

DRAINAGE OF AGRICULTURAL LAND

A bibliography

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PREFACE

This bibliography contains selected references to the literature on the drainage of agricultural land with emphasis on subsurface drainage, mostly published between 1950 and 1966. Topics included are drainage in general, drainage practices, drainage research and groundwater hydrology as a basis of drainage.

The bibliography comprises books, transactions of congresses, bibliographies and the more important abstract journals and periodicals dealing with drainage. Separate articles published in journals and in the transactions of congresses have been omitted. Pamphlets on research institutes and universities have also been excluded.

Only publications written in English, French and German and some Dutch publications with English summaries have been listed.

An effort has been made to include most of the important works, published in the three major Western languages, and to list the most important sources (especially bibliographies and abstract journals) that may serve as a point of departure to further literature.

BOOKS

General and practical aspects of drainage

Application of drainage in the reclamation of salinized soils.

Israel program for scientific translation, Jerusalem, 1960. 228 pp.

Translated from the Russian. Originally published in 1958 by U.S.S.R.

Academy of Sciences, Soil Institute. A collection of eleven articles dealing with practical methods of drainage as a protection against salinization of irrigated soils.

BEERS, W. F. J. VAN / Some nomographs for the calculation of drain spacings.

Bull. no. 8, International Institute for Land Reclamation and Improvement, Wageningen, 1965. 48 pp.

Numerous drainage formulas have been developed over the years. The nomographs presented here simplify the use of some of them.

CHOW, V. T. / Hydrologic determination of waterway areas for the design of drainage structures in small drainage basins.

Bull. no. 462, University of Illinois, Engineering Experiment Station, Urbana (Illinois, U.S.A.), 1962. 104 pp., bibliography.

This study contains a simple method to determine the peak discharge of flow from small rural drainage basins for the design of waterway openings of minor drainage structures. Major phases of the study include a historical review of engineering studies and methods of waterway area determination, a survey of design practice in different state highway agencies in the United States, a collection and analysis of available hydrologic data for the State of Illinois, the development of a method for waterway area determination, a simplification of the developed method and a compilation of formulas for waterway area determination.

Code of practice for the design of open watercourses and ancillary structures. Drawn up by a working party on open watercourses constituted by the Royal Netherlands Institute of Engineers and the Royal Netherlands Society of Agricultural Science.

Bull. no. 7, International Institute for Land Reclamation and Improvement, Wageningen, 1964. 80 pp.

A collection and assimilation of the various principles for the design of open canals for drainage into a code of practice.

CULPIN, C. / Agricultural mechanization. Mechanical equipment for field drainage and ditching.

United Nations, Economic Commission for Europe, Geneva, 1961. 47 pp.

Requirements and machines for surface and sub-surface drainage and ditch cleaning. Operating costs. List of manufacturers and of machines.

FAUSER, O. / Kulturtechnische Bodenverbesserungen. Teil I: Allgemeines, Entwässerung.

5. Auflage. Sammlung Göschen, Band 691, Verlag Walter de Gruyter, Berlin, 1959. 127 pp.

Soil improvement. Chapter I General data; chapter II Drainage: the effect of drainage, depth and distance of the drains, calculation of the drainpipe size, planning and execution of drainage projects, economy of drainage.

HEESE, K. / Meliorationsmaschinen (Entwässerung).

VEB Verlag Technik, Berlin, 1961. 82 pp.

Description of 21 types of reclamation (drainage) machines with comprehensive technical data. Manual for their practical use. Basic indications for the most economical organization of land reclamation sections with complete machinery equipment.

HUDSON, A. W., H. G. HOPEWELL, D. G. BOWLER and M. W. CROSS / The draining of farm lands.

Bull. no. 18, Massey College, Palmerston North (New Zealand), revised 2nd ed., 1962. 319 pp., bibliography.

Handbook on drainage dealing with the following subjects: 1. Characteristics of soil and soil water and the effects of excess water. 2. Drain outflows. 3. Surveying for drainage systems and preparatory work in the field for digging trenches. 4. Use of aerial photography in farm drainage practice. 5. Open drains and grassed waterways. 6. Chemical weed control in open drains. 7. Covered field pipe drains. 8. Fascine stone and other drains. 9. Mole draining. 10. Draining of peat soils. 11. Pumping to remove drainage water. 12. Ditching and pipe trenching machinery. 13. Some legal as-

pects of the control of watercourses. 14. Recent developments in drain-forming practices and materials. 15. Storing drainage water for stock or for irrigation.

IVITSKII, A. J. / Principles of underdrainage design in the Belorussian S.S.R.

Published for the National Science Foundation, Washington, D.C. and the Department of Agriculture, U.S.A. by the Israel Program for Scientific Translations, Jerusalem, 1960. 90 pp., bibliography.

Translated from the Russian original: Printsipy proektirovaniya zakrytogo drenazka v Belorusskoi S.S.R. Academy of Sciences of the Belorussian S.S.R., Minsk, 1954.

KENDALL, R. G. / Land drainage.

Faber and Faber, London, 1950. 133 pp.

Several drainage methods and tools for drainage from a practical point of view.

LIVESLEY, M. C. / Field drainage.

Spon, London, 1960. 204 pp.

Glossary of terms used in drainage. History of field drainage. The purpose and the benefits of drainage. Underground water movement. Soils and systems. Field ditches and pipe drains. Reconditioning of existing tile drainage systems. Reinstallment drainage. Preparation and execution of schemes. Machinery in field drainage.

LUTHIN, J. N. (ed.) / Drainage of agricultural lands.

American Society of Agronomy, Monograph 7, Madison, 1957. 620 pp.

Comprises contributions from the U.S.A., England, Australia, Denmark and the Netherlands, classed under 5 headings: the physics of land drainage; the theory of land drainage; engineering aspects of land drainage; drainage investigation methods; land drainage in relation to soil and crops.

LUTHIN, J. N. / Drainage engineering.

John Wiley, New York, etc., 1966. 250 pp.

Drainage engineering from the design view. Emphasis is placed on fundamentals in developing proper procedural methods. Most of the formulas for

flow into auger holes and drain tubes are explained. Sections on rainfall, runoff and surface drainage problems that occur in humid regions are also included.

MUTH, E. / Untersuchungen über die Wirkung von Filterstoffen bei Abfluss-strömungen in Dränanlagen.

Thesis Justus-Liebig Universität, Giessen, 1962. 105 pp., 87 refs.

The most frequent disturbances in discharging groundwater by tile drains are silting up, choking up with ochre and plant roots growing into the drain. Investigations were made with filter material to prevent these disturbances.

NICHOLSON, H. H. / The principles of field drainage.

University Press, Cambridge, 2nd ed., 1953. 11 and 163 pp.

The fundamentals of field drainage. Drainage practices.

PESTRONG, R. / The development of drainage patterns on tidal marshes.

Dissertation Stanford University. University Microfilms, Inc. Ann Arbor, Michigan, 1966. 135 pp., 42 refs.

Despite strikingly different environmental controls, drainage patterns on tidal marshes bear strong resemblances to terrestrial drainage systems. The underlying nature of these similarities, as well as of the many differences, is the object of this study.

PILLSBURY, A. F. and W. R. JOHNSTON / Tile drainage in the San Joaquin Valley of California.

Water Resources Center Contribution. Department of Irrigation and Soil Science. University of California, no. 97, Los Angeles, 1965. 245 pp.

The performance of 33 different tile drainage systems was studied within a four-year period. Measurements were made on the quantity and quality of all tile effluent and of the applied water. Tailwater losses were measured and piezometers were installed to measure water table recession rates and, in some cases, the shape of the water table during recession. Soil samples were collected annually and analyzed to establish annual salinity changes in the profile.

POIREE, M. and Ch. OLLIER / Assainissement agricole. Drainage par tuyaux et fossés, aménagement des cours d'eau et émissaires.

Bibliothèque de l'Institut de Topométrie du Conservatoire National des Arts et Métiers. Editions Eyrolles, Paris, 1962. 440 pp.

Physical properties of soils. Water in the soil. The cycle of water in nature. Principal hydraulic laws applicable to drainage. Design of watercourses and drainage canals. Ditch drainage. Tile drainage. Execution and maintenance of agricultural drainage works.

ROE, H. B. and Q. C. AYRES / Engineering for agricultural drainage. McGraw-Hill, New York-London, 1954. 501 pp.

Drainage design with special chapters on drainage of irrigated lands, on moisture control on peatlands and on quality of drain tile.

Soil Conservation Service national engineering handbook, Section 16: Drainage. U. S. Government Printing Office, Washington, 1961.

The handbook is being published in sections, each section dealing with one of the many phases of engineering included in the soil and water conservation program. Section 16 includes, among others, the following chapters: principles of drainage; sub-surface drainage of irrigated land in arid and semi arid areas; open ditches for agricultural drainage; drainage enterprises; drainage of organic soils; mole drainage.

SOMEREN, C. L. VAN / The use of plastic drainage pipes in the Netherlands.

Mededeling 62, Cultuurtechnische Dienst Utrecht, 1965. 32 pp.

A general picture of some of the significant features of plastic drainage in the Netherlands, viz.: the materials which are now available, the results of research carried out and the problems for which a satisfactory solution has not yet been found.

SUTTON, J. G. / Design and operation of drainage pumping plants.

U. S. Soil Conservation Service, Washington, 1950. 81 pp.

In a study of 17 representative drainage pumping plants in the upper Mississippi Valley, over a period of 6 years, daily records of operation were made to determine the amounts of pumping, static lifts, and costs of pumping, and tests were made to determine the pump discharges and plant efficiencies.

TEIPEL, R. / Die Mechanisierung der Dränarbeiten.

Fortschrittsberichte für die Landwirtschaft, Institut für Landwirtschaftliche Information und Dokumentation, Deutsche Akademie der Landwirtschaftswissenschaften zu Berlin, D.D.R. 1964, no. 2, Berlin, 1964. 74 pp., bibliography. Russian, English and French summaries.

Mechanization of drainage.

THEOBALD, G. K. / Methods and machines for tile and other tube drainage.

FAO Agricultural Development Paper no. 78, FAO, Rome, 1963. 104 pp., refs. pp. 101 - 104.

Contents: The need for drainage; methods of drainage, under drainage layout; materials, tools and machines; drain installation; junctions and outfalls; mole drainage.

THORN, R. B. (ed.) / The design of land drainage works. A collection of papers selected, annotated and arranged in the form of a design handbook.

Butterworth Scientific Publications, London, 1959. 235 pp.

11 papers selected from the Proceedings of the Institution of Civil Engineers, the Proceedings of the Institution of Water Engineers and from technical journals, revised by the authors. The papers are dealing with many aspects of land drainage and include land drainage in England, theory of flow in alluvial channels, design of fluming for land drainage works, land drainage pumping stations, use of hydraulic models in the design of land drainage structures.

Water. The yearbook of agriculture 1955.

United States Department of Agriculture, Washington. 751 pp.

Drainage is dealt with on p. 478 - 576, in the following chapters: The history of the drainage enterprises; technical problems and principles of drainage; systems for draining the surface; tile drainage; outlet ditches; the use of pumps for drainage; drainage of peat and muck lands; the disposal of seepage and waste water; drainage in forestry management; drainage in the Red River Valley.

WEAVER, M. M. / History of tile drainage in America prior to 1900.

Waterloo, New York, 1964. 343 pp.

Theoretical aspects of drainage

BADEN, W. and R. EGGE L SMANN / Der Wasserkreislauf eines Nordwestdeutschen Hochmoores. Eine hydrologische Studie über den Einfluss von Entwässerung und Kultivierung auf den Wasserhaushalt des Königsmoores bei Torstedt/Han.

Schriftenreihe des Kuratoriums für Kulturbauwesen no. 12, Hamburg, 1964. 156 pp., 113 refs.

The hydrologic cycle of a northeast German moor. A hydrological study of the influence of drainage and cultivation on the water balance of the Königs-moor bei Torstedt/Han.

BEERS, W. F. J. VAN / The auger hole method.

Bull. no. 1, International Institute for Land Reclamation and Improvement, Wageningen, 2nd impr. 1963. 32 pp. Also available in French and German.

A simple method for measuring hydraulic conductivity of soil below the water table. Is mostly used in connection with the design of drainage systems in water logged land.

BELLIN, K. / Entwicklung und Probleme des Dränversuches unter besonderer Berücksichtigung des Ertragsversuches.

Mitteilungen aus dem Institut für Wasserwirtschaft und landwirtschaftlichen Wasserbau der Technischen Hochschule Hannover, Heft 4, Hannover, 1964. 136 pp., 229 refs.

Drainage investigations; crop-yield as an evaluation of drainage.

BOUWER, H. / A study of the draining capacities of longitudinal and transverse tile drainage systems.

Thesis Cornell University, 1955. 85 pp.

Transverse and longitudinal drainage systems in homogeneous isotropic soils have been compared with regard to their drainage capacities. There is no difference in draining capacity between longitudinal and transverse systems.

BREITENOEDER, M. and K. ZANKER / Der Entzug des in Mineralböden eingedrungenen Niederschlagswassers durch die Dränung.

Schriftenreihe des Kuratoriums für Kulturbauwesen, Heft 8, Verlag Wasser und Boden, Hamburg, 1960. 123 pp.

Withdrawal by subsurface drainage of precipitation water penetrated into mineral soils. Part I by Breitenöder: Flow towards drain pipes in mineral soils when soil pores are completely filled with water. Part II by Zanker: The influence of subsurface drainage on the free water in the soil. A problem of non-steady flow.

DIELEMAN, P. J. (ed.) / Reclamation of salt affected soils in Iraq. Soil hydrological and agricultural studies.

Publ. no. 11, International Institute for Land Reclamation and Improvement, Wageningen, 1963. 175 pp.

This study on the reclamation of salt affected soils in Iraq is a compilation of the results of research work of four authors, who were employed for six years as foreign experts in the Ministry of Development and Development Board of Iraq. A number of experimental fields were laid out for the purpose of studying the behaviour of soil, salt and crop under given conditions of irrigation and drainage. An account of the background of the experiments and the conditions under which they took place is followed by a discussion of the results.

ENGELUND, F. / Mathematical discussion of drainage problems.

Trans. Danish Acad. Tech. Sc. 3. Akademiet for de tekniske videnskaber, København, 1951. 64 pp.

Section I of this study comments briefly on the mathematical methods of computing steady two-dimensional flow. The method is applied in Section 2 to the flow on a horizontal impervious layer. Section 3 gives some elementary considerations concerning unsteady flow. In sections 4 and 5 the drainage of a homogeneous isotropic soil extending infinitely downwards and sideways is considered. In Section 6 the influence of anisotropy of the soil is investigated in a special case.

ERNST, L. F. / Grondwaterstromingen in de verzadigde zône en hun berekening bij aanwezigheid van horizontale evenwijdige open leidingen.

Thesis University of Utrecht. Centre for Agricultural Publications and Documentation, Wageningen, 1962. 189 pp., bibliography. English summary.

Groundwater flow in the saturated zone and its calculation when horizontal parallel open conduits are present. General theoretical research on groundwater flow with applications to drainage by means of subsurface pipes.

Especially theories about radial and entrance resistance have been developed in connection with effects of diameter and covering material of pipes.

HOORN, J. W. VAN / Grondwaterstromingen in komgrond en de bepaling van enige hydrologische grootheden in verband met het ontwateringsprobleem.

Thesis Agricultural University, Wageningen, 1960. 136 pp., 33 refs. English summary.

Groundwater flow in basin clay soil and the determination of some hydrological factors in relation with the drainage system. A report of drainage investigations in heavy clay soils with special attention to the influence of depth of water and crop production. Methods for determining drain spacings in basin clay soils.

JAGER, A. W. DE / Hoge afvoeren van enige Nederlandse stroomgebieden.

Thesis Agricultural University, Wageningen, Centre for Agricultural Publications and Documentation, Wageningen, 1965. 167 pp., 35 refs. English summary.

Peak runoff in small river basins in the Netherlands. The study is focussed on the relation between rainfall and runoff. Runoff, as defined in this study, comprises surface runoff as well as groundwater drainage, while small river basins are defined here as areas with natural drainage. The investigation is limited to some sandy regions.

LAMMERS, G. / Hydraulische Grundlagen zur wirtschaftlichen Bemessung von Entwässerungsleitungen.

Thesis Bonn, 1959. 205 pp., 192 refs.

Hydraulic principles for the calculation of the required size of drain pipes.

SCHILFGAARDE, J. VAN, D. KIRKHAM and R. K. FREVERT / Physical and mathematical theories of tile and ditch drainage and their usefulness in design.

Research Bull. no. 436, Agricultural Experiment Station, Iowa State College, Ames, 1956. 39 pp., bibliography.

A review of literature followed by an evaluation of some current solutions to drainage problems and a comparison of the theories with field data.

TALSMA, T. / The control of saline groundwater.

Thesis Agricultural University, Wageningen, 1963. 68 pp.

Contents: Drainage requirements to control the salinity factor. The Murrumbidgee irrigation areas (Australia). Assessment of the salinity hazard.

WESSELING, J. / Enige aspecten van de waterbeheersing in landbouwgronden.

Thesis Agricultural University, Wageningen, 1957. 90 pp. English summary. Also published as : Verslagen Landbouwk. Onderz. No. 63.5, Staatsdrukkerij en Uitgeverijbedrijf, 's Gravenhage, 1957, bibliography.

Some aspects of the water management in agricultural soils. Contents: Introduction; water requirements of crops; air requirements of crops and aeration of the soil; estimation of the most favourable depth of groundwater table; drainage.

WESSELING, J. / Ueber einige Fragen der Beherrschung des Wasserhaushaltes in landwirtschaftlich genutzten Böden.

Uebersetzt aus dem Holländischen von H. Fabian. With English summary. Wageningen, 1957. 105 pp.

German translation of J. Wesseling : Enige aspecten van de waterbeheersing in landbouwgronden. (Some aspects of the water management in agricultural soils).

ZEEUW, J. W. DE / Analyse van het afvoerverloop van gebieden met hoofdzakelijk grondwaterafvoer.

Thesis Agricultural University Wageningen, Veenman, Wageningen, 1966, 139 pp., 55 refs. English summary.

Hydrograph analysis of areas with prevailing groundwater discharge. Where most methods in this field were especially designed for conditions with direct runoff as a major part, the aim of this study is to develop a model for the precipitation-discharge relationship in permeable areas with relatively low rainfall intensities, like in most parts of the Netherlands. The developed method can be considered as non-linear, time variant. Its application leads to rather simple calculation models, producing reliable reconstructions of the hydrographs.

ZEICHNER, D., J. BEAR and D. ZASLAVSKY / Drainage by means of interceptor in phreatic aquifers.

Haifa, 1964. 144 pp., 63 refs. Hebr. with English summary.

Deals with the non-steady flow towards an interceptor line, and with the influence of the latter on the drawdown in its vicinity.

Groundwater hydrology as a basis of drainage

CASTANY, G. / *Traité pratique des eaux souterraines.*

Dunod, Paris, 1963. 657 pp.

General textbook on groundwater.

CHOW, V. T. (ed.) / *Handbook of applied hydrology. A compendium of water resources technology.*

McGraw-Hill, New York, etc., 1964. 1418 pp.

The 29 sections of this handbook, written by 45 experts, can be roughly divided into four groups. The first group deals with closely related sciences upon which hydrology depends. The second group covers various phases of the hydrologic cycle and phenomena, including rainfall, snow, evapotranspiration, infiltration, etc. The third group is devoted to practice and application of hydrology in various fields, while the fourth group is related to some socio-economic aspects of hydrology.

HARR, M. E. / *Groundwater and seepage.*

McGraw-Hill, New York, 1962. 315 pp.

1. Fundamentals of groundwater flow.
2. Application of the Dupuit theory of unconfined flow.
3. Conformal mapping by elementary functions.
4. Special mapping techniques.
5. Confined flow.
6. Approximate methods of solution for confined flow problems.
7. Unconfined flow through earth structures on homogeneous foundations of great depth.
8. Unconfined flow through homogeneous earth structures of finite depth.
9. Seepage from canals and ditches.
10. Seepage towards wells.

LINSLEY, R. K., M. A. KOHLER and J. L. H. PAULHUS / *Hydrology for engineers.*

McGraw-Hill, New York, 1958. 340 pp.

The origin, distribution and properties of the waters of the earth, including the design and operation of engineering projects for the control and use of water.

POLUBARINOVA - KOCHINA, P. Y. A. / *Theory of groundwater movement.*

Translated from the Russian by J. M. Roger-Dewiest. Princeton University Press, New Jersey, 1962. 613 pp.

A monograph dealing with problems of groundwater flow. Gives a survey of the most important Russian contributions in this field. The original Russian edition was published in Moscow in 1952.

SCHNEIDER, A. E. / The physics of flow through porous media. University of Toronto Press, Toronto, 1957. 236 pp.

Contents: porous media; fluids; hydrostatics in porous media; Darcy's law and solutions; physical aspects of permeability; general flow equations; multiple phase flow.

SCHUELLER, H. / Les eaux souterraines. Hydrologie dynamique et chimique. Recherche, exploitation et évaluation des ressources.

Masson, Paris, 1962. 642 pp.

Standard work on groundwater. Water and its physical-chemical properties. Properties of terrain in relation with statical water. Movement of water in rocks. Circulation of groundwater. Temperature of groundwater. Geochemistry of groundwater. Precipitation and infiltration. Water balance. Search for water and exploitation of groundwater.

Steady flow of groundwater towards wells.

Proceedings and Informations no. 10, Committee for Hydrological Research T.N.O., The Hague, 1964. 179 pp.

A compendium which aims at reviewing present knowledge on the flow of groundwater into wells. The following subjects are discussed: fundamental terms and laws, elementary cases of flow, cylinder-symmetrical flow (or two-dimensional radial flow), non-cylinder-symmetrical flows, and the determination of the values of the formation constants by means of pumping tests.

TODD, D. K. / Groundwater hydrology.

Wiley, New York, 1959. 336 pp.

Quantitative aspects of groundwater; groundwater quality; conservation of groundwater; methods for investigating groundwater; artificial recharge and seawater intrusion; economical and legal considerations and groundwater research means.

TRANSACTIONS OF CONGRESSES

Dränung und Dräntechnik. Vorträge der 11. Landeskulturtagung, Hildesheim
8. Oktober 1963.

Arbeiten der D. L. G., Band 93. D. L. G. Verlag, Frankfurt/Main, 1964. 54 pp.,
12 refs.

Drainage and drainage techniques.

Hydrological and technical problems of land drainage. Proceedings of the sym-
posium with international participation, held in Prague on 7 - 12 October, 1965.

Edit. by J. Divis and J. Dvorak. Publ. by Czechoslovak Scientific and Tech-
nical Society, Agriculture and Forestry Section, Prague 1, Siroka 5, 1965.
453 pp.

Reports. Regional Meeting. International Commission on Irrigation and Drain-
age.

1st, Utrecht, 1962.

2nd, Lissabon, 1964.

3rd, Verona, Roma, 1965.

Transactions, Congress on Irrigation and Drainage.

International Commission on Irrigation and Drainage.

1st, New Delhi, 1951.

2nd, Algiers, 1954.

3rd, San Francisco, 1957.

4th, Madrid, 1960.

5th, Tokyo, 1963.

6th, New Delhi, 1966.

BIBLIOGRAPHIES

Bibliography on drainage and profile morphology (1961 - 1947).

Bibliography, Commonwealth Bureau of Soils, no. 488. Harpenden, 1962. 7 pp.

Bibliography on pump drainage with abstracts.

American Society of Agricultural Engineers. St. Joseph, 1961. 11 pp.

Bibliography on salinity in relation to drainage (1964 - 1956).

Bibliography, Commonwealth Bureau of Soils, no. 796. Harpenden, 1964. 11 pp.

DAVIS, E. G. and M. L. GOULD / Drainage of agricultural land. A bibliography of selected references.

U.S. Department of Agriculture, Washington, 1956. 200 pp. Miscellaneous Publication no. 713.

The bibliography contains selected, annotated references to the literature published between 1936 and 1955 on the drainage of land for farming.

GRAF, D. W. / Bibliography on land drainage.

United States Department of Agriculture, Washington, 1936. 245 pp.

RANEY, W. A. / Progress in irrigation and drainage research. A bibliography of publications from the 31 Eastern States during 1956 - 1959.

Washington, 1960. 17 pp.

Recent publications on drainage from the Netherlands in English or with English summary.

Institute for Land and Water Management Research, Wageningen, 1964. 6 pp.

An annotated bibliography.

RUSSELL, M. / Select catalogue of literature on drainage, irrigation, soils and related subjects filed in the CSIRO libraries of the Irrigation Research Stations at Griffith, N.S.W., Merbein, Victoria and the Regional Pastoral Laboratory, Deniliquin, N.S.W.

Griffith, (Australia), 1956. 195 pp.

Supplement to select catalogue 1956/1957. Griffith, 1958. Third supplement to select catalogue. Griffith, 1959. 22 pp.

WELLISCH, H. / A selected bibliography on fluid mechanics, hydrology and hydraulic engineering. 1950 - 1960.

"Tahal", Water Planning for Israel, Tel Aviv, 1961. 69 pp.

ABSTRACTING JOURNALS AND INDEXES

Abstracts of Recent Published Material on Soil and Water Conservation.

United States Department of Agriculture, Agricultural Research Service, Soil and Water Conservation Division, Plant Industry Station, Beltsville, Maryland.

Issued at irregular intervals.

Agricultural and Horticultural Engineering Abstracts.

National Institute of Agricultural Engineering, West Park, Silsoe, England.

Quarterly.

Bibliography of Agriculture.

United States Department of Agriculture, Washington, D.C. 20402.

Monthly.

Bibliographie Hydrologique.

Association Internationale d'Hydrologie Scientifique.

Affiliated bodies in the following countries published national bibliographies on hydrology: Argentine, Austria, Australia, Belgium, Bulgaria, Canada, Denmark, Egypt, Finland, France, Germany, Great Britain, India, Ireland, Israel, Italy, Japan, Morocco, Netherlands, Norway, Poland, Portugal, South Africa, Spain, Sweden, Switzerland, USSR, U.S.A., Yugoslavia, Czechoslovakia, Hungary. The bibliographies are published at irregular intervals.

Bibliography on Irrigation, Drainage, River Training and Flood Control.

International Commission on Irrigation and Drainage, New Delhi.

Published annually. The first Volume (1958) covers the period 1954 - 1956.

Bibliography of Soil Science, Fertilizers and General Agronomy.

Commonwealth Bureau of Soils, Harpenden, England.

Published every third year.

Bulletin Signalétique. Section 11: Sciences de la Terre II; Section 18; Sciences Agricoles.

Centre de Documentation du Centre National de la Recherche Scientifique, 15
quai Anatole-France, Paris.

Monthly.

Landwirtschaftliches Zentralblatt. Abteilung I : Landtechnik; Abteilung II :
Pflanzliche Produktion.

Akademie-Verlag, Leipzigerstrasse 3 - 4, Berlin W 1.

Abt. I six times a year, Abt. II monthly.

Meteorological and Geostrophysical Abstracts.

American Meteorological Society, 45 Beacon Street, Boston 8, Mass. (USA).

Monthly.

Soils and Fertilizers.

Commonwealth Bureau of Soils, Rothamsted Experiment Station, Harpenden,
England.

Bimonthly.

PERIODICALS

Agricultural Engineering.

American Society of Agricultural Engineers, 420 Main Street, St. Joseph,
Michigan (USA).

Monthly.

Deutsche Agrartechnik.

VEB Verlag Technik, Berlin, Oranienburger Strasse 13/14.

Monthly. German language.

Deutsche Gewässerkundliche Mitteilungen.

Bundesanstalt für Gewässerkunde, Koblenz, Kaiserin-Augusta-Anlagen 15.

Monthly. German language, short English summaries.

L'Eau.

Comité "Hygiène et Eau" and Association Française pour l'Etude des Eaux, 23
Rue de Madrid, Paris VIII^{me}.

Monthly. French language.

Journal of Agricultural Engineering Research.

West Park, Silsoe, England.

Quarterly.

Journal of the Hydraulics Division. Proceedings of the American Society of
Civil Engineers.

33 West 39th Street, New York, 18. U.S.A.

Bimonthly.

Journal of Hydrology.

North Holland Publishing Co., Amsterdam.

Quarterly.

Journal of the Irrigation and Drainage Division. Proceedings of the American

Society of Civil Engineers.

33 West 39th Street, New York, 18. U.S.A.

Bimonthly.

Journal of Soil and Water Conservation.

Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, Iowa (USA).

Bimonthly.

Landtechnik. Zeitschrift für Entwicklung, Herstellung, Handel, Instandsetzung und für den praktischen Einsatz von Schleppern und Landmaschinen.

Hellmut-Neureuter Verlag, 819 Wolfratshausen bei München.

Bimonthly. German language.

Oesterreichische Wasserwirtschaft. Zeitschrift für alle wissenschaftlichen, technischen, rechtlichen und wirtschaftlichen Fragen des gesamten Wasserwesens.

Springer Verlag, Wien I, Mülkerbastei 5.

6 numbers a year. German language.

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