No. 23 1963

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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Yugoslavia: Prof. Dr A. Skoric, Faculté d'Agronomie, Zagreb.

Bucarest. Where we are to meet in August 1964.
In the background the main conference hall for the 8th. international congress.

The interior of the main conference hall.

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No. 23 **1963**

NEWS OF THE SOCIETY
NOUVELLES DE L'ASSOCIATION
NEUES AUS DER GESELLSCHAFT

8th International Congress of Soil Science

The Secretary-General visited Headquarters of the Congress at Bucharest as a guest of the Rumanian Society of Soil Science. It is a great pleasure to state that thanks to the enduring activity of President Cernescu and Vice-President Obrejanu, in close cooperation with the Rumanian Organizing Committee under expert chairmanship of Prof. Dr. N. Giosan, our Rumanian colleagues succeeded in provoking a very great, world-wide interest in the 8th Congress.

A few dates may be quoted. Per October 23, 1963, 1217 inscriptions to the Congress were received, whereas 886 communications have provisionally been announced. As usual the greatest interest goes to the commissions IV and V with respectively 150 and 165 papers. It will be clear that such a real "deluge" poses enormous organisational problems, notably in view of the motion adopted at the Madison Congress that the number of communications should be limited to 400, equally divided over the 7 commissions. Apart from this, the financial aspect has also to be taken into consideration as the printing of the mentioned number of papers would exceed the budgetary possibilities of any host country. There is however no doubt that the Organizing Committee is able to handle this problem, although it may mean disappointment to a number of authors whose papers will have to be discarded.

A special point of discussion has been the simultaneous translation in the three official languages of the Society, english, french and german. The fact that the Rumanian Government will put at the Congress' disposal not only the new 3000-seats Atheneum building in which all technical facilities and the newest devices for multi-lingual translation are available, but also the Congress House with three more rooms with complete auditory equipment, is a guarantee that any language barrier will be easily surmounted.

A day was spent by touring through the lovely Carpathian region which will be visited at least in part by the participants in any of the tours. Actually 568 registrations for the Rumanian tours, both pre- and after-Congress, have been received whereas the Russian tour with over 330 applicants it well "over-subscribed". Possibilities are now studied to accommodate more participants in this tour than the originally allowed number of 100—120. The beauty of the country, the hospitality of its inhabitants, but most of all the efficacy of all who devote time and energy to the organisation of the Congress should be cause to look forward with eager expectation to the 8th international congress of soil science.

8me Congres International de la Science du Sol

Le Secrétaire général a visité le siège du Congrès à Bucarest comme invité de l'Association Roumaine de la Science du Sol. Il est noté avec satisfaction que grâce aux activités soutenues déployées par le Président Cernescu et le Vice-Président Obrejanu, en étroite collaboration avec le Comité Organisateur sous l'efficace présidence du Prof. Dr N. Giosan, nos collègues roumains ont réussi à provoquer dans le monde entier un grand intérêt pour le huitième Congrès.

Quelques points méritent d'être particulièrement relevés. Au 23 Octobre 1963, le nombre des inscriptions au Congrès était de 1217 tandis que 886 rapports avaient été annoncés à titre provisoire. Comme dans le passé, les Commissions IV et V ont spécialement l'intérêt avec resp. 150 et 165 rapports. Il sera clair qu'un tel "avalanche" pose des énormes problèmes du point de vue d'organisation notamment par rapport à la résolution adoptée lors du Congrès de Madison que le nombre de communications sera limité à 400, répartis impartialement dans les Commissions. A part de cela, il y aura lieu de considérer l'aspect financier de la question étant donné que la publication du nombre mentionné dépasserait les possibilités budgétaires de tout pays hôte. Il n'y a aucune doute que le Comité Organisateur ne sache surmonter cette difficulté bien que cela puisse signifier une déception pour les auteurs des rapports qui devront être écartés.

Un point particulièrement examiné a été la traduction simultanée dans les trois langues officielles de l'Association: anglaise, française et allemande. Le fait que le Gouvernement Roumain mettra à la disposition du Congrès non seulement le nouveau bâtiment de l'Atheneum avec ses 3000 places et offrant toute facilité technique pour la traduction en plusieures langues, mais aussi le Congresshall avec ses trois additionnelles salles de conférences pourvues d'installations auditives, est une garantie que la barrière linguistique sera aisément surmontée.

Une journée fut consacrée à parcourir la riante région des Carphates; les participants dans les excursions la visiteront aussi, du moins en partie. 568 personnes se sont inscrites aux excursions roumaines, tant avant qu'après le Congrès; l'excursion organisée dans l'U.R.S.S. est plus que complète avec les 330 demandes d'inscription. On étude maintenant les possibilités d'accepter un plus grand nombre pour l'excursion que les 100—120 indiqués dans le programme.

La beauté du pays, l'hospitalité de ces habitants mais surtout l'efficacité de tous ceux qui consacrent leur temps et leur énergie à l'organisation du Congrès donnent tous cause d'anticiper avec empressement le 8me Congrès de la Science du Sol.

8.er Internationaler Bodenkongress

Der General-Sekretär besuchte das Zentralamt des Kongresses in Bukarest als Gast des Rumänischen Bodenkundlichen Vereins. Es war ihm eine grosse Genugtuung festzustellen dass, Dank der unablässigen Aktivität des Präsidenten Cernescu und des Vice-Präsidenten Obrejanu, in intensiver Zusammenwirkung mit dem Rumänischen Organisationskomitee unter sachverständiger Leitung des Prof. Dr. N. Giosan, unsere Rumänischen Kollegen ein grosses, die ganze Welt umfassendes Interesse für diesen 8.ten Kongress zu erregen verstanden haben.

Ein Paar Punkte mögen hervorgehoben werden. Bis zum 23. Oktober 1963 waren 1217 Anmeldungen zum Kongress eingelaufen. Ausserdem wurden 886 Mitteilungen, allerdings provisorisch, angekündigt. Wie gewöhnlich konzentrierte sich das Hauptinteresse auf die Kommissionen IV und V, mit resp. 150 und 165 Arbeiten. Es ist klar dass ein solcher überwältigender Strom von Verhandlungen schwierige organisatorische Probleme schafft, besonders mit Hinsicht auf den Antrag, während des Madisonner Kongresses angenommen, dass die Gesamtzahl der Verhandlungen, über die 7 Kommissionen gleichmässig verteilt, die 400 nicht überschreiten sollte. Überdies hat man die finanziellen Folgen mit in Betracht zu ziehen, damit Druck und Herausgabe der aufgenommenen Arbeiten die etatmässigen Möglichkeiten nicht übertreffen. Indessen ist nicht im Geringsten zu bezweiflen, dass das Organisationskomitee dieses Problem meistern wird, obgleich eine Anzahl von Verfassern, deren Verhandlungen ausgeschlossen werden müssen, dadurch sehr enttäuscht sein werde.

Ein besonderer Punkt in der Diskussion war auch die gleichzeitige Übersetzung in die drei offiziellen Sprachen der I.B.G., nämlich English, Französisch und Deutsch. Die Tatsache dass die Rumänische Regierung nicht nur das neue Atheneumgebäude,

worin ein Saal mit 3000 Sitzen, zur Verfügung stellt, mit der darin angebrachten neuesten technischen und sonstigen Apparatur für vielsprachige Verfolgung des gesprochenen Wortes, sondern auch noch das Kongressgebäude mit drei weiteren Hörsälen, ist eine Garantie, dass jede Sprachenbarriere leicht zu überwinden sein wird.

Ein Tag wurde einer Tour durch das wunderschöne Karpathengebiet, welches auch durch die Teilnehmer an den verschiedenen Kongresstouren wenigstens teilweise besucht werden wird, gewidmet. Es waren zur Zeit schon 568 Anmeldungen für die vor wie nach dem Kongress stattfindenden Rumänischen Touren eingelaufen, während die Russische Tour mit über 330 Bewerbern wohl schon „überzeichnet" ist. Man versucht jetzt einen Weg zu finden um für diese Tour mehr Teilnehmer als die anfänglich zugestandene Zahl von 100 bis 120 aufnehmen zu können.

Die reizende Schönheit des Geländes, die Gastfreiheit seiner Einwohner, aber über alles die Sachverständigkeit von allen die sich der Organisation des Kongresses gewidmet haben und denen Zeit noch Mühe zu viel ist, rechtfertigt dass jeder mit grosser Erwartung den 8. Internationalen Kongress entgegensehen darf.

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

Asociacion Argentina de la Ciencia del Suelo.

Commission I (soil physics and physico-chemistry) held a special and very successful meeting on electric double layer phenomena in Buenos Aires on May 9th 1963. Prominent participants were Eng. Luis A. Cerana and Drs. R. Carlson, R. Rosell and M. Tschapek.

Canadian Society of Soil Science.

The new council for the year 1963—64 consists of:

President-Elect	—	Mr. L. Farstad, Canada Agriculture, 6660 Marine Dr., Vancouver, B.C.
President	—	Dr. R. F. Bishop, Research Station, Kentville, N.S.
Past-President	—	Mr. Wm. Odynsky, Research Council of Alberta, Edmonton, Alta.
Secretary	—	Dr. J. E. Brydon, Soil Research Institute, Canada Agriculture, Ottawa, Ont.
Eastern Councillor	—	Mr. D. W. Hoffman, Department of Soils, O.A.C., Guelph, Ont.
Western Councillor	—	Dr. R. A. Hedlin, Department of Soils, University of Manitoba, Winnipeg, Man.
ISSS-Representative	—	Dr. P. C. Stobbe, Soil Research Institute, Canada Agriculture, Ottawa, Ont.

Israel Society of Soil Science.

The following officers of the new council have been elected by the General Assembly on April 4 1963:

President	—	Dr. J. Noy, Irrigation Extension Service, Ministry of Agriculture, Tel Aviv.
Secretary	—	Dr. J. Shalhevet, The Vulcani Institute of Agricultural Research, P.O.B. 12, Rehovot.
Treasurer	—	Mr. M. Gal, Faculty of Agriculture, Rehovot.
Member	—	Dr. D. Hillel, The Vulcani Institute of Agricultural Research, P.O.B. 12, Rehovot.
Member	—	Dr. J. Hagin, Technion, Israel Institute of Technology, Haifa.

Soil Science Society of Pakistan.

The new council for the years 1963—64 and 1964—65 consists of:

President	—	Dr. M. O. Ghani, Vice-Chancellor, Dacca University.
Vice-Presidents	—	Dr. A. Q. M. B. Karim, Head of the Department of Soil Science, Dacca University.
		Dr. A. Wahab, Director of Soil Survey, West Pakistan.
Secretary	—	Dr. M. A. Islam, Director of Soil Survey, East Pakistan.
Joint Secretary	—	Dr. A. Islam, Deputy Director of Soil Survey, East Pakistan.
Treasurer	—	Dr. A. Karim, Soil Science Department, Dacca University.
Councillors	—	10 members.

British Soil Science Society Conference
New College, Oxford.
September 13th—16th, 1963.

164 of the 557 members of the British Soil Science Society attended the Summer meeting of the Society which was held in New College, Oxford from 13th—16th, September, 1963.

Excursions were organised to study the soils in the area. One concentrated on soil and land management and attracted a large proportion of the members who attended. Other excursions included visits to the Fyfield Down Nature Reserve, a more general survey of the Agricultural History of the Cotswolds, a study of the periglacial soils of the area, and a study of forest soils in Bagley Wood, near Oxford.

Visits were made to research stations in the locality including such recent foundations as the A.R.C. Weeds Research Organisation at Begbroke Hill and the A.R.C. Radiobiological Research Station at Letcombe Regis. Other stations visited were the National Vegetable Research Station at Wellesbourne, and the Hydraulics Research Station at Wallingford.

The Soil Science Laboratory of the Oxford University Department of Agriculture houses a soil museum consisting of 150 monoliths from all parts of the world. Most of the conference delegates paid a visit to see the monoliths which had been specially indexed for the meeting, and saw several other demonstrations also.

The final day of the conference consisted of lectures and discussion groups. An innovation was made in that only four selected topics were covered in the morning by authorities on the subjects and the discussion groups in the afternoon centred round these four topics. The subjects covered were "A system of classification for British soils" by Mr. B. Avery and Mr. J. Muir, "The plant physiologists view of ion uptake" by Professor J. Dainty, "Some problems presented by soil water movement" by Dr. E. L. Childs and "Humus" by Dr. J. Tinsley.

It was a great pleasure for the Society to be able to entertain Sir John and Lady Russell to dinner in New College on the occasion of their diamond wedding anniversary on September 14th. The best wishes of the Society were expressed by its President, Dr. A. B. Stewart and in his reply Sir. John recalled the days when soil science was not the respectable occupation that it is today.

The first Mexican congress of soil science

The most important scientific activity of the Mexican Society of Soil Science, established in October 1962, has been the organisation of its First National Congress held from July 15th to 17th of 1963, in the National School of Agriculture at Chapingo, Mexico, and the National School of Biological Sciences at Mexico City. The event was inaugurated by the Secretary of Agriculture and Livestock Ing. Julián Rodríguez Adame, accompanied by prominent persons from Research Institutes, Colleges of Agriculture and related Societies in the Country.

The Congress included conferences, general meetings, presentation of research reports and proposals, concerning the seven following subjects:

1. *Soil—Plant Relationships*
   President: Dr. Reggie J. Laird
   Secretary: Ing. Antonio Turrent, F.
2. *Soil Chemistry*
   President: Dr. Enrique Ortega T.
   Secretary: Ing. Miguel Brambila
3. *Soil Physics*
   President: Ing. Mariano Villegas S.
   Secretary: Dr. Rodolfo Chena G.
4. *Soil Biology*
   President: Dr. Carlos Casas Campillo
   Secretary: Ing. José T. Vázquez G.

5. *Soil Genesis, Classification and Survey*
   President: Ing. Mario Macías Villada
   Secretary: Prof. Nicolás Aguilera H.

6. *Soil Conservation*
   President: Ing. Ismael Cervantes R.
   Secretary: Ing. Juan de Dios Gutierrez

7. *Soil—Water—Plant Relationships*
   President: Ing. Enrique Espinoza V.
   Secretary: Ing. Donaciano Ojeda

One hundred and eighty one members participated in the Congress and 49 different research papers, by 31 authors, were presented.

The activities of this event will be published in Spanish in the near future in the "Proceedings of the First National Congress of Soil Science".

The Executive Committee of the Society was responsible for the organization of the Congress:

President:	Dr. Nicolás Sánchez D.
Vice-President:	Prof. Nicolás Aguilera H.
Secretary:	Ing. Roberto Nuñez E.
Treasurer:	Ing. Ricardo García L.
Members of the Committee:	Ing. Antonio Turrent F.
	Ing. Donaciano Ojeda.

The new Executive Committee, elected on October 4th, to be active for one year (1963—1964), is as follows:

President:	Dr. Rodolfo Chena González
Vice-President:	Dr. Enrique Ortega Torres
Secretary:	Ing. Roberto Núñez Escobar
Treasurer:	Ing. Donaciano Ojeda
Members of the Committee:	Ing. Alfonso Delgado de G.
	Prof. Nicolás Aguilera H.

Société Yougoslave de la Science du Sol

Nouveaux membres du bureau:

Président:	Prof. Dr. A. Skoric, Faculté d'agronomie, Zagreb
Vice-Président:	Prof. Dr. M. Ciric, Faculté d'agronomie, Sarajevo
	Ing. L. Vilarov, docent de la Faculté d'agronomie, Skopje
	Dr. B. Milojic, docent de la Faculté d'agronomie, Beograd
Secrétaire Général:	Dr. M. Pantovic, docent de la Faculté d'agronomie, Beograd
Trésorier:	Dr. Z. Racz, Faculté d'agronomie, Zagreb
Représentant dans le Conseil de l'A.I.S.S.:	Prof. Dr. A. Skoric, Faculté d'agronomie, Zagreb
Représentant dans le Comité International pour la Nomenclature:	Prof. Dr. G. Filipovski, Faculté d'agronomie, Skopje

NEWS OF THE COMMISSIONS
NOUVELLES DES COMMISSIONS
NEUES AUS DEN KOMMISSIONEN

Commission I (Soil Physics)

Soil Physics Terminology
(corrected text)

A terminology committee was established at the 7th congress at Madison 1960.

The request to the committee was:

"The committee is requested to assume responsibility to develop a limited number of generally acceptable terms, as well as their definitions, for the most commonly and widely used concepts that pertain to physical processes in the soil. In consultation with the officers of Commission I, the general feeling seems to be that the total number of terms should not be much larger than 10 so that sufficient time and attention can be given to a small number of important terms and that a reasonably succesful effect can be made to come to internationally acceptable definitions. Primary emphasis is to be placed upon terms that are not only used in soil science and in soil physics but also in other sciences such as plant physiology and micrometeorology."

A preliminary report was printed in I.S.S.S. Bulletin No 20, May 1962 and comments were received from

C. H. M. van Bavel (Tempe),
J. L. Farrar (Toronto),
E. C. Childs (Cambridge),
T. J. Marshall (Adelaide),
A. J. Peck & A. A. Poulovassilis (Cambridge).
A. W. Taylor & D. R. Bouldin (Wilson Dam) and
S. A. Taylor & R. O. Slatyer (Logan & Canberra).

The comments have been considered and the following final report is submitted.

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 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 pure water at the same temperature.

It should be noted that soil water is understood to be the equilibrium solution in the soil; pure water refers to the chemically pure compound H_2O.

1. **Total potential of soil water:**

The amount of work that must be done per unit quantity of pure 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 shorten the term to total potential or soil water potential and to divide it into parts, the division to be such that the sum of 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 quantity of pure 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 water (at the point under consideration) but in all other respects indentical to the reference pool.

1.2 *Gravitational potential:*

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

1.3 *Matric or capillary potential:*

The amount of work that must be done per unit quantity of pure 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 water at the elevation and the external gas pressure of the point under consideration to the soil water.

1.4 *Potential due to external gas pressure:*

This potential component is to be considered only when external gas pressure differs from atmospheric pressure as e.g. in a pressure membrane apparatus. A specific term and definition is not given.

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 water must be subjected in order to be in equilibrium through a porous permeable wall with the soil water.

It should be noted that this quantity may be identified with the matric or capillary potential defined above.

3. **Osmotic suction:**

The negative gauge pressure to which 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 water.

It should be noted that this quantity may be identified with the osmotic potential defined above.

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 soil water. Total suction is thus equal to the sum of matric or soil water suction and osmotic suction. Total suction may also be derived from the measurement of the partial pressure of the water vapour in equilibrium with the soil water.

It should be noted that this quantity may be identified with the total potential defined above when gravitational and external gas pressure potentials can be neglected.

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 in systems under atmospheric pressure may be identified with a potential expressed in terms of the height of a water column. More specifically it can be identified with the sum of gravitational and matric or capillary potentials, and may 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 can be referred to as the soil moisture characteristic curve. Depending upon whether the curve is determined with decreasing or increasing water content one may designate it as a desorption and adsorption curve, respectively.

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 proportionality factor in Darcy's law as applied to the viscous flow of water in soil, 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 permeability (intrinsic permeability has been used in some publications) 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 non-steady state flow in unsaturated soil it is often convenient to introduce a variable termed the soil water diffusivity defined as follows:

9. **Soil water diffusivity:**

The hydraulic conductivity divided by the differential 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 when one gram mass is used as unit quantity of water.

Term	Symbol*	Dimension	Unit
1 Total potential	ψ	$L^2\ T^{-2}$	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 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	Φ	$L^2\ T^{-2}$	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 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 w or h 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.

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Western European Working Group on Soil Structure

(see Bulletins 21, 1962 and 22, 1963).

From the 9th till the 14th of September 1963, the West-European Working Group on Soil Structure met for the third time. The session was held at Versailles (France) at the "Centre National de la Recherche Agronomique".

From the report by Professor De Boodt, Secretary-General of the working group, is quoted:

Re the publication of the West European Methods Book on Soil Structure Determination, contact has been established with the Food and Agriculture Organisation of the United Nations at Rome. As a result it is now suggested that the text-

book be edited in English, French, Spanish and German as a joint F.A.O.—I.S.S.S. publication. The book will consist of 7 chapters with the following titles:

I. General information.
II. Field information about the actual soil structure.
III. Basic laboratory information about soil components.
IV. Basic laboratory information on soil properties.
V. Laboratory measurement of the behaviour of the soil under applied forces.
VI. Additional useful characterization.
VII. Quick field methods other than field structure evaluation.

Joint Meeting of Commissions IV and V

New Zealand, 1962.

The Transactions of the joint meeting of Commissions IV and V are from the press. A 916 pages volume is the laudable result of the efforts of the New Zealand Organisation Committee and, foremost, of the editor Mr. G. J. Neale, to make the scientific outcome of this important conference available to the members of the I.S.S.S. with as brief a delay as possible.

As a reminder it may be mentioned that the following topics have been discussed:

i Soil processes and soil fertility (12 papers)
ii The nutrient elements (11 papers)
iii Soil organic matter (6 papers)
iv Soil structure (4 papers)
v Soil classification and soil fertility (36 papers, 24 countries)
vi Soil fertility and land use (34 papers)
vii Soil science and society (9 papers)

Two public lectures on Man and the Soil, one by the President of the Conference, Norman H. Taylor, entitled: The Challenge of the Past and one by Dr. Charles E. Kellogg: The Challenge of the Future, conclude this most valuable volume.

As mentioned in Bulletin 22, the price of this volume is £ NZ 4.— or about US $ 11.— and should be ordered directly with the Secretary-General, Soil Bureau, Private Bag, Lower Hutt, New Zealand.

FORTHCOMING CONFERENCES

Second International Working-meeting on Soil-Micromorphology. Arnhem (the Netherlands) — September 22—25, 1964.

Second and final announcement to all colleagues and interested parties.

As already announced in the Bulletin of the International Society of Soil Science No. 22, an international Micromorphological Working-meeting will be held in the Netherlands from the 22nd upto the 25th September 1964. Following this conference, an excursion to the peat- and anmoor areas in the western part of the Netherlands will take place on the 26th September 1964.

Judging from the many reactions and promised papers already received from micromorphologists and colleagues from associated professional circles, it has become apparent that a discussion is wanted on all those subjects which were proposed in the first announcement.

On account of organisational reasons, the conference will not take place in Wageningen, as planned at first; but in ARNHEM in the building called: „Huis der Provincie" (Provincial House: Seat of the Provincial Government of Gelderland).

The meeting is being prepared by Drs. F. W. G. Pijls, J. Schelling and A. Jongerius; respectively Director, Head of the Department Specialized Investigations and Chief of the Section Micropedology, of the Netherlands Soil Survey Institute.

Dr. A. Jongerius is in charge of coordination and daily activities concerning the preparations.

The actual meeting will be presided by:
Prof. Dr. W. L. Kubiëna, Chairman. Bundesforschungsanstalt für Forst- und Holzwirtschaft, Reinbek near Hamburg, West-Germany.
Dr. A. Jongerius, 1st Secretary. Soil Survey Institute, Bennekom, the Netherlands.
Ir. S. Slager, 2nd Secretary. Laboratory for Regional Soil Science of the State Agricultural University, Wageningen, the Netherlands.

At a later date, some members of the meeting will be invited to the chair of the various sessions.

At the meeting, the emphasis will be on discussions. Therefore, the summaries of the papers presented to the Congress will be sent to all members on or about the 1st of June 1964.

At the opening of the conference, each member will receive the printed Transactions. The various speakers will conduct short introductions. The discussions that follow will be printed and sent as appendix to the members not later than 3 months after the closing date of the conference.

The lectures must be held in the English, German or French language. The papers must also be written in one of these three languages.

The total text, including the summary, list of references, tables, line-drawings and black/white photographs, may not exceed the equivalent of 4750 words. The illustrations, in which the tables are also included, will be limited to six, of which not more than 4 items may consist of black/white photographs. On a limited scale, colour printing will be applied.

Space will be provided for exhibits of items of interest to soil micromorphologists, such as enlarged photographs of apparatus, working-methods and results, slides, thin sections, monoliths, books, articles from periodicals etc.

The registration fee (non-refundable) amounts to Dfl. 80.—. This will include one set of Summaries, the Transactions and the Discussions of the Congress.

The fee for the excursion to be held on the 26th of September 1964 is Dfl. 35.— (lunch and dinner included).

Important dates:

15th March 1964.

For authors — Final date for receipt of complete manuscripts. Those that will arrive after this date, will not be published in the Transactions of the Congress. On account of organizational reasons, it is absolutely necessary that authors arrange for a remittance of their registration fee at the same time that they send in their manuscripts.

1st June 1964.

For other participants (non-authors) — Final date for receipt of registration fee.

For all participants — Final date for receipt of application for participation in the excursion, as well as for receipt of the excursion fee.

For contributors of exhibits — Final date for receipt of exhibition material.

For further details apply to the Secretary of the Organizing Committee:

Dr. A. Jongerius, Stichting voor Bodemkartering (Soil Survey Institute), Postbox 10, Bennekom, the Netherlands.

International Society for Photogrammetry

The ISP will hold an international congress in Lisbon from 7 up to 19 September, 1964. As this Photogrammetry Congress thus partially coincides with the 8th International Congress of Soil Science, and undoubtedly members of our Society are interested to assist in both conferences, contact has been established with the ISP in order to find out whether a postponal of the Lisbon Congress could be considered. This appeared to be impossible but Major General R. Ll. Brown, Vice-President of the ISP, informed the Secretary-General of ISSS that the first meeting of Commission VII, which deals with Photo-interpretation, has now been placed towards the end of the first week of the Lisbon meeting (September 11th, 1964). This will enable interested members to participate in the ISSS-Congress and assist as well in all the technical meetings of Commission VII of the ISP.

For further information apply to the Secretary-General of the ISP: Georg. Eng. Manuel da Fonseca Alexandre, Instituto Geografico e Cadastral, Praca da Estrela, Lisboa, Portugal.

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

Bericht:

über die FAO/IAEA-Konferenz „Technical Meeting on the Use of Isotopes in Soil Organic Matter Studies" vom 9.—14. September 1963 in der Forschungsanstalt für Landwirtschaft Braunschweig — Völkenrode.

(sehe Mitteilungen I.B.G. no. 22, Seite 12)

Vom 9.—14.9.1963 fand auf Einladung der Food and Agriculture Organization of the United Nations, Rom und der International Atomic Energy Agency, Wien, unterstützt von der Kommission II der Internationalen Bodenkundlichen Gesellschaft in der Forschungsanstalt für Landwirtschaft Braunschweig-Völkenrode eine Arbeitstagung über „Anwendung von Isotopen auf dem Gebiet der organischen Stoffe des Bodens" statt. An dieser Tagung nahmen die Vertreter von 30 verschiedenen Nationen aus allen fünf Kontinenten teil. Ausserdem waren Vertreter der UNESCO sowie des Bundesministeriums für wissenschaftliche Forschung der Bundesrepublik Deutschland anwesend.

Die Konferenz ist von Prof. Dr. O. Fischnich, General Director Assistent im Namen der FAO eröffnet worden. Es wurden 10 einführende Vorträge und 36 Referate gehalten. Die Diskussionsbeiträge zu den Vorträgen waren sehr zahlreich (186 Diskussionsbemerkungen).

Zur Einführung ist über die Rolle der organischen Stoffe für die Fruchtbarkeit der Böden, insbesondere in tropischen und ariden Gebieten berichtet worden. In einem weiteren Vortrag ist der Stand der Kenntnis der physiologischen Wirkung der Bestandteile der organischen Substanz des Bodens auf den Stoffwechsel der Pflanzen, das Wachstum und den Ertrag zusammengefasst worden. Zu diesem Thema sind einige interessante Beiträge über die Aufnahme von Rotteprodukten aus Stroh und chemische definierte Bestandteile, wie Vanillinsäure, die mit ^{14}C markiert waren, geliefert worden.

Ein weiterer zusammenfassender Vortrag befasste sich mit der Chemie der Humussubstanzen. Dabei ist sowohl über die Bildung dieser Stoffklasse als auch über die Auftrennung mit markierten Humusstoffen berichtet worden. Ferner ist über die Auftrennung von Stoffen aus dem Humus gesprochen worden, die sowohl mit Kohlenstoff-14 als auch mit Tritium markiert waren.

Ferner war der Stand der Untersuchungen zur Kenntnis des Gleichgewichtes zwischen Synthese und Abbau sowie über die Umwandlung organischer Substanzen im Boden während der Humusbildung Gegenstand eines zusammenfassenden Vortrages. Ein Referat befasste sich mit der Humifizierung von mit ^{14}C-markiertem Pilzmycel im Boden.

In mehreren Beiträgen sind die Probleme der Beziehungen zwischen der Rotte verschiedener Pflanzenrückstände und dem Verlust an organischen Stoffen im Boden behandelt worden. In diesem Zusammenhang stehen Untersuchungen über die Bildung von Humus aus markiertem Pflanzenmaterial bzw. dessen Bestandteile. Für derartige Untersuchungen ist die Markierung mit ^{14}C eine besonders wertvolle Hilfe.

Einen weiten Rahmen nahmen die Berichte über die Umbildung von Stickstoff in der organischen Substanz des Bodens ein. Hierbei sind über den Einbau stickstoffhaltiger Komponenten in die gebildeten Stoffe des Humus sowie über die mikrobielle Fixierung von elementarem Stickstoff in der organischen Substanz jeweils mehrere Referate gehalten worden die über Arbeiten mit ^{15}N berichteten.

In einem Übersichtsvortrag ist die Rolle der Mikroorganismen bei der Bildung und dem Zerfall der organischen Bestandteile im Boden ausführlich dargelegt worden.

Dazu sind einige Vorschläge für die Anwendung neuerer Arbeitsmethoden gegeben worden. In den anderen Sektionen waren ebenfalls Beiträge zu diesem Problem enthalten.

Probleme der Bodenbearbeitung, die im Zusammenhang mit dem Humusgehalt des Bodens stehen, sind ebenfalls diskutiert worden.

Der Beitrag über die physikalisch-chemischen Eigenschaften des Humus und seiner Bestandteile gaben verschiedene Hinweise für die Anwendung der Isotope auf diesem Gebiet.

Ein ganzer Tag war den experimentellen Techniken gewidmet, wobei mehrere Beiträge für die Arbeitsmethoden und Einrichtungen zur Arbeit mit ^{14}C geliefert wurden. In gleicher Weise betrafen einige Vorträge die Technik mit den Isotopen ^{15}N und ^{3}H. Diese enthielten auch teilweise Ratschläge über die Ausstattung und die Kosten für die Arbeiten mit Isotopen auf dem Gebiet der organischen Stoffe des Bodens.

In einer Schlusssitzung sind Empfehlungen für die zukünftige Anwendung der Isotopen in einigen Arbeitsrichtungen gegeben worden. Es bestand auch der Wunsch, dass es möglich gemacht werden solle, markiertes Pflanzenmaterial an einigen Stellen in der Welt herzustellen und anderen Forschern zugänglich zu machen.

Ausserdem sollte eine Vorplanung der Arbeit mit dem Isotop ^{15}N angeregt werden, um durch Absatzgarantie den Preis der entsprechend markierten Verbindungen zu senken.

Im Verlauf der Tagung fand die Besichtigung einiger Institute der Forschungsanstalt für Landwirtschaft statt. Am letzten Tag führte eine Exkursion die Teilnehmer in den Harz und nach Goslar.

Symposium on Mangrove Soils

The West-African Regional Committee for Soil Conservation and Utilisation (CROACUS), technical sub-committee of the Commission pour la Coopération Technique de l'Afrique sud du Sahara (CCTA) et le Conseil Scientifique de cette même région (CSA) held its 5th meeting in Freetown (Sierra Leone) from 10—15 June 1963. One of the main points for discussion was the reclamation of Mangrove soils. 25 Specialists, among whom Dr. van der Meer, International Land Development Consultants Ltd. (Netherlands), who represented the I.S.S.S., assembled to discuss the various aspects of increasing rice production in the mangrove area. Topics on which papers were read included:

Development of mangrove swamp areas in Sierra Leone, by H. D. Jordan, Director West African Rice Research Station, Rokupr.

The vegetation of mangrove swamps in West Africa, by H. D. Jordan.

The use of Melaleuca Leucodendron in mangrove soil reclamation in Sierra Leone, by J. S. Sawyer, Acting Chief Conservator of Forests, Sierra Leone.

The mechanical cultivation of rice in the grasslands of Sierra Leone, by H. E. G. Morgan, Senior Agricultural Officer, Agricultural Division Ministry of Natural Resources, Sierra Leone.

Practical inlandswamp improvement in the eastern province of Sierra Leone, by J. Geldhof, F.A.O., Land Use Expert, Sierra Leone.

CCTA/FAO/UNESCO Symposium on the classification of soils of inter-tropical regions, their correlations and their interpretation, Léopoldville, Congo, 28 May—7 June 1963.

At this very important meeting an account was given of the state of affairs with regard to soil survey and soil mapping of a number of African States: Cameroun, Côte d'Ivoire, Gabon, Madagascar, République Centrafricain, République du Congo (Brazzaville), Tschad, Togo and Western Nigeria.

Also a number of papers dealing with special soils were read, to wit:

Red and yellow soils of Western Nigeria, by A. J. Smyth, W. Nigeria.

Sols rouges et sols jaunes du Côte d'Ivoire, by M. Leneuf et G. Riou, Abidjan.

Les sous-groupes des sols ferrugineux tropicaux lessivés à concrétions, by R. Fauck, Dakar.

Les sols tropicaux sub-arides de l'Afrique Ouest, by G. Bocquier et R. Maignien, ORSTOM, Paris.

Some weakly developed soils of the Eastern Serengeti Plains, Tanganyika, by G. D. Anderson, Tanganyika.

MISCELLANEOUS NEWS — INFORMATIONS DIVERSES
VERMISCHTE MITTEILUNGEN

International Information collected on Permeability and Capillarity

A task group on permeability and capillarity of soils, representing Committee D-18 (Soils for Engineering Purposes), American Society for Testing and Materials, was established in 1962 to assemble information on research and methodology for the permeability and capillarity of soil and rock materials. The present objective of this task group is to collect information on equipment and procedures currently used throughout the world, to summarize current and past research, and to promote needed research for the future.

A detailed questionnaire has been prepared and distributed to universities, federal and state government agencies, and commercial organizations in the engineering, agricultural, and geologic disciplines in the United States and foreign countries. Anyone who did not receive a questionnaire, may do so by contacting the chairman of the task group: A. I. Johnson, Chief, Hydrologic Laboratory, U.S. Geological Survey, Denver, Colorado.

Elemental Expression of P and K Fertilizer Analyses

The American Society of Agronomy recently distributed among its members some material on elemental guarantee for fertilizers. Although the decision to express nutrients in soil, plant and fertilizers on the elemental basis in all publications of ASA has been fully effective as off January 1963, the change to a more exact way of expressing the contents of phosphorus and potassium in fertilizers did not yet find a general application.

The ASA Headquarters staff has now prepared a Fact Sheet on this subject which merits more than "national" distribution and is therefore reproduced here for the benefit of interested ISSS-members, which in their own country may help in eliminating confusion that exists with regard to actual proportions of N, P and K in fertilizers.

Since 1955, when the Soil Science Society of America passed a resolution to change fertilizer guarantees to the elemental basis for all plant nutrients, there has been considerable discussion of this subject. Actually, the change was proposed in the 1920's. But, until recently, there was very little action.

Advantages and disadvantages of changing all fertilizer guarantees to the elemental basis are outlined in this article. The change is endorsed by the American Society of Agronomy, Soil Science Society of America, Crop Science Society of America, Association of American Fertilizer Control Officials, Association of Experiment Station Directors, and American Society for Horticultural Science. The technical journals of ASA, CSSA, and SSSA now report all fertilizer nutrients on the elemental basis.

Fertilizer Labeling. Currently, fertilizer is labeled as required by law in each state. All states require *manufacturers to print a guaranteed analysis or* chemical composition on the fertilizer bag and/or attached tag. The analysis of complete fertilizers is expressed in percentages (by weight) of N-P_2O_5-K_2O.

Inaccuracies of Present Form. Nitrogen is legally expressed on the elemental basis as "total nitrogen" (N). Phosphorus is expressed on the oxide basis as "available phosphoric acid". This term designates the available phosphorus pentoxide (P_2O_5). Potassium is expressed as "soluble potash" or potassium oxide (K_2O).

But, *in reality,* there is no P_2O_5 or K_2O in fertilizers. Phosphorus exists most commonly as monocalcium phosphate, but also as other calcium or ammonium phosphates. Potassium is ordinarily in the form of potassium chloride or sulfate. Furthermore, P_2O_5 and K_2O are not involved in plant nutrition. Plant roots absorb most of their phosphorus in the form of an orthophosphate ion, H_2PO_4, and most of their potassium as the potassium ion, $K+$.

Current oxide labeling of P and K makes percentages of these two plant nutrients look higher than they are. The chemical compound P_2O_5 contains 5 oxygen atoms for each 2 P atoms and has a molecular weight of 141.95, of which only 61.95 parts are actual P. K_2O contains 1 oxygen atom for each 2 K atoms and has a molecular weight of 94.2, of which only 78.2 parts are actual K. The oxygen makes up the difference in weight of both compounds-80 parts in P_2O_5 and 16 parts in K_2O.

Nutrients cannot be put into fertilizers as the elements N, P, and K, but as chemical compounds. That's why we do not and cannot have fertilizers containing 100 percent plant nutrients, if expressed on the elemental basis. But, with the current system of expressing P and K as oxides fertilizers could have an analysis of more than 100 percent. These high-analysis fertilizers are not too far over the horizon. In fact, some of them are under study now.

The important information in a fertilizer guarantee is the actual amount of plant nutrient in the bag. For this purpose the elemental system is best because more complex expressions such as the oxide do not convey the chemically correct information.

Advantages of Change. Greater uniformity, simplicity, and accuracy will result by expressing *all* nutrient contents of fertilizers, soils, and plants on the elemental basis rather than by the present mixture of elemental and oxide values. Plant composition is usually expressed as elements. The same has been true in animal science and in the analysis of feeds, insecticides, and other materials.

The elemental expression states the actual concentrations of the active ingredients, in a manner that can be applied correctly to all fertilizers, irrespective of the chemical forms in which the active ingredients occur.

We talk about N-P-K, but presently we express them as $N\text{-}P_2O_5\text{-}K_2O$ in the case of fertilizers. We say that plants remove so many pounds of N-P-K and then recommend adding so many pounds of $N\text{-}P_2O_5\text{-}K_2O$ to replace the elements. This is confusing. Norway, New Zealand, and South Australia are ahead of us in eliminating this confusion.

Other confusion will be eliminated by use of the elemental expression. Currently, at least seven different terms are used for P_2O_5 such as: phosphorus pentoxide, phosphoric acid, phosphate, phosphoric oxide, and phosphorus.

Elemental expressions indicate the actual proportions of N, P, and K in fertilizers. Oxide expressions make the amount of P appear about 2.3 times as large as it really is, and that of K about 1.2 times as large. It is no wonder that farmers, many students, and some sales representatives have misunderstood the meaning of fertilizer labels up to now. A national survey in the late 1950's indicated that "the average farmer doesn't seem to understand clearly the meaning of analysis, grade, or ratio". The elemental expression for all nutrients should make fertilizer grades easier to understand than is possible with the present system.

Disadvantages of Change. Before the complete changeover can be made, revision of state fertilizer laws will have to be made in many instances. During the period of changeover, *dual labeling* probably will be included in revision of the laws. Some state laws already provide for the change, especially pertaining to dual labeling.

Changing to the elemental expression will make it appear that the analysis is being lowered. Some manufacturers feel that farmers may be skeptical of the new labels. They may insist on buying the "higher analysis" fertilizer. A strong educational program is needed to fully inform them of the change.

There will be additional costs in changing labels on fertilizer bags, especially when used across state lines where the change may not yet be in effect. It also will cost industry and educational institutions extra effort and money to explain this change to farmers.

Bulletins, brochures, and textbooks will have to be changed to include the new system. But the reader will not be any worse off than he is now when he reads that so many pounds of P are removed by plants from soils and that more pounds of P_2O_5 must be added to replace the amount of P removed.

Steps Toward Change. Some important steps have already been taken toward changing oxide expressions to elemental. A few states have adopted parts of a Model State Fertilizer Bill that provides for switching P and K from oxide to elemental expression. The provision allows a state to change to the complete elemental basis after a public hearing and if and when a sufficient number of surrounding states are ready to change.

In another step, a group of industry representatives, fertilizer control officials, state and USDA scientists developed an elemental guarantee policy for secondary elements and micronutrients in 1961. The group unanimously agreed that these plant nutrients should be indicated on an elemental basis. Since the need for expressing N on the elemental basis was realized and accomplished many years ago, only the change of P and K remains before we can have complete uniformity.

Several states recently put into effect a double-listing system in reporting their soil test analyses. Fertilizer recommendations also will be given to farmers in both elemental and oxide values for P and K.

Some positive programs have already been proposed and adopted. For example, the International Minerals and Chemical Corporation, one of the leading suppliers of fertilizer ingredients, recently proposed a five-point program for adopting elemental guarantees.

One approach by a land-grant university is an educational program that proposes to: (1) Change field experiments using fertilizers to express plant nutrients as elements; (2) revise popular publications to emphasize the elemental expression for plant nutrients, with ample explanation of the relation between the elements and the oxides; (3) conduct an extension program to acquaint farmers and others with the elemental designation and the relation between the oxide and elemental expressions; (4) revise soil test recommendations to provide for better understanding of the elemental expressions.

Part 4 of this program will include: (a) provisions for alternative rates of fertilizer application, depending on the economic position and managerial skill of the operator; (b) a system of determining credits for residual fertilizers, manures, and legumes; (c) expressions of fertilizer needs on both the elemental and oxide bases; and (d) simple conversion scales to show the relation between the elemental and oxide forms of P and K.

Conversion Made Easy. Simple conversion tables and charts will be provided to farmers and others to show the ease of changing values from the oxide to element or vice versa. The table below is an example of these. It gives the conversion from element to oxide or from oxide to element for P and K in either percent or pounds.

A progressive educational program resulting in uniformity and consistency in the expression of fertilizer guarantees on the elemental basis should enhance the prestige of our agricultural educational institutions and of the fertilizer industry. In due time, the change also should give farmers and the public in general additional confidence in their agricultural institutions and in industry for their willingness and initiative to keep up with improvements and solution of needs of modern times.

To get a majority of farmers to understand the change of expression from oxide to elemental P and K, the aducational effort must become part of the program of all agronomic industries and agricultural institutions. As one midwest farmer recently put it, "We no longer have to be sold on an idea over a period of years. You show us a definite need to accept a new idea and we will accept it."

There is no doubt that farmers can and will accept the elemental system of expressing fertilizer guarantees when it is presented to them in an easy yet accurate manner.

$P\text{-}P_2O_5$ and $K\text{-}K_2O$ Conversion Tables *

Pounds or % as oxide	Give the following pounds or percent As P	As K	Pounds or % as the element	Give the following pounds or percent As P_2O_5	As K_2O
1	0.44	0.83	1	2.29	1.20
5	2.18	4.15	5	11.45	6.01
8	3.49	6.64	8	18.32	9.62
10	4.37	8.30	10	22.90	12.03
12	5.24	9.96	12	27.48	14.43
14	6.11	11.62	14	32.06	16.84
18	7.86	14.94	18	41.23	21.65
20	8.73	16.60	20	45.81	24.05

* Atomic weight of element: P = 31.0; K = 39.1; O = 16.0. Moleculair weight of oxide: $P_2O_5 = (2 \times 31) + 5 \times 16) = 142.0$; $K_2O = (2 \times 39.1) + 16 = 94.2$.

NEW EDITIONS — NOUVELLES EDITIONS — NEUE AUSGABEN

Dictionary of agriculture in German, English, French and Spanish, edited by G. Haensch and G. Haberkamp, 2nd ed. Elsevier Publishing Company, Amsterdam/London/New York, 1963. Price Dfl. 53.50 — £ 5.7.6.

This volume of 744 pages covers, in the four languages mentioned, the most important items in the various fields of agriculture. The leading language is German and the translation of the terms numerated or references selected is given in coordinated columns. Alphabetical indices in each of the languages make the text easily accessible. The student in the wide field of basic and applied agriculture will find it easy to read and understand any treatise on subjects of his specialization in modern language different from his native tongue.

The number of entries is 10.057 dealing e.g. with processing of agricultural products as well as with soil science, genetics, general biology, crop farming, to name a few. The soils section covers 322 subjects, which is only a few less than F.A.O.'s multilingual vocabulary of soil science, and speaks for the thoroughness of compilation of the dictionary. A further valuable asset is that for any biological species, be it annual or perennial crop plant, weed or fungus, the latin name is likewise given.

For a student in agriculture who wishes to be assisted in surmounting language barriers, a most valuable dictionary.

Agrochemia, by Professor Dr. David Davidescu, 880 pages, graphs, color-photographs, tables, litt. Editura Agro-Silvica, Bucuresti, Rumania, 1963.

This second revised and enlarged edition of Professor Davidescu's textbook on agricultural chemistry is written in his rumanian mother tongue. Although therefore internationally of relatively limited use it has a large impact on rumanian agriculture, the more so as this well-known specialist in problems of fertilizers and fertilization has a wide international experience.

The basic trend of this book is the discussion on the interaction between plants-soils-fertilizers and micro-organisms, and as such offers a scientific foundation for the "chemicalization" of agriculture.

Fertilizer Technology and Usage. Edited by Malcolm H. Mc. Vickar, G. L. Bridger and Lewis B. Nelson. 464 pages, photographs, tables, graphs, diagrams, litt. Published by the Soil Science Society of America, Madison 11, Wisconsin, 1963. $ 8,—.

This book carries the title and contains the proceedings of a short course, sponsored by the Soil Science Society of America and held at Purdue University, Lafayette, Indiana, February 12—13, 1962.

In the present publication, up to date knowledge is compiled on the different aspects of fertilizers and their use, the role and functions of the respective elements in the plant, the forms in which they are present in the soil and the factors affecting their availability; the resources and technology of fertilizers.

In a concise form, but amply illustrated with tables, graphs, photographs and diagrams, the role of fertilizers as a strong weapon in the worldwide struggle against hunger is discussed in chapter 1 and in chapter 2 the basic rules concerning the economic use of fertilizers are laid down, while in the following chapters the main nutrients N, P and K are dealt with (chapter 3 to 8 inclusive), in chapters 9 and 10 the "secondary nutrients" (Ca, Mg, S) and micro nutrients and in chapters 11 and 12 the advances in manufacture of mixed fertilizers and their nature, behaviour and use. Last but not least chapter 13 gives a review of the advances in "foliar feeding" of plant nutrients.

This book may be welcomed as an instructive handbook, the more so while an extensive and up to date list of litterature after each chapter shows the way for more detailed studies.

Pedologie generale, par H. Margulis, pp. 116, graphs, tables, litt. Gauthiers-Villars, Paris, 1963.

This book contains a basic discussion on soil forming processes and the factors involved, to wit: time, parent rock, relief, climate and biotics (vegetation, fauna and Man). An interesting section in this concise volume on soil science is the mathe-

matical approach to characteristics as N-content, and processes, as clay formation. The author has, finally, made extensive use of information to be found in the russian litterature. All in all a simple but very readable introduction in important aspects of soil formation.

Croissance et developpement des plantes, by L. Kofler, pp. 234, fig., litt., index. Gauthier-Villars, Paris, 1963.

Although not dealing with soil science, this textbook on plant physiology may interest students in the field of soil-plant relationships. The first part deals with the growth mecanism (kinetics), including a study of meristems, growth rhythm, tropisms, etc. Part II contains a discussion on auxines and allied growth substances whereas in part III specific problems as related to growth and development find ample treatment. For experimentators in plant nutrition some valuable information is included in the final chapter on technics of conditioning.

Magyar orszag talajai (The Soils of Hungary), by P. Stefanovitz, pp. 442, graphs, tables, coloured photographs, litt., index. Akademia Kradó, Budapest, 1963.

One more east-european textbook is published in a revised and enlarged edition. The author, one of the prominent pedologists of Hungary, has divided the material in five parts.

1. *History of Hungarian soil science.*
2. Soil forming factors and their influence on the soils.
3. The principal soils of Hungary.
4. Geography of soil types and
5. Agrotechnical aspects of soil conditions in Hungary.

Part 5 contains a discussion on the classification of the Hungarian soils, with emphasis on their genesis. Thanks to a summary in german, this Hungarian concept, accompanied by a 1 : 500.000 scale coloured soil map, is now available for critical study and as such a valuable contribution to international soil geography.

Aspects de pédologie appliquée, by A. P. A. Vink, pp. 174, color-photographs, fig., tables, litt. Editions A la Bacconière, Neuchâtel, Suisse, 1963.

This french textbook on applied soil science is based on the lectures given by the author at the well-known International Training Centre for Aerial Survey at Delft, Netherlands. In four chapters the aspects of soil science as related to (i) soil survey, (ii) total classification, (iii) areas to be developed and (iv) soil conservation are discussed.

For soil scientists in developing countries, or called upon to advise on matters of agricultural development, a most interesting volume which gives a lead to the solution of a range of problems associated with the application of soil science for the production of more food for more people, with strong emphasis on aerial photography as an essential implement.

Tropische Böden, by Arnold Finck, pp. 188, tables, graphs, photographs, index, litt. Verlag Paul Parey, Berlin, 1963.

This volume is presented as an introduction in the pedological fundamentals of tropical and sub-tropical agriculture. It contains the extended content of lectures for students in tropical agriculture at the Kiel University. Although full of relatively simple basic material, this treatise merits attention because of the systematic approach to soils and soil problems as related to agriculture. The first chapter gives general information on the tropics as agricultural production area; chapters II—V discuss the main aspects of soil formation in humid and arid regions, whereas chapters VI and VII are devoted to fertility and production potentially of the soils in tropics and sub-tropics. In the final chapters one finds information on processes of deterioration (erosion) and on evaluation of tropical soils respectively. Indeed an easily understandable book full of information either derived from personal experience of the author or from the extensively quoted litterature.

OBITUARY — NECROLOGIE — NEKROLOGIE

Professor Dr. Carlo Ferrari † (1910—1963)

Carlo Ferrari was born in Bologna, Italy, February 12, 1910. He received the doctor's degrees of Agricultural Sciences in 1931 and of Chemistry in 1934 from the University of Bologna. Assistant at the Institute of Agricultural Chemistry, he was nominated in 1949 Professor of Agricultural Chemistry and Director of the Institute of Agricultural Chemistry of the Bologna University and of the annexed Laboratory and Experiment Station of the Italian Ministry of Agriculture and Forests. He worked chiefly in the field of the application of photometric techniques to problems connected with agricultural chemistry. In particular, his contribution to the knowledge of the silico- and phospho-molybdic acids in solution allowed him to decidedly improve the photometric phosphoric acid determination as phospho-molybdic blue. This micro-reaction, universally used for analytical purposes, is now utilized in several Italian laboratories also for macro-determinations, for instance for determining the P_2O_5 contents of fertilizers.

Professor Ferrari devised a new method for determining soil phosphate deficiency which actually is the most widely used in Italy. The results obtained in the last years in large scale investigations of Italian soils have been presented at a session of the International Soils Conference, November 1962.

President of the sub-commission charged by the Italian Ministry of Agriculture with the study and the improvement of the official methods of fertilizer analysis, Professor Ferrari was also a member of the Central Committee of the International Chemical Fertilizers Center, C.I.E.C., Zürich, Switzerland. In this Center he actively participated in the commission of study of analytical methods to be adopted universally for fertilizer evaluation in order to facilitate their export trade.

Professor Ferrari was a member of the Academies of Sciences of Bologna and Ferrara, and of the National Agricultural Academy.

Umberto Pallotta.

Professor Dr. Hans Kuron † (1904—1963)

Am 29. Juli 1963 starb der ord. Prof. Dr. Ing. Hans Kuron, Direktor des Institutes für Bodenkunde und Bodenerhaltung an der Universität Giessen. Mitten aus einem arbeitsreichen und erfolgreichen Leben hat ihn der Tod uns unerwartet entrissen. Die Deutsche Bodenkundliche Gesellschaft trauert um ihr langjähriges Mitglied und ihren Vizepräsidenten. Sie bedauert den allzu frühen Tod eines überaus rührigen Forschers, dessen Arbeitsrichtungen besonders auf dem Gebiete der Bodenphysik und Bodenerhaltung lagen.

Seit Wiedergründung der Deutschen Bodenkundlichen Gesellschaft hat Kuron die Leitung der Kommission I (Bodenphysik) und viele Jahre auch der Kommission VI (Bodentechnologie) inne gehabt.

Nach dem Studium der Chemie in Breslau promovierte er 1930 daselbst, wo er Assistent unter Prof. Dr. Ehrenberg geworden war, über „Adsorption von Gasen und Dämpfen in Böden und Tonen und ihre Verwendung zur Oberflächenbestimmung dieser Stoffe". Schon bald wechselte er zum Institut für Bodenkunde in Berlin über und habilitierte sich dort für das Fach der Bodenkunde unter Prof Dr. Schucht, dessen Nachfolger er ab 1937 wurde. Nach einer kurzen Tätigkeit nach dem letzten Weltkrieg als Direktor der Landwirtschaftlichen Untersuchungs- und Forschungsanstalt in Speyer erhielt er 1950 einen Ruf als Professor für Bodenkunde an der Justus-von-Liebig-Universität in Giessen.

Viele akademische und wissenschaftliche Ämter übernahm Kuron in den folgenden Jahren. Er bewährte sich sowohl als Dekan der Landwirtsch. Fakultät als auch als Rektor der Universität Giessen. Als Präsident der Kommission für Landerosion in „The International Association of Scientific Hydrology" fand er ebenso wie in seiner Eigenschaft als Vizepräsident der „Deutschen Bodenkundlichen Gesellschaft" Gelegenheit, sich seinem Lieblingsgebiet der Bodenerhaltung erfolgreich zu widmen, das bis dahin in Deutschland etwas stiefmütterlich behandelt worden war.

Wir verdanken Kuron darüber hinaus viele wertvolle Forschungsarbeiten: Kolloidchemische und tonmineralogische Arbeiten, bodenphysikalische Untersuchungen und Entwicklung von bodenphysikalischen Methoden zur Kennzeichnung von Aggregation, Stabilität und Plastizität von Böden sowie Untersuchungen über Genetik und Melioration von Marschböden kennzeichnen den Fleiss und den Weitblick dieses nicht nur in Deutschland, sondern auch im Ausland hochgeschätzten Wissenschaftlers.

Seine vielseitigen Sprachkenntnisse westlicher und östlicher Sprachen erleichterten ihm, engen Kontakt mit dem Ausland aufzunehmen und in manchen internationalen Vereinigungen tätig zu sein. Auch wir verdanken ihm dadurch manch wertvolle Aufklärung und Hilfestellung. Sein Leben war ausgefüllt mit viel Arbeit, aber auch gekrönt mit viel Erfolg bis zur letzten Minute, als ihn der Tod in seinem Arbeitszimmer traf.

Hans Kuron hatte viele Freunde in Deutschland und im Ausland, so in der Internationalen Bodenkundlichen Gesellschaft, die mit uns um seinen Tod trauern und einen guten Kameraden verloren haben, dessen Andenken wir stets in hohen Ehren halten werden.

F. Scheffer.

Dr. J. K. Basu † (1901—1963)

Dr. J. K. Basu, a Soil Scientist of international repute, was born in 1901 in Calcutta. He had a brilliant academic career in the Calcutta University and later on his scientific career was started at the Rothamsted Experimental Station where he joined in 1927 and obtained the Ph.D. degree of the London University. An eminent scientist by himself, he had the opportunity of working under several well renowned scientific personalities like Dr. J. N. Mukherjee of the Calcutta University, Dr. E. M. Crowther of the Rothamsted Experimental Station, Dr. A. A. De Sigmond of Budapest and Dr. Freundich of Dahlem-Berlin. On his return to India, he started his career as Soil Physicist under the Sugarcane Research Scheme, Padegaon (Bombay) where he made a name for him by his pioneering and monumental work on the genetic classification of black soils. He will for ever be remembered as the first and formost worker on the black soils of India. The other branches in Soil Science, to which he also made notable contributions are soil conservation, dry farming, reclamation of alkaline soils and soil fertility. He was one of main architects and authors of evolving the famous Improved Bombay Dry Farming Method and technique of contour strip cropping for erosion control.

In 1955, on his transfer from Bombay to New Delhi, the sphere of his activity had a wider expansion by his appointment as Director (later on Senior Director) of Soil Conservation to the Govt. of India in the Ministry of Food and Agriculture. In this capacity, he was able to initiate the soil conservation programme of the country on a national scale. After his retirement from the Govt. of India services in 1960, he joined the F.A.O. as an Agricultural Advisor to the Govt. of Sudan. The post he held almost till his premature demise on the 8th March, 1963.

He was the President of the Indian Society of Soil Science for the years 1949 and 1950. In 1950 he was the President of the Section of the Agricultural Sciences of Indian Science Congress. He was also for some time a Vice-President of Commission VI of the International Society of Soil Science and he was a permanent representative of the Indian Society of Soil Science on the Nomenclature Committee of the International Society of Soil Science. He is survived by his wife, two sons and two daughters, and will long be remembered by his students, collaborators and innumerable friends and admirers.

T. D. Biswas.

Professor Dr. Alexander Nikolaevitch Rozanov † (1892—1963)

Soviet soil scientists have suffered a heavy and irreparable loss. On January 31, 1963 the leading scientist professor Alexander Nikolaevitch Rozanov past away.

A. N. Rozanov was born in 1892 in the town of Kineshma. In 1915 he graduated from the Petrovsk (now Timiriasev) Agriculture Academy. He devoted more than 40 years to his favourite science. For many years A. N. Rozanov worked in Central Asia: at first in scientific expeditions under the guidance of N. A. Dimo and then in the Institute of Soil Science and at the chair of soil science and agrochemistry in the Cotton Institute. In 1934 he was invited to Moscow to the Dokuchaev Soil Institute. Very soon A. N. Rozanov became head of the laboratory of saline soils which he directed till his death.

Rozanov's outstanding works were dedicated to the soils of Central Asia. His monograph "Serozems of the Central Asia" was of enormous importance and it was for this work that Rozanov received the highest award: the Dokuchaev Gold Medal.

In recent years A. N. Rozanov worked with an increasing energy and success. His research in Kura-Araksin lowland is a valuable contribution to the study of soil genesis and geography. He described quite a new soil type — grey-brown soils, a link between the soils of dry and humid subtropics. It is widely distributed in the other countries of Asia. Not less popular is his monograph "Soil of loess provinces of China" which is devoted to the soil type — "heilutu".

A. N. Rozanov is the author of 140 scientific works on soil genesis and geography. They are of considerable importance in practice of the irrigated agriculture. Some of them are the basis of many projects for development of new lands.

Rozanov's name was well known not only because of his outstanding works in the field of the irrigated agriculture but also due to his fruitful scientific activity in World Soil Congresses and Conferences. He conducted extensive organisational work as the chairman of Commission VI of the All-Union Soil Science Society.

Despite his illness A. N. Rozanov had many new creative plans and strove for their implementation, therefore his death was so unexpected.

The bright image of A. N. Rozanov will remain forever in the hearts of all who knew him.

USSR Soil Science Society.

Professor Dr. Manuel Muñoz Taboadela † (1917—1963)

On the 27th of March, Dr. Manuel Muñoz Taboadela, Professor of Applied Geology of the University in Santiago de Compostela and Director of the Center of Pedology and Vegetal Biology of the Consejo Superior de Investigaciones Científicas (Higher Council for Scientific Research) died in Santiago de Compostela, Galicia, Spain.

He was born in Lillo (Toledo) on May 17, 1917. He studied pharmacy and received the Extraordinary Prize for his Degree of Licenciate. In 1948 he took his doctor's degree. His thesis on "Total Manganese in relation to the colour of Andalusian Black Earths" was likewise rewarded with the Extraordinary Prize. In 1944 he became a bursary of the Consejo Superior de Investigaciones Científicas and in 1950 a Scientific Collaborator of the Consejo at the Institute for Soil Research and Vegetal Physiology.

In 1953 he was called to the Chair of Applied Geology of the Faculty of Pharmacy in Santiago de Compostela. Two years later he founded and further directed the Center of Soil Research and Vegetal Biology in that town as a scientific branch of the National Institute for Pedology and Agrobiology of the C.S. de I.C.

The C.S. de I.C. permitted him to stay for over a year at the Macaulay Institute for Soil Research at Aberdeen, Scotland. This was particularly effective in establishing connections between Scottish and Galician Agriculture, there being many similar conditions in the two regions. He also visited various Research Centers in France, Belgium, Holland, Germany, etc.

His research work was published in national and foreign reviews and his authority in certain techniques in clay mineralogy was the reason that he was invited, together with Dr. Aleixandre, to compile the IVth Chapter of the book edited by R. C. Mackenzie on "The differential thermal investigation of clays" published by the Mineralogical Society of London in 1957.

Dr. Taboadela was not only fully devoted to his scientific work but also notedly qualified as a teacher who scientifically formed the collaborators that now will pursue his work. His hearty friendliness and gentle unaffectedness made him a friend to everybody who knew him.

J. M. Albareda.

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