or on the margins of several disciplines, they bring to the subject different sets of skills, experiences, and approaches. The Symposium on 'Hillslope Processes' was with the objective of bringing together representatives of the various disciplines concerned with hillslope processes for the first international meeting on the subject. The goals of the symposium were to provide a forum for the presentation of current research on hillslope processes, to facilitate the exchange of ideas and the dissemination of new developments across disciplinary boundaries, and to generate new initiatives for future research and cooperation.

The proceedings of the symposium are contained in this volume. Following the opening chapter of general interest on the comparative rates of denudation by the various slope processes, there are nine papers on hydraulic processes and eight on gravitational processes.

The contributions illustrate that during the past 30 years the study of hillslope processes has become increasingly technical and complex. Allegorically, this field of study has grown from childhood to adolescence. Although it has come a long way in three decades, it is still far from maturity, and much basic work remains to be accomplished. For instance, the basic hydraulics and mechanics of most hillslope processes remain poorly understood, and there is an urgent need for field experiments on the scale of the entrie hillslope rather than the small plot. Finally, obvious problems exist with extrapolating the results of process studies over space and through time in order better to understand hillslope morphology.

Price: £ 37.50.

Orders to: George Allen and Unwin. P.O. Box 18, Hemel Hempstead, Herts. HP2 4TE England; Allen & Unwin, 9 Winchester Terrace, Winchester, MA 01890, U.S.A.; or: P.O. Box 764, North Sydney, NSW 2060, Australia.

Milieux et Paysages. Essai sur diverses Modalités de Connaissance.
Collection Recherches en Géographie, sous la direction de Y. Chatelin et G. Riou. Masson, Pares, New York, 1986. 154 p. ISBN 2-225-80818-X.

De la forêt congolaise au désert du Sahel, du Fouta-Djalon au Kilimandjaro, de la Guyane à Java, ce groupe de chercheurs (pédologues, géographes, botanistes) a parcouru et étudié, depuis une vingtaine d'années, une grande partie de la zone tropicale. Au cours de ces années, ils ont été confrontés avec des paysages très différents, des milieux très complexes, un développement extraordinairement rapide des savoirs et des savoir-faire. Mais parallèlement, ce progrès scientifique les entraînait et les isolait dans le cadre étroit de spécialisations de plus en plus approfondies. L'observation de nouveaux détails leur faisant oublier l'ensemble de notre milieu de vie.

Au cours de ces découvertes, ils ont pu confronter leur savoir de laboratoire à celui du paysan malgache, du riziculteur javanais ou du pasteur peul. Et ils ont pris de la nécessité de ne jamais oublier un savoir à l'aide d'un autre. Pour ces chercheurs, il était alors essentiel d'analyser leur démarche scientifique. Cette analyse a entraîné une recherche de l'histoire de leur discipline et de l'histoire de la découverte du monde tropical. Ils ont pu admirer l'accumulation progressive de ces connaissances, souvent difficilement conquises et parfois perdues, ainsi que les voyageurs, naturalistes, dessinateurs et écrivains qui, au cours des siècles, ont participé à la découverte de la nature.

Du savoir traditional à la connaissance scientifique, d'une première impression à une analyse détaillée, d'une recherche routinière à la critique lucide d'une discipline, il n'est pas facile de se remettre toujours en question ou d'éviter des contradictions successives. Ce cheminement les a amenés à d'autres interrogations, d'autres analyses; par exemple sur l'éclatement du savoir, sur la nature de la Nature.
Prix: FF 98.00.
Commandes à: Masson, 120 Bd Saint-Germain, F-75280 Paris Cedex 06, France; or: Masson Publ. U.S.A., Inc., 1 Ames Court, Plainview, NY 11803, U.S.A.

The Revolution of New Technology. Proceedings of a Symposium jointly organized by the People's Republic of China and the Commission of the European Communities, Beijing, October 1985.C.E.C., 317 p.

In these proceedings, participants have described their thoughts on the future technological challenges and current efforts in policy making and implementation to deal with them. It is believed that the essential problem is not the technology, but the management of technololgy, particularly of those technological developments which would help to cope with each nation's domestic contexts and to construct and enrich the nature of world social economy.
Requests to: Office for Official Public. of the European Communities, 2, rue Mercier, L-2985 Luxemburg.

Anthropogenetic Indicators in Pollen Diagrams. K. E. Behre, editor. A. A. Balkema Publ. Rotterdam and Boston, 1986, viii + 232 p. and 22 enclosures. ISBN 90-6191-673-9. Cloth.

Human impact has been the most important factor effecting vegetation change, at least in Europe, during the last 7000 years. With the onset of agriculture, at the so-called Neolithic revolution, the human role changed from that of a passive component to an active element which impinged directly on nature. This change had dramatic consequences for the natural environment and landscape development. Arable and pastoral farming, the actual settlements themselves and the consequent changes in the economy significantly altered the natural vegetation and created the cultural landscape with its many different and varying aspects.

From very shortly after its inception, pollen analysis was employed not only to reconstruct the general history of vegetation but also to trace the history of habitation and settlement and to elucidate the different forms of agriculture economies in both the prehistoric and historical periods. Since particular species, e.g. cultivated plants, weeds and some other species, occur only in the context of or are at least highly correlated with human activity and, furthermore, since many of these species are represented in the pollen record, the concept of anthropogenic indicators has been developed. The presence of anthropogenic indicators in pollen diagrams enables to trace the history of habitation and its changing intensity with time. In addition, attempts have been made to reconstruct the different types of agriculture pursued in earlier periods. The interpretation and evaluation of the occurrence of some indicator species in the context of prehistoric agricultural systems, which have no modern counterpart, are the subject of ongoing discussion.

To improve the criteria used for reconstructing human impact as recorded in pollen diagram a working group to consider 'Methods of interpretation of anthropogenic indicators in pollen diagrams' was established in 1982. Membership of the Group was limited to those working in the area of Europe north of the Alps. The topics considered were also limited to those which pertain to this area.

Different methodological approaches are employed to obtain a better evaluation of anthropogenic indicators. These include the correlation of the pollen record with old systems of land use as noted in historical sources or with systems still extant but of very limited distribution; comparison with the archeological record, and the evaluation of the record of human activity in pollen diagrams from different parts of Europe through prehistoric and mediaeval periods. The various contributions were presented and discussed at a symposium which took place in Wilhelmshaven in October 1985.

The present publication contains the contributions prepared for the symposium, revised after intensive discussions and, in some instances, the results of further research.
Price: Dfl. 75,00, US$ 30.00 or £ 21.00.
Orders to: A. A. Balkema Publ., P.O. Box 1675, 3000 BR Rotterdam, the Netherlands. In U.S.A. and Canada: A. A. Balkema Publ., P.O. Box 230, Accord, MA 02018, U.S.A.

State-of-the-Art: Irrigation, Drainage and Flood Control, No. 3. K.K. Framji, editor. International Commission on Irrigation and Drainage (ICID), New Delhi, 1984, 455 p.

This volume in the State-of-the-Art series discusses two items. In part 1, irrigation by low quality waters, 15 papers deal with the use of reclamed water, irrigation water quality criteria, irrigation by saline water, and some related papers. Part 2, status on irrigation, drainage and flood control techniques, contains 2 papers emanating from the work of the ICID Committee on Construction and Operation.

Price: US$ 39.00.

Orders to: see below.

Design Practises of Open Drainage Channels in an Agriculture Land Drainage System. A World-wide Survey. K.K. Framji, B.C. Garg and S.P. Kaushish, editors. International Commission on Irrigation and Drainage (ICID), New Delhi, 1984, 343 p.

This global survey will provide useful information to irrigation and drainage engineers and scientists the world over about the practices being followed in various countries for the layout and design of drainage channels in agricultural lands. It will also help in identifying the areas where standardization of certain planning and design aspects could be attempted, and also the scope of further research and technological developments in the field of drainage for better management of agricultura and increased crop yield from them.

Price: US$ 34.00.

Orders to: Dr. B. C. Garg, Secretary, ICID, 48 Nyaya Marg, Chanakyaburi, New Delhi 110 021, India.

Soil-Plant Relationship. An Ecological Approach. D. W. Jeffrey. Croom Helm, London and Sydney, Timber Press, Portland, 1987, 295 p. ISBN 0-7099-1464-4 (paperback, U.K. edition); 0-88192-076-2 (paperback, U.S.A. edition).

This is a guide book for students through a subject area with many facets. The first two parts concentrate on assembling basic ideas on plants and then soils, setting the multidisciplinary scene. Plants are viewed first as the centre of a complex of organisms with specific mineral requirements and capable of processing energy, water and minerals. Symbiotic relationships are described which facilitate ion accumulation and other relationships contribute to the transfer of ions within ecosystems. Sols are described as a vital portion of general environment, supplying ions and water on the one hand, whilst also subjecting the plant to growth constraints. The text provides a basic understanding of the phenomena described, emphasising the possibilities for experimental investigations. The third part contains case histories which draw on the descripitive text. They range from simple autecological studies, those at the ecosystem or watershed level, and complex examples with many interacting soil factors.

Price: £ 11.95 in U.K.

Orders to: Croom Helm Ltd., Provident House, Burrell Row, Beckenham, Kent BR3 1AT, England; or: Timber Press, 9999 S.W. Wilshire, Portland, OR 97225, U.S.A.

Microbial Autecology. A Method for Environmental Studies. R. L. Tate III, editor. John Wiley & Sons, New York, Chichester, 1986, xi + 266 p. ISBN 0-471-80922-5.

Autecology is defined by ecologists as the study of individual organisms or species within an ecosystem. Aspects of the work include evaluation of microbial life cycles and behavior as a means of adaptation of the individuals to the environment. This is contrasted with synecology, which involves the study of groups of organisms that are associated together as a unit.

Although many of the classical microbiological studies are prime examples of autecological research, microbial autecology must still be considered to be a science in its infancy. This is not the result of limited interest in the subject but rather the situation is derived primarily from the lack of readily available techniques for the study of individual microbial populations in situ. Until recently, microbial autecological research was essentially synonymous with laboratory or test tube studies. The vision of the scientists involved with such research has in recent years been expanded by the introduction of fluorescent antibody and radioautographic procedures. Although the procedures are complex, microorganisms can finally be observed in samples of native habitats. With the development of automated laboratory and field analytical procedures and the incorporation of microcomputers into data analysis, we have approached the technical expertise that will allow the science to grow into maturity. This growth will include an expansion of the vision of the scientists conducting the research so that instead of being limited to evaluation of the behavior of one or a few microbial species in an ecosystem, they will be able to observe concurrent population fluctuations of entire communities.

The present book is complete introduction to the field. It describes the methods available for analysis of the biological, chemical, and physical data collected for autecological studies. It gives important background on the history and current status of autecology. A range of techniques is described and analyzed to give readers a firm understanding of the field and current research areas.

It brings together methods available from both within and without the ecological disciplines for a fully comprehensive analysis of 'state of the art' research in the major ecosystem types of soils, fresh waters, and marine ecosystems.

Price: £ 41.35.

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Utilization, Treatment and Disposal of Waste on Land. E.C.A. Runge et al., editors. Soil Science Society of America, 1986, 318 p. ISBN 0-89118-781-2.

This publication contains the proceedings from a workshop devoted to the utilization, treatment, and disposal of waste on land.

The objectives of the workshop were: (1) to bring together experts involved with various aspects of utilization, treatment, and disposal of waste on land; (2) to update interested individuals in this important use of soils in solving society's increasing problem with waste management; (3) to publish these papers in a proceedings so the information can be made widely available in one publication; and (4) to draw attention to the role soil science disciplines have in helping solve societal problems in an economic way.

The workshop consisted of invited papers from various disciplines under four general areas: 1) land treatment of sewage effluents with minimum pretreatment-large flows-land application; 2) small flows – onsite clustered systems; 3) land application of municipal sludges; and 4) hazardous waste in the soil environment.

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Integrated Rural Development. Proceedings of a Symposium, T.L.V. Ulbricht, editor. Nationale Raad voor Landbouwkundig Onderzoek, Den Haag, 1986, 278 p. ISBN 90-5059-002-0.

The universal problem of backward rural areas is difficult to quantify. A level of development which is at the bottom end of the scale in one country is regarded as prosperity in another. One country may comprise within its borders both backward regions and prosperous areas, while in others the entire territory except the cities may be a source of concern. A third difference is that some countries have a good infrastructure and public facilities, which give them the means to tackle the problem, while others only possess these resources to a very limited degree.

Although the situation may vary substantially from country to country, the results of the symposium on Integrated Rural Development held in Wageningen in September 1985, will be of great interest to all those involved in this field. This is principally the consequence of the method of approach employed. The problem of development have been analysed at local level by means of a study of a total of 12 regions in 8 EEC countries. The study shows how great the interaction is between different factors which determine prosperity and welfare. It is also clear that a general national or EEC programme will not produce the desired results unless it is in the form of an outline programme which makes it possible to differentiate according to local circumstances.

The present proceedings contain 17 papers and a record of the ensuing discussions; 12 of the papers are in English in 5 in French.

Price: Dfl. 45,00, DM 40.00, FF 128.00, £ 13.00.

Orders to: National Council for Agricultural Research, P.O. Box 297, 2501 ED The Hague, The Netherlands.

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