No. 20 1962

BULLETIN

OF THE INTERNATIONAL SOCIETY
OF SOIL SCIENCE

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BULLETIN

DE L'ASSOCIATION INTERNATIONALE
DE LA SCIENCE DU SOL

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MITTEILUNGEN

DER INTERNATIONALEN BODENKUNDLICHEN
GESELLSCHAFT

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DRUKKERIJ SYSTEMA N.V. — AMSTERDAM (HOLLAND)

INTERNATIONAL SOCIETY OF SOIL SCIENCE
ASSOCIATION INTERNATIONALE DE LA SCIENCE DU SOL
INTERNATIONALE BODENKUNDLICHE GESELLSCHAFT

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No. 20 **1962**

NEWS OF THE COMMISSIONS

Joint Session Commissions IV and V
New Zealand 1962

FINAL REMINDER

The printed „Invitation" circular has now been posted to all members of the International Society of Soil Science. No further general circular will be issued, but a final notice will be sent to all those who have returned the „Notice of Intent" form, enclosed with the „Invitation". Any member who hopes or expects to participate in the Conference, should therefore, if he has not already done so, return the „Notice of Intent" form immediately.

The final notice will be sent out in June.

This announcement is therefore the last general notice to members concerning the November, 1962, Conference of Commissions IV (Soil Fertility and Plant Nutrition), and V (Soil Genesis, Classification and Cartography) to be held in New Zealand.

Further information may be obtained by writing to:

The Secretary-General,
International Soil Conference,
P.O. Box 8001,
WELLINGTON, New Zealand.

Indications at present are that a good and very representative attendance of members will be participating in the Conference. Enquiries have come in from over 50 countries, and a very good offering of papers has been received. These are now being edited for pre-printing. A particularly encouraging response has been received from National Societies for Section B of the programme (Soil Classification and Soil Fertility). Over 30 countries have offered contributions, so that very worthwhile discussions should result.

Local arrangements for the Conference are proceeding smoothly, and detailed planning for the tours and meetings is well in hand. At present, however, it appears that unless more registrations are received from Europe, the proposed Charter flight from Amsterdam to New Zealand and return will have to be abandoned.

Commission I

(This manuscript has been received during the printing of the Bulletin and could therefore not be translated in time into the two other officials languages: french and german.)

Soil Physics Terminology

A preliminary report by the committee established at the 7th Congress at Madison 1960.

A. Terms relating to the state of water in soil.

Water in soil is subject to several force fields originating from the presence of the soil solid phase and dissolved salts and from the action of external gas pressure and the gravitational field. These effects may be quantitatively expressed by assigning potentials to the soil water.

The sum of these potentials is designated through the total potential of soil water and may be identified with the partial specific Gibb's free energy of the soil water relative to free water at the same temperature.

1. Total potential of soil water:

The amount of work that must be done per unit mass of water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool of pure water at a specified elevation at atmospheric pressure, to the soil water (at the point under consideration).

It may be convenient to divide the total potential into parts. It is imperative that the division be such that the sum of all the parts equals the total potential. The following division is suggested:

1.1 *Osmotic potential:*

The amount of work that must be done per unit mass of water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool of pure water at a specified elevation at atmospheric pressure, to a pool containing a solution identical in composition with the soil solution*) (at the point under consideration) but in all other respects identical to the reference pool.

1.2 *Gravitational potential:*

The amount of work that must be done per unit mass of water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool containing a solution identical in composition to the soil solution at a specified elevation at atmospheric pressure, to a similair pool at the elevation of the point under consideration.

1.3 *Pneumatic potential:*

The amount of work that must be done per unit mass of water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool containing a solution identical in composition to the soil solution at the elevation of the point under consideration at atmospheric pressure, to a similar pool subject to a gas pressure equal to the gas pressure on the soil water.

1.4 *Matric or capillary potential:*

The amount of work that must be done per unit mass of water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool containing a solution identical in composition to the soil solution at the elevation and the gas pressure of the point under consideration, to the soil water.

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*) The soil solution is understood to be a solution containing the dissolved components present in the soil water and in osmotic equilibrium with the soil water.

2. **Matric or soil water suction:**

The negative gauge pressure, relative to the external gas pressure on the soil water, to which a solution identical in composition with the soil solution must be subjected in order to be in equilibrium through a porous permeable wall with the water in the soil.

It should be noted that this quantity may be identified with the matric or capillary potential defined above, allowance being made for the use of the proper sign and proper units.

3. **Osmotic suction:**

The negative gauge pressure to wich a pool of pure water must be subjected in order to be in equilibrium through a semipermeable (i.e. permeable to water molecules only) membrane with a pool containing a solution identical in composition with the soil solution.

It should be noted that this quantity may be identified with the osmotic potential defined above, allowance being made for the use of the proper sign and proper units.

4. **Total suction:**

The negative gauge pressure, relative to the external gas pressure on the soil water to which a pool of pure water must be subjected in order to be in equilibrium through a semi-permeable membrane with the water in the soil. Total suction is thus equal to the sum of matric or soil water suction and osmotic suction.
Total suction may also be derived from vapour pressure measurements of the atmosphere in equilibrium with the soil water.

5. **Hydraulic head:**

The elevation with respect to a specified reference level at which water stands in a piezometer connected to the point in question in the soil. Its definition can be extended to soil above the water table if the piezometer is replaced by a tensiometer.

It should be noted that the hydraulic head is a potential expressed in terms of the height of a water column. More specifically it can be identified with the sum of gravitational, pneumatic and matric or capillary potentials which can be termed the *hydraulic potential.*

6. **Water content:**

The amount of water lost from the soil upon drying at 105° C, expressed either as the weight of water per unit weight of dry soil or as the volume of water per unit volume of soil in bulk.

The relationships between water content and matric or soil water suction (which depends on the history of the adsorption and desorption of the soil) can be referred to as the *soil moisture characteristics.* The special desorption curve starting from the saturated state can be referred to as the *soil water retention curve.*

7. **Differential water capacity:**

The absolute value of the rate of change of the water content with matric or soil water suction.

The water capacity at a given water content will depend on the particular desorption or adsorption curve employed. Distinction should be made between volumetric and specific water capacity.

B. **Terms relating to the movement of water in soil.**

Experimentally it has been established that generally the flow of a fluid in a porous medium can be described by Darcy's law which states that the flux of fluid is proportional to the driving force. In viscous flow of water in soils, the driving force equals the negative gradient of the hydraulic potential.

8. **Hydraulic conductivity:**

The constant of proportionality in Darcy's law as applied to the viscous flow of water in soils, i.e. the flux of water per unit gradient of hydraulic potential.

If conditions require that the viscosity of the fluid be divorced from the conductivity of the medium, it is convenient to define the *instrinsic permeability* of the soil as the conductivity, expressed in gm^{-1} cm^3 sec multiplied by the viscosity in poise.

For the purpose of solving the partial differential equation of the stationary flow, it is convenient to introduce a variable termed the *diffusivity*. For non-stationary water flow the *soil water diffusivity* is defined as follows:

9. **Soil water diffusivity:**

The hydraulic conductivity divided by the volumetric water capacity (care being taken to be consistent with units), or the flux of water per unit gradient of moisture content in the absence of other force fields.

C. **Symbol, dimension and unit for the above given terms.**

	Term	Symbol	Dimension	Unit
1	Total potential	..	L^2 T^{-2}	erg gm^{-1}, joule kg^{-1}
1.1	Osmotic potential . . .	O	L^2 T^{-2}	erg gm^{-1}, joule kg^{-1}
1.2	Gravitational potential .	Z	L^2 T^{-2}	erg gm^{-1}, joule kg^{-1}
1.3	Pneumatic potential . .	P	L^2 T^{-2}	erg gm^{-1}, joule kg^{-1}
1.4	Matric potential . . .	M	L^2 T^{-2}	erg gm^{-1}, joule kg^{-1}
2	Matric suction		M L^{-1} T^{-2}	dyne cm^{-2}, bar, cm water, cm Hg
3	Osmotic suction . . .		M L^{-1} T^{-2}	dyne cm^{-2}, bar, cm water, cm Hg
4	Total suction		M L^{-1} T^{-2}	dyne cm^{-2}, bar, cm water, cm Hg
5	Hydraulic head . . .	H	L	cm, m
5.1	Hydraulic potential . .	..	L^2 T^{-2}	erg gm^{-1}, joule kg^{-1}
6	Water content	w		cm^3 cm^{-3}, gm gm^{-1}
7	Differential water capacity	C	M^{-1} L T^2	cm^2 $dyne^{-1}$, bar^{-1}
8	Hydraulic conductivity .	K	**)	**)
8.1	Intrinsic permeability .	k	L^2	cm^2, Darcy
9	Soil water diffusivity .	D	L^2 T^{-1}	cm^2 sec^{-1}

*) Symbols as C, K and D may have worth as a subscript if they in the same paper are used for water as well as for heat.

**) The dimension would depend on the units used to describe the driving force as shown in the table below:

Driving force		Hydraulic conductivity	
	Dimension	Dimension	Unit
Hydraulic potential gradient	L T^{-2}	T	sec
Hydraulic head gradient	L L^{-1}	L T^{-1}	cm sec^{-1}
Pressure gradient	M $L^{-2}T^{-2}$	M^{-1} L^3 T	gm^{-1} cm^3 sec

D. **Other terms.**

The terms considered above are capable of precise physical definition. There have grown up over the years several other terms concerning the moisture condition of soils e.g. „field capacity". Although useful in a qualitative way, they have no precise physical definition, depending on various variable physical factors. The committee recommends that, if these terms are used, a full description of the boundary conditions and method should be given.

E. **Remarks.**

It should be noted that only for two terms there is a slight divergence of opinion. In those cases two possibilities are given: *Matric or capillary potential* and *matric or soil water suction*. In that way the committee fully agrees upon the report given above. For the present preliminary report the following information can be given concerning reasons for choosing one or the other of the terms:

Aslyng, Bolt, Gardner, Holmes and Rode prefer the terms matric potential and matric suction. Matric is derived from the term matrix (the solid phase). Matric covers both adsorption and capillarity due to the solid phase and between which it is not possible to distinguish in measurements. The selected terms should in soils be applicable above, below and at the level of the ground water table, and in order to be consistent the same term should be used in connection with both potential and suction.

Miller and Youngs prefer to discourage the use of the word matric (which refers to the solids) since it is no better than the existing commonly used word capillary (which refers to the interconnecting voids); the two are complementary, and any arguments concerning adsorption and capillarity are applicable to both. We therefore prefer to keep to Buckingham's capillary potential, rather than confuse the literature further by introducing new terms which are no more informative. We do not think that the same term should necessarily be used for both potential and suction. The former is a theoretical concept, the latter a practical measurement. Thus we prefer to keep the use of the term soil water suction which gives a good description of the measurement and does not link it irreconcilably with present-day theoretical concepts which may prove incomplete later on.

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Huntingdon Road
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Hydrotechnical Laboratory
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Denmark

COPENHAGEN, March 20th, 1962

NOTE. Those who feel strongly against the draft must *in writing* state their arguments and suggestions concerning alterations to the Secretary General of the I.S.S.S., c/o Royal Tropical Institute, 63, Mauritskade, Amsterdam, Netherlands, within two months after having received this number of the Bulletin.

Commission I

(This manuscript has been received during the printing of the Bulletin and could therefore not be translated in time into the two other official languages: french and german.)

Soil Structure Working Party

As a result of the decision of the Council of ISSS in its meeting of August 21, 1960, in Madison, Wisconsin (see Bulletin No. 17 page 8) a West-European working group on soil structure was established. The group held its first meeting in Wageningen (Netherlands) on 13 and 14 February, 1962.

Delegates from Austria, Belgium, France, Germany, Great Brittain, Israël and the Netherlands took part in these initial deliberations. The following subjects were discussed:

Necessity of listing detailed information on the soil which is being investigated, including: (i) general information, (ii) field information on the actual soil structure, (iii) basic laboratory information on soil components (IV) basic laboratory information on soil properties (V) behaviour of soil on external forces (vi) recommended characterizations.

A further major point was: procedure for collecting and distributing descriptions of technics, and of standardization of methods.

The pertinent data to collect through national secretaries will be the base of a manual, to be published in mimeographed form by Dr. M. de Boodt, Soils Department, Agricultural University, Ghent, Belgium.

The next meeting is scheduled for spring 1963 in Paris.

For further information apply to:

Ir. P. Boekel
Institute for Soil Fertility
Van Hallstraat 3
GRONINGEN, Netherlands

Commission III

During the Madison Congress 1960, it was decided that on behalf of Commission III a New Bulletin „Soil Microbiological Methods Newsletter" be established.

After a long time of preparation, this now has been achieved. 150 Subscriptions, divided over 24 countries, have been registered.

The first mimeographed copy of the Bulletin is now available. Applications are to be sent to: Dr. J. Pochon, Institut Pasteur, 25, rue du Docteur Roux, Paris, XVe, France.

Special meeting of Commission III

The organization of the meeting on Soil Fauna, Soil Microflora and their Relationship proceeds quite satisfactorily. 75 persons have registered for the colloquy. Eighteen countries, among which most European countries, will be represented. Titles of 40 papers have been received and are about evenly distributed over the sections. Is seems that both among soil zoologists and among soil microbiologists the theme of the colloquy has met with much interest. This provides for a good basis for a succesful meeting. The preliminary timetable as published in the first circular remains unchanged. It is intended to include in the Proceedings, which will be published by the North Holland Publishing Company, a bibliography on the relationships between soil fauna and soil microflora. For this purpose all participants have been kindly invited to go through their card index and to make a list of the appropriate titles.

The registration fee for the colloquy of D. *f* 50,— entitles the participants to receive the proceedings. For further details see Bulletin No. 19, page 5 an 6.

NOUVELLES DES COMMISSIONS

Réunion conjointe des Commissions IV et V
Nouvelle Zélande 1962

DERNIERE ANNONCE

La circulaire d'invitation imprimée a été envoyée à tous les membres de l'Association Internationale de la Science du Sol. Aucune autre communication générale ne suivra, mais une note finale sera adressée aux membres qui ont retourné le formulaire intitulé „Intention de participer" joint à la lettre circulaire d'invitation. Cette note sera envoyée au cours de Juin.

La présente annonce est donc la dernière communication générale aux membres concernant la Conférence Internationale des Sols, Nouvelle Zélande, Novembre 1962.

Pour toutes informations ultérieures, prière de s'adresser à:

The Secretary General
International Soil Conference
P.O. Box 8001
WELLINGTON, New Zealand.

Tout fait prévoir à présent que l'intensité de participation sera très favorable. Demandes d'informations ont été reçues de plus de 50 pays, ainsi qu'un choix de contributions. Ces textes sont maintenant en voie de préparation pour la publication avant-Congrès. Une réponse particulièrement encourageante venait des Sociétés nationales pour la section B du programme (Classification et Fertilité du Sol). Plus de 30 pays ont présentés des communications, ce qui devrait donner lieu à une discussion animée et valable.

Les arrangements locales et les plans détaillés pour les excursions et les sessions se développent efficacement. Il semble pourtant qu'à moins qu'un plus grand nombre d'inscriptions soit reçu de l'Europe, le transport proposé par avion spécial de Amsterdam à la Nouvelle Zélande ne peut pas être réalisé.

Commission III

Lors du Congrès Madison 1960 il fut décidé que dans le cadre de la Commission III, un Bulletin „Informations Techniques de Microbiologie du Sol" soit établi..

Après un long temps de préparation, ce but a été atteint. 150 Inscriptions, réparties dans 24 nations ont été enregistrées. Pour obtenir un exemplaire du premier numéro, polycopié, de ce Bulletin d'Informations s'adresser à:
Dr. J. Pochon, Institut Pasteur 25, rue du Docteur Roux, Paris, XVe, France.

Réunion spéciale de la Commission III

L'organisation de la réunion spéciale sur la fauna et la microflore du sol et leurs interrelations, est en bonne voie de développement. 75 Personnes se sont faites inscrire pour le colloque. 18 Pays, parmi lesquels pratiquement tous les pays européens, seront représentés. 40 Communications ont été reçues et réparties uniformément dans les diverses sections.

Le thème du colloque semble provoquer l'intérêt tant des zoologistes du sol que des microbiologistes du sol, ce qui est une bonne base pour atteindre à un colloque réussi. L' ordre du jour provisoire, indiqué dans la première communication, sera maintenu.

Le Comité organisateur a l'intention de faire insérer dans les Comptes Rendus de la conférence, qui seront publiés par la North Holland Publishing Company, une bibliographie sur la relation de la faune et de la microflore du sol. A cette fin, tous les participants ont été priés de bien vouloir compulser leur catalogue en fiches et de dresser une liste de références appropriées.

Le paiement des frais d'inscription pour le colloque, se montant à H. *f* 50,—, donne droit à recevoir un exemplaire des Comptes Rendus.

Pour toute autre information, voir Bulletin No. 19, page 6.

NEUES AUS DEN KOMMISSIONEN

Gemeinsame Sitzung von Kommission IV und V
Neu-Seeland 1962

ENDGÜLTIGE ERINNERUNG

Die „Einladung" ist nun als gedrucktes Rundschreiben an alle Mitglieder der Internationalen Bodenkundlichen Gesellschaft auf die Post gegeben; kein weiteres allgemeines Rundschreiben wird mehr herausgegeben. Aber eine Schlussnotiz wird noch jenen allen, welche ihre Angabe des Vorhabens zur Konferenz zu kommen zeitig eingesandt haben, zugeschickt werden. Jedes Mitglied, hoffend oder erwartend an der Konferenz teilzunehmen, möge daher, wenn nicht schon geschehen, uns umgehend seine Absicht mitteilen. Jene Schlussnotiz wird im kommenden Juni ausgehen.

Diese Ankündigung ist also die letzte allgemeine Mitteilung an die Mitglieder, die im November 1962 in Neuseeland abzuhaltenden Konferenz der Kommissionen IV (Bodenfruchtbarkeit und Pflanzenernährung) und V (Bodengenese, Klassifizierung und Kartographie) betreffend.

Weitere Information bekommt man nur auf Schreiben an:

The Secretary General
International Soil Conference
P.O. Box 8001
WELLINGTON, New Zealand.

Bisherige Anzeichen, dass eine gute und sehr representatieve Teilnahme von Mitgliedern an der Konferenz zu erwarten ist, sind günstig. Aus über 50 Ländern sind Anfragen eingelaufen und ein gutes Angebot von Verhandlungen wurde empfangen; diese werden jetzt vorgedruckt. Eine speziell ermutigende Antwort ging ein von den Nationalen Vereinen für Sektion B des Programms (Bodenklassifikation und Bodenfruchtbarkeit). Über 30 Länder haben Beiträge zugesagt, sodass die betreffenden Diskussionen ohne Zweifel der Mühe wert sein werden.

Die örtlichen Anordnungen verlaufen glatt, und mit den Einzelheiten der Pläne für die Touren und Versammlungen macht man gute Fortschritte. Jedoch scheint es, dass wenn nicht mehr Einschreibungen aus Europa einlaufen, der vorgenommene Charter-Flug von Amsterdam nach Neu-Seeland und zurück, leider aufgegeben werden muss.

Kommission III

Während des Madison Kongresses 1960 wurde beschlossen zur Herausgabe eines Bulletins: „Technische Notizen für Bodenmikrobiologia", im Rahmen der Kommission III. Nach langen Vorarbeiten ist jetzt die erste Nummer herausgekommen. 150 Einschreibungen, verteilt über 24 Länder, wurden bereits entgegengenommen.

Das jetzt erschienene Exemplar in Schlablone-Form ist erhältlich bei:
Dr J. Pochon, Institut Pasteur, 25, rue du Docteur Roux, Paris, XVe, France.

Sondersitzung der Kommission III

Die Organisation der Sitzung, die Bodenfauna, die Bodenmikroflora sowie deren gegenseitigen Verhältnisse betreffend, entwickelt sich sehr zufriedenstellend. 75 Personen haben sich bis jetzt für das Kolloquium angemeldet. 18 Länder, unter welchen fast alle Europäische, werden vergegenwärtigt sein. 40 Titel von Verhandlungen wurden schon empfangen und gleichmässig über die verschiedenen Sektionen verteilt.

Es scheint dass sowohl bei den Bodenzoologen wie bei den Bodenmikrobiologen der Kolloquiumstoff viel Interesse geweckt hat. Das verspricht, dass eine gute Basis für ein erfolgreiches Kolloquium gefunden wurde. Die vorläufige Zeittafel, wie im ersten Rundschreiben veröffentlicht, bleibt unverändert.

Es besteht die Absicht bei den Verhandlungen, welche durch die North Holland Publishing Company herausgegeben werden, eine Bibliographie über die Verhältnisse zwischen Bodenfauna und Bodenmikroflora mit einzuschliessen. Mit Hinsicht darauf wurden alle Teilnehmer freundlichst gebeten, ihre Kartothek gründlich durch zu nehmen und eine Liste von geeigneten Titeln aufzustellen.

Die Einzahlung des Einschreibungsbetrages für das Kolloquium zu D. *f* 50.— schliesst für die Teilnehmer den Empfang der Verhandlungen mit ein.

Für alle weiteren Informationen, bitte Mitteilungen Nr. 19, Seite 10/11, nach schlagen.

NEWS OF THE NATIONAL SOCIETIES
NOUVELLES DES SOCIETES NATIONALES
NEUES DER GESELLSCHAFTEN IN EINZELNEN LÄNDERN

Soil Science Society of America

The following are the 1962 officers of the Soil Science Society of America:

President:	Dr C. A. Black, Department of Agronomy, Iowa State University, Ames, Iowa.
Vice President:	Dr H. B. Cheney, Soils Department, Oregon State University, Corvallis, Oregon.
Past President:	Dr Werner L. Nelson, American Potash Institute, Inc., 402 Northwestern Avenue, West Lafayette, Indiana.
Executive Secretary:	Dr M. Stelly, 2702 Monroe Street, Madison, Wisconsin.
Editor-in-Chief SSSA Proceedings:	Dr N. C. Brady, Department of Agronomy, Cornell University, Ithaca, New York.

The 1962 annual meetings will be held August 20-23 on the Cornell University Campus, Ithaca, New York.

Asociación Argentina de la Ciencia del Suelo

The Second Argentine Convention and First Latin American Soil Science Congress will be held in Mendoza, Argentina, between the 22nd. and 30th. of April this year.

The meeting will be attended by more than 150 delegates with nearly 40 participants from other Latin American countries besides Argentine.

The papers to be submitted to the Congress, more than 100, will be discussed in eleven working sessions and will be preceded by seven lectures dealing with the recent advances in the field of soil physics, chemistry, biology, etc.

A pre-Congress tour from Buenos Aires to Mendoza (1.200 km) will be arranged and during the Congress two one day tours dedicated to irrigated and mountain soils will be organized.

All correspondence dealing with Congress matters should be addressed to: Prof. Ing. L. Nijensohn, President of the Organizing Committee, Facultad de Ciencias Agrarias, Chacras de Coria, Mendoza, Argentina.

Société Belge de Pédologie

M. le Professeur R. Tavernier fut désigné comme représentant de la Belgique dans le Conseil de l'Association Internationale de la Science du Sol.

Le Secrétaire Général de la Société communique le suivant: Le vendredi 27 octobre 1961, la Société belge de Pédologie a organisé à Gand un Symposium international, consacré aux „Applications des Sciences nucléaires en Pédologie", sous la présidence du président, Monsieur le Professeur Dr A. van den Hende. Ce Symposium a été suivi par environ 200 participants, dont des collègues français, néerlandais, allemands, italiens, grecs, égyptiens. Neuf communications ont été présentées par des pédologues allemands, français, et belges. Un numéro spécial du bulletin „Pédologie" consacré au Symposium sortira de presse début 1962 (prix: 200 FB, Secrétariat: 6 Rozier, Gand).

British Society of Soil Science

From 16th-18th April, 1962, the British Society of Soil Sciense will hold a meeting on „Productivity and Soil Type" and on „Soil Microbiology".

The autumn meeting of the Society will be held at Aberystwyth from 7th-10th September, 1962.

Sociedad Venezolana de la Ciencia del Suelo

It is a pleasure to announce the revitalization of the Venezuelan Society of Soil Science. The following officers have been elected at a meeting held on November 25th, 1961:

President:	Ing. Agr. Jesús B. Silva Calvo, Subdirector of the Shell Service for the Farmer, Cagua.
Vice President:	Ing. Agr. Alfredo Bustamante, Agrology of the Soil's Section of the Agricultural and Breed's Ministry's Center of Agronomic Investigation, Maracay.
Secretary:	Ing. Agr. Ildefonso Pla Sentís, Professor of the Venezuela's Central University's Faculty of Agronomy's Institute of Edaphology, Maracay.
Treasurer:	Ing. Agr. Emilio Hidalgo Torres, Chief, Agricultural and Breed's Ministry's Center of Investigation's Section of Soil, Maracay.
Member:	Ing. Agr. Luis Bascones, Chief, Shell Service for the Farmer's Soil Section, Cagua.

It is expected that over 50 members will affiliate with I.S.S.S.

INTERNATIONAL CONGRESSES OF ALLIED SCIENCES
CONGRES INTERNATIONAUX DE SCIENCES CONNEXES
INTERNATIONALE KONGRESSE VON VERWANDTEN WISSENSCHAFTEN

Unesco/International Association of Scientific Hydrology, October 1962, Bari, Italy: Symposium on Land Erosion.

Unesco/International Geographical Union, September 1962, Crete: Symposium on Geomorphological Mapping of Arid Regions and on Land Use Problems in Arid Mediterranean Climates.

Meeting of the Advisory Committee for Humid Tropics Research of Unesco Honolulu, Hawaii, August, 1961.

Dr. G. Donald Sherman of the University of Hawaii, who represented I.S.S.S. at this meeting, reports as follows:

The meeting was called to order by Professor G. Mangenot.

Dr. F. R. Fosberg was elected chairmain for this meeting.

The Secretariat Report reviewed the activities of the Commission and their progress. The Commission discussed projects in the following areas:

1. Taxonomic Research in Animal and Plant Resources.

   They stressed the need for accurate identification of fauna and flora from both regional and local aspects.
   The need for storage facilities for specimens was considered most critical.

2. Ecological Research

   The contributions of various areas of research were discussed. There is a need for more geological and climatological information for the ecologist. The soil scientist can contribute information through soil survey and also through a greater emphasis on soil formation processes. There is a need, also, for more research in the function of vegetation in the control of erosion and floods.

   Lastly, the need for evaluation of all natural resources was considered a valid area for the Commission's attention.

The Commission made the following recommendation for future symposiums.

1. River Deltas — This symposium would study the problems of reclamation of river deltas. This symposium would be held at Bangkok in 1962.
2. Laterites — There was strong support for a symposium to be held in „laterites" some where in Africa in possibly 1962. The Commission felt that a symposium on this subject would be very fruitful and would help develop a common understanding of the laterite.

The representative of the International Geographical Union announced that it had prepared a bibliography in the humid tropical regions.

IV-ème Symposium International de „AGROCHIMICA" sur l'adsorption des éléments nutritifs par la végétation Pisa — Firenze, 9—14 avril 1962

Siège du Comité organisateur: Istituto di Chimica Agraria della Università degli Studi di Pisa — Via S. Michele degli Scalzi, 2.

5 Discours principaux seront tenus, par M.M. les Professeurs Dr. O. T. Rotini, Pisa (Italie): Aspects essentiels de l'adsorption des éléments nutritifs par la plante
Dr. R. Scott Russell, Oxford (R.U.): La perméabilité de la cellule
Dr. A. I. Kursanov, Moscou (USSR): Le transport cellulaire
Dr. E. Epstein, Davis (Cal., U.S.A.): Interaction ionique
Dr. H. B. Tukey, East Lansing (Michigan, U.S.A.): La fertilisation foliaire
Dr. M. V. H. Homès, Bruxelles (Belgique): La solution hydroponique.

Un nombre d'autres contributions sera présenté par des spécialistes dans le domaine scientifique faisant l'object du colloque.

NEW EDITIONS — NOUVELLES EDITIONS — NEUE AUSGABEN

Nuclear Methods for Measuring Soil Density and Moisture

Newly developed nuclear methods for accurate and rapid measurement of moisture and density of soil are presented in the Symposium on Nuclear Methods for Measuring Soil Density and Moisture, STP-293, just published by the American Society for Testing and Materials.

The papers present data obtained on specific projects and evaluate the methods by comparing results with those obtained by the conventional sand-cone and oven-drying method.

Apparatus, instruments, techniques, limitations and applications are described in detail, and they are well illustrated in the book.

In addition to the seven papers included, considerable discussion material has been appended to this volume.

Copies of this book may be obtained from ASTM headquarters, 1916 Race Street, Philadelphia 3, Pa., at $ 4.00 each. To ASTM members, $ 3.20.

BOOK REVIEWS

In Bulletin No. 19 a review has been published on the late Professor Reifenberg's text book on the Soils of Palestine. This review provoked not only quite some interest, but also focussed attention on another, even less known book of Dr. Reifenberg.

It is a pleasure indeed to put in an effort to save also this highly important study on the rise and fall of agriculture in the Levant from unwarranted oblivion: **The Struggle between the Desert and the Sown** (Rise and Fall of Agriculture in the Levant), by A. Reifenberg. Jewish Agency Publishing Department, Jerusalem 1955, pp. 109, 72 plates, I £ 6.500.

The widespread occurrences of soil erosion in recent times and the accompanying disastrous effects, sometimes described as due to maladjustment between society and the soil, have stimulated numerous studies on the fate of the land in various countries. Several interpretative writings analyzing history from the point of soil exploitation by man have been published recently but rarely have we seen a scholary work, so well written and richly documented as the late Professor Reifenberg's book on the history of land use and soil erosion in the Levant. Based on first hand knowledge and research, Professor Reifenberg presents us with an absorbing story on the decline of agriculture, combining in it his deep knowledge of the landscape with his love and interest of history and archaeology. In addition the beautiful collection of 72 plates cannot but bring home the points he makes, making the book accessible and interesting for the general reader as well. A hebrew edition has already been published a few years ago.

The physical environment of the countries of the Levant—Palestine, Jordan, Lebanon and Syria — is described briefly in the first two chapters of the book. The next three chapters are devoted to evidence illustrating the gradual destruction of the vegetation, the denudation of the soil, and the fate of various water installations. The last chapter reviews synoptically the history of agriculture and land use in the Levant up to the period of the British Mandate. The book is beautifully produced and richly illustrated. It would have been useful had the author provided us with one or two maps of the region; the lack of a subject matter index is a serious omission.

The author has collected copious evidence showing that the now bare hillsides were once covered with soil and vegetation, that agriculture once flourished in areas which are to-day desolate, and that the land supported once a large town population. The pattern of destruction began with uninhibited exploitation of forests in times of war, and the use of wood for charcoal and lime burning. The destruction of the vegetation was completed by pastoral overgrazing by the conquering nomads, especially after the Arab invasion. In its wake followed accelerated erosion, washing away the soil into the lowlands and into the sea. The effects were most disastrous wherever the old labouriously erected terraces have become neglected and left in disrepair.

This sad picture of past glory and of present decay has often been interpreted as being due to a desiccation of the climate. Reifenberg tends to agree with those who believe that there was no significant climatic change during historic times, and advances as evidence that when neglected wells and silted up reservoirs are cleaned, the water again reaches the same level as in the past. The expansion of desert conditions in the Levant is due entirely to ecological factors, resulting from man's interference in the precarious balance established by nature. At the same time one should beware of the wrong notion — and this point is perhaps not stressed strongly enough by the author — that the now bare mountains were once covered with a deep layer of fertile soil or that the whole region was once thickly forested.

The bedrock in most of the Eastern Mediterranean consists of various limestones and marls, often with karstic structure. It is well known that limestone derived soils rarely reach great depth, not even in a humid climate. Also, the vegetation climax of this climatic region is not the dense European forest, but rather the more open maquis type bush forest and open woodland. The semiarid Mediterranean and steppe climate, with its frequently torrential rains after a prolonged draught period, makes the sparsely vegetated soil naturally susceptible to erosion. The ecological balance is *a priori* precarious. It is therefore not surprising that the cumulative effect of centuries of mismanagement and interference by man has resulted in the denudation which we witness to-day.

Sufficient historic and archaeologic evidence is available to assess broadly the extent of the damage. A quantitative estimate of the average rate of erosion is more difficult to obtain. Reifenberg arrives at figures from 0.1 mm of soil annually washed away from the Jordan river catchment area (p. 43), to about 1 mm of soil layer lost yearly in Northern Palestina (p. 46).

Not all of the eroded soil is carried by the flood waters to the sea. Much of it is deposited on lower slopes in valleys, plains and other flats. It is not quite clear why Reifenberg considers these deposits to be most unwelcome and of no use to anybody (pp. 43 and 45). Surely these alluvial deposits are both easier to cultivate and to irrigate than the often inaccessible steep slopes from where the soil has been washed down. Even if these slopes were still covered with soil and vegetation, modern land use classification would only assign them a capability class V or less, i.e. suitable for pasture or woodlands. Erosion is not necessarily always bad and harmful. The most densely settled land and the most intensively irrigated agriculture is confined to alluvial lowlands, where accretion has kept the soils fertile for thousands of years.

Erosion damage in the flat coastal region must be considered as potentially more disastrous. The destruction of fertile soil in the coastal plain is mainly caused by the advancement of dune sand, and by the formation of swamps when the outlet of wadis becomes blocked. We are indebted to Reifenberg and his colleagues for some of the best studies in this field.

Notwithstanding previous statement that there is no evidence of a change in climate, Reifenberg states later (p. 40 and 52) that deforestation and soil erosion have resulted in the desiccation of the land. He explains it as being due to reduced infiltration of rain on the denuded lands, with a consequent decrease in the flow of springs. This interpretation is not quite compatible with hydrologic evidence. Modern watershed measurements have convincingly demonstrated that when vegetation is destroyed, a large part of the moisture previously lost through transpiration becomes available for runoff. Neither burning nor forest cutting seem to have any negative effect on soil infiltration; it is the increased amount of moisture available for runoff which washes away the soil no longer held back by the vegetation.

Because of the highly fissured nature of the limestone there is even on the present sparse vegetative cover less than 10% surface runoff (p. 46). It is therefore difficult to visualize that the devastation of vegetation has resulted in decreased infiltration. It seems rather that, once the bedrocks became exposed, infiltration and water absorption through the fissured limestone may have actually increased, and where decrease in flow in springs has been observed it may mean that the gradually enlarged dissolution channels have diverted the water into deeper layers.

The valuable chapter on the art of irrigation and the history of the various water installations is probably the first extensive discussion of foggaras, dams, reservoirs, aqueducts and irrigation channels, amply documented from historical

sources and with numerous beautiful photographs. Reifenberg *emphasizes strongly* in this and in the next chapter that large scale irrigation installations were possible only during times of good government, and that these were neglected and decayed during periods of unrest and conquest by neighbouring nomads.

Perhaps it should have been expressed more clearly that not only a stable government, but also a large and wealthy urban population, able to transfer some of its wealth back into agricultural investments, has contributed to the expansion of agriculture during Roman times. When it pays the farmer to conserve the soil and to intensify production, he does it; but it is the wealth of the towns which provides the means and inducement for him to do so.

The stable and flourishing conditions of the Roman period have never been attained again. Agriculture declined rapidly since, especially during the unrests of the Mameluke period and during the four centuries of Ottoman rule, when exorbitant taxation and a ruinous land tenure system depopulated villages and brought the final decay to the agriculture of the Levant.

In his book, which unfortunately became the last of his major studies, Reifenberg has assembled a great deal of documentary evidence and presented it in a thoughtprovoking way. It will forever remain a memorial to his broad outlook, beyond the narrow horizons of a specialized scientific discipline, reminding us of his love for the land and of his deep understanding of history.

Dan H. Yaalon

MISCELLANEOUS NEWS — INFORMATIONS DIVERSES — VERMISCHTE MITTEILUNGEN

Soil Science Society of America Executive Committee Revises Policy on Expression of Plant Nutrients in Proceedings

The SSSA Committee at its 1961 meeting adopted the following publication policy:

„Values for plant nutrients in soil, plant, and fertilizer analyses should be expressed on an elemental basis or in other ways as needed for theoretical purposes. Authors may have the option of including values on the oxide basis in addition to those on the elemental basis."

The above policy is to go into effect for all manuscripts received after July 1, 1962, and all issues of the SSSA *Proceedings* beginning with the January-February 1963 issue.

The SSSA Executive Committee had initially taken action on expression of plant nutrients on an elemental basis at the 1960 meeting, but the action taken at that time covered essentially fertilizer application only. The 1961 action adds soil and plant analyses to the plant nutrient values which must be expressed on an elemental basis.

Übersicht der Entwicklung der Internationalen Arbeitsgemeinschaft für Bodenfruchtbarkeit *)

Der Zweck der internationalen Zusammenarbeit bei den Felduntersuchungen betreffs Bodenfruchtbarkeit wurde erläutert und festgestellt auf dem 6sten Kongress der Internationalen Bodenkundlichen Gesellschaft in Paris 1956 und veröffentlicht in den Verhandlungen dieses Kongresses. Die Aufgabe, welche die Arbeitsgemeinschaft sich gestellt hat ist im Wesentlichen das Feststellen der Beziehungen zwischen den bei der Forschung erhalten Daten über Wachstum, Ertrag und Eigenschaften der Pflanzen und den gemessenen bodenkundlichen und klimatologischen Fruchtbarkeitsfaktoren, wobei man sich gegenseitiger Erfahrungen und moderner Hilfsmittel bedient. Das Objekt das wir gewählt haben ist der Einfluss physikalischer, biologischer und klimatologischer Faktoren auf die Stickstoffverhältnisse des Bodens und die Stickstoffernährung der Pflanzen. Der Bericht über unsere Tätigkeiten gelegentlich der Zusammenkunft der Kommissionen II und IV der I.B.G. in Hamburg im August 1958 enthielt neben der geschichtlichen Entwicklung der Arbeitsgemeinschaft insbesondere den Umfang der Feld-, Gefäsz- und Topfversuche. Die folgende Tabelle (Seite 16) gibt abermals eine Zusammenfassung der beendeten und noch laufenden Versuche nebst den Versuchsplänen.

A

Aus den Ergebnissen der Sortenherkunftsversuchsfelder im Jahre 1957 stellte sich heraus dass es bei Kartoffeln notwendig ist mit einer einzigen Herkunft zu arbeiten, sollen die Resultate der verschiedenen Serien vergleichbar sein. Die für die I.D.-Versuche benutzten Saatkartoffeln (Voran) und auch das Saatgut des Hafers (Regent) und des Weizens (Carsten VI) wurden zentral von Giessen distribuiert.

Wir unterscheiden also für die Lösung der gestellten Frage, internationale Stickstoffversuche (I.N.V.) und internationale Dauerversuche (I.D.V.) Die I.N.-Versuche, welche einjährig sind, umfassen 8 Serien mit insgesamt etwa 250 Versuchsfeldern. Hafer (Regent) war die Versuchspflanze; auch dieses Saatgut wurde zentral versorgt. Die 20 I.D.-Versuche bestehen stets aus 12 Varianten (3 Pflanzen, nämlich Kartoffeln, Hafer und Winterweizen, mit 4 Düngungsstufen). Es wird beabsichtigt eine Reihe von 10 Versuchsjahren zu erhalten.

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*) Vortrag gelegentlich der Jahrestagung der Deutschen Bodenkundlichen Gesellschaft in Wien — 21-23.8. 1961.

Versuche der internationalen Arbeitsgemeinschaft bei den Felduntersuchungen betreffs Bodenfruchtbarkeit

Zentren	INV *Sorten* Herkunft Versuche 1957	INV *Stickstoff-* Steigerungs- Versuche 1958	IDV *Frucht-* folge- Dauer- versuche	INV *Gefäss-* Versuche 1958	IDV *Gefäss-* Versuche 1959, 1960 und 1961	*Verschiedene* Bodenunter- suchungen
Oldenburg	—	×	×	×	×	×
Linz	—	×	×	×	×	×
Rostock	—	×	×	×	×	×
München	—	×	×	—	—	—
Giessen	—	×	×	×	×	×
Löwen	×	×	×	—	—	×
Groningen	×	×	×	×	×	×
Ljubljana	×	×	×××	—	—	—
Berlin	—	—	×	—	—	×
Leipzig I	—	—	×	—	×	—
Leipzig II	—	—	×	—	—	—
Völkenrode	—	—	×	—	—	—
Liebefeld—Bern	—	—	×	—	—	—
Gross-Gerau (Giessen)	—	—	×	—	—	—
Hohenheim (Stuttgart)	—	—	×	—	—	—
Zagreb	—	—	×	—	—	—
Versailles	—	—	×	—	—	—
Wien	—	—	×	—	—	—

INV = Internationale Stickstoffversuche. Objekte in vierfacher Wiederholungen: 0, 25, 50, 75, 100 und 125 N/ha.

IDV = Internationale Fruchtfolge-Dauerversuche. Objekte: $N_0K_2P_2$, $N_1K_1P_1$, $N_2K_2P_2$ und $N_3K_3P_3$;
Versuchspflanzen: Kartoffeln, Winterweizen und Hafer.

Erst sollen nun die I.N.-Versuche besprochen werden. Abbildung 2 (Seite 17) gibt ein Beispiel einiger Ertragskurven aus der I.N.V.-Serie.

B

Die Hauptfrage ist wie sich die Unterschiede in Forum und Niveau der verschiedenen Kurven aus den erhaltenen bodenkundlichen und klimatologischen Faktoren erklären lassen.

Das umfangreiche Material wird augenblicklich dokumentiert und bearbeitet, wobei uns die Erfahrungen der Mitarbeiter zur Verfügung stehen. Bei der Bearbeitung lassen sich 4 Phasen unterscheiden.

1ste Phase. Die einzelnen Kurven, welche den Zusammenhang zwischen Stickstoffdüngung und beziehungsweise Korn-, Stroh-, Gesamtertrag und Gesamtstickstoffaufnahme wiedergeben, mussen konstruiert werden, wobei die verschiedenen Parameter berechnet werden. Wir verfügen dabei über die unentbehrliche Unterstützung der elektronischen Rechenanlage der Österreichischen Stickstoffwerke in Linz. Es ist klar, dass wir mit der Berechnung dieser Wachstums-Kurven unvermeidlich schon in das Problem der Formulierung dieser Kurven geraten sind. In Ihrer Gesellschaft wo der Namen von Mitscherlichs mit Ehre genannt wird, sind diese Probleme nicht unbekannt. Das Interesse an der Biostatistik nimmt in letzter Zeit stark zu, besonders in den angelsächsischen Ländern. Auch in einer Subgruppe unserer Arbeitsgemeinschaft wurde diese Frage intensiv diskutiert. In Linz wurden die Gleichung nach *Mitscherlich*, die Formel nach von *Boguslawski* und das Polynom dritten Grades auf unsere Ergebnisse angewandt. Die letzte Gleichung erwies sich wie eine periodische Gleichung bei der Streuung unserer Daten als zu anpassungsfähig. Wir arbeiten daher weiterhin mit den beiden andren Gleichungen.

2e Phase. Jedes Versuchszentrum für sich bearbeitet an Hand der aus Linz empfangenen Kurven sein Material. Es kommt insbesondere darauf an festzustellen

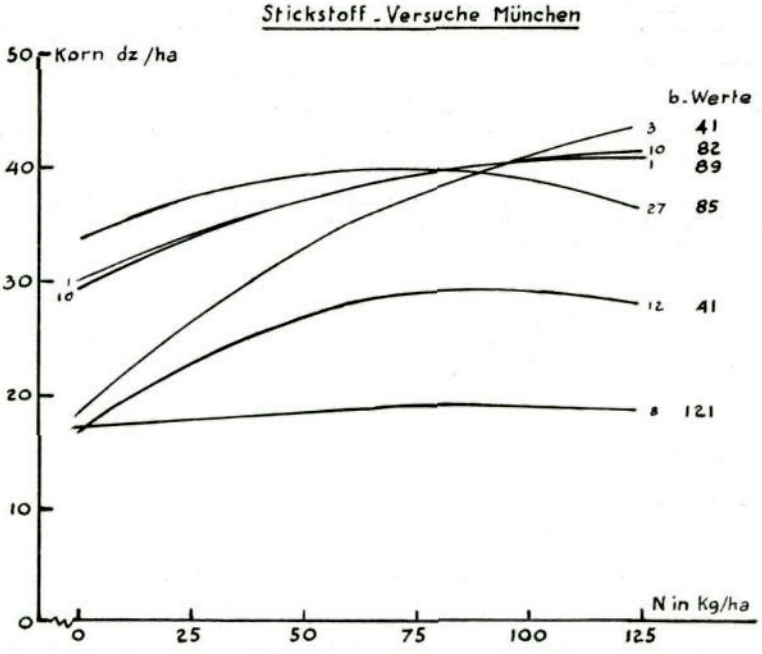
welche Fruchtbarkeitsfaktoren die Parameter der Kurven (besonders Höchstertrag a oder vom Boden gelieferter Stickstoff b) beeinflussen können. Die Erfahrung der Mitarbeiter ermöglicht eine erste Wahl der Faktoren.

Einige Beispiele mögen diese Bearbeitungsmethode erläutern. Die Ernährungselemente P, K und Mg wurden optimal angewandt und auch das pH des Bodens wurde im optimalen Trajekt gewählt. Infolge dessen handelt es sich insbesondere um den Einflusz physikalischer, biologischer und klimatologischer Faktoren auf die Unterschiede im Wachstum und Ertrag der Pflanzen. Für die Beschreibung dieser Eigenschaften sind Bestimmungen wie Tongehalt, Azidität, Wasserbindung, Strukturaspekte, Organische-Stoffgehalt und Stickstoffverhältnisse im Boden benutzt worden. Es ist dabei notwendig mit einfachen Zahlen zu arbeiten. Zum Beispiel ist hinsichtlich der Wasserbindung die Feuchtigkeitskarakteristik wichtig (Unterschied im Feuchtigkeitsgehalt zwischen pF 2 und pF 4). Der allgemeine Strukturaspekt wurde nach einer auf einander abgestimmten visuellen Methode mittels einer Zahl festgestellt. Auch die komplexe Grösze „Bodenzahl" wird bei unseren Untersuchungen benutzt. In den teilnehmenden Ländern wurden diese Schätzungen mit einander verglichen. Auch eine Reihenfolge der Bodentypen wurde festgestellt.

Der Stickstoffhaushalt des Bodens kann zu den biologischen Faktoren gerechnet werden. Ein Masz für die Menge des leichtverfügbaren Stickstoffs wurde nach einer Inkubationsmethode zentral bestimmt. Man könnte nun versuchen die Beziehung zwischen diesen Zahlen und den b- Werten der Kurven oder z.B. den Quotienten Strohertrag/Kornertrag festzustellen.

Betreffs der klimatologischen Faktoren muss festgestellt werden, dass wir uns leider auf eine Karakterisierung der Versuchszentren beschränken mussten; die Data der I.D.-Versuche werden dafür benutzt. Es wird noch viel Mühe kosten die Zahlenreihen zu verwendbaren einfachen Zahlen zu komprimieren.

Im Allgemeinen sind wir überzeugt, dass eben dieses Ringen um verwendbare Grössen zur Interpretation der Fruchtbarkeitsunterschiede gefördert wird durch die Zusammenarbeit der Untersucher verschiedener Versuchszentren.



3e Phase. Die berechneten Parameter der Kurven und die anfänglich gewählten Fruchtbarkeitsfaktoren werden für das ganze Material einer Aspektenanalyse unterworfen (multivariate analysis). Auf Basis der Korrelationsberechnungen wird es hierdurch ermöglicht die betrachteten Faktoren in wesentlich unterschiedliche Gruppen (bestimmte Aspekte der Fruchtbarkeit) zu trennen.

4e Phase. Zum Schluss wird für das ganze Material eine Regressions-Analyse gemacht mit den Faktoren, welche mittels der Aspekten-Analyse gewählt worden sind. Wir hoffen damit eine qualitative und quantitative Antwort geben zu können auf die Frage welche Faktoren die Stickstofflieferung des Bodens und die Ertragssteigerung durch Düngung beeinflussen.

Die moderne Entwicklung der statistischen Analyse wird bei unserer Arbeit benutzt und ohne Zweifel gefördert. Die Unterstützung der modernen Rechenanlage is dabei selbstverständlich unentbehrlich.

Betrachten wir nun die ökologischen Dauerversuche und die Bearbeitung deren Ergebnisse. Die I.D.-Versuche geben andere Perspektive als die I.N.-Versuche, andererseits gibt es aber auch Beschränkungen. Die kleinere Zahl der Kurven, welche auch weniger exakt bestimmt worden sind, haben zur Folge dass eine Faktoren-Analyse weniger Erfolg verspricht. In dieser Hinsicht werden wir wahrscheinlich zufrieden sein müssen mit einer Varianzanalyse der Komplexe, Standorte, Düngungsstufen, Jahre (d.h. Witterung) und Pflanzen und ihre Interaktionen. Die I.D.V.-Serie hat aber ausgebreitetere Möglichkeiten als die I.N.V.-Serie hinsichtlich der genauen und detaillierten Beschreibung des Wachstums der Pflanzen im Laufe der Zeit. Eine genaue Beschreibung der Entwicklung der Pflanzen in Abhängigkeit von gut registrierten Witterungen in den verschiedenen Jahren, gestützt durch eine gründliche Kenntnis der bodenkundlichen Zustände, kann zu wichtigen Hinweisen führen über die Bedeutung der verschiedenen Fruchtbarkeitsfaktoren. Die Dokumentation der vielen Daten bringt spezielle Schwierigkeiten mit sich. Die Zahlen werden auf Lochkarten registriert und können für die mathematische Bearbeitung auf Streifekarten übertragen werden.

Es wurde schon mittels der Rechenanlage in Linz eine Probeauswertung mit Ergebnissen von drei Jahren und acht Standorten der I.D.V.-Serie durchgeführt. Ein wichtiger Hinweis ist dabei erhalten, nämlich dass es keine signifikante Interaktion gibt zwischen Düngung und Standort. Das würde bedeuten, dass die Stickstoffkurven der Standorte sich nicht wesentlich unterscheiden. Dagegen wurden zwischen Standorten und Jahren wohl signifikante Interaktionen gefunden. Es ist jetzt die Aufgabe der einzelnen Versuchszentren, nach einer gegebenen Rechenvorschrift, die Varianzanalyse der Ergebnisse ihrer I.D.-Versuche zu machen.

Die I.N.- und I.D.-Gefässversuche haben zum Zweck in einigen Versuchszentren das Material „Boden", herrührend aus unter verschiedenen klimatologischen Umständen entstandenen Parabraunerden, hinsichtlich seiner Fruchtbarkeit zu prüfen. In dieser Weise wird es vielleicht möglich sein einen Unterschied zwischen Standort und Boden zu erlangen. Hafer ist auch hierbei die Versuchspflanze. Es hat sich u.a. bereits in den I.N.-Gefässversuchen ergeben, dass von den verschiedenen Verzuchszentren verschiedene Erträge und Stickstoffaufnahmen gefunden werden. Nach der Reihenfolgemethode wurden die folgenden Zahlen erhalten (1 niedrig und 4 hoch):

Stationen	Groningen	Oldenburg	Rauisch Holzhausen	Linz	P
Kornertrag	1	2	3	4	0,022
Strohertrag	1	4	3	2	0,0028
Gesamtertrag	1	2	4	3	0,0004
N-Aufnahme Korn	1	2	3		0,0001
N-Aufnahme Stroh	3	2	1		0,079
Gesamt N-Aufnahme	1	2	3		0,0001

Die Frage kommt jetzt auf, ob wir hierbei mit „Standortunterschieden", mit methodischen Abweichungen oder mit beiden zu tun haben. Es ist erwünscht die Gefässversuchsmethoden auf einander ab zu stimmen, weil diese Versuche z.B. auch für die Landklassifikation von Bedeutung werden können. Darum ist dieser Vergleich auch im Jahre 1961 nach vorgeschriebener Versuchsmethode fortgesetzt worden.

In beschränktem Umfange wurde auch ein Methodenvergeleich bei Bodenuntersuchungen im Laboratorium durchgeführt. Die Bestimmungen von pH, P_2O_5, K_2O und MgO wurden in 230 Bodenproben der I.N.-Versuche ausgeführt in den Laboratorien in Löwen, Linz, Oldenburg, Rostock und Oosterbeek (Niederlande).

Die Korrelationskoëffizienten zwischen den Ergebnissen der verschiedenen Stationen sind hoch wo diese bereits a priori hoch erwartet werden können. Eine Aspekten-Analyse war auch hierbei von Bedeutung um eine Anweisung zu bekommen ob die Methoden auch wesentlich verschieden sind. Es ergab zich z.B., dass die nach der Neubauermethode bestimmten Kali- und Phosphatzahlen nur zum Teil mit den in Bodenextrakten erhaltenen vergleichbar sind; nach der Neubauermethode werden auch Kali- und Phosphatvariationen erhalten welche sich wesentlich von, nach anderen Methoden bestimmten, unterscheiden. Es ist selbstverständlich dass über die landwirtschaftliche Bedeutung der Methoden nur ein Vergleich mittels Feldversuche Auskunft geben kann.

Zum Schluss sei erwähnt, dass auch verschiedene andere Nebenuntersuchungen mit dem Material unserer Versuche ausgeführt werden, so wie weitere Herkunftsversuche und Versuche über Zersetzbarkeit des Strohes, Klebergehalt des Weizens und biologische Wertigkeit des Samens. Auch wurde begonnen mit einer wiederholten pH-H_2O-Bestimmung in Bodenproben welche regelmässig den I.D.-Versuchen entnommen werden; wie bekannt werden die pH-Schwankungen von der Witterung hervorgerufen und sind sie ein Masz für die Bodenfruchtbarkeitsschwankungen.

Unsere Gemeinschaftsarbeit überblickend, glauben wir dass man bis jetzt nicht unzufrieden zu sein braucht. Daher können wir diese Arbeit mit Optimismus fortsetzen. Es wäre empfehlenswert unter den Auspizien der I.B.G. ein Stickstoffsymposium zu organisieren nach Beendigung unserer Bearbeitung der Resultate. Wir hoffen in dieser Weise einen bescheidenen Beitrag zu liefern zum kritischen Vergleich der potentiellen Fruchtbarkeit der Böden im gemässigten Klima Europas.

P. Bruin
Vorsitzender der Arbeitsgemeinschaft
Groningen, Niederlande

New CSF combined moisture-content/density meter provides unique facilities for scientific soil investigation

A new small-size, low-priced combined moisture-content/density meter designed by Compagnie Générale de Télégraphie sans Fil, Paris, working in close cooperation with the C.E.A. (Commissariat à l'Energie Atomique), will be soon commercially available on international markets.

Largely competitive with existing apparatus, this new CSF instrument will give unique facilities to all those concerned with fast and accurate density and/or moisture-content measurements of soils.

Basic design principles involve two well-known effects: the slowing down of fast neutrons by water (moisture-content measurements) and the scattering of gamma rays by the Compton effect (density measurements).

The equipment consists of a humidity probe, a density probe and an integrator. All units are rugged and well suited for intensive field use. Electronic circuits are fully transistorized ensuring thus immediate operation, extreme reliability and low drain on the built-in power supply which makes use of standard dry-cells.

The operation is quite simple: accurate measurements are quickly made and, the tests being non-destructive, can be repeated for comparison at any desired time intervals.

The facilities provided by this truly portable and effective instrument have already aroused great interest among agronomists, agricultural experts and in a number of industrial spheres. Its use will permit a very marked improvement in the speed and accuracy of soil analysis especially for intensive cultivation, irrigated farming, forest nurseries and timber farming, reclamation of infertile land, ecological studies and soil conservation.

LETTERS TO THE EDITOR

Sir,

The Bulletin of the International Society of Soil Science would not have space to deal with all the issues raised by Raeside in his letter about G. D. Smith's „Seventh Approximation". I would like here to make two main points.

I must first correct Raeside's impression that Australia stands with the traditionalists (including New Zealand) against the radical Americans. It would be disastrous if there were official national views on scientific topics; but while there are some traditionalists in Australia, we have probably as large a proportion of soil scientists as any other country who prefer a morphological, analytical approach. (Perhaps this is because the traditional approach breaks down more seriously in Australia than elsewhere). An Australian committee (its members coming from two Universities, a State Authority, and a Commonwealth organisation) worked out and presented a morphological scheme to the Internatinal Congress of Soil Science in 1954. Features of this scheme have obviously been embodied in the currently appearing Atlas of Australian Soils by Northcote. Another Australian committee, appointed by the Australian Society of Soil Science, has recently completed a detailed review of G. D. Smith's „Seventh Approximation"; this committee states that Smith has not been radical enough, that he has not consistently kept to morphological criteria.

Secondly I must emphasize that the criteria used in a classification depend on one's purpose. One should not expect that soils, which vary independently in so many characters in space and time, could be arranged in a single system that would suit everyone's purpose.

A morphological system has the purpose of communication (or some might say, identification). If one's purpose, however, is to show or to deduce the ancient history of a soil, one will naturally pick just those features that throw light on its history, and will disregard some other features of agricultural interest. Raeside speaks for many pedologists in refusing to consider his subject an „appendage to agriculture". But after deliberately rejecting agronomic criteria a pedologist has no right to claim that his classification, done for his special purpose, is also the most relevant one for agriculture. It is vain to dream of a classification that will be „equally useful to both the pedologist, the chemist, and the agriculturist". A good handbook on soil might deserve such a claim. But it would deal with soils from many aspects, and would therefore contain many special classifications within its pages.

G. W. LEEPER,
University of Melbourne,
Australia
12th March, 1962.

PROF. DR. HANS DEUEL † (1916—1962)

Hans Deuel, o. Professor für Agrikulturchemie und Vorstand des Agrikulturchemischen Institutes der Eidgenössischen Technischen Hochschule in Zürich, ist am 17. Januar 1962 nach langer, schwerer Krankheit gestorben.

Hans Deuel wurde am 4. Mai 1916 in Leipzig geboren. Er durchlief dort die Vorschule und das humanistische Gymnasium. An der Eidgenössischen Technischen Hochschule in Zürich erwarb er sich den Titel eines Ingenieur-Agronoms, 1943 eines Doktors der technischen Wissenschaften und 1947 die venia legendi für Agrikulturchemie. 1949 wurde er zum o. Professor und Institutsvorstand gewählt, als Nachfolger seines Lehrers Prof. Dr. H. Pallmann, der zum Präsidenten des Schweizerischen Schulrates ernannt worden war. 1950—1953 war er Präsident der Kommission II (Chemie) der Internationalen Bodenkundlichen Geselschaft. 1960 hielt er im 7. Internationalen Bodenkundlichen Kongress in Madison in dieser Sektion den Hauptvortrag.

Hans Deuel war ein begeisternder Lehrer und hervorragender Forscher. Seine Studien waren vor allem auf die Beziehungen zwischen Konstitution und Eigenschaften von Polysacchariden, Humus und Tonmineralien gerichtet. Ionenaustauch war eines seiner Lieblingsprobleme.

Rund 150 Publikationen zeugen von den hervorragenden wissenschaftlichen Qualitäten Hans Deuels. 27 Chemiker, Naturwissenschafter, Landwirte und Förster haben bei ihm doktoriert und sind, mit einem reichen Rüstzeug versehen, als begehrte Fachleute ins Leben hinausgetreten.

Persönlich war Hans Deuel ein edler Mann mit feiner humanistischer Bildung. Seine menschlichen und wissenschaftlichen Qualitäten sichern ihm ein bleibendes Andenken.

Roman Bach

PROF. DR. A. J. ZUUR † (1902—1961)

After a long illness Prof. Dr. A. J. Zuur at Kampen (Netherlands) passed away on December 2, 1961. He was head of the pedological department of the State Authority for the reclamation of the Zuiderzee and part-time professor at the Agricultural University of Wageningen.

After matriculation at the grammar school Dr. Zuur studied at the Agricultural University of Wageningen. He graduated in 1927 and took up a position with the Zuiderzee Reclamation Authority for pedological investigations. During the first years he worked as assistant of Dr. D. J. Hissink. This work afterwards proved to become his lifetask. In 1938 Dr. Zuur received his Ph. D.-degree on a thesis „The desalinization of the soil of the Wieringermeerpolder, an inquiry into the salt and water movements in the soil of newly reclaimed polders". In 1951 he was appointed professor at Wageningen to lecture on the reclamation of young, recently empoldered soils.

Evidently the development of the creative personality of Dr. Zuur received a strong stimulus by the fascinating influence of such an ambitious enterprise as the reclamation of the Zuiderzee. He was a dynamic personality with many-sided interests, nevertheless he succeeded in developing his gifts in a disciplined manner with a selfconfidence conquered from doubts.

Dr. Zuur had not an easy task. He was supposed to reveal the pedological foundations how tot reclaim the young soils. This had to be done simultaneously with the progress of the reclamation activities, which could not always be postponed till the results of the soil scientific experiments were available. However, the knowledge of Zuur and his staff increased gradually. He provided the reclamation of the consecutively enclosed polders with gradually improved advices. From the very beginning the board of the Wieringermeer Reclamation Authority had much confidence in scientific research, and the team of investigators, with Dr. Zuur in a leading position, has not disappointed the expectations.

With his wide knowledge Dr. Zuur understood the value of scientific principles. His pedological research was always based on the geology of the area. The process of transformation of the water saturated mud into arable land — formerly never studied intensively — was investigated by Dr. Zuur in detail. Studying the chemical and hydrological characteristics of soils, the determination of the mechanical composition hereby proved to be one of the most important makeshifts. It affects also the structure and workability of the soils.

Hereby his work was a continuation of the investigations of van Bemmelen, Hissink and Maschhaupt. During the later years of the reclamation of the young polders the disturbing influence of climate and of man's activities upon the expected development became apparent. The Ph.D.-thesis of Dr. Zuur also demonstrates his efforts to discover general rules from the innumerable complicated data. His many papers and reports contain a wealth of information.

Dr. Zuur never aspired to leading positions but he automatically reached them as a consequence of his capacities. Even in other countries his knowledge and abilities have often been used for formulation of advices. Herefore he visited the United States, Pakistan, India and Egypt. He enjoyed these trips scientifically as well as culturally. Being a sociable person, he offered his help willingly and in the most unselfisch way with full respect for the historically determined peculiarities of the visited countries. He felt that he enriched himself hereby.

For us the passing away of Zuur means the loss of an able investigator, a colleague always ready to help and a true friend. He represents for us the living through a philosophy of life by which the agony of death was conquered.

P. Bruin

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