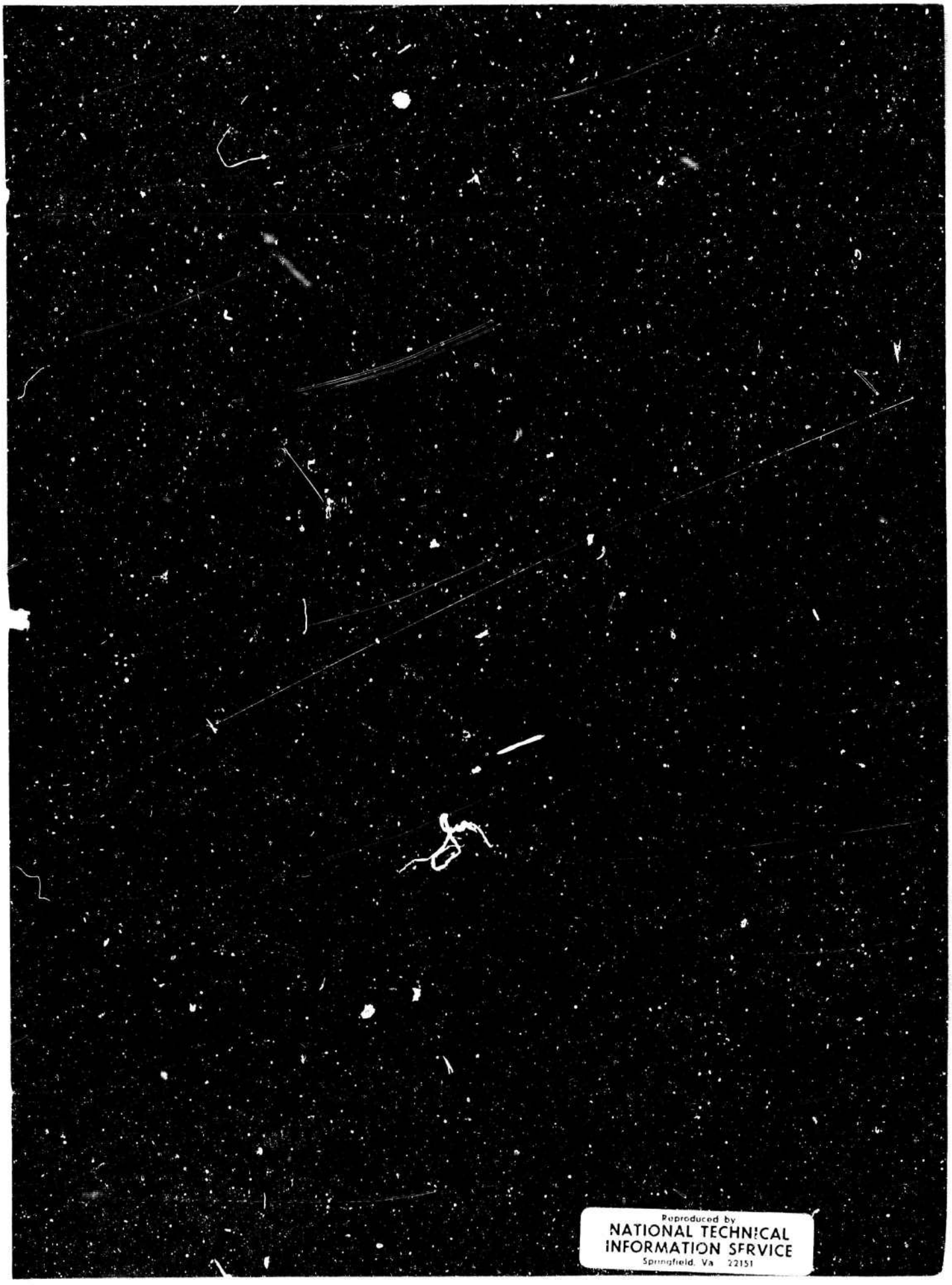

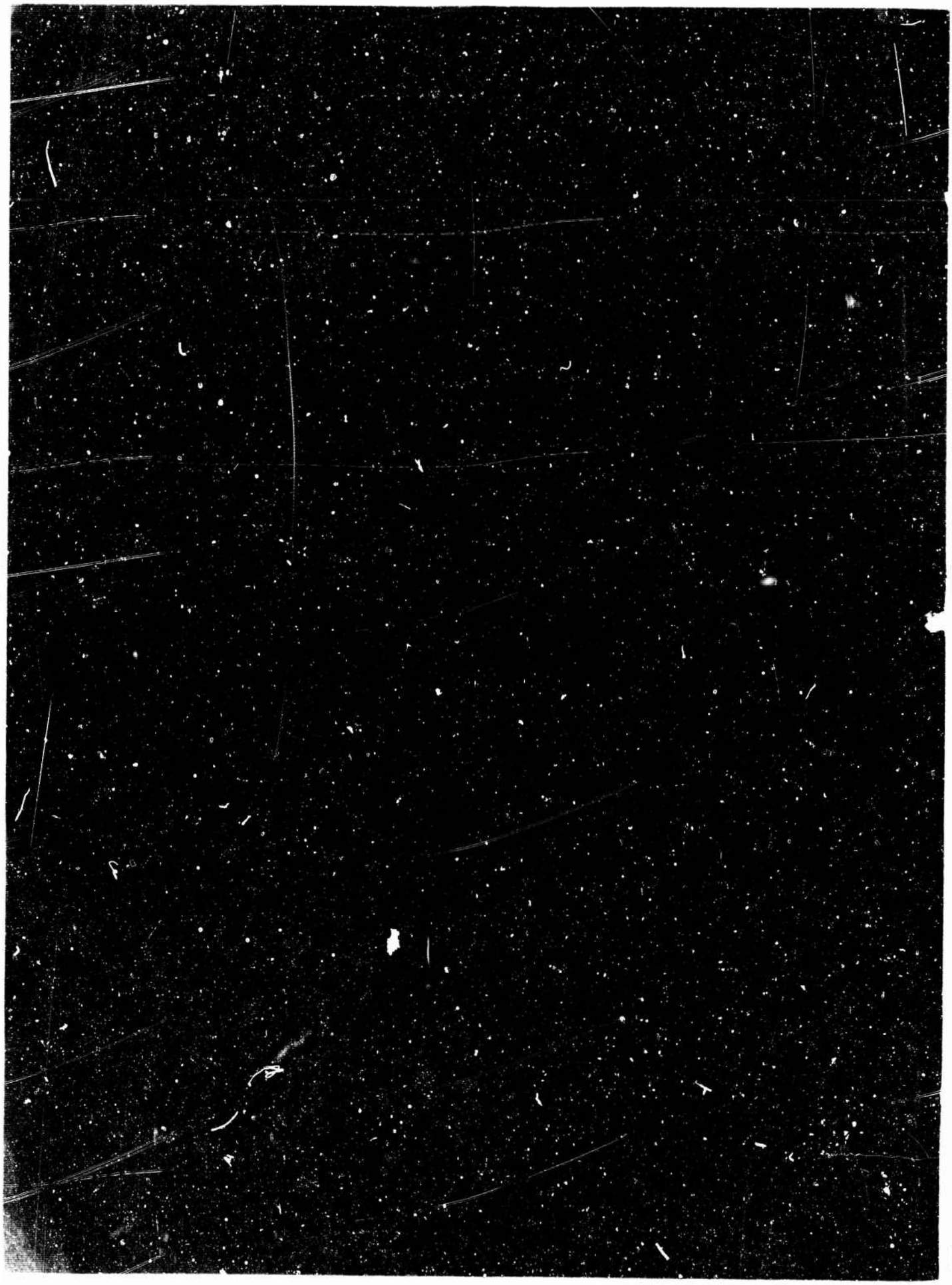

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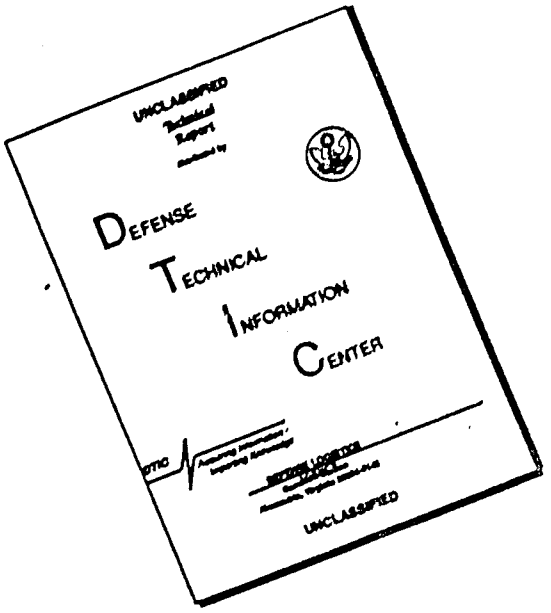

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13. ABSTRACT

This report consists of 594 references to worldwide desert literature appearing between 1966 and 1970, as located during the period January 1969 to August 1970 in standard abstracting and indexing tools, by continuing searches in sources not so indexed, and by a worldwide network of direct contacts. It is arranged alphabetically by authors, with a brief index of subject geographic terms. Brief abstracts are included, with emphasis on arid lands aspects of such topics as geomorphology, weather and climate, vegetation, fauna, surface materials, hydrology, and geography.

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TECHNICAL REPORT

71-20-ES

DESERT RESEARCH, II: SELECTED REFERENCES 1966-1970

Compiled by

Patricia Paylore

Office of Arid Lands Studies
University of Arizona

Contract No. DAAG17-67-C-0199

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FOREWORD

This compilation of desert references from the world literature has been searched during the period January 1969 to August 1970, under a continuation of contract DAAG17-67-C-0199 with the U. S. Army Natick Laboratories, Earth Sciences Laboratory. It is presented here as a companion to Desert Research: Selected References 1965-1968 (Technical Report 70-24-ES, December 1969, 410 p.), which is available from the Defense Documentation Center and the Clearinghouse for Federal Scientific and Technical Information under the number AD703884.

This final contribution terminates a six-year association between the U. S. Army Natick Laboratories and the Office of Arid Lands Studies, to provide the Department of Defense and the world's scientific community a tool designed specifically for bibliographical coverage of the desert environment and its extensive literature. In future, the massive literature bank which the Office of Arid Lands Studies now holds will be available through an automated program of dissemination, by way of an international arid lands information network. The University of Arizona, and this Office in particular, is pleased to take this opportunity to express its gratitude to Natick Laboratories for its sponsorship of what it is hoped will be a continuing source of usefulness to the U. S. Government and its friends throughout the world.

CONTENTS

ABSTRACT

This report consists of 594 references to worldwide desert literature appearing between 1966 and 1970, as located during the period January 1969 to August 1970 in standard abstracting and indexing tools, by continuing searches in sources not so indexed, and by a worldwide network of direct contacts. It is arranged alphabetically by authors, with a brief index of subject geographic terms. Brief abstracts are included, with emphasis on arid lands aspects of such topics as geomorphology, weather and climate, vegetation, fauna, surface materials, hydrology, and geography.

INTRODUCTION

As indicated by the time span covered by the publications included in this compilation, there is some overlap between it and the earlier volume, Desert Research: Selected References 1965-1968 (Technical Report 70-24-ES). This is an inevitable aspect of bibliography, especially when the coverage purports to be worldwide. Many of the citations in this overlap period will be seen to be of foreign origin, delayed in receipt by abstracting and indexing services in their original format, and even later appearing as translations. A very few references between 1963 and 1965 are included to maintain a sequence of references on ecological investigations at the Nevada Test Site.

Excluded from this compilation are references very clearly agricultural, as being outside the scope of our contract, though several references that seem to fall in this category are included because they deal with soil-plant-water relationships that can have a bearing on military geography. A number of entries referring to disease vectors, particularly in desert areas of the Soviet Union, are included because they appeared to have implications beyond local interest. In general, however, strictly medical citations are left to the admirable coverage of the Medical Literature Analysis and Retrieval System (MEDLARS) of the National Library of Medicine, Bethesda, Maryland, especially those referring to diseases that are not endemic to desert environments. Some of the common tools used in our literature searches are:

ANAG	Abstracts of North American Geology
ATD	Aerospace Technology Division Reports (Library of Congress)
BA	Biological Abstracts (including BASIC and Bioresearch Titles)
BIGENA	Bibliography and Index of Geology Exclusive of North America
CBE	Chemical, Biological, and Environmental Factors, Monthly Survey (Library of Congress, Aerospace Technology Division)
MGA	Meteorological and Geoastrophysical Abstracts
STAR	Scientific and Technical Aerospace Reports
SWRA	Selected Water Resources Abstracts
USGRDR	U. S. Government Research and Development Reports

Whenever any of the abbreviations noted above follow the citation in this compilation, the user may wish to consult the abstract that appeared in such source, for the annotations given here have been prepared by the technical staff of the Office of Arid Lands Studies, or modified from author abstracts to emphasize our arid lands interests, and this shorter scope may not be appropriate for special requirements. We have tried in all ways, however, to make the references, or fuller information about them, readily available, including referrals to availability from the National Technical Information Service. In addition to the tools noted above, the Office of Arid Lands Studies conducts a continuous and systematic search of sources not covered by these tools, and enjoys, as well, the benefits of direct contacts through a worldwide network of colleagues and arid lands institutions.

The particular format of the following references has been determined by the computer program developed here for automated retrieval of the immense desert reference information bank available at the Office of Arid Lands Studies. Thus the use of asterisks indicates to the computer a new element in each reference, and has no meaning whatsoever to the user nor should it affect his use of the information in this form.

DESERT RESEARCH, II:
SELECTED REFERENCES 1966-1970

1. *Abdalla, R. E.
*1969 *Some studies on relapsing fever in the Sudan. *Journal of Tropical Medicine and Hygiene 72(5): 125-218. BA (51) 50883.
*The origin and nature of a few isolated cases of relapsing fever which appeared in Khartoum among immigrant communities from the southern Sudan were studied. Among the infected people asymptomatic cases and ambulatory patients with mild symptoms formed the majority. Examination of lice for infection and susceptibility tests in animals showed that the infection was caused by Borrelia recurrentis and hence the disease was louse-borne relapsing fever.

2. *Abdallah, A.M.
*1966 *Stratigraphy and structure of a portion in the northwestern desert of Egypt, U.A.R. (El Alamein-Dabaa-Qattara-Moghra area) with reference to its economic potentialities. UAR Geological Survey, Paper 45. 19 p.

3. *Abdel-Rahman, A.A.
*1967 * Water relations of windbreak trees under desert conditions. *Phyton (Annales Rei Botanicae)12(1/4): 35-41. BA (50) 56736.
*The water relations of some windbreaks growing in the desert region at Burg El Arab were studied. Tamarix, being a highly salt-tolerant species, can be grown in saline areas found in lowlands distributed in the desert region along the Mediterranean Littoral west of Alexandria. The growing plants act in trapping the drifted sand that covers the salt crust at the soil surface. The new accumulating soil receiving run-off water is favorable for plantations of fruit trees and crops. Acacia saligna, which provides a complete cover over the soil surface, is a proper tree for the control of movement of sand dunes.

4. *Abdel-Rahman, A.A./Batanouny, K.H.
*1966 *Microclimatic conditions in Wadi Hoff. *Société Géographie d'Egypte, Bulletin 39: 137-153.

5. *Abdel-Salam, M.A./Sabel, S.A.
*1966 *Soils of the Gaza strip. *Société Géographie d'Egypte, Bulletin 39: 25-30. Map.

6. *Abou-el-Enin, H.S.
*1966 *Cuesta features: definition, classification, and their development in the Maghara District, northern Sinai, U.A.R. *Société Géographie d'Egypte, Bulletin 39: 177-192. Maps.

7. *Addadi, C./et al
*1968 *Age de la mise en place de nappes dans le Tell méridional Algérie (Age of emplacement for the southern Tell nappes, Algeria). *Acad. des Sciences, Paris, Comptes Rendus, D 267: 557-560.

8. *Agi, M.
*1968 *Wetter und Klima im östlichen Mittelmeergebiet unter besonderer Berücksichtigung dez Zyperntiefs (Weather and climate in the eastern Mediterranean region from particular consideration of the Cyprus lows). *Freie Univ., Berlin, Institut f. Meteorologie u. Geophysik, Meteorologische Abhandlungen 74(4). 117 p. MGA 21.2-95.
*Discusses cyclonic activity from a climatological and synoptic view, summarizing climatological characteristics of the area, showing new 10-year monthly mean maps of atmospheric pressure in the area, and including statistical and synoptic investigations of Cyprus lows 1954-1964.

9. *Akademiia Nauk SSSR,/Geografii Institut, Moscow
*1958 *Sredniaia Aziia: fiziko-geograficheskaia charakteristika (Central Asia: physicogeographical characteristics). *Izdatvo, Moscow. 647 p. MGA 19.10-10
*Comprehensive treatise on the physical geography of Central Asia covering its general characteristics and those of individual regions: relief climate, glaciation, water, soil, flora and fauna. Bibliography p. 611-624.

10. *Alimen, H.
*1968 *Chronologie des formations contenant les industries acheuléennes dites de "Tabelbala-Tachenghit", Sahara nord-occidental (Chronology of formations containing Acheullian industry of Tabelbala-Tachenghit, northwestern Sahara). *Acad. des Sciences, Paris, Comptes Rendus, D 267: 839-842.

11. *Allred, D.M.
*1965 *Note of phalangids at the Nevada Test Site. *Great Basin Naturalist 25(1/2):37-38. BA(50)61670.
*This is another of a series of faunal reports dealing with the ecology of the Nevada Test Site. Two species of phalangids are known from this area. Eurybunus riversi Goodnight and Goodnight is widely distributed at the test site, found in 10 of the 25 areas studied, present in all plant communities, with seasonal activity

predominantly during the winter months. Leioburnum townsendi Weed, though common in the western U. S., only 4 specimens were found at the test site, taken in Pinyon-Juniper community during July and Aug. Graphs of the relative abundance in 9 plant communities and seasonal activity based on numbers of individuals of E. riversi are given.

12. *_____ _____

*1966 *Unusual records of Utah mites. *Great Basin Naturalist 26(1/2): 34. BA (50) 61676.

*Gives records of mites taken from reptiles collected during an ecological study of the reptiles of the Great Salt Lake Desert in 1953. All were taken in Tooele County, Utah. The numbers of hosts infested and mites collected are listed.

13. *_____ _____

*1969 *Bees of the Nevada Test Site. *Great Basin Naturalist 29(1): 20-24. BA (50) 117843.

*From 1959 to 1965, many bees were collected at the Nevada Test Site as part of the ecological studies conducted by the Department of Zoology and Entomology of Brigham Young University, under contract with the U.S. Atomic Energy Commission. The identifications form the basis of this report on the host relationships, seasonal occurrence, and geographic distribution at the test site. Genera and species are listed alphabetically. Areas of collection refer to divisions delineated by Allred, Beck, and Jorgensen. Methods of collection used were hand capture, aerial and sweep nets, and can pit-traps.

14. *Allred, D.M./Beck, L.E.

*1967 *Spiders of the Nevada Test Site. *Great Basin Naturalist 27(1): 11-25. Illus. BA (50) 61671.

*During the years 1959-1965, more than 5600 spiders were collected in connection with other studies at the Nevada Test Site. These represent 94 species of 65 genera in 22 families. The greatest numbers of species were found during June and July, and populations of spiders were highest from June through Sept. The Coleogyne and Mixed communities supported the greatest numbers of species, and the Coleogyne and Salsola communities possessed the highest populations. Fewest species were found in the Pinyon-Juniper community, and lowest populations in the Grayia-Lycium.

15. *Allred, D.M./ Johnson, D.E./Beck, D.E.
*1965 *A list of some beeflies of the Nevada Test Site. *Great Basin Naturalist 25(1/2): 5-11. BA (50) 61623.
*This paper reports 2,573 identifications representing 111 species of 24 genera. The species, numbers of individuals collected, months of occurrence, and ecological distribution is tabulated. Species taken in most abundant numbers at the test site are Lordotus albidus Hall, L. nigriventris Johnson and Johnson, and Poecilanthrax apache Painter and Hall. Those most widely distributed ecologically are Paracosmus morrisoni Osten Sacken, Poecilanthrax apache, and Villa aenea Coquillett. The greatest numbers of species and individuals were found in the Mixed and Larrea-Franseria communities. Seasonally, the greatest numbers and species occurred in May, June, April, and Sept., respectively.

16. *Allred, D.M./Goates, M.A.
*1964 *Mites from mammals at the Nevada Test Site. *Great Basin Naturalist 24(2): 71-73. BA (50) 101066.
*Presents mite-host associations resulting from ecological studies at the nuclear test site north of Mercury, Nye County, Nevada. Given are 11 new mite-host associations, 10 new distribution records for the test site and apparently for Nevada, and an unusual record of erythraeid mites of the genus Caeculisoma crawling on bats. Tabulation of mite-host associations shows 23 spp. of mites and their mammalian hosts.

17. *American University, Foreign Area Studies Division
*1969 *Area handbook for Argentina. *U.S. Dept. Army, Pamphlet 550:73; Superintendent of Documents, Washington, D. C. 440 p. Available CFSTI as AD-698 093.
*Covers the economic, social, political, and military institutions and practices of the country, including public health, law, terrain, weather, and transportation.

18. * --- ---
*1969 *Area handbook for Lebanon. *U.S. Dept. Army, Pamphlet 550-24; Superintendent of Documents, Washington, D. C. 362 p., maps. Available CFSTI as AD-692 729.
*A revised edition of the 1964 publication. It offers an integrated exposition and analysis of the dominant social, political, and economic aspects of the country.

19. *American University, Foreign Area Studies Division
*1969 *Area Handbook for Libya. *U.S. Dept. Army, Pamphlet 550-85; Superintendent of Documents, Washington, D. C. 304 p. Available CFSTI as AD-702 763.
*Designed to be useful to military and other personnel who need a convenient compilation of basic facts about the social, economic, political, and military institutions and practices of Libya, with the emphasis on objective description of the present society and the kinds of possible changes that might be expected in the future.

20. *Amin, M.A.
*1969 *The Khashm El Girba irrigation scheme: a new socioeconomic project in the Sudan. *Professional Geographer 21(3): 150-152.

21. *Amiran, D.H.K.
*1967 *Symposium on Coastal Deserts (and Changes in Occupance of Arid Areas) in Peru, April 3-21, 1967. *Nature and Resources 3(4): 11-13. HGA 19.9-543.
*Reviews the 36 papers presented at the symposium, lists the areas studied in the field during the northern and southern excursions, and presents the general resolutions proposed by the Arid Zone Commission of the International Geographical Union which organized the symposium with assistance from UNESCO.

22. *Anderson, A.C./Allred, D.M.
*1964 *Kangaroo rat burrows at the Nevada Test Site. *Great Basin Naturalist 24(3/4): 93-101.
*This study, as part of a broad ecological study, was made to determine the nature of burrows made by the chisel-toothed kangaroo rat, Dipopomys microps occidentalis Hall and Dale, in different soil types and plant communities at the Nevada nuclear test site. Such information is important in evaluating the radiation dosage a rat may receive while in its burrow, and the effects of soil compaction from over-pressure of a nuclear detonation.

23. *Anderson, D.J.
*1967 *Studies of structure in plant communities. V: Pattern in Atriplex vesicaria communities in south-eastern Australia. *Australian Jr. Botany 15(3): 451-458. BA 49(15) 76301.

*The distribution pattern of A. vesicaria (perennial saltbush) was examined in a number of locations extending from Hay in western New South Wales to Koonamore Station in South Australia. The populations sampled were from a range of locations exhibiting a variety of topographical, edaphic, and effective rainfall conditions. Pattern varied considerably between sites.

24. *Anderson, T.W.
*1968 *Electrical analog analysis of ground water depletion in central Arizona. *U.S. Geol. Survey, Water-Supply Paper 1860. 21 p. ANAG (1969) 03692.
*The extensive use of ground water in the Salt River valley and lower Santa Cruz River basin (largest agricultural areas in Arizona) for irrigation has resulted in water level declines as much as 20 feet per year in some places. The use of electric analog modeling techniques has made it possible to predict future ground water levels under conditions of continued withdrawal in excess of rate of replenishment. Prediction of future water table conditions is accomplished by extension of pumping trends to determine resultant effect on regional water levels. Results indicate probable depths to water in central Arizona in 1974 and 1984 if aquifer characteristics are accurately modeled and if withdrawal of ground water continues at the same rate and under same areal distribution as existed between 1958 and 1964.

25. *Arad, A./Michaeli, A.
*1968 *Hydrogeological investigations in the western catchment of the Dead Sea. *Israel Journal of Earth-Sciences 16(1967-4): 181-197. Map. BIGENA 32(9) E68-11848.
*Three main aquifers exist in the area under study: the lower Cretaceous sandstone aquifer (below or above ground level); the upper Cenomanian dolomitic limestone (mostly phreatic) aquifer; the graben fill aquifer (sometimes phreatic, sometimes confined) of Neogene Recent age. The annual natural replenishment is between 70 and 100 x $10^6 m^3$; it takes place mainly in the northern part of the western catchment area of the Dead Sea. The water wells situated along the main graben fault line pump mainly from the reserves of a huge natural reservoir.

26. *Argentina, Instituto Nacional de Geología y Minería, Buenos Aires
*1967 *Carta geológico-económica de la República Argentina: hoja 7a, Salta, provincias de Salta y Jujuy (1:200,000). *Same as author. BIGEOL 33(4) E69-07665.

27. *Arieh, M.J.
*1967 *Seismicity of Israel and adjacent areas. *Israel, Geol. Surv. Bulletin 43: 1-14.

28. *Arizona, State Land Dept.
*1969 *Annual report on ground water in Arizona, Spring 1968-Spring 1969. *Same as author, Water Resources Report 42. 46 p. GRA 3(14) 170-05718.
*Graphs showing water levels in selected wells and estimated annual groundwater pumpage in most of the developed areas, and maps showing depth to water in selected wells, change in water levels in selected wells 1964-1969, and potential well production by areas are shown. Projects supported by the Federal-State cooperative program include effects of vegetation manipulation on surface runoff, Sycamore Creek; and electrical analog analysis of Avra Valley.

29. *Armillas, P.
*1969 *Arid frontier of Mexican civilization. *N.Y. Academy of Sciences, Transactions 31(6): 697-704. NGA 21.2-304.
*Presents a map showing the pronounced recess of the central section of the early 1500's agricultural frontier abutting to the heartlands of Tarascan and Aztec power which corresponds to the present-day boundary between steppe and desert climates (Koeppen's BS and BW types) on the one hand and mesothermal savanna (Cw) and temperate mountain forest (Cf) on the other. The author states that to the north of the boundary the ancient outposts of Tarascan and Aztec settlement were aligned about the present mean position of the 700 mm isohyet and that within a distance of < 60 mi northward the annual average drops < 400 mm. He then notes the general correspondence between climatic boundary and the early 1500's agricultural frontier and using historical and archeological evidence traces this correspondence from about 600 AD to the present. He states inter alia that definite correlations have been detected between winter temperatures in the northern latitudes and the amount of summer rainfall over central Mexico.

30. *Ashbel, D.
*1967 *Climate of the Near East. I: Air and soil temperature. *Hebrew University, Jerusalem. NGA 19.9-530.

*Entirely charts and tables. Legends in Hebrew and English. Data for all stations for the observation period to 1965 include temperatures for soil and air.

31. *Ashbel, D.
*1967 *Frequencies of temperature thresholds (hours per month) and maximum minimum graphs. *Hebrew University, Jerusalem. Unpaged. NGA 19.7-321.
*Numerous charts and tables. Text in English and Hebrew. Contains graphs of daily mean, maximum and minimum and tables of frequencies for varying periods at approximately 100 listed stations mostly in Israel, and a few in Turkey, Syria, Iraq, and Lebanon.

32. *---- ----
*1968 *Rain and snow in the Near East (Turkey, Iraq, Syria, Lebanon, Jordan, Israel and Egypt) 1875-1967. *Hebrew Univ. Jerusalem. NGA 20.7-404.
*Contains, in addition to the main tables, the author's isohyetal map of annual rainfall and snow in the Near East, graphs (in pocket) of annual rainfall for individual years and of long term trends at stations in the various countries, a station index with the number of stations ranging from 1 in Jordan to 63 in Turkey. The main tables give monthly and annual means of rainfall and of numbers of rainy days in Turkey and monthly and annual rainfall for individual years in the other countries.

33. *Australia, Bureau of Meteorology
*1969 *Tropical cyclones in the northern Australian regions, 1966-67 season. *Same as author, Melbourne. 77 p. NGA 21.3-456.
*The areas of responsibility of the 3 Tropical Cyclone Warning Centers at Darwin (Norther Region), Brisbane (Northeastern Region) and Perth (Northwestern Region) are listed, the 3 classes of tropical disturbances are defined, and the code used in the catalog identification is given in the introduction. The 3 parts, one for each center, contain lists of tropical disturbances, general discussion, and evaluation of aids to development and movements. Case histories are included in which development; features of the track; rainfall flooding and flood damage; winds and wind damage; and sea, swell, storm surges; and related damage are discussed. Tracks of cyclones in each of the 3 regions are shown on maps.

*Australia, CSIRO/Division of Meteorological Physics
*1966 *Annual report, 1965-1966. *Same as author, Melbourne. 24 p. MGA 19.1-45.
*Summarizes activities in dynamic and synoptic meteorology, upper atmosphere studies, micrometeorology and evaporation, agricultural meteorology, radiation, etc.

*Australia, Department of National Development
*1967 *Surface water resources. *Australia, Department of National Resources, Sydney.
*This new map, at a scale of 1 inch to 95 miles, and accompanying booklet, replace the 1955 information on drainage systems. Lines and colors indicate average annual run-off over the continent much in the same way isohyets are used on rainfall maps. Areas of high run-off contrast sharply with most of the continent over which less than half an inch of the rainfall appears as surface flow in an average year. Used in conjunction with a rainfall map, the new sheet can indicate approximately how much of the rainfall runs into streams in any part of Australia. Nearly all the rest, representing about 90% of Australia's total rainfall, returns to the atmosphere as evaporation and transpiration from plants.

*Australian and New Zealand Association for the Advancement of Science
*1967 *Symposium on drought. ANZAAS Congress, 39th, Melbourne, 1967, Report. *Australia, Director of Meteorology, Melbourne. 71 p.
*Papers deal with economic aspects, effects on livestock, drought and plants, drought amelioration, and drought assessment by statistical analysis of rainfall.

*Automobile Club of Egypt
*1963 *Principal desert roads of Egypt (Scale 1:2,750,000). *Automobile Club of Egypt, Cairo.

*Barnaroli, A.
*1968 *On the evolution of the Gulf of Aden. *Int. Geological Congress, 23rd, Prague, 1968, Report, Section 1. Proceedings 1: 125-134.
*Discusses Tertiary rift, possible drifting of Arabia and Somaliland, similar Jurassic-Cretaceous structure.

39. *Babayev, A.G./et al
*1968 *Basic problems in the study and development of desert territories of the USSR. *Soviet Geography: Review & Translation 9(6): 430-443.

*Lack of water and shifting sand are the principal development obstacles. An interagency research council under the Academy of Sciences USSR and the present specialized desert journal were established in 1967 to coordinate Soviet desert research and publish its basic results.

40. *Bagirov, B.G.
*1967 *A new drink from Yandak and green tea extracts as a nutritive medium for replacing water loss in hot climates (translated title). *Gigiyena i Sanitariya 9: 114-116. CSE 25:138.

*Since fluid and electrolyte imbalance are grave problems at plants in Turkmenia, a beverage containing green tea and Yandak (Alhagi pesarum) extracts was tested on volunteers. Yandak is a legume, grows well in hot places perenially, and contains significant quantities of tannic acid, soluble silicon compounds, glucosides, flavin groups, and vitamins A, C, and K. The physiological responses of the test group were compared to those of a group receiving only water. The tea prevented significant rises in body temperature and even lowered it in a few cases. The test group desired to drink less than the control group, liked the taste of this beverage, and water loss in the test group was 600 gm/da less than in the water drinking group. A following experiment revealed that when volunteers drank a solution of 2% green tea and 0.17% Yandak, blood pressure remained closer to normal and pulse rate did not rise to the extent it did in the control group when both groups perform labor after drinking.

41. *Dahl, S.K.
*1967 *Control of evaporation from soil. In Symposium on water evaporation control, Poona, 1962, Proceedings, p. 257-259. *Unesco South Asia Sci. Coop. Office/Indian Council Sci. Indus. Res, New Delhi. MGA 20.7-359.

*The evaporation control from the moist surfaces of a number of typical Indian soils by the spreading of monomolecular films of cetyl alcohol and stearyl alcohol was investigated. The experimental arrangement and the procedure for computing evaporation are described. Black cotton soil shows the highest percentage of evaporation control, next comes Delhi alluvium, and, lastly, sand.

42. *Bailey, H.P.
*1966 *Climate of southern California. *Univ. Calif. Press, Berkeley. (California Natural History Guide, 17). MOA 18.4-436.
*A description of the geographic setting, land f[illegible], and air flow, followed by discussion of the 5 climat[illegible] regions, including high and low desert climates. Droughts are treated as problems in applied climatology. It is concluded that rainfall has gradually declined in southern California, and that a drought of major magnitude has taken place in the last 20 years.

43. *Bailey, H.G./Rice, R.M.
*1969 *Soil slippage: an indicator of slope instability on chaparral watersheds of Southern California. *Professional Geographer 21(3): 172-177.

44. *Banta, B.H./Tanner, W.W.
*1964 *A brief historical resume of herpetological studies in the Great Basin of the western United States. I: The reptiles. *Great Basin Naturalist 24(2): 37-57.

45. *Barrett, S.C.
*1967 *Baja California II, 1535-1964. A bibliography of historical, geographical and scientific literature relating to the peninsula of Baja California and to the adjacent islands in the Gulf of California and the Pacific Ocean. *Westernlore Press, Los Angeles, California. 250 p.
*Includes a chronological index to books I and II.

46. *Bartholomew, J. and Son, Ltd.
*1967 *Middle East. Rev. ed. *Bartholomew and Son, Ltd., Edinburgh.
*This map, at a scale of 1:4,000,000, shows routes, railways, oil pipe lines, boundaries, sand deserts, salt marsh and escarpment. Inset: Southern Arabia.

47. *--- ---
*1968a *Israel with Jordan. *Bartholomew and Son, Ltd., Edinburgh.
*This map, at a scale of 1:250,000, shows boundaries, roads, railways, airports, cease-fire line, armistice line, physical features, oil pipe lines and ancient sites. Insets: Israel military administration, Israel, Middle East.

48. *Bartholomew, J. and Son, Ltd.

*1968b *North-east Africa. Rev. ed. *Bartholomew and Son, Ltd., Edinburgh.

*This map, at a scale of 1:5,000,000, shows boundaries, roads, railways, airports, canals, oil pipe lines, physical features and spot elevations. Insets: Nile Delta and Suez.

49. *--- ---

*1968c *North-west Africa. *Bartholomew and Son, Ltd., Edinburgh.

*This map, at a scale of 1:5,000,000, shows roads, railways, boundaries, airports, oil pipe lines, sand dune areas, arsh and flood areas, salt areas, and spot elevations. Insets: Cape Verde Islands, Asension, St. Helena, and Azores.

50. *Beadle, N.C.W.

*1968 *Some aspects of the ecology and physiology of Australian xeromorphic plants. *Australian Journal of Science 39(9): 348-355.

51. *Beals, E.W.

*1968 *Spatial pattern of shrubs on a desert plain in Ethiopia. *Ecology 49: 744-746.

*The distribution of the shrub Cadaba rotundifolia on a sandy plain showed a complex pattern which apprently included a trend towards aggregation, and within areas of higher density a strong trend towards regularity. The latter may result from competition for water, and the former from seed dispersal. Of the various methods of analyzing departure from randomness, the ratio, observed variance to expected variance, and the index of dispersion associated with it, were the most sensitive.

52. *Beard, J.S.

*1968 *Drought effects in the Gibson Desert. *Royal Society West. Australia, Journal and Proceedings 51(2): 39-50. Map.

*On a recent expedition through part of the Gibson Desert and adjacent areas it was observed that most of the vegetation had been severely affected by drought during some recent period, with widespread death and dieback. Regeneration had since taken place. Brief details of the principal vegetation types and of the effects of drought are given. The latter are shown not to have been caused by fire and are traced to three

years of drought in 1961-1964. It is suggested that infrequent severe droughts cause cyclic death and regeneration in these arid areas, producing more or less even-aged stands. The text includes descriptions of the following land forms : 1) sand dunes, 2) sand plains, 3) mulga, 4) mulga parkland.

53. *Beatley, J.C.
*1967 *Survival of winter annuals in the northern Mojave Desert. *Ecology 48(5): 745-750. MGA 19.6-429.
*Following early autumn germination in Mojave Desert winter annual populations in southern Nevada, 1963-64, there was 38 percent survival to maturity. Death occurred in early spring at the time of shift from the slow vegetative growth of winter to the beginning of stem elongation. Despite no marked precipitation deficiencies during the 7-8 month growing season, mortality apparently resulted from inadequate soil moisture to meet the demands of all seedlings at the point in the life cycle of a many-fold increase in plant volume.

54. *---- ----
*1969 *Dependence of desert rodents on winter annuals and precipitation. *Ecology 50(4): 721-724.
*Winter annual parameters, postreproduction rodent densities, and precipitation were recorded over 5 consecutive years on 15 sites in Jackass Flats, southern Nevada. It is concluded that occurrence and failure of reproduction in desert rodents are correlated with the presence and absence of winter annuals in the environment. The data suggest that dietary water (and vitamins), available in winter annual vegetation prior to or at time of onset of the breeding season, are requirements in the physiology of reproduction of heteromyid species.

55. *Beaumont, P.
*1968 *A climatological traverse from the Caspian Sea to the watershed of the Elburz Mountains, Iran. *Weather 23(12): 515-517. MGA 20.11-375.
*The Elburz Mountains represent an unusually sharp climatic barrier zone. To the south is one of the driest salt deserts of the world. To the north is a wet area with dense deciduous forest on the lower mountain slopes and intensive rice cultivation on the plains. A traverse was made on June 12, 1967, with recordings taken at one-mile intervals using a whirling psychrometer

from a vehicle moving at 20 mph. The run began on the shore of the Caspian Sea at 1200 hr and finished at the watershed of the Elburz Mountains at about 1500 hr, a distance of 81 mi with an ascent of 3000 m. The results are shown graphically and briefly discussed.

56. *Beaumont, P.
*1968 *The road to Jericho: a climatological traverse across the Dead Sea lowland. *Geography 53(2): 170-174.
*The road from Jerusalem to Jericho gives evidence of the very considerable environmental differences which existed between adjacent parts of the Jordan Valley, that express the clear effect of altitudinal differences on local climate variations.

57. *---- ----
*1968 *Salt weathering on the margin of the Great Kavir, Iran. *Geol soc. Amer., Bulletin 79(11): 1683-1684. BIGENA 32(12) E68-16655.
*Part of the fine-grained material characteristic of the outer margin of the Great Kavir central basin may have formed as a result of saline weathering of larger-sized pebbles under alternating wet and dry conditions in the surrounding piedmont zone.

58. *Bechara, A.
*1967 *Regionalplanung in der Vereinigten Arabischen Republik (Regional planning in the United Arab Republic). *Petermanns Geographische Mitteilungen 111(1): 19-22. Maps.
*A survey of economic planning in the UAR, especially on the regional plan of 1963 for the Aswan district. The author believes that such planning for the whole country would be advantageous, and to that end proposes to create 7 macro-divisions: Faiyum, Eastern Desert, Sinai, southern Western Desert, northern Western Desert, Nile Valley, and the Delta, and further to sub-divide these into 24 meso-regions. English Summary p. 19.

59. *Beck, D.E./Allred, D.M.
*1966 *Tingidae, Neididae (Berytidae) and Pentatomidae of the Nevada test site. Great Basin Naturalist 26(1/2): 9-16. BA (50) 61653.
*This report is another in the continuing series of publications concerned with the results of ecological observations of fauna at the U.S. Atomic Energy Commission Nevada Test Site. The data are arranged in

tabular form. Five tingids were collected, all new records for Nevada. As a group, the Neididae (Berytidae) were widely distributed over the test site by 3 species. Jalysus wickhami Van Duzee was the most abundant especially on 3 species of Eriogonum. Of the Pentatomidae, the most commonly encountered species, Chlorochroa sayi Stal, had a wide geographic and seasonal distribution of 8 pentatomids collected.

60. *Beck, D.E./Allred, D.M.
*1968 *Faunistic inventory: BYU (Brigham Young University) ecological studies at the Nevada Test Site (invertebrates, vertebrates). *Great Basin Naturalist 28(3): 132-141. BA (50) 118800.

*The Nevada Test Site is located in the southeastern part of Nye County, Nevada. It is about 70 miles northwest of Las Vegas, just north of the Las Vegas-Tonopah Highway (U.S. 95). The test site is divided in almost equal north-south halves by a biotic line of demarcation with the Great Basin Province to the north and the Mojave Desert to the south. At the southwestern edge of the site near Forty-mile Canyon the elevation is approximately 2800 ft. At Rainier Mesa in the north-central region, the elevation is 7694 feet, with some of the surrounding mountains reaching slightly above this level. Practically all portions of the test site were visited and some surveys conducted. However, the major portions of the site where systematic year-around surveys were made are the lowland desert valleys basins, playas, and foothills. The main objective of the research projects was to make a faunistic inventory of the test site. The test site was surveyed to determine plant communities characteristic of the areas of our studies.

61. *Beck, D.E./Allred, D.M./Despain, W.J.
*1967 *Predaceous-scavenger ants in Utah. *Great Basin Naturalist 27(2): 67-78. BA (50) 61647.

*A summary of data accumulated over the years of field surveys on the predaceous activities of ants preying on a live animal or one recently killed, based on the trapping of small rodents for parasitic arthropods. The literature is reviewed with pertinent comments added where significant. Species of ants, collecting data and prey are tabulated. Of the 126 kinds of ants known for Utah, the authors list 42 kinds representing 41 species in 17 genera. Six species were found only in the Great Basin, 14 in the Colorado River Drainage

Basin, and 24 were generally distributed in both basins. Of the approximate 126 kinds of ants previously reported, 19 have been found by this study to be predaceous-scavengers. There is little evidence that any of the ants observed in this study were prey-specific in their association.

62. *Belyayev, N.A.
*1968 *Industrial development of the desert of west Turkmenia. *Soviet Geography: Review and Translation 9(6): 511-519.
*A review of industrial development of West Turkmenia, with emphasis on the expansion of the oil, gas and chemical industries, the growth of population and urban construction, and the water-supply problem.

63. *Ben-Arieh, Y.
*1969 *Pits and caves in the Shephelah of Israel compared with similar pits in East Anglia. *Geography 54(2): 186-192. Map.

64. *Benham, A.D.
*1968 *Estimation of effective rainfall in the design and operation of irrigation schemes. *UN Econ. Com.Asia Far East, Water Resources Series 34: 131-134. MGA 20.8-442.
*Effective rainfall is defined as the rainfall left to meet the consumptive requirements of a crop after losses through evaporation from the plants, percolation and surface runoff have taken place. This lecture discusses the various ways of assessing effective rainfall and lists and discusses the empirical rules that have been formulated in the following countries of the ECAFE region: Japan, Taiwan, Vietnam, Thailand, Burma, and India. Included also is a paragraph on U. S. practice.

65. *Bennett, G.D./Mundorff, M.J./Hussain, S.A.
*1968 *Electric analog studies of brine coning beneath fresh-water wells in the Punjab region, West Pakistan. *U.S. Geol. Survey, Water-Supply Paper 1608-J. 31 p. MGA 20.11-655.
*Graphical procedure developed by Morris Muskat to deal with the problem of water coning beneath an oil well was utilized to study the coning of brine or brackish water beneath a fresh-water well, supplied at equilibrium by uniform areal recharge. Applied to conditions

in the Punjab region of West Pakistan, the results indicate that prospects are good for the development of wells capable of yielding fresh water above a stable cone in the underlying brine or brackish water.

66. *Bennett, J.W., ed.
*1966 *Social research in North American moisture-deficient regions. *Amer. Assoc. Adv. Sci., /Southwestern and Rocky Mountain Division,/ Committee on Desert and Arid Zones Research, Contribution 9. 70 p.
*Contents: Do we need a sociology of arid regions? by C.B. Cleland; Deficit-creating influences for role performance and status acquisition in sparsely populated regions of the U.S., by C.F. Kraenzel; Ecology, economy and society in an agricultural region of the northern Great Plains, by J.W. Bennett; The problem of drought perception, by T.F. Saarinen; and Technological conservatism in cattle ranching as an adaptive process, by T. J. Maloney.

67. *Berdyyev, A.S.
*1968 *Toxoplasmosis among wild vertebrates in Turkmenia (translated title). *Akademiia Nauk Turkmenskoy SSR, Izvestiya, ser. Biologicheskikh Nauk 5: 82-85. CBE 40: 157.
*Study of the serum of 486 wild vertebrates from the desert zone of Central Kara Kum and Central Kopet Dagh in the complement fixation reaction with toxoplasma antigen showed that the following species carry toxoplasma: the long-clawed ground squirrel (Spermophilopsis leptodactylus), the samll five-toed jerboa (Allactaga elater), the great gerbil (Rhombomys opimus), the red-tailed Libyan bird (Meriones erythrourus), the Afghan pika (Ochotoma rufescens), the long-eared hedgehog (Hemiechinus auritus), the common sheltopusik (Ophisaurus apus), and Vormela peregusna. Wild animals in this area can serve as a natural reservoir of toxoplasma and thus this part of the Turkmen SSR is a natural focus of toxoplasmosis.

68. *Bessmertnyi, V.E.
*1968 *Khimicheskii metod bor'by s solontsevatost'yu takyrov (Chemical method of controlling alkaline takyr). *Izv Akad Nauk Turkm SSR ser Biol Nauk 2: 55-60. BA (51) 51742.
*The application of 2500 kg/ha of gypsum improves the water properties of takyr (desert) soils, creates a

more favorable ratio of cations in the soil absorbing complex, lowers the alkalinity of the soil solution during leaching and has a positive secondary action on the washing out of the salts.

69. *Beurlen, K.
*1967 *A estrutura geológica do nordeste do Brasil (Structural geology of northeastern Brazil). *Boletim Paranaense de Geociência 26: 22-23. (Abstr.)

70. *Biswas, A.B.
*1966 *A note on certain sand dunes from the Kaliana area, Mahendragarh district, Punjab. *India, Geological Survey, Records 94(2): 221-228. RINENA 32(10) W68-13073.
*Morphological and micropetrological studies of certain sand dunes occurring in the Kahana area of the Mahendragarh district, Punjab were carried out. Three types of dunes namely longitudinal, transverse, and barchans have been recognized in the area. The aeolian sands composing the dunes are of uniform size and are very well sorted having a coefficient of sorting below 2.0 and appear to have been deposited under uniform conditions of wind. The sands are composed mainly of quartz with subordinate quantity of felspar. The heavy mineral assemblage consists of magnetite, ilmenite, garnet, amphiboles, pyroxenes, epidote, zoisite, micas, tourmaline, sillimanite, kyanite, monazite and zircon.

71. *Blanc, P./Conrad, G.
*1968 *Geochemical evolution of oued Saoura (Northwestern Sahara) waters (translated title). *Revue de Géographie Physique et de Géologie Dynamique 10(5): 415-428. SMRA 2(24) W69-10114.
*Geochemical evolution of streamflow waters in the northwestern Sahara were investigated on the basis of geochemical, hydrologic and geologic data recorded in 1965 and 1966. The study shows that in time of a flood, Saoura carries the waters of the Atlas mountains province, supports a narrow band of vegetation in the desert areas of the norwestern Sahara, and carries soluble salts which concentrate at the extreme limit reached by the streamflow. Solid loads carried by streamflows consist of clays and sands and these loads do not modify the streambed morphology because of the

short-time periods associated with the flood high-water marks. Salt concentrations are slowly diffused through the alluvium formations and water-bearing formations (aquifers) along the whole course of Oued Saoura, especially in the Melah and Sebbet areas where large accumulations of halite, gypsum, and some carnallite are present.

72. *Boisvert, W.E.
*1966 *Ocean currents in the Arabian Sea and northwest Indian Ocean. *U. S. Naval Oceanographic Office, Special Publication SP-92. NGA 20.4-791.
*Presents data on surface currents and winds. Explanations are given on the monthly charts used to represent graphically the current and wind conditions of the area. The basic surface current data in each 1° quadrangle were tabulated by direction to 8 points of the compass. The wind data were obtained from British, German, Netherlands, and U. S. sources. Wind roses give relative frequencies of selected wind speed categories by direction.

73. *Bollen, W.B./Nishikawa, S.
*1968 *Systematic description and key to streptomyces isolants from Chile, Mexico and Arizona desert soils. Progress Report. *Calif. Inst. Tech., Pasadena,/Jet Propulsion Laboratory/Oregon State University, Corvallis. NASA-CR-96470, Contracts NAS7-100, JPL-950783. 100 p. STAR 6(20) N68-33066.

74. *——— ———
*1969 *Systematic description and key to streptomyces isolants from Chile, Arizona and Antarctica desert soils. *Calif. Inst. Tech., Pasadena,/ Jet Propulsion Laboratory/Oregon State University, Corvallis. NASA-CR-100445, Contracts NAS7-100, JPL-950783. 215 p. STAR 7(10) N69-21223.
*Sixty-seven isolants from Chile, Arizona, and Antarctica desert soils have been examined. Of these, 37 have been identified; 9 were cultured on the various media but these could not be classified and were designated "indeterminate", 20 could not be subcultured from the original slants. With the exception of 2, non-sporulating cultures, all the streptomycete cultures isolated from the Antarctica desert soil were identified

as Streptemyces longis roflavus. The non-sporulating cultures may be variants of S. longisperoflavus as their colony characteristics are similar to other cultures which have been identified as S. longisperoflavus.

75. *Bond, R.D.
*1968 *Water repellent sands. *Int. Congress Soil Science, 9th, Adelaide, Australia, Transactions 1: 339-347. SMRA 3(6) W70-02440.
*This paper reports field investigations of water repellent sandy soils in South Australia. In arid or semiarid lands where soil moisture for plant growth is already limited by the climate, soils of a water repellent nature cause further difficulties in even infiltration of the limited rainfall and subsequent uneven germination and poor growth of range and pasture grasses. Water repellence is caused by organic coatings which prevent water films from spreading over soil particles since the advancing contact angle of wetting with water is frequently greater than 90 degrees. Observations showed that the degree of water repellence varied with type and age of plant cover.

76. *Bond, T.E.
*1967 *Microclimate and livestock performance in hot climates. *Amer. Assoc. Adv. Sci., Publication 86: 207-220.
*Indicates how animal performance and some of the factors of the microclimate are related. It is shown that animal performance can often be influenced by one or several of the microclimatic factors discussed. No single index accurately describes the microclimate of an animal, and care must be exercised in assessing the environmental conditions surrounding an animal.

77. *Borisenko, V.A.
*1967 *New occurrences of steppe pika in Kustanay district (translated title). *Moskovskoye Obshchestvo Ispytateley Prirody, Otdel Biologicheskiy, Byulleten' 72(3): 125. CBE 23: 84.
*The steppe pika (Ochotona pusilla) was discovered during field work in the steppes of Kustanay district in the period of 1962-1965. Although its presence in this area had not been verified previously, excrement,

burrows, and tracks were found in brush and scrub growths at several points from 100 km northwest to 50 km southeast of Naurzum. This evidence indicates that steppe pika has been spreading northward in recent years.

78. *Borisov, A.A.
*1967 *Klimaty SSSR (C mates of the USSR). *Izdatvo Prosves enie, Moscow. 294 p. MGA 19.6-8.

*This third ed. contains new material and an additional chapter on the variations and fluctuations of climate in the territory of the U.S.S.R. during geological time. Contents: a brief historical account of climatic studies in the U.S.S.R. since the 18th century and accounts of the climate of Russia in earlier periods; an examination of the factors producing the general climate of the U.S.S.R., namely: the radiation regime, the general circulation conditions and the moisture cycle; the characteristics of the individual climatic elements over the U.S.S.R. including atmospheric and soil temperature, atmospheric moisture (absolute and relative humidity), cloudiness and solar radiation, precipitation, evaporation and potential evaporation, snow cover, and the general climate of the U.S.S.R.; the classification of the U.S.S.R. into climatic regions. The book contains extensive climatic data presented in the form of tables, graphs and maps.

79. *Born, M.
*1967 *Anbauformen an der agronomischen Trockengrenze Nordostafrikas. *Geographische Zeitschrift 55(4) 243-278. Maps.

*The Red Sea Hills are a marginal area in which an impressive expansion of teras-cultivation as well as flush-irrigation has taken place. But, with the exception of the southern fringe, the Red Sea Hills can offer only a limited scope for a permanent sedentary agriculture. Much of the present expansion of cultivation is due to the basic problems of the camel-nomadism of this area and can not yet be considered a stable foundation for the future. For the problem areas of the Red Sea Hills there does not seem to be an alternative solution but the numerical restriction of herds or the depopulation of the tribal lands. English summary, p.276-277.

80. *Borod'ko, S.L.
*1968 *Current status of experimental studies of coccidioidomycosis prophylaxis (translated title). Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii 1: 98-100. CBE 28: 152.
*A laboratory rat can develop a resistance to the disease, but the fungus is retained in the body for a long time. A killed vaccine has produced resistance in mice, saving 50--70% of the animals. The fungus was found in the organs of the surviving animals, however. Animals that survive an intraperitoneal dose of fungus are insufficiently protected against the same or smaller inhaled dose. Aleksandrov and Gefen used the aerosol route in their experiments and found that immunized apes were protected from fatality, although they had well developed pulmonary coccidioidomycosis. An additional subcutaneous vaccination protected dogs aginst repeated aerosol infection. Heat killed, carbon tetrachloride inactivated, formolized and dried vaccines were tested and the formolized 0.5% artrospore vaccine proved to be the best. Administration of an attenuated vaccine increases resistance to subsequent infections. Both types of vaccine are being tested.

81. *Botswana, Geological Survey Department
*1966 *Provisional geological map of Botswana (scale: 1/2,000,000). *Botswana, Geological Survey Department, Lobatsi.

82. *Boulos, L.
*1966 *A natural history study of Kurkur Oasis, Libyan Desert, Egypt. IV: The vegetation. *Postilla 100: 1-22. Maps. BA (48) 84069.

83. *Bowie, J.E./et al.
*1968 *Use of water riparian vegetation, Cottonwood Wash, Arizona. *U.S. Geol. Survey, Water Supply Paper 1858. 62 p. MGA 20.1-670.
*The change in water use as a result of the modification of riparian vegetation was measured in Cottonwood Wash, Mohave County, Ariz. A 4.1-mi length of the stream channel was selected and divided into a 2.6-mi upper reach and a 1.5-mi lower reach. Measurements of streamflow, ground-water levels, vegetation, and meteorological phenomena in the area defined the use of water by riparian vegetation under natural hydrologic conditions. Subsequent defoliation and eradication of the vegetation in the lower reach permitted the determination of the

change in water use as a result of the modification. The computed average loss of water from the lower reach before modification was 80 acre-ft/growing season, a quantity which represented 18% of the average flow entering the reach in the same period. The average loss after modification of the vegetation was 42 acre-ft/growing season, a quantity which represented 12% of the average flow entering the reach in the same period.

84. *Box, T.W.
*1968 *Range resources of Somalia. *J. Range Management 21(6): 388-392. IA (50) 72136.
*Livestock production from native range lands is the most important agricultural enterprise in the Somali Republic. Many areas described in the literature as desert are actually grassland savannahs, having a greater potential than currently realized. Major problems are water, use of grazing systems, proper stocking, and application of range management principles.

85. *Box, T.W./Powell, J./Drawe, D.L.
*1967 *Influence of fire on south Texas chaparral communities. *Ecology 48(6): 955-961.
*Experimental fall burning of south Texas chaparral communities significantly reduced canopy of all brush species in untreated areas and in areas previously treated by roller chopping, shredding, and scalping. There was a significant reduction in lotebush (Condalia obtusifolio (Hook) Weberb.), lycium (Lycium berlandieri Dunal.), and creeping mesquite (Prosopis reptans Benth. var. cinerascens (Grau) Burkart), brasil (Condalia obovata Hook.), and Mexican persimmon (Diospyros texana Scheele). The study substantiates the theory that fire suppressed brush on south Texas grasslands.

86. *Boxhall, P.
*1968 *Way to the Murzuk sand sea. *Geographical Magazine 41(2): 120-124. Map.
*Tripolitania and Fezzan, Libya.

87. *Boyer, D.L./Smith, Jr., A.L.
*1969 *An annotated climatological bibliography of India. *U. S. Air Force, Environmental Technical Applications Center, Washington, D.C., Report ETAC-TN-69-6. 61 p. AD-691 432.
*Includes 141 climatological references, all post-1959.

88. *Boyko, H.
*1967 *Some new methods in ecological climatography and ecological hydrology. *Biometeorology 2(2): 924-930. BA 49(1) 586.
*A number of new methods are presented, as well as examples of practical applications: a vegetation map of the Huleh region in Israel; examples of quantitative indications of groundwater fluctuations in oases by investigating the vegetation cover; and an example showing the determination of the yearly water influx into these oases of Wadi Araba as a basis for recognizing their potential for settlements and land use in general, without endangering the natural equilibrium; plant sociological records showing the erratic features of desert climate and the various adaptations of plant species to this important factor of erratics.

89. *Bradley, W.G.
*1967 *Home range, activity patterns, and ecology of the antelope ground squirrel in Southern Nevada. *Southwest Naturalist 12(3): 231-251. BA (51) 64701.
*Live trapping data from the Desert Game Range in southern Nevada were used to determine the activity patterns and home range of the antelope ground squirrel, Citellus leucurus. Young ground squirrels appear above ground in the late summer. Few animals remained on the study area by the following spring. Above-ground activity occurs at that time of the day when temperatures are moderate. Live trapping data as indicated by the number of daily captures and average range of daily movements clearly suggest that temperature is a major factor influencing activity. Squirrels are largely inactive at temperatures below 10°C. and above 32°C. and are most active in Sept, a time when moderate temperatures occur throughout the day. The winter and early summer are periods of reduced activity as revealed by few captures and shorter average range of movements for daily and monthly periods. Home ranges by the greatest distance between captures method averaged 20.6 acres as contrasted with an estimate of 14.9 acres by the minimum home range plus estimate method and eight acres by the distance between random points of capture method.

90. *Brawer, M.
*1968 *The geographical background of the Jordan water dispute. In C. A. Fisher, ed., Essays in political geography, p. 225-242. *Methuen, London. Maps.

*One of the aspects of the Palestine problem is the Jordan water dispute. Israel has completed a project for withdrawal of large quantities of water from the river, while Syria has embarked on a project designed to cut off the headwaters of the Jordan. The dispute is basically a direct result of long-standing Arab-Israel hostility, and not a genuine clash of interests. The quantities of water in dispute seem very small when compared with those involved in other similar and recent disputes, for example that between Pakistan and India, or with the dimensions of water projects in other parts of the Middle East, for example, the Nile or the Tigris and Euphrates, but they are nevertheless of considerable importance in the region through which the Jordan runs.

91. *Brokaw, A.L./Barosch, P.J.
*1968 *Geologic map and sections of the Riepetown quadrangle, White Pine County, Nevada (1:24,000). *U.S. Geol. Survey, Geological Quadrangle Map GQ-758. ANAG (1969) 04210.

92. *Brown, J.M.M./De Wet, P.J.
*1967 *A survey of the occurrence of potentially harmful amounts of selenium in the vegetation of the Karoo. *Onderstepoort Journal of Verterinary Research 34(1): 161-217. Maps. BA 49(15)80304.
*The Se content of the vegetation of the Karoo was investigated. Given suitable conditions numerous species of plants in this area can take up moderate amounts of the element. A classification of these plants on the basis of apparent Se uptake was attempted.

93. *Brown, R.M.
*1968 *Two Libyan oases. *Mondo 4: 1-11.
*Deals with Augila and Marada.

94. *Bryson, A.B./Baerreis, D.A.
*1967 *Possibilities of major climatic modification and their implications: northwest India, a case for study. *American Meteorological Society, Bulletin 48(3): 136-142.
*On the basis of field observations and theoretical studies it is believed that the dense pall of local dust over northwestern India and West Pakistan is a significant factor in the development of subsidence over the desert. Archeological evidence derived from the

northern portion of the desert within India suggests a pattern of intermittent occupation with the role of man being important in making the desert. As man has made the desert, so through surface stabilization can he reduce the dust and consequently modify the subsidence and precipitation patterns in the region. The social consequences of such climatic modification are briefly considered.

95. *Dryssine, C.
*1966 *Contribution a l'étude des sols du Sud Marocain: (Sols de la région de Taouz et du Mal'der Bouziane) (A study on the soils in southern Morocco: Soils of the district of Taouz and the Maider Bouziane). *Al Awamia 20: 1-41. BA (50) 94844.
*The general soil development conditions in these presaharian regions, physical and chemical characteristics of a number of soil profiles and the nature of soil formation, and the effects of the wind and river floods in shaping the profiles are described. Among the agronomical problems are those of the formation of a hard and compact clayey crust interfering with crop development and of the occasionally high salinity of the soils.

96. *Dryssine, I.
*1966 *Etudes sur la dynamique de la microflors de troie types de sols Marocains (Study of microflora dynamics in three types of Moroccan soil). *Cah Rech Agron 23: 1-189.
*In a profile of the red sandy soil the maximal number of Azotobacter was found in the sandy layers while Clostridium were found in the clay layers. Denitrifying activity was concentrated in the clay layer and the bacterial activity of the carbon cycle took place at the bottom of the profile. In a profile of the brown soil Azotobacter bacteria were numerous at the surface but their number diminished with depth. The surface layers were also rich in Clostridium but their numbers dropped sharply below 120 cm of depth. Nitrifying bacteria were numerous up to 60 cm of depth. Denitrification diminished with depth. Cellulolytic microorganisms abound in the 1st 60 cm of the soil profile. In the profile of the heavy clay which was rich in Azotobacter and Clostridium up to a depth of 80 cm nitrifying bacteria abounded up to a depth of 1 m. Denitrification was high throughout the profile and cellulolytic bacteria abounded throughout. The

microflora of these soils was more uniformly distributed through the profile and throughout the year than in the 1st 2 soil types. The above conditions prevailed in winter at the time of maximal humidity.

97. *Buol, S.W.
*1966 *Soils of Arizona. *Arizona Agric. Experiment Station, Technical Bulletin 171. 25 p.
*Included is a soil association map which indicates the distribution of soils in the state. Each mapping unit is described briefly in general terms. No attempt is made to give detailed profile descriptions of the soils present. Characteristic series in each unit are named and their placement in the new classification system is given to inform the professional reader of the characteristics of the soils in the unit.

98. *Busch, C.D./Turner, Jr. F.
*1967 *Sprinkler irrigation with high salt-content water. Amer Soc Agr Eng Trans 10(4): 494-496. BA (50) 72179.
*The 2-year study of sprinkling cotton with saline (3160 ppm) water indicates daytime evaporation losses from sprinkling markedly affect both the Na content in plant leaves and the crop yield. The normal diurnal fluctuations plus problems of sprinkler adjustment suggest night sprinkling as a reasonable procedure for sprinkler irrigation where water is classified as poor in quality.

99. *Busch, F.E./Hudson, J.D.
*1969 *Ground-water levels in New Mexico, 1967. *New Mexico State Engineer, Basic Data Report. 74 p. Maps.

100. *Bush, P.D./Finke, J./Wilson, J.R.
*1968 *Desalinization-power plant proves economically feasible. *Environmental Science and Technology 2(6): 428-434. BA (49) 113782. SWRA 2(20) W69-08295.
*An evaluation of capital costs and potential cost variables reveals that the variables can affect the projected unit cost of water from dual-purpose plants by no more than 15 percent from best to worst conditions.

101. *Butzer, K.W./Twidale, C.R.
*1966 *Deserts in the past. In R.S. Hills, ed., Arid lands: a geographic appraisal, p. 127-144. *Methuen, London.
*Discussions of criteria of climatic change including lacustrine conditions, river terraces, palynology, sediments and fossil soils, dune forms, dendrochronology, and archaeology. Emphasis is on pluvial periods of the Quaternary.

102. *Butzer, K.W./Hansen, C.L./Leigh, E.G.,Jr./ Van Campo, M./ Gladfelter, B.G.
*1968 *Desert and river in Nubia. *Univ. Wisconsin Press, Madison. 562 p. MGA 20.1-8.
*An account of the Yale Prehistoric Nubia Expedition of 1962-63, encouraged by Unesco to document or remove the archeological wealth of the High Dam Reservoir upstream of Aswan, including: nilotic and wadi interrelationships; evolution of the Proto-Nile Basin into an integral part of the modern hydrographic system; geomorphic processes and landforms in an arid environment; prehistory of southern Egypt.

103. *Bytinski-Salz, H.
*1966 *An annotated list of insects and mites introduced into Israel. *Isr J Entomol 1: 15-47.
*About 190 species of insects (Coleoptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera, Orthoptera, Thysanoptera) and mites are considered as introduced into Israel, most of them during the last half century. General remarks on the history of introductions, their origin, acclimatization and present economic status are followed by a detailed list in which it is endeavored to establish, as far as possible, the first date of introduction, the host, and spread within the country.

104. *Cameron, R.E.
*1969 *Abundance of microflora in soils of desert regions. *Calif. Inst. Tech., Pasadena,/ Jet Propulsion Laboratory. 21 p. NASA-CR-101127, JPL-TR-32-1378. Contract NAS7-100. STAR 7(14) N69-26316.
*Surface soils were collected by aseptic techniques from cold, polar, hot volcanic, and high mountain deserts, and were analyzed for physical, chemical, and microbiological properties. Soils showed a wide range of properties but were generally greyish, yellowish,

or brownish sands, low in organic matter and cation exchange capacity. There were detectable concentrations of water-soluble ions, and pH values above 7.0, except in volcanic areas. Total microbial abundances ranged from zero (undetectable) to more than 10 super 8 per gram of soil. Aerobic and microaerophillic bacteria were most abundant, followed by algae and molds. The anaerobic bacteria were generally least abundant or undetectable.

105. *Cameron, R.E./Blank, G.B./Gensel, D.R.
*1966 *Desert soil collection at the JPL soil science laboratory. *Calif. Inst. Techn., Pasadena,/ Jet Propulsion Laboratory, Technical Report 32-977. 53 p. BA 49(15) 80457.
*Desert soils and other geologic materials collected from 100 sites in desert regions comprise the Desert Soil Collection. Approximately 400 samples were obtained from the surface to depths of 1 meter since 1961, primarily from arid and semi-arid regions in the United States. Most of the samples are from California deserts. Additional samples were obtained from arid or semi-arid regions of Baja, California and Sonora, Mexico, several states of Argentina and Chile, and Egypt, U.A.R. Descriptive information on the location and characteristics of the collection site, including photographs of the terrain and soil, are included.

106. *Cameron, R./King, J./David, C.
*1968 *Soil microbial and ecological studies in Southern Victoria Land. *Antarctic Journal U.S. 3(4): 121-123. BA (50) 71757.
*Basic groups of microorganisms of extreme environments, with the emphasis on desert soils, were identified. The environmental parameters were correlated with the distribution, abundance, and kinds of microorganisms and their activities.

107. *Campbell, A.C.
*1968 *The Central Kalahari Game Reserves. *African Wildlife 22(3): 191-198. BA (50) 79377.
*The Central Kalahari Game Reserve, located in the middle of Botswanna in the eastern Kalahari Desert, is one of the largest and remotest game reserves in Africa. The entire reserve of 21,000 square miles is covered by sands varying in depth up to 300 ft. There is no surface water in the reserve except for several days in depressions

after heavy rains. Annual rainfall rarely anywhere exceeds 16 in. and often is less than 10 in. The country is mainly composed of low rolling dunes covered by open grassland, broken here and there by small clumps of thorn trees or by heavily wooded areas in some places. Travel is extraordinarily difficult as there are no roads and the few tracks are passable only by 4-wheel drive vehicles. All water, fuel and other supplies must be carried by the traveller. A unique feature of the game reserve is its human population of Bushmen varying in number from 1000 to 3000 at different times of the year, who have absolute rights to hunt. Enormous herds of migratory game were present until 1961 but since have been declining rapidly for no known reason.

108. *Canavan, F.
*1968 *Geologists and their contribution to Australia. *Geol. Soc. Australia, Journal 15(2): 163-174. BIGEOL 33(4) E69-05829.
*Historical evaluation, future programs, prospects for development.

109. *Candela, B./et al.
*1968 *Large-volume-long distance fresh water transferral as an alternate to desalination. *Hudson Institute, Economic Development Studies Section, HI-923/2-P. Croton-on-Hudson. 52 p. Maps.
*A preliminary evaluation of technical and economic alternatives related to transfer of large quantities of Mississippi and Arkansas River waters over long distances with significant changes in elevation to provide irrigation water to Texas, Oklahoma, New Mexico, Arizona and the areas of Nevada, Calif. and Mexico served by the Colorado River System.

110. *Canizares, O.
*1965 *Physical geography, its role in skin diseases in tropical America (human). *Dermatologia Internationalis 4(1): 34-37. BA 49(17) 90644.
*The 4 main types of climate of dermatologic interest in tropical America are the tropical rain forest, the tropical savanna, the desert, and the mountain climate. They have definite and different effects on the development and distribution of skin diseases, with each region presenting its own characteristic pattern.

111. *Carr, J.T., Jr.
*1967 *Climate and physiography of Texas. *Texas, Water Development Board. Report 53. 27 p. MGA 19.1-317.
*Aims to provide explanations of the large daily, seasonal, and annual variation in climatic parameters in the various sections of the State and to emphasize moisture sources and topography, the 2 most important factors affecting precipitation and temperature. Physiography and climate regimes in the various climatological subdivisions of Texas are examined in detail. Simplified explanations of characteristic "summer drought" in east Texas and of the rainfall gradient along the Texas coast are offered. An attempt is made to explain how and why mountains and scarps trigger the precipitation mechanisms and why plains, valleys, and plateaus do not. The decrease in rainfall resulting from a moisture bearing wind trajectory over the dry land in Mexico is apparent in the Stockton Plateau and Pecos Valley.

112. *Carrodus, B.B./Specht, R.L./Jackman, M.E.
*1965 *The vegetation of Koonamore Station, South Australia. *Royal Soc. So. Australia, Transactions 89: 41-52. BA (50) 90437.
*A vegetation map of Koonamore Station in the arid zone of South Australia is presented, describing six vegetation forms or sub-forms (semi-arid mallee, arid scrub, low arid scrub, low arid woodland, shrub steppe, and ephemeral herb and grassland) and 15 plant associations for the Station. These are correlated with the landscape and soils on which they are found. Appended is a list showing the ecological distribution of 196 native and 16 alien species recorded on the survey.

113. *Chatterjee, S.P.
*1966 *Progress in climatology in India. *Tokyo Journal of climatology 3(1): 30-35. MGA 18.12-380.
*After noting that rainfall measurements were taken in India as early as the 4th century B.C., this brief summary indicates the different aspects that have been studied by meteorologists, geographers, agriculturists and others, in the fields of surface climatology, upper air climatology, weather and climate, rainfall and runoff, climatic types, and climatic changes.

114. *Ch'en, Ching-sheng

*1966 *Brief introduction to some basic knowledge on saline soils (translated title). *Ti Li 1: 35-40. Translation available CFSTI as AD-692 153.

*Discusses salt content in salinized soils and its damage to crops, salinized soil formation in relation to natural conditions, and classification of salinized soils. Most plants cannot absorb water in salt solutions at an osmotic pressure of 6.8 atm. The osmotic pressure in deserts in central Asia varies from 3.29 atm to 8-15 atm. Classifications have been made for the Ning-hsia region, in the Northwestern region, and in North China.

115. *Chernenko, I.M.

*1968 *The Aral Sea Problem and its solution. *Soviet Geography: Review and Translation 9(6): 489-492.

*A hydrogeologist suggests that nine-tenths of the present stream flow into the Aral Sea can be diverted for other purposes without causing the sea to dry up. The diversion would cause the sea level to drop by 12 meters, where it would stabilize because of a greater intake of sub-surface runoff resulting from an increased artesian pressure differential, and because the draining of flooded shore areas and the drying up of reed growths will make more water available through savings in evaporation and transpiration.

116. *Christensen, E.M.

*1967 *Bibliography of Utah botany and wildland conservation. Brigham Young University Science Bulletin, Biological Series 9(1). 136 p.

*This bibliography includes articles on botany per se, biotic communities, range management, watershed management, forestry, recreational use of wildlands, and those aspects of zoology and wildlife management involving plant communities or habitat management. Most of the references are to scientific papers and theses, but selected semipopular and popular articles are included. References published by Dec. 31, 1964, are listed. The references are arranged alphabetically by author. A chronological arrangement follows the alphabetical listing. A general subject index based on the reference titles is also included.

117. *Christensen, E.M.
*1967 *Bibliography of Utah botany and wildland conservation, no. 2. *Utah Academy of Sciences, Arts and Letters, Proceedings 44(11): 545-566.
*Brings the original bibliography up to date through 1964.

118. *Church, R.J.H.
*1968 *West Africa, a study of the environment and of man's use of it. 6th ed. *Wiley, N. Y. 543 p. Maps.
*Physical basis, resources and their development, and political divisions.

119. *Cloudsley-Thompson, J.L.
*1966 *Climate and fauna in the central and southern Sudan. *Sudan Notes and Records 47: 127-136.

120. *----- -----
*1969 *The zoology of tropical Africa. *Norton. 355 p.
*Brief accounts of the climate, zoogeography, soils, and vegetation of Africa. Includes discussions of migrations, irruptions, and rhythmic behavior, and three chapters on various physiological and behavioral adaptations to heat. The final chapter reviews the effect of the African environment on man and the ecological effect of man on Africa. An encyclopedic work, with original sources of all facts cited, serving as a valuable guide to literature as recent as 1967.

121. *Cluff, C.B.
*1969 *A new method of installing plastic membranes. *US Department of Agriculture, Agricultural Research Service, ARS-41-147, p 86-93. SWRA 3(6)W70-02274.
*Plastic liners can be successfully installed and covered in one operation. The use of the plastic-laying chute on small ponds as described in this paper, or larger self-propelled plastic-laying spreaders on reservoirs, should result in a substantial savings in time and money over the more conventional methods of installing and covering plastic. Although the amount of field seaming is increased, the effect of the inherent weakness in field seaming is minimized by the ability to immediately cover the seam. The time required to make a seam in the field is reduced because the plastic is held in place by the soil cover. The chance of damage to

the film is greatly lessened since the protective earth cover is applied at the same time the plastic is laid down. This is of particular advantage with the use of plastic having a low puncture resistance, such as polyethylene.

122. *Cobb, L.G.
*1967 *The "El Niño" phenomenon and rainfall in Peru and Ecuador. In W.K. Henry et al., Research on tropical rainfall patterns and associated mesoscale systems. *U. S. Army Electronics Command, Ft. Monmouth, N. J., Technical Report ECOM-02313-S2: 87-103.

*In The 'El Niño' phenomenon and rainfall in Peru and Ecuador, Cobb reports an excellent correlation between high sea temperatures (El Niño phenomena) and excessive rainfall. This correlation does not extend to the Andes highland.

123. *Coetzee, C.G.
*1969 *The distribution of mammals in the Namib Desert and adjoining inland escarpment. *Namib Desert Research Station, Scientific Papers 37/53: 23-36.

*The mammals of the Namib Desert and adjoining escarpment zone are listed under the different habitats they occur in: sand dunes, coastal hummocks, gravel plains, rocky outcrops and canyons, riverine growth. Their utilization of these habitats and possible dispersion routes are discussed.

124. *Condon, R.W.
*1968 *Estimation of grazing capacity on arid grazing lands. In G.A. Stewart, ed., Land evaluation, Papers of a CSIRO symposium organized in cooperation with UNESCO 26-31 August 1968. p. 112-124. *Macmillan of Australia.

*A method of estimating grazing capacity of arid lands is described. This requires the selection of a standard land class for which the grazing capacity is known, or can be determined with reasonable accuracy; and the establishment of rating scales for the various factors which influence grazing capacity. The most important of these rating scales is average annual rainfall.

125. *Conrad, G./Gèze, B./Paloc, H.
*1967 *Observations sur des phénomenes karstiques et pseudo-karstiques du Sahara (Observations on karstic and pseudo-karstic phenomena of the Sahara). *Revue Géogr. Physique et de Géologie Dynamique, ser. 2, 9(5): 357-369. Map. BIGENA 32(9) E68-11726.

*The limestone formations of the Sahara desert frequently show surface karst forms: clints (Lapiez), dolines (dayas), and dry valleys. Subsurface forms, potholes, caves, and resurgences are more unusual. Pseudo-karst features occasionally develop in sandstones, granites, rhyolitic or trachtic lavas. Most of these karst or pseudo-karst features are fossil and date from the late Tertiary and Quaternary. Their evolution apparently continues in the present.

126. *Constantine, D.G.

*1967 *Activity patterns of the Mexican free-tailed bat. *Univ. N. Mexico, Publ. Biol. 7: 8-79. BA (50) 57997.

*The widespread distribution of rabies in the Mexican free-tailed bat and the occurrence of many bat deaths at Carlsbad Cavern stimulated a study of virus-host relationships, requiring clarification of the activity pattern of this bat species, particularly in reference to Carlsbad Cavern. New techniques had to be developed to study the host. This paper emphasizes the ecological phase of the investigation. Great numbers of adult bats were observed to die during certain years at Carlsbad Cavern and at several bat caves in Texas. The deaths occurred at the onset of the fall migration. Neither rabies nor insecticide could be credited as the cause. Morbidity was characterized by epileptiform convulsions and at times by hemorrhaging in lungs and thorax. Examples of unfavorable weather influences were reviewed. Cases of rabies virus infection in Mexican free-tailed bats at Carlsbad Cavern usually were relatively few. This species was found to live in certain Mexican caves that also shelter the vampire bat, which has been reported as a rabies carrier.

127. *Contreras, H.B.

*1966 *Diseño de un mapa evaporimétrico de Chile en base a radiación solar (Plan for an evaporimetric map of Chile on the basis of solar radiation). *An. Fac. Quim. Farm 18: 338-344. BA (50) 56731.

*Agreement was found for a linear relation between solar radiation and evaporation from Weather Bureau of Standards pans for selected points in Chile. By way of this linear relationship a monthly radiation map was converted into an evaporimetric map of Chile, between 18° and 36° South latitude.

128. *Cooley, M.E.
*1968 *Some notes on the Late Cenozoic drainage patterns in southeastern Arizona and southwestern New Mexico. *Arizona Geological Society, Tucson, Southern Arizona Guidebook 3:75-78. ANAG (1969) 03235.

*The development of the drainage in southeastern Arizona and southwestern New Mexico has been controlled and modified repeatedly by pulses of large-scale faulting, epeirogenic upwarping or subsidence, and volcanic activity. As a result -- in Late Cenozoic time, mainly during the Pliocene and Quaternary -- a close relation exists between these events and the evolution of the Gila and the Salt Rivers, which are the two main streams of the area. This report presents a working hypothesis of the drainage development based on regional trends in sediment size and the association of the sedimentary deposits with the volcanic rocks and geological structure, coupled with about 1,100 measurements of imbrication of pebbles and the direction of the dip of crossbeds.

129. *Cooper, J.B./John, L.C.
*1966 *Geology and groundwater occurrence in southeastern McKinley County, New Mexico. New Mexico State Engineer, Technical Report 35. 108 p. Maps.

130. *Cowgill, P.
*1969 *Willcox Playa (Arizona). *Arizona Highways 45(10):2-11.

131. *Cox, J.L.
*1967 *Climate of the Pecos area. *U.S. Weather Bureau, Space Operations Support Division, Spaceflight Meteorology Group. 41 p. AGA 19.8-454.

*Discussion of seasonal variations that produce weather affecting this area in Texas and New Mexico. Includes sky cover, ceiling and visibility, surface winds, atmospheric temperature and relative humidity and precipitation.

132. *Crabb, P.
*1968 *Water supplies in South Australia. *Geography 53(3):282-293. Maps.

133. *Craig, A.K.
*1968 *Marine desert ecology of southern Peru. *Florida Atlantic University, Department of Geography, Boca Raton, Florida, contract ONR NOOl4-67-A-0320-0001, "Final Report, Reconnaissance phase." 111 p. AGA 21.2-311.

*This report contains preliminary results of a reconnaissance conducted December 1967-February 1968 along part of the south

central Peruvian coast between the Rio Pisco and Rio Ica. These data constitute the initial phase of a project involving a general survey of marine desert ecology. Broad objectives include reconstruction of the late Pleistocene paleogeographic environment and assembly of land-based evidence for previous Peru Current deflections. Contemporary problems of human ecology are attacked after systematic review and organization of existing literature on geology, geomorphology, oceanography, climatology, botany, and archeology.

134. *Craig, A.K./Psuty, N.I.
*1968 *Studies in marine desert ecology of southern Peru. *Caracas Papers 1(2)/Florida Atlantic University, Boca Raton, Department of Geography, Occasional Papers 1, for Office of Naval Research, Geography Branch. 196 p. Maps.
*Reconnaissance work along part of the south-central Peruvian coast between Rio Pisco and Rio Ica.

135. *Creasi, V.J./Boyer, D.L./Smith, Jr., A.L.
*1970 *A selected annotated bibliography of environmental studies of Israel (1960-1969). *Environmental Technical Applications Center (Air Force), Washington, D.C., Report ETAC-TN-70-4. 59 p. Available CFSTI as AD-705 199.
*119 references to environmental studies concerning Israel, listed alphabetically by author by year. A subject index is included to facilitate use. Studies other than in English are annotated in the left margin by appropriate language designation.

136. *Czeratski, W.
*1967 *Der wasserhaushalt des sandbodens (Water conservation of sandy soil). *Landbauforsch Volkenrode 17(2):135-142.
*Experiments with the introduction of a plastic foil in 60 centimeters depth did not succeed; a layer of asphalt was used. Investigations showed that the water supply for plants can be almost doubled by this artificial "hardpan-layer", with a consequent high increase of yield.

137. *Damiano, A.
*1969 *Contributo alla conoscenza dell'entomofauna libica (Contribution to knowledge on Libyan entomofauna. *Rivista di Agricoltura Subtropicale e Tropicale 63(1/6):129-138.
*In this note, the author describes the principal parasites, observed from 1961 to 1968, which are harmful to the plants cultivated in Tripolitania. Considerable economic damage was caused by such phytophaga as the citrus fruit moth (Prays citri Mill.), the owlet moth (Pandesma fugitiva Walk)

and the tussock moth (Casama innotata Walk). The latter hit the Karroo acacia, a plant used for wind-breaks and boundaries, particularly hard. The parasites are listed in order and both host plant and geographic distribution are indicated.

138. *Danilova, N.M./Dubrovskii, Y.A.
*1967 *Patogistologiya leishmaniom u bol'shikh peschanok, zarazivshikhsya v estestvennykh usloviyakh (Pathohistological leishmaniasis in great gerbils infected under natural conditions). *Biol Nauk 10(11):26-30.

*The development of leishmanioma in great gerbils (Rhombomys opimus) in natural foci of skin leishmaniasis in southeastern Turkmenia occurs in several histological stages: the emergence of the infiltrate or the incubation period; the diffuse infiltrate; the infiltrate with necrosis. Macroscopically they correspond to these stages: the absence of external signs of the disease; early forms of swelling (from barely noticeable swelling to well pronounced swelling); and swelling covered by an incrustation. The development of leishmanioma is characterized by a slight degree of infection of the epithelium, the absence of an ulcer, and by the presence of parasites in all stages of development of the infection.

139. *Davenport, D.C./Hudson, J.P.
*1967 *Local advection over crops and fallow. 2: Meteorological observations and Penman estimates along a 17 kilometer transect in the Sudan Gezira. *Agricultural Meteorology, 4(6):405-414. HGA 19.10-470.

*Daily measurements of maximum and minimum temperature, wind velocity, and vapor pressure were made at windward and leeward edges of selected cotton fields, interspersed amongst uncropped fields, in the Sudan Gezira. Mean temperature, vapor pressure deficit and wind run were lower at the leeward than windward edges of the cotton. At comparable windward sites, wind run per day and mean daily temperature decreased as the downwind distance from the most windward edge of the 17 kilometer transect increased. Values of evaporation, calculated by the Penman formula from meteorological data at various sites, were reduced by the presence of upwind stretches of cotton. Negative Bowen ratios indicated that advective conditions existed.

140. *Davies, J.A.
*1967 *Global radiation and reflection coefficients at Azraq in Jordan. *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B. 15(4): 376-384. HGA 19.6-291.

*Measurements of incoming and reflected global radiation at Azraq in the Jordan Desert during April and May 1966 permitted the calculation of coefficients of atmospheric transmission and ground surface reflection. Most surfaces, except for basalt, showed a marked dependence of reflection upon solar elevation. Absorbed global radiation was calculated for different surfaces in the area and estimates of the net radiation and potential evapotranspiration were made.

141. *Davis, L.G./et al.
*1968 *Weather modification experiments in Arizona. *Pennsylvania State University, Department of Meteorology, NSF Grant GA-777, Report 12A and Final Report.
*Data from a 5-year randomized seeding program in southern Arizona, which showed no significant change in rainfall with seeding, were reanalyzed with the application of the steady-state model. The model is best used on individual clouds rather than a cloud population. Data were stratified according to rainfall amounts and cloud top heights. Results showed that seeding should have produced significant increases in cloud top height and rainfall for shallow clouds, but no change in cloud top height and a decrease in rainfall for deep clouds. These deductions may help to explain the inconclusive results frequently obtained from analyses of average precipitation increases from cumulus seeding.

142. *Dawson, T.J./Denny, M.J.S.
*1969 *A bioclimatalogical comparison of the sunny day microenvironments of two species of arid-zone kangaroo. *Ecology 50(2):328-332.

143. *Decker, W.L.
*1967 *Potential evapotranspiration in humid and arid climates. In Conference on Evapotranspiration and Its Role in Water Management, Chicago, 1966, Proceedings, p. 23-26. *American Society of Agricultural Engineers. BAM9(19)98101.
*Evaluates the concept of potential evapotranspiration and its relationship to various climatic conditions. Attempts at measuring potential evapotranspiration from a growing plant canopy are valid only when water is abundant and unlimited in the soil profile. Estimations of evapotranspiration potential from mean temperature and energy budget data are discussed. In semiarid and arid regions the actual evapotranspiration is determined by the amount of precipitation. Analysis shows that use of a method for estimating potential evapotranspiration based on the mean temperature will result in no great difference between the moist and dry climates at similar latitudes and elevation. Movement toward warmer and cooler climates results in rapid changes of potential evapotranspiration. When high levels of soil

moisture are maintained through irrigation, the actual evapotranspiration is nearly equal to the potential evapotranspiration. Potential evapotranspiration is discussed in relation to irrigation problems.

144. *Decroux, J.
*1966 *Bilan hydrique dans trois types de sols marocains: Sept années d'observation en cases lysimetriques à Rabat (Water balance in three types of moroccan soils: Seven years of observation of solubility in Rabat). *Cah Rech Agron 22:3-81.

*Whatever state the soil may be in or whatever type of cultivation it has, drainage due to heavy winter rain always occurs. The water that evaporates, directly or by plant transpiration, depends upon the equilibrium between the climate and the abundance of vegetation, rather than on the nature of the soil, which acts only as a reservoir and a support. Stagnant water is a function of the soil and of the time of year, as with the drainage. The type of soil intervenes, by its constant hydration, as a humidifier, and by its texture and structure, as a drying agent. Climate is not only a humidifying agent but also a desiccator. No matter what the type of soil is, drying is as serious and severe as potential evaporation by transpiration, hence, the drying effect of the short rain periods at the end of spring.

145. *DeFélice, P.
*1968 *Étude des échanges de chaleur entre l'air et le sol sur deux sols de nature différente (Study of heat exchange between atmosphere and soil over two different soils). *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser.B. 16(1):70-80. MGA 19.9-409.

*Soil temperature at 2 depths, surface, and air temperature near the ground in sand dunes of the Great Western Erg and in the hamadas, near the oasis of Béni-Abbès (Algeria) was measured. From these results thermal diffusivity coefficients for these 2 soils was deduced. Knowing incident, reflected, diffuse, and emitted radiation of the ground, the energy exchange between air and ground surface through convection and conduction could be computed. It was found that these energies vary with the nature of the soil and with time; it is concluded that a breeze appears between dunes and hamada, quite similar to the sea breeze. French, German and English summaries.

146. *DeFina, A.L./et al.
*1966 *Difusión geográfica de cultivos índices en la provincia de Córdoba y sus causas. (Geographic distribution of crop-indexes in Córdoba Province and its causes). *Argentina, Instituto de Suelos

y Agrotécnia, Publicación 102, 45 p. MGA 19.2-53.

*Results of an agroecological survey at 176 locations are discussed and presented on maps of crop-indexes for 18 crops (cacao, pineapple, banana, etc.). Tabulated temperature-precipitation values and altitudes of 570 stations were used to delineate 21 agroclimatic districts shown on a map. The 142 crops that can be grown in the 21 districts are listed. The significance of the 18 crop-indexes (shown graphically) and the agroecological conditions of the province are discussed. A map of mean annual precipitation of the province is given which together with the tabulation for the 570 stations partially fills a gap in the climatological literature of Argentina and of South America. English summary p. 44.

147. *DeGraaff, T./Mel, J.A.J.
*1965 *On the tunnel system of Brant's Karroo rat, Parotomys brantsi in the Kalahari Gemsbok National Park. *Koedoe 8:136-139.

*The structure of the tunnel system of Brant's Karroo rat, observed during a visit to the Park in December 1963, is discussed, and three tunnel systems of Parotomys brantsi and 2 of the gerbil Gerbillus pacba, in the vicinity of Twee Rivieren, are analyzed.

148. *Delaporte, B./Gasson, A.
*1967 *Etude de Bacteries des sols arides du Maroc: Bacillus maroccanus n. sp. (Study of Bacteria in dry soils of Moroco). Académie des Sciences, Paris, Comptes Rendus Hebdomaires 264(19):2344-2346.

*Two known soil organisms Brevibacterium halotolerans and B. frigoritolerans and a new species were found at a depth of 5-10 centimeters in the arid Mediterranean region of Marrakech. For this sporulating bacterium the name Bacillus maroccanus is proposed, and its cultural characteristics for laboratory cultivation are presented.

149. *Desai, B.N.
*1967 *Circulation over India and neighbourhood during the southwest monsoon season. *Indian Journal of Meteorology and Geophysics 18(4):459-464. MGA 20.3-301.

*Survey of circulation as represented by streamlines analysis. Claims regarding its utility in day-to-day forecasting have to be treated with reserve since they fail to give adequate importance to topographical features affecting rainfall, air masses, and other factors.

150. --- ---
*1968 *Is the low-level inversion over north-west India and west Pakistan during the monsoon

season due to air-masses or due to subsidence? *Current Science, Bangalore, 37(24):694-695. MGA 20.11-255.

*Refers to the papers of Flohn et al. (1965), Miller and Keshava Murthy (1967), and Bellamy's (1949) computations of divergence over eastern West Pakistan. In his latest paper, Desai (1968) shows that the subsidence ideas of Flohn (1965, 1966) and Ramage do not support each other, and that workers who put forward subsidence ideas do not mean the same thing; some consider ascending motion while others consider descending motion in the lower levels over the desert. The author concludes that his air mass idea (Desai 1966, 1967) are still of value and explain most of the observed facts more satisfactorily than do the recently propounded subsidence ideas.

151. *Desikan, V./Swaminathan, M.S./Chacko, O.
*1968 *Distribution of sunshine and global solar radiation over the arid and semi-arid regions in the Indian sub-continent. *Indian Journal of Meteorology and Geophysics, Delhi, 19(2):149-158. MGA 20.9-268.

*A study of the distribution of sunshine and global solar radiation over the arid and semiarid zones of the Indian subcontinent was made. Over these regions about 500 calories per centimeter squared are received daily during the major part of a year. During monsoon and winter seasons, global radiation drops to about 300-400 calories per centimeter squared per day. The article discusses in detail the distribution of the duration of sunshine and the daily and hourly distribution of global radiation over these areas. The effect of seasonal weather conditions are also noted.

152. *Dieleman, P.J./et al.
*1963 *Reclamation of salt affected soils in Iraq. *International Institute for Land Reclamation and Improvement, Wageningen, Publication 11. 175 p.

153. *Dixey, F.
*1966 *Water supply, use and management. In E.S. Hills, ed., Arid Lands: a geographical appraisal, p. 77-102. *Methuen, London. MGA 19.12-779.

*This general discourse on streamflow and ground water in arid and semiarid lands contains some interesting information and illustrations (photos and map) on subterranean collecting galleries called qanats, foggaras, and socavones in different parts of the world. A general discussion of what is well known about salinity in arid regions and about tolerance of plants, animals and man to salinity is given in the last section.

154. *Doberitz, R.
*1967 *Zum kuestenklima von Peru (Coastal climate of Peru). *Hamburg, Seewetteramt, Einzelveroeffentlichungen 59. 115 p. MGA 19.9-10.
*Climatological observations of 2 stations in the Peruvian coastal belt. The very low sea temperature of the Peru Current is responsible for the low annual air temperature, though the occasional presence of the equatorial countercurrent known as "El Nino" may increase it significantly. The normal weak wind regime is very constant.

155. *Dodd, A.V.
*1969 *Areal and temporal occurrence of high dew points and associated temperatures. *U.S. Army Natick Laboratories, Technical Report 70-4-ES. 218 p.
*Graphs show frequency of occurrence of high dew points and temperatures at 78 stations for the midseason months of January, April, July, and October. Tables show maximum, minimum, and median temperatures associated with dew points above 75 degrees Fahrenheit. Maps show frequence of occurrence each month of dew points above 76 degrees, 80 degrees, and 84 degrees at 215 stations between latitudes 40 degrees north and 40 degrees south. Data for each station are presented on circular graphs, making possible quick comprehension of the seasonal pattern of occurrence of high dew points at the irdividual stations, and the inclusion of the circular graphs on the maps gives some insight into the areal distribution of the occurrence of high dew points.

156. *Dollfus, O.
*1967 *Le rôle de la nature dans le développement péruvien (The importance of Nature in the development of Peru). *Annales de géographie 76(418): 714-735. Maps.
*The population of Peru is distributed in small, densely-peopled pockets which cover only a small fraction of the country's area, either in the coastal desert or in the valleys or basins of the Andes or along the river banks of the Amazon. Sets forth what limits of development are imposed by the natural environment and stresses the relative aspects of these limits in the face of techniques employed and the methods of organising the economy.

157. *Dunin-Barkovskiy, L.V.
*1968 *The water problem in the deserts of the USSR. *Soviet Geography: Review and Translation 9(6): 458-468.
*A regional review of existing and planned irrigation projects in the desert zone of the Soviet Union envisages the use of water from the Siberian streams in the northern section of the desert zone. For increased water supplies in

the south, the author looks to other potential sources such as artificial increases of precipitation in the mountains of Central Asia, elimination of wild growths of water-loving plants, and technological advances that will make possible the economical desalting of water from salt lakes and of mineralized subsurface waters.

158. *Dupuy, A.
*1968 *La migration des Laro-Limicoles au Sahara algérien (Migration of the Laro-Limocolae across the Algerian Sahara). *Alauda Rev Int Ornithol 36(1/2):27-35.
*In the spring of 1966, observations of migrating birds were made for nearly a month near a brackish extent of water called Daiet-Tiour (meaning "sea of birds" in Arabic). The water covers several square kilometers being fed from a wadi which is sometimes dry, but in this instance having had water since the fall of 1965. The depth was nowhere greater than 1 meter. Most of the birds arrived after sunset and left before sunrise.

159. *Dury, G.H.
*1968 *Geographical descriptions of Australia. *Australian Geographer 10(6):441-452.

160. *Dutcher, L.C./Thomas, H.E.
*1968 *Regional geology and ground-water hydrology of the Sāhil Sūsah area, Tunisia. *U.S. Geological Survey, Water-Supply Paper 1757-G. 53 p. MGA 20.4-843.
*Discusses the regional geologic and hydrologic features of the Sahel Susa (coastal area) and the large bordering area in central Tunisia west of Susa. It considers the ground water geology of the region and the general occurrence and movement of ground water within this area of less than 24,000 square kilometers. The purpose of the report is to provide an answer to the question of where water can be obtained for the people of central Tunisia, of whom approximately 80 percent inhabits the coastal area and the bordering Low Steppes.

161. *Efrat, E./Gabrieli, E.
*1966 *Physical master plan of the Israel Coastal strip. Physical master plan of the northern Negev. *Israel, Ministry of the Interior, Planning Department. 2 folios. 36 p.

162. *Ehrler, W. L.
*1969 *Daytime stomatal closure in Agave americana as related to enhanced water-use efficiency. In Hoff, C. C. and Riedesel, M.L., eds., Physiological systems in semiarid environments. p. 239-247.

*University of New Mexico Press, Albuquerque, MGA 21.1-553.

*The water-use efficiency of well-watered agave and corn plants was established in a 10-week greenhouse experiment. Results were obtained by determination of the transpiration ratio. The greater efficiency of agave was a direct consequence of the prevalent daytime stomatal closure followed by nocturnal opening. At night, the transpiration rate doubled, despite a reduction in evaporative demand.

163. *Elbashan, D.

*1968 *Frequency of calm days in Israel. *Israel, Meteorological Service, Series C, Miscellaneous Papers 22. 8 p. MGA 20.4-382.

*The average annual number of calm and rainless days for Israel is estimated to be 92, with the greatest number falling in the months of January, February, October, November and December. No regional differences were found, most probably because of technical factors (local differences in exposure, instrumentation, effective heights, skill and reliability of observers, etc.) --enlarging the "within-region" variance.

164. *Eldblom, L.

*1961 *Notes on problems of irrigation in three Libyan oases (translated title). *Lund Studies in Geography 22. Ekistics 23(137):199-202.

*An inquiry into how irrigation methods can influence the structure of an oasis, and what the agricultural potential may be. The article does not give detailed descriptions of irrigation methods, but rather studies the influence of such methods on oasis structure and development.

165. *---- ----

*1968 *Structure foncière: organisation et structure sociale. Une étude comparative sur la vie socio-économique dans les trois oasis libyennes de Ghat, Mourzouk, et particulièrement Ghadamès. *Lund Universitet, Geografiska Institution, Meddelanden Avhandlingar 55. 424 p. Maps.

*English summary 337-347.

166. *English, P.W.

*1968 *The origin and spread of qanats in the Old World. *American Philosophical Society, Proceedings 112(3):170-181.

*Horizontal wells or qanats were discovered in the vicinity of Armenia more than 2,500 years ago and spread rapidly to become one of the most important methods of dry-land irrigation in the Old World. In parts of Iran, Afghanistan, Algeria and Morocco, this ingenious device has made human settlement possible in distinctly marginal areas. Modern

technology threatens to replace the qanat with the more efficient deep wells, but the extent to which social and economic patterns have become enmeshed with this water-supply system will make the transition difficult.

167. *Ergenzinger, P.
*1968 *Beobachtungen im Gebiet des Trou au Natron, Tibestigebirge (Observations in the area of the Trou au Natron, Tibesti mountains). *Die Erde 98(2):176-183. BIGEMA 32(12)E68-16356.
*The Tarso Doon shield volcano (50-80 km in diameter, with its summit rising to about 2500 m) in the western Tibesti mountains (Chad) is surmounted by two stratovolcanoes (Tousside and Emi Ti) and perforated by two explosion calderas (Trou au Natron and Doon Kinimi). The Trou au Natron was formed before the Würm pluvial (Pleistocene); the Doon Kinimi dates probably from the Neolithic subpluvial. The volcanic material and sedimentary deposits in the calderas and the basis for datings are discussed.

168. *Ericksen, G.E./Fahey, J.J./Mrose, M.E.
*1968 *Humberstonite ..., a new saline mineral from the Atacama desert, Chile. *Geological Society of America, Special Paper 115:59. (Abstr.) BIGEMA (10)E68-13567.

169. *Erickson, A.E./Hansen, C.M./Smucker, A.J.M.
*1968 *The influence of subsurface asphalt barriers on the water properties and the productivity of sand soils. *International Congress of Soil Science, 9th, Adelaide, Australia, Transactions 1:331-337.
*Field trials were made with placement of an impervious asphalt barrier at various depths in sandy soils in Michigan, Arizona and Taiwan, Formosa. The barrier increases the amount of water held in the root zone of crops. Depth is determined by soil and rooting characteristics of the crop. Areal extent of the barrier is determined by drainage requirements. Soil moisture measurements were made by the nuclear probe method. In arid soils the technique has made irrigation economically feasible for high value crops.

170. *Eriksson, E.
*1969 *Chloride concentration in groundwater, recharge rate and rate of deposition of chloride in the Israel coastal plain. *Journal of Hydrology, Amsterdam, 7(2):178-197. MGA 20.10-739.
*Describes the possibility of using chloride concentrations in ground water for estimating recharge rates, the application being demonstrated on available data from the coastal

plain aquifer in Israel. The method can be applied where deposition rates of airborne chloride is known, provided the matrix of the aquifer does not contain chloride. This condition would generally hold for more permeable aquifers where relicts of marine waters were washed out long ago.

171. *Everett, D.E./Rush, F.E.
*1967 *A brief appraisal of the water resources of the Walker Lake area, Mineral, Lyon, and Churchill counties, Nevada. *Nevada, Department of Conservation and Natural Resources, Water Resources-Reconnaissance Series, Report 40. 44 p. Maps. WRA 3(5)W70-01807.

*Located in west-central Nevada, this area is an extremely arid one, with precipitation generally averaging less than 5 inches per year. This general reconnaissance survey of the hydrology of the area indicates an inflow to the area of 169,000 acre-feet per year, with total discharge is approximately 265,000, mostly evaporation from Walker Lake and Weber Reservoir. Groundwater levels are declining, though suitable for agricultural and municipal use, so that planning for future development must take this depletion into account.

172. *Eyre, S.R.
*1968 *Vegetation and soils, a world picture. 2nd ed. *Aldine Publishing Co., Chicago. 328 p. ANAG 1969(C4129).

*Originally published in 1963, this book is an introduction to the study of worldwide vegetation patterns, their development and relationships to soil types. One part is devoted to the evolution of plant communities and soil profiles, and the final part considers tropical regions with chapters on rain forests, seasonal tropical forests, semi-desert and desert areas, the savanna, and mountain areas. An extensive bibliography and continental vegetation maps are included.

173. *Farah, G.T.
*1969 *Land tenure and land use in the arid zone. *University of Colorado (Ph.D. dissertation). 262 p. Dissertation Abstracts 30(2):462A-463A.

*The findings of this study show: 1) that under arid conditions, land use, by necessity, must be extensive, e.g., in order to minimize the impact of weatner variations, land should be used either for grazing or for drought tolerant cereals and fruit plants; 2) that extensive agriculture requires relatively large acreage per farm if the farm is to be economically viable; 3) that the scarcity of grass and water brings about severe competition and conflict and misuse of resources which necessitates public ownership or

group control of these resources; and 4) that government intervention is necessary in order to minimize the uncertainty which looms large in the farmer's operation. Emphasis is on Jordan.

174. *Fedorovich, K.A./Falgov, N.N.
*1967 *Achievements of Soviet geography in Kazakhstan (translated title). *Akademiia Nauk SSSR, Izvestiya, ser. Geograficheskaya (6):24-30.

175. *Feltis, R.D.
*1968 *Preliminary assessment of ground water in the Green River formation, Uinta Basin, Utah. *U.S. Geological Survey, Professional Paper, 600B:200-204. MGA 20.1-695.
*The Green River Formation of Eocene age contains not only large reserves of hydrocarbons in the form of bituminous sand and oil shale but also aquifers that yield small to large quantities of water to wells and springs. Thus, sufficient water for processing the hydrocarbons may be locally available from subsurface sources. The ground water ranges from fresh to briny. Detailed hydrologic studies are needed to determine the quantity and quality of water in the formation.

176. *Fernald, A.T./Corchary, G.W./Williams, W.P.
*1968 *Surficial geologic map of Yucca Flat, Nye and Lincoln Counties, Nevada (1:48,000). *U.S. Geological Survey, Miscellaneous Geological Investigations Map I-550. ANAG (1969)04177.

177. *Fernald, F.G./Herman, B.M./Curran, R.J.
*1969 *Some polarization measurements of the reflected sunlight from desert terrain near Tucson, Arizona. *Journal of Applied Meteorology 8(4):604-609.
*Measurements were taken of the polarization of solar radiation reflected from the desert terrain 18 miles southwest of Tucson. The polarimeter was mounted in an aircraft and flown from 1000-2000 feet above the surface. Results showed the plane of polarization ranged from about 3% to 18%, increasing as the scattering angle varied from 180 degrees (backscattering) to 90 degrees.

178. *Feth, J.H.
*1967 *Chemical characteristics of bulk precipitation in the Mojave Desert Region, California. *U.S. Geological Survey, Professional Paper 575-C: 222-227. MGA 19.2-287.
*Analyses of 41 samples of bulk precipitation from 12 places in the Mojave Desert region show wide ranges of dissolved-solids concentration and a variety of chemical types, although the calcium bicarbonate type water dominates. Specific

conductance of the solutions analyzed ranged from 8.9 to 823 micromhos and shows strong inverse correlation with quantities of rain but no discernible correlation with time of exposure of the gage between samples. Dust that locally includes saline materials appears directly to govern the chemical type and concentration of a few samples. Bulk precipitation in the Mojave is closely similar to bulk precipitation sampled at Menlo Park, California near the coast, in the San Francisco Bay area.

179. *Feth, J.H.
*1967 *Natural contamination hazards in arid basins. In Groundwater development in arid basins, Symposium, 1967, Proceedings p. 21-35. *Utah State University, Logan.
*Naturally occurring chemical substances that are possible contaminants of ground water are discussed and examples from the Great Basin are cited. Ground water quality is reviewed, including occurrence of brines. The questions of why there is so much ground water of tolerable to good chemical quality in arid basin aquifers, and to what extent these resources are renewable are largely unanswered.

180. *Figueroa Palacios, H.
*1968 *Geomorfología del área costera de Valparaíso entre la bahía de Quintero y el Río Aconcagua. *Revista Geográfica de Valparaíso 2(1)[1(2)?] :3-11.

181. *Filippova, N.A./Chunikhin, S.P.
*1969 *The tick argas (chiropterargas) bolleti roubaud and colas-belcour, 1933 (Parasitiformes, argasidae), a new species for the USSR fauna (translated title). *Zoologicheskii Zhurnal 48(9): 1407-1409. Translation avaliable as AD-699 683.
*Argas boueti previously unknown in the USSR was found in Turkmenia and Uzbekistan. Hosts: Rhinolopus ferrumequinus and R. tocharicus. In both cases almost fully engorged larvae have been found.

182. *Fischer, H.
*1967 *"The White Sands," die Gipswuste in New Mexico, USA ("The White Sands", the gypseous desert in New Mexico, USA). *Naturwiss Rundsch 20(10): 428-432.
*Discusses the surface formation of the desert in great detail, climatic causes of unusual geological formations, mineral and chemical substances represented in the desert surface, vegetation which, through extensive root systems, is able to absorb enough water to survive in the desert, (e.g., the cotton poplar, Populus monilifera).

183. *Fischer, V.
*1967 *Water and the Southwest. *American Forests 73(11):14-17.

*Water has always been the major resource problem in the arid Southwest, but water experts warn that the area is now facing the greatest water crisis in the history of the United States, due to population, pollution and progressively increasing demands caused by the American standard of living. Present water supplies are not even adequate to maintain the currently existing level of development in the Southwest, and the Colorado River is already overcommited. The situation obviously is serious when the groundwater overdraft in the Gila River basin of Arizona is 2,200,000 acre-feet per year. Although national and international schemes (such as the North American Water and Power Alliance) have been put forward as possible answers to the water supply question, it appears that the regional approach is the most useful at the present time. Within this approach more efficient use of presently-existing water supplies is necessary, but it seems that the regional water shortage will be solved only by desalination of salt water or by importation of water from other areas.

184. *Flohn, H.
*1960 *Ein Klimaprofil durch die Sierra Nevada de Meridia (Venezuela)(Climatic cross section of the Sierra Nevada de Mérida, Venezuela). *Wetter und Leben 20(9/10):181-191. MGA 20.6-445.

*Author combines his personal observations with published climatic data for stations along the route, for the period 1953-1960, to discuss the climate along this route and to illustrate comments upon several aspects of high-mountain equatorial climatology. The local climates near the route vary from arid zone type, through savanna to tropical rain forest. The data used is summarized in tabular and diagrammatic form. The local rainfall and vegetation patterns are discussed in terms of the mountain-valley wind circulations.

185. *Fontes, J.C./Gonfiantini, R.
*1967 *Comportement isotopique au cours de l'évaporation de deux bassins sahariens (Isotopic composition during evaporation from two Sahara basins). *Earth and Planetary Science Letters 3(3):258-266. MGA 19.5-764.

*Evolution of the water isotopic composition of 2 basins in the northwestern Sahara having no outlet was studied. A regular sampling taken during the whole drying process of these basins showed a considerable isotopic enrichment due to low relative humidity. A theoretical model was developed providing an estimate of the amount of water evaporated between the rainfall and the sampling, and of the amount of salts dissolved by ground leaching.

186. *Forman, D.J.

*1965 *Ayers Rock, Northern Territory; 1:250,000 geological series, sheet SG 52-6, international index, explanatory notes. *Australia, Bureau of Mineral Resources, Geology and Geophysics, Canberra. 12 p. BIGMA 32(1)B68C0527.

*The Ayers Rock area lies on the southern margin of the Amadeus basin, principally a sandy desert where the most outstanding landforms are the Mount Olga, Ayers Rock, and Conner inselbergs.

187. ---- ----

*1966 *Ploods Range, Northern Territory; 1:250,000 geological series, sheet SG 52-3, international index, explanatory notes. *Australia, Bureau of Mineral Resources, Geology and Geophysics, Canberra. 15 p. BIGMA 32(1)B68-00526.

*The Ploods Range area is located in the southwestern portion of the Amadeus basin, a sandy desert bounded by mountain ranges to the south. Salt lakes in the north contain water after heavy rains and comprise the drainage center of the area. The oldest rocks are the Mount Harris basalt and Ploods Range beds.

188. ---- ----

*1966 *The geology of the south-western margin of the Amadeus basin, central Australia. *Australia, Bureau of Mineral Resources, Geology and Geophysics, Report 87. 54 p., maps. BIGMA 32(10) B69-12920.

189. *Foulk, J.D.

*1967 *Attack activity of two species of gnats in southern California. *Entomological Society of America, Annals 62(1):112-116.

*A modified D-vac insect suction sampler was used to collect attacking, biting gnats in March and April 1966, near the north shore of the Salton Sea, California. Leptoconops kerteszi Kieffer, a diurnal species, had definite mid-morning and midafternoon peaks of activity. Winds in excess of 5-10 kilometers per hour reduced their ability to attack.

190. *Fox, M.J.

*1967 *A technique to determine evaporation from dry stream beds. *Journal of Applied Meteorology, 7(4):697-701. Available CFSTI as AD-692 018.

*A technique is described to determine 24 hour stream-bed evaporation subject to the constraints that it be inexpensive, uncomplicated, and accurate to within plus or minus 10 percent. Using maximum thermometers, a totalizing anemometer, and pans filled with dry sand, evaporation

is predicted. The results of statistical evaluation of the prediction equation on the experimental data gives an average percentage error of 13 percent and a standard error of 0.88 mm. Using this technique, it was determined that evaporation is not important in the annual hydrological balance of a stream bed.

191. *French, N.R.

*1969 *Chronic low-level gamma irradiation of a desert ecosystem for five years. *University of California, Los Angeles, Laboratory of Nuclear Medicine and Radiation Biology. Available CFSTI as UCLA-12-734. Contract AT(04-1)-GEN-12.

*Populations of vertebrate animals, certain insects, and plants were studied in three 8-hectare areas located in the Mojave desert, enclosed by a fence to prevent rodents from entering or leaving the study area. One area was irradiated almost continuously at a dose rate of 80 to 500 mr/hr. Animal populations were examined by capturing, marking, and releasing individuals. Plants were examined for growth and for production of leaves, flowers, fruit, and seeds. The life span of the population of pocket mice, Perognathus formosus, in the irradiated area was shorter than in the other areas. No difference was detected in the numbers of a small lizard, Uta stansburiana, that survived from year to year. Females of a larger but less numerous species of lizard have become sterile in the irradiated area. All vertebrate animals in the irradiated area have received exposures of 1 to 2 r/day. Certain species of plants have produced fewer flowers and fruits in the irradiated area. Plants have received exposures of 4 to 7 r/day. Although wild populations of small mammals are surprisingly sensitive to damage from chronic low-level radiation exposure, they are evidently able to persist under these conditions. There may be certain compensating mechanisms that become operative when the population is subjected to radiation stress.

192. *Frith, H.J/Calaby, J.H.

*1969 *Kangaroos. *Hurst, London, Humanities Press, New York. 212 p.

*The primitive but efficient reproductive biology of kangaroos is reviewed, as are details of behavior and movements. Drought is the most effective regulator of numbers, serious disease is almost unknown, their most significant predator modern man. Direct competition between cattle and kangaroos is minimal except in times of drought. Market hunting of kangaroos is examined, with suggestions that the species be included in estimates of range carrying capacity in favor of improving total productivity.

193. *Funaioli, L.

*1968-1969 *L'importanza degli animali selvatici nell'uso della terra di certi paesi aridi e semi-aridi africano (The importance of wild animals in the use of land of some arid and semiarid African countries). *Rivista di Agricoltura Subtropicale e Tropicale 62(10/12):400-42.; 63(1/6):3-37.

*Although immense areas of Africa have been considered marginal for agricultural and animal industries, a rich fauna does thrive in these areas, able to utilize scarce vital resources with high returns while maintaining the soil-vegetation balance so important in arid lands. Studies show that wild animals can produce higher returns per unit of land than conventional pastoral activities.

194. *Furon, Raymond

*1967 *The problem of water: a world study. Translated by Paul Barnes. *American Elsevier, New York. 208 p.

*Contents: definition of water; salt water and the sea; fresh water; water and agriculture, damage by water; water and industry; drinking water supplies for towns; water pollution; search for water; development problems in arid zones, thirst of the world; from dewdrop to ocean reservoirs.

195. *Gabriel, K.R.

*1967 *Israeli artificial rainfall stimulation experiment: statistical evaluation for the period 1961-1965. *Symposium on Mathematical Statistics and Probability, 5th, Berkeley, California, 1965-1966, Proceedings 5:91-113. IGA 19.6-190.

*A rainfall stimulation experiment is being carried out in Israel by seeding silver iodide from an aircraft in a randomized cross-over design. Results of 4½ seasons show 15 percent more rainfall with seeding than without, a result which is 5 percent significant. It is suspected that the excess precipitation has occurred mainly on a small number of days on which seeding apparently was very effective. It has not been possible to identify meteorological conditions particularly favorable to seeding effectiveness. No evidence has been found that seeding effects persist beyond the day of seeding.

196. *Garcia-Moya, E./McKell, C.M.

*1970 *Contribution of shrubs to the nitrogen economy of a desert-wash plant community. *Ecology 51(1):81-88.

*Total nitrogen incorporated in the shrubs of a low-fertility desert plant community (principally Acacia gregii, Cassia armata, and Larrea divaricata) was estimated from the nitrogen content of plant parts, the total weight of

plants and proportional weight of roots, stems, and leaves, and the number of plants per unity area. The average nitrogen content of the shrub leaves, stems, and roots was 1.31 percent, .87 percent, and .80 percent respectively. Shrub cover occupied 20 percent of the ground surface and contained an average of 29 kg nitrogen/ha. Legume shrubs were not significantly greater in nitrogen content than nonlegume shrubs. Soil nitrogen content decreased significantly as a function of radial distance from the center of the shrub canopy. Areas between shrubs averaged .019 percent nitrogen in the surface inch of soil. Soil nitrogen content decreased significantly from the surface to 90 centimeters depth and was closely related to shrub species and their root distribution patterns.

197. *García, E./Mosiño, P.A.
*1968 *Los climas de la Baja California. *Comité Nacional Mexicano para el Decenio Hidrológico Internacional, Memoria 1966-1967:29-56. Universidad Nacional Autónoma de México, Instituto de Geofísica, México, D. F.

198. *García, R.M./Pase, C.P.
*1967 *Moisture-retention capacity of litter under two Arizona chaparral communities. *U.S. Forest Service, Research Note RM-85. 2 p.
*Water-holding capacity of Pringle manzanita litter averaged 5.1 mm, and shrub live oak litter 4.8 mm, under dense uniform canopies. Pringle manzanita litter held more water per gram of litter than did shrub live oak (2.00 vs 1.30), but total litter produced was less (11.2 tons per acre vs 12.1).

199. *Gates, G.E.
*1967 *On the earthworm fauna of the Great American Desert and adjacent areas. *Great Basin Naturalist 27(3):142-176.
*This paper discusses the megadrile fauna of an area containing more than a million square miles. The number of species of earthworms now known from the desert states is 21, larger than the number recorded for anyone of the adjacent states with more rainfall. Every one is obviously exotic in the area, most of the lumbricids having come from Europe, one probably from somewhere east of the Mississippi, and megascolecids from Asia. The original home of the ocnerodrilid is unknown, but is unlikely to have been in North America.

200. *Gault, H./Millau, C.
*1968 *The hidden Edens of Tunisia. *Holiday 43(4):62-66+.

201. *Haussen, H.

*1968 *Les indices xerothermique en peninsule hispanique et en Afrique du nord partie N.O. (Xerothermic and hygrothermic values in the Hispanic peninsula and in the N. W. part of Northern Africa. *Collectanea Botanica (Barcinone) 7(1):499-504. BA (50)57953.

*Various proposed climatic subdivisions of Spain and North Africa are reviewed, including the Bioclimatic chart of the Mediterranean region jointly published by UNESCO-FAO in 1962. Criticisms of these and other attempts to classify various regions by showing them on maps in different colors and shades are analyzed and the difficulties of tenable generalizations in climatic relationships pointed out.

202. *Hauthier, R.

*1967 *Ecologie et ethologie des reptiles du Sahara nord-occidental (region de Beni-Abbès) (Ecology and ethology of the reptiles of the northwestern Sahara (region of Beni-Abbès).) *Annales du Musee Royale de L'Afrique Centrale, ser. in octavo sciences zoologiques, 155:1-83. BA (50)84322.

*The biogeography of the northwestern Sahara is discussed, including data on the climate, with reference to rainfall, temperature, and wind. Three types of biotope are described: the Erg, which is a sand-dune massif; the moist and covered grounds such as wadis and oases; and the rocky, desert and uncovered ground of Hamada, Balát, and Djebels. With reference to origin, the reptile fauna belongs to 3 different domains: the Saharo-Sindian, the Turko-Mediterranean, and the Soneralo-Sudanian. Characteristic species of each type are mentioned. Information is given on 27 spp. of reptiles, with reference to their distribution, nutritional regime, nycthermal rhythm, annual cycle, etc., grouping the species according to their preferred biotopes. Also discussed are the factors of distribution (substratum, vegetation, water), nycthemeral rhythms and thermoregulation (with charts and tables), the annual cycle, and the extent to which the species are sedentary or inclined to move around.

203. *Gavrilova, Z.I.

*1968 *K aeroklimatologii Iuzhnoĭ Afriki (Aeroclimatology of South Africa). *Nauchno-Issledovatel'skii Institut Aeroklimatologii, Leningrad, Trudy, 49:27-38. MGA 21.2-331.

*A chart shows the physico-geographical and climatic characteristics of South Africa. The distribution is considered of the following parameters: temperature, geopotential, humidity, and wind velocity over South Africa.

204. *Gerasimov, I.P.
*1968 *Basic problems of the transformation of nature in Central Asia. *Soviet Geography: Review and Translation 9(6):444-458.
*A review of broad research problems leading to ultimate transformation of the Central Asian environment for the purpose of expanding irrigated agriculture and desert grazing. The problems are: land resources and reclamation needs for irrigation purposes; the water and salt regime of irrigated fields, regional types and methods of control; the water and salt budget of irrigated areas and means of determining and regulating it; the hydrologic cycle of Central Asia and ways of transforming it for irrigation purposes; and the use of forage and water resources for expanding the desert grazing economy.

205. *Ghazi Noori, M.
*1966 *Hydrology of surface water in Iran. *Symposium on Hydrology and Water Resources Development, 1st, Ankara, Turkey, Feb. 7-12, 1966, Proceedings and Papers, p.199-211. IGA 18.12-370.
*The Caspian Sea, mountain, dry desert, and Persian Gulf climates are described briefly. The general program consisting of stream gaging including silt sampling, snow surveys, precipitation, evaporation measurements, and of ground water investigation is described. Annual precipitation ranging from 50 to 2000 mm in the 6 major river basins is shown on a map. Annual maximum and minimum flows (for a 10 year period) are tabulated for 17 rivers. Pan evaporation in 4 of the river basins ranges from 995 to 3025 mm. The total flow of unused water into the Caspian Sea, the Persian Gulf, and into various lakes is estimated as 50 billion cubic meters. The various dams recently built and designed to store about 15 billion cubic meters of this water are listed.

206. *Gibbs, W.J./Maher, J.V.
*1967 *Rainfall deciles as drought indicators. *Australia, Bureau of Meteorology, Bulletin 48. 33 p. IGA 19.1-305.
*Abnormally low rainfalls in 1964-66 over central Australia and parts of New South Wales and Queensland produced a drought (the worst in 170 years) which quickened interest in research into its causes and pattern of occurrence. Studies published by the Bureau at regular intervals include a comprehensive drought study by Foley (1957). This Bulletin summarizes Foley's study and presents maps of variability of annual rainfall for the years 1885-1965. A 14 page historical review of droughts in various parts of Australia is included. Conclusions include the following: the occurrence of the first decile range on the 1885-1965 maps corresponds

well with droughts recorded by Foley. It is most unlikely that the whole of the Australian continent will ever be drought affected at any one time.

207. *Giess, W.
*1968 *A short report on the vegetation of the Namib coastal area from Swakopmund to Cape Frio. *Dinteria 1:13-29. Namib Desert Research Station, Scientific Papers 36. 17 p.
*Only perennial plants were collected, adapted to the extremely dry conditions and strong winds, with little moisture except from fog or very irregular precipitation.

208. *Gile, L.H./Hawley, J.W.
*1968 *Age and comparative development of desert soils at the Gardner Spring radiocarbon site, New Mexico. *Soil Science Society of America, Proceedings 32(5):709-716. ANAG(1969)04821.
*Radiocarbon ages were obtained from seven buried charcoal horizons in a desert area (along the San Andres Mountains). With increasing age of soil during Recent time, the progression of soil development appears to have been marked by development of an A horizon, destruction of thin sedimentary strata, slight accumulation of carbonate, development of structure in materials of sufficiently fine texture, and with continued carbonate accumulation, development of a weak calcic horizon. Soils of Pleistocene age can have distinct argillic horizons and strong horizons of carbonate accumulation.

209. *Gischler, C.E.
*1967 *A hydrological synthesis of the Chad Basin. *Nature and Resources 3(3):9-15. BA(50)5642. STRA 2(20)W69-08304.
*Reports on studies and projects important to the Unesco hydrological synthesis of information on the Lake Chad Basin, with emphasis on international cooperation. Reviews research activities, and describes objectives of the Unesco program. Present work includes phreatic water studies in Nigeria, and stable and unstable isotope investigations.

210. *Gist, C.S.
*1967 *Problems of sampling desert arthropods before and after a thermonuclear cratering test. *Great Basin Naturalist 27(1):25-35.
*Analysis of selected arthropods near ground zero before and after the thermonuclear test (Project Sedan 1962) is presented. Evidence was sought of possible changes in species composition, or in relative abundance of species as a result of the test. These factors might influence the long-term recovery of the close-in area, or indirectly

affect the survival of vertebrates in these areas. The arthropods recorded were common species (or species groups) which could be distinguished in the field. Data was tabulated of captures in grids of 100 traps at 3800, 5000 and 9000 feet respectively. There were no demonstrable effects of the Sedan test at 9000 feet. Except for the reduction in numbers of arthropods at 3800 feet compared to 5000 feet, the author perceived no short-term test-related effects in the tabulated data Deducing real changes in arthropod populations on the basis of captures in traps or seasonal variation is difficult, and requires a considerable sampling to overcome chance differences.

211. *Givoni, B./Sohar, E.
*1968 *Rectal temperature in the prediction of permissible work rates in hot environments. *International Journal of Biometeorology, 12(1):41-50. MGA 19.11-357.
*Experiments were performed on 9 volunteers in which the changes in rectal temperature and sweat rate were recorded under different levels of metabolic rate, air temperatures, vapor pressure and air velocity. Analysis of the results enabled the development of a formula for the prediction of the elevation of body (rectal) temperature after 30 minutes of work at known metabolic rates in given thermal environments. The elevation in body temperature is considered to express both the amount of heat dissipated through the heat dissipating mechanism, as well as the heat which has not been dissipated and is stored in the body. With the aid of the proposed formula, the permissible metabolic rate of work at various external heat loads can be calculated. English, German and French summaries, p. 50.

212. *Glancy, P.A./Rush, F.E.
*1968 *Water-resources appraisal of Smoke Creek-San Emidio desert area, Nevada and California. *Nevada, Department of Conservation and Natural Resources, Water-Reconnaissance Series, Report 44. 57 p. ANAG(1968)02576.
*Precipitation within the Smoke Creek-San Emidio Desert area is assumed to be the source of practically all water. Geologic terrane controlling the natural hydrologic system consists mainly of consolidated-rock mountain masses bordering and separating the valleys, and alluvial-mantled valley floors. Mountain ranges and intervening basins are the result of structural deformation of the Earth's crust that set the gross hydrologic framework. Principal known and developed aquifers occur in alluvial deposits, at relatively shallow depths. Knowledge is unavailable about presence, size, or quality of water reservoirs at great depths in alluvium or consolidated rocks. Chemical analysis

of 24 water samples show quality ranges from good to very poor. Future development may depend upon whether quantity and quality of available water are adequate for intended use.

213. *Glubb, J.B.
*1967 *Syria, Lebanon and Jordan. *Thames and Hudson, London. 236 p.

214. *Goeden, R.D./Fleschner, C.A./Ricker, D.W.
*1968 *Insects control prickly pear cactus. *California Agriculture 22(10):8-10.
*A considerable degree of control of prickly pear cacti has been achieved on Santa Cruz Island rangeland, as a result of ecological manipulation: primarily, through the introduction of an effective natural insect enemy (Dactylopius sp.) of the prickly pear; and secondarily, by the initiation of better range management in promoting plant competition through wild sheep eradication and restricted cattle grazing.

215. *Goldschmidt, M.J./Arad, A./Neev, D.
*1967 *Mechanism of the saline springs in the Lake Tiberias depression. *Israel, Hydrological Service, Hydrological Paper 11, 19 p./Israel, Geological Survey, Bulletin 45.
*The authors develop the theory that the emergence of brackish to saline springs in the Lake Tiberias depression is caused and controlled by the flow of cyclic water in the major regional aquifers. The bulk of the dissolved salts emerging at these springs is supplied by diluted brines of the Upper Pleistocene Lisan Lake, remnants of which are still entrapped in and slowly emerge from reservoir rocks within the Rift Valley and adjacent Cretaceous formations. The water discharged by the brackish to saline springs is a mixture of fresh cyclic water, supplied by 2 fresh water aquifers of Tertiary and Upper Cenomanian strata, and of a much smaller quantity of diluted brine, supplied by the Lower Cenomanian aquifer. The discharges of fresh and of saline water from the 2 Cenomanian aquifers are in phase. The supply of saline water is controlled by the cycle of replenishment-depletion of the respective aquifer, based on the palaeo-hydrology and the hydrogeology of the region, on the hydro-geochemical grouping of the water present in the aquifers and of the water discharged by the brackish to saline springs and on the hydrological and the hydro-geochemical regimes of these springs.

216. *Gol'tsberg, I.A., ed.
*1969 *Microclimate of the USSR. *Israel Program for Scientific Translations, Jerusalem, Israel. 240 p. Available CFSTI as TT-68-50470.
*Discusses results and methods of research work carried out by the Main Geophysical Observatory in evaluating quantitative indexes of the microclimate in different regions of the USSR. Differences in air and soil temperatures, wind, radiation balance and soil moisture are discussed, and recommendations are made on the utilization of microclimatic features by the national economy.

217. *Gomez, H.J.
*1968 *Water reuse in Monterrey, Mexico. *Water Pollution Control Federation, Journal 40(4):540-545. SWRA 2(20)W69-08289. EA(49)97528.
*Aridity, an extended drought, industrial development, and population explosion necessitated water reuse as early as 1955. Some industries treat and reuse water individually, while others use the central treatment facility of a cooperative. Water quality treatment varies with use demands, such as watering gardens, cleaning of buildings and equipment, fire protection, cooling, boiler feed, and various industrial processes. Production costs as well as physical and chemical properties of the water are presented for each quality use type.

218. *Goor, A.Y./Barney, C.W.
*1968 *Forest tree planting in arid zones. *Ronald Press, New York. 409 p.
*Intended to help reduce failures in planting forest tree seedlings in arid and semiarid zones by describing techniques and species used in afforestation under differing conditions of aridity and soil as influenced by plantation purposes. Covers climate, soils, and ecology of vegetation; collection and handling of tree seed; selection, layout, and management of nurseries; techniques of afforestation; special plantations for production, protection, and beautification; and species suitable for arid-zone afforestation.

219. *Gorsline, D.S.
*1967 *Sedimentologic studies of the Colorado Delta. *University of Southern California, Los Angeles, Department of Geology; U.S. Office of Naval Research. Contract Nonr 228(29), NR 388-079.

220. *Gouws, V.C.
*1968 *Analysis of rainfall over South Africa for the period July 1, 1967 to February 29, 1968. *South Africa, Weather Bureau, Nuusbrief (227): 19-21. WGA 19.12-361.

*Discusses and portrays on a chart the rainfall situations for each of the 4 provinces and for South West Africa and Botswana. The information presented is based on an analysis of total rainfall at 130 selected representative stations. The isolines on the chart show that, except in 4 very small localized areas, rainfall was below normal, ranging from 40 to 80 percent of normal.

221. *Green, C.R.
*1962 *Probabilities of temperature occurrence in Arizona and New Mexico (Arizona Climate, Supplement 1). *University of Arizona, Tucson, Institute of Atmospheric Physics. Map.

222. *Green, C.R./Battan, L.J.
*1967 *Study of visibility versus population growth in Arizona. *Arizona Academy of Science, Journal 4(4):226-228. NGA 20.7-474.
*Results of an analysis of variations of 1100 and 1700 MST visibilities at Tucson and Phoenix, Arizona, over a 17-year period (1949-1965) are compared with estimates of population. Frequency of "poor" visibility in the Tucson area has been significantly correlated. The increase in motor vehicles and aircraft is undoubtedly partially responsible for increases in atmospheric pollution leading to reduced visibility. The much higher frequencies of reduced visibility at Phoenix reflects its larger population and industrialization.

223. *Green, C. R./Kangieser, P.
*1967 *Probability of low temperatures occurring in Arizona (Arizona Climate, Supplement 2). * University of Arizona, Tucson, Institute of Atmospheric Physics. 23 p. Map. NGA19.5-229.
*Provides information on the terminal occurrence (first in the fall and last in the spring) of low temperatures. The locations of the 83 stations are shown; their latitudes, longitudes, elevations and descriptions are tabulated. The results of the analysis presented in a table include: 1) The dates in the spring on which the probabilities of the last occurrences of 40 degrees, 36 degrees, 32 degrees, 28 degrees, 24 degrees, 20 degrees, and 16 degrees F decrease from 90 percent, 75 percent, 50 percent, 25 percent, to 10 percent; 2) The dates in the fall on which the probabilities of the first occurrences of the same temperatures increase from 10 percent to 90 percent, through the same intermediate values; and 3) The mean length of the growing season, i.e., the number of days between the last occurrence of a given threshold in the spring and its first occurrence in the fall at the 50 percent probability level. The use of the table is demonstrated in an example.

224. *Greenleaf, J. E./et. al.
*1967 *Thirst and artificial heat acclimatization in man. *International Journal of Biometeorology 11(3):311-322. MGA 19.8-67.
*Investigation on the relationship between serum osmotic changes, water intake and water balance in 4 fit young men during and after exercise in heat, before and after artificial heat acclimatization. English, German, and French summaries p. 321-322.

225. *Gringof, I. G.
*1967 *Pastbishchnye rasteniia Kyzylkuma i pogoda (Pasture plants in Kyzyl-Kum and the weather). *Sredneaziatskii Naucho-Issledovatel'skii Gidrometeorologicheskii Institut, Trudy 34. 137 p. MGA 19.6-16.
*The characteristics of the leading pasturage plants of the Kyzyl-Kum desert are discussed; indicators of onset of phases of growth are described and agrometeorological conditions of spring and fall vegetation renewal and of drying up of ephemeral plants are analyzed. Quantitative indices of the rate of development of ephemeral cereals in relation to air temperature and soil moisture are established. New computation methods are proposed for estimating yields of the vegetal mass of short grasses, sagebrush, and of shrubs under field conditions. Bibliography, p. 129-135.

226. *Gueldiev, A. G.
*1966 *Construction of the Kara-Kum canal in Turkmenistan, Translation. *International Commission on Irrigation and Drainage, Transactions, 1:C133-C142. SWRA 1(7)R20288X66A.
*The Kara-Kum Canal is located in Turkmenia, the most arid territory in the Soviet Union. Climate of Turkmenia is favorable, but low rainfall and high evaporation make agricultural cultivation impossible without irrigation. In 1966 the canal was more than 800 kilometers long and the irrigated area was about 165,000 hectares. Water intake in the canal was 200 cubic meters per second in 1965. Problems in planning and constructing the canal are discussed. Large water losses are tolerated because only 20-21 percent of available water is being utilized. The canal is used for transportation, carrying vessels with tonnage up to 500 tons. Experimental work shows that vegetation can be controlled by either deepening the canal to a minimum of 5.5 meters or adding herbivorous fish.

227. *Gallyyev, A.

*1967 *Insects harmful to the plant life of the Karakum Canal area (translated title). *Problemy Osvoyeniya Pustyn' 3:57-62. CRE 3:66-68.

*Eighty harmful and potentially harmful insect species have been found in the vicinity of the Karakum Canal, some of which are listed in Table 1. Also discussed are the plants attacked by each insect, the parts of the plant they damage, the population density and population.

228. *Hunaji, N. N.

*1968 *Evaporation investigations at Elephant Butte Reservoir in New Mexico. *International Association of Scientific Hydrology, Publication 78:308-325.

*Describes studies of the water losses by evaporation at Elephant Butte Reservoir, south central New Mexico, representing the first phase of an evaporation suppression research program initiated in the summer of 1963. Such a program requires the determination of evaporation as accurately as possible to evaluate the efficiencies of evaporation savings and the economic feasibility of suppression. Only after establishing certain experimental relationships and correlating the various parameters involved can full-scale evaporation reduction studies be performed. The determination of evaporation at this Rio Grande site is important not only for future suppression studies, but also for the growing problems involving interstate and international water rights and the reliabilities and assurances of domestic water delivery.

229. *Gupta, I. C./Abichandani, C. T.

*1967 *Seasonal variations in the composition of some saline irrigation waters of western Rajasthan. *Annals of Arid Zone 6(2):108-116. BA (49)124256. SWRA 1(11A)W68-00736.

*Saline ground waters from 7 sites in Jodhpur and Pali districts of western Rajasthan were examined for seasonal variations in salt composition. Salinity varied from 2316 to 10,160 micromhos EC per centimeter during rabi season of what cultivation. Recharge of waters in the wells was prominent after the start of monsoon and sites with recharge source nearby showed more seasonal fluctuations in salinity levels than sites with recharge source further away.

230. *---- ----

*1968 *Salt composition of some saline water irrigated soils of Western Rajasthan. Indian Society of Soil Science, Journal 16(4):305-313. BA(50)117236.

*Irrigation with saline ground waters of varying salinity and Sodium adsorption ratio values ranging from 7 to 69 on coarse to medium textured soils increased the soluble Na percentage in soil solution to over 75 and exchangeable Na percentage to over 30 at most of the experimental sites. Irrigation waters examined generally contain preponderance of magnesium over calcium resulting in large accumulation of magnesium in soil solution. Wheat crop, however, continues to be raised on these soils in the usual manner. Large amounts of calcium carbonate in the soil does not seem to offer any protection against sodic development during irrigation.

231. *Gupta, R. K.

*1968 *Anthropogenic influences on the vegetation of western Rajasthan. *Vegetatio 16(1-4):79-94. BA (50) 96177.

*The area is now desert-like, and the question is to what extent this desertification is due to man's activities. These direct influences of man are discussed: The socio-economic conditions of the human population, their land utilization and agriculture, use of vegetation for fuel, fiber, wood and animal feed. These indirect influences are discussed: Over-grazing of natural pastures, changes in the vegetation related to grazing or release from grazing, introduction and spread of disseminules of undesirable plants, and degradation of the microclimate following the elimination of vegetation.

232. *Gutkin, V. L.

*1966 *Vertolet na rekognostsirovke i p ostroike znakov v peschanykh raionakh (*Helicopters on reconnaissance and in erection of signals in sandy regions). *Geodeziya i Kartografiya 8:16-19. Translation available CFSTI as AD-674 621.

*Discusses the use of helicopters to accomplish topographic-geodetic work in a sandy, nearly impenetrable region. The work was accomplished by one crew of 17 men and a rented helicopter. By calculation, the reconnaissance and erection of one point with the aid of a helicopter used approximately 280 percent less time than the same project using automobiles, and the budget economized by 200 percent. The use of a helicopter increases quality, secures the absence of blind spots and insures the prompt registering of data.

233. *Hadley, N. F./ Williams, S. C.
*1968 *Surface activities of some North American scorpions in relation to feeding. *Ecology 49(4):726-734.

234. *Hagedorn, H.
*1968 *Über äolische abtragung und formung in der Südost-Sahara (Aeolian removal and formation in the southeast Sahara. *Erdkunde 22(4):257-269. MGA 20.11-266.
*The rocks of the Borkou mountain area in the southeast Sahara on the southwest edge of the geological Kufra basin, are predominantly sandstones, deposited in succession from the Cambrian to the Cretaceous. The structural relief forms are widespread structural terraces. The climate of the area is completely arid and is ruled by the NE trade wind, which blows from September to May with extraordinary regularity and strength. Relief is characterized by wind corrosion forms that take in the basal portion of the mountain area. Wind relief is described and analyzed with the help of some air photos. The dominant forms are wind alleys and aerodynamically formed ridges stretching NE-SW and owing their formation to the grinding activity of the trade wind. The grinding material is quartz sand that is irregularly distributed over the mountain area. The most important removal process is corrasion; deflation plays only a subordinate role. A series of relief levels is recognized and analyzed on the basis of surface forms from areas of varying altitude but with similar petrographic and tectonic composition.

235. *Hall, J. N.
*1967 *A simple method of navigating in deserts. *Geographical Journal 133(2):192-205.
*Discusses dead reckoning navigation by sun compass and position fixing by using selected stars.

236. *Hallett, J.
*1969 *A rotor-induced dust devil. *Weather 24(4): 133. MGA 21.3-471.
*This note discusses the cover photography that shows a dust cloud raised by the strong vertical motion occurring below the roll cloud formed by air flowing over the mountain range to the west of the Fah Hah Range, Pyramid Lake, Nevada.

237. *Hamad, M. A.
*1969 *Capture of ground water in African Sahara desert. *American Society of Civil Engineers, Irrigation and Drainage Division, Journal 95(IR4):563-580. SWRA 3(7)W70-02452.

*The two-dimensional problem of unsteady seepage flow through a confined sand bed of vast plan area is attempted on mathematical lines. The treatment is applied to the groundwater reservoir lying under the vast African Sahara Desert with the object of determining the amount of its storage. The future groundwater discharges of two main oases in Egypt (namely Kharga and Dakhla) have been predicted to the year 2000. The free flow discharge of Kharga Oasis at present can irrigate a cultivated area of about 10,000 acres, the corresponding area of Dakhla Oasis being 22,000 acres. The installation of pumps in Kharga wells increases their discharge by about 15 percent and those of Kahhla by about 7 percent. Owing to various complications in the pump installation, and the low water gain obtained by them, pumps should not be used. Their expenses far exceed the water gain.

238. *Hammer, A. M.
*1968 *Note on rainfall in the Sudan. *Weather 23(5):211. MGA 19.10-419.
*Data for 1961 from 24 randomly chosen rainfall stations in the Sudan have been examined to determine the contribution of various daily rainfall-amounts to the total annual rainfall. Results indicate that 14.8 percent of the raindays produced 46.3 percent of the total rainfall, and 32.2 percent produced 72.5 percent of the total rain. These figures agree with similar figures for tropical areas found by Riehl. A graph showing the average curve of cumulative percentage of raindays against percentage of annual rainfall is shown.

239. *Hance, W. A.
*1967 *The Gezira scheme, a study in agricultural development. In W. A. Hance, African economic development, revised edition, p. 31-53. *Praeger, New York. 326 p.

240. *Hanks, R. J./Gardner, H. R./Fairbourn, M. L.
*1967 *Evaporation of water from soils as influenced by drying with wind or radiation. *Soil Science Society of America, Proceedings 31(5): 593-598. MGA 19.6-362. SWRA 2(1)W69-00378.
*Evaporation of water directly from the soil accounts for loss of a large part of the precipitation in the arid zone. A study to determine relative importance of temperature gradients in evaporation of water from soil was made by adjusting the wind and radiation intensity. Wind treatment caused a temperature depression at the soil surface initially that nearly disappeared after about 5 days. The radiation treatment caused a temperature increase at the soil surface that increased with time.

241. *Hanna, S. R.
*1969 *The formation of longitudinal sand dunes by large helical eddies in the atmosphere. *Journal of Applied Meteorology 8(6):874-883.
*It is suggested that helical roll vortices in the atmosphere are responsible for the formation of the longitudinal sand dunes that cover over half of the area of the large deserts of the world. The dunes are aligned in the direction of the prevailing wind and are spaced more or less 2 kilometers apart. Observations in the atmosphere and in the laboratory, and hydrodynamic stability theory, indicate that dominant forms of motion in the boundary layer of the atmosphere are counter rotating helical roll vortices aligned along the wind and having diameters approximately equal to the thickness of the boundary layer. The necessary conditions for the formation of these roll vortices are fulfilled over large deserts and their spacings agree with the observed spacings of the dunes.

242. *Happold, D. C. D.
*1969 *The mammalian fauna of some jebels in the northern Sudan. *Journal of Zoology (London) 157 (Part 2):133-145. BA(50)64049.
*Mammals were collected and observed on 7 jebels in the Sudan. A brief description of the position and geology, size, amount of soil, vegetation and rainfall is given for each jebel since these features are important in determining the variety and abundance of the mammalian fauna. There are few mammalian species, if any, on the desert jebels. Acomys cahirinus is the commonest species, and it may be very abundant if the jebel is large enough. Small desert jebels appear to have no mammals. In the desert, the jebel and the desert faunas are distinct, whereas in the woodland savanna there is an overlap between the mammals of the jebel and those of the savanna. The desert jebels are islands, so that each population is isolated from the next. This situation is probably due to the past climatic and vegetational history of the region.

243. *Harbeck, G. E., Jr.
*1968 *Status of evaporation measurements in the United States. *International Association of Scientific Hydrology, Publication 78:285-292. WRA 20.9-363
*The difference in importance of evaporation in the design of reservoirs in humid and arid regions is briefly noted. In summary the author states that the choice of the technique is based upon economics. The energy budget method is reliable but expensive. Evaporation maps based on evaporimeter data are adequate for most purposes. A mass-transfer technique is often suitable for small ponds, but cannot be used successfully when inflow and outflow are large compared to the reservoir volume.

244. *Harrili, J. R.
*1968 *Hydrologic response to irrigation pumping in Diamond Valley, Eureka and Elko Counties, Nevada, 1960-1965. *Nevada, Department of Conservation and Natural Resources, Water Resources Bulletin 35. 85 p. ANAG(1969) 04805.

*Because most pumping is 10 miles south of the nearest area of natural discharge, local overdraft will occur long before an appreciable amount of natural discharge can be salvaged. Pumpage increased about 2,000 acre-feet per year during the period reviewed, resulting in an estimated storage depletion of 60,000 acre-feet. If the same rate prevails, new equilibrium may not be achieved until increased pumping costs result in a decrease or relocation.

245. *Harris, D. J.
*1967 *Electrical effects of the Harmattan dust storms. *Nature 214(5088):585. MGA 18.10-414.

*Measurements of the electric field at ground level, and of the electric current from air to ground, have been made at Zaria, Nigeria during the Harmattan season. A chart is shown illustrating the variation in the Earth's electric field over a period of 24 hours during which intense Harmattan conditions prevailed.

246. *Harris, R. W.
*1968 *Establish drought-tolerant plants by direct seeding. Interim report. *California State Division of Highways, Maintenance Department 31 p. Available CFSTI as PB-183 677.

*This is a progress report on research being conducted by the University of California, at Davis, consisting of establishing drought-tolerance, aggressiveness, resistance to insects and diseases, beauty and the ability to accomplish the desired functional purpose. Seeding techniques are being developed which consider maximum utilization of the plant's inherent seed germinatability, natural soil moisture, suitable soil temperature, fertilizer placement and weed control. The goal is to obtain attractive and functional roadside plantings which are able to survive with minimum maintenance and with little or no irrigation. Trials to date indicate this planting technique can be applied on roadsides throughout the state, using indigenous plant material or plants growing under climatic conditions similar to that specific area.

247. *Harris, W. V.
*1968 *Termites of the Sudan *University of Khartoum, Sudan Natural History Museum, Bulletin 4. 31 p.
*This list of the Isoptera known to occur in the Sudan is based on specimens in the British Museum (Natural History) and on published records. Included in the list are 38 species belonging to 26 genera. A key is given for the identification of the genera based on the characters of the soldier caste, with illustrations of 15 genera. An annotated list gives references to the original description of each species and such changes on nomenclature as affect the Sudan record. A brief note is included on economic damage resulting from termite attack. A list of localities with the provinces, and a bibliography conclude this account.

248. *Harrison, D. L.
*1968 *On three mammals new to the fauna of Oman, Arabia, with the description of a new subspecies of bat. *Mammalia 32(3):317-325.
*An adult male wild sheep, Ovis ammon (Artiodactyla: Bovidae) obtained in the mountains of Oman in November 1967 is described and illustrated. It is the first known occurrence of the species in the Arabian peninsula outside Iraq. Two spp. of Microchiroptera are also newly recorded from Oman: Eptesicus nasutus (Vespertilionidae), a new local race E.n. batinensis, and Taphozous perforatus (Emballonuridae).

249. *Harrison, D. L./Seton-Browne, C. J.
*1969 *The influence of soil color on subspeciation of mammals in eastern Arabia. *Linnean Society, Zoological Journal 48(4):467-470.
*Some subspecies of mammals described from the Batinah Coast of Oman are discussed. The Baluchistan gerbil, Gerbillus nanus, exists in 2 quite distinct color forms on each side of the Oman range, which we have shown to correspond closely with the coloration of soil samples obtained from the areas in which they were collected. A pale sandy form near to G.n. arabium lives on the pale sands fringing Rub al Khali, while a much darker form G.n. setonbrownei lives on the darker soil of the Batinah Coast.

250. *Harrison, R. S.
*1969 *The Mahardah scheme. *Focus 19(5):8-11.
*Of the total farm land of Tunisia, the area with the greatest potential for large-scale irrigation lies in the basin of the Majardah, one of the most productive parts of the country, and it is hoped that the pilot project being carried out indicates progress possible through cooperation between farmers and a government dedicated to reform.

251. *Hastings, J. R./Humphrey, R. R.
*1969 *Climatological data and statistics for Sonora and northern Sinaloa. *University of Arizona, Institute of Atmospheric Physics, Technical Report 19. 96 p.
*Data on total monthly precipitation, mean monthly temperature, and seasonal statistics from various weather stations in Sonora and Sinaloa.

252. *Haynes, C. V.
*1968 *Preliminary report on the Late Quaternary geology of the San Pedro Valley, Arizona. *Arizona Geological Society, Southern Arizona Guidebook 3:79-96. ANAG(1969)

253. *Hazrati, A.
*1967 *Identification and typing of horse-sickness virus strains isolated in the recent eptzootic of the disease in Morocco, Tunisia, and Algeria. *Arch. Inst. Razi 19: 131-143. BA (50) 71462.
*Several virus strains isolated during the recent epizootic of African horsesickness in North Africa were studied. These strains were either received for confirmation and typing or were isolated from samples submitted to the Razi Institute, Iran. The virus strains were identified as African horse-sickness virus because of their pathogenicity for suckling mice, adult mice, guinea pigs and horses (in one case) as well as their ability to fix complement in the presence of horse-sickness antiserum when tested by the complement fixation test.

254. *Heathcote, R. L.
*1969 Drought in Australia: a problem of perception. *Geographical Review 59:175-194.

255. *Hecht, G./Kniesel, J.
*1968 *Die Oase Siwa (VAR): Bemerkungen zur Geographie (The oasis of Siwa, UAR). *Geographische Berichte 13(2:47):93-104.
*English summary, p. 103.

256. *Hedberg, I./ Hedberg, O., eds.
*1968 *Conservation of vegetation in Africa south of the Sahara. Proceedings of a symposium held at the 6th plenary meeting of the Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale, Uppsala, 1966. *Acta Phytogeographica Suecica 54. 320 p.
*Covers the arid areas of the Zone Sahélienne, East Africa, south Tropical Africa, and South Africa, with regional syntheses for each; and includes appendices on the progress of African floras and the mapping of the African flora. Maps, photographs.

257. *Hellmuth, E. O.
*1968 *Eco-physiological studies on plants in arid and semi-arid regions in Western Australia. I: Autecology of Rhagodia baccata (Labill.) moq. *Journal of Ecology 56:319-344.
*This species shows marked control over water loss and a higher assimilation rate than other native plants of Western Australia, as well as high heat resistance. These drought-resistant properties, together with its capacity to grow on a wide range of soil types, its ease of propagation, and its palatability for sheep, make it potentially useful as a pasture for the arid and semi-arid regions of Western Australia.

258. --- ---
*1969 *Eco-physiological studies on plants in arid and semi-arid regions in Western Australia. II: Field physiology of Acacia craspedocarpa F. Muell. *Journal of Ecology 57:613-634
*Investigations have been made on the field physiology of Acacia craspedocarpa F. Muell. which grows in arid and semi-arid regions of Western Australia, showing that stomatal control of water loss does not occur. Control over water loss appears to be referable to anatomical characteristics and the development of water-retaining substances in cells of phyllodes in late summer. Increasing resistance to water loss but not to carbon dioxide exchange was responsible for increasing water use efficiency in late summer. The development of negative turgors under late summer conditions did not impair the photosynthetic activity. The heat resistance limit was found to be well above the maximum phyllode temperature recorded.

259. *Henane, R.
*1963 *Comportement alimentaire et adaptation organique en zone désertique (Alimentary behavior and organic adaptation to desert zones). *Revue de Corps de Santé des Armées, 4:33-54. NASA-TT-F-11612. STAR 6(7)No8-22210. English translation, 1968, under Contract NASw-1695.
*A brief description of the climate of the Sahara is followed by a detailed description of the diet of the nomadic Meharists. Religion and custom as well as practical expediency are discussed as reasons for the selection of such imbalanced eating habits. A detailed analysis of the nutritional value and substantial deficiencies offered by the diet are shown to be basic to this native group's adaptation ability to the torrid desert climate. Other tests on both man and animals are discussed and compared in terms of validity and accuracy.

260. *Henderson, R. J./Emerson, D. W.
*1969 *Locating deep aquifers by resistivity soundings. *Australian Journal of Science 38(1):299-300. MGA 20.11-674.

*The major part of this report is on a preliminary investigation conducted by the authors in the Coonamble Basin in northern New South Wales, with known geology and water distribution. The equipment used in a resistivity sounding at the site of Bohena-1 well 27 kilometers south-west of Narrabri, which was drilled in 1963 to a depth of 1655 meters, and the field procedure are described. A computer program was used to calculate a theoretical sounding curve based on the data supplied by the well logs. This enabled prediction of the required electrode separation and the likelihood of resolving any particular layer. The results of the field sounding together with an idealized lithological log of the well are shown in a graph. The authors conclude that the results are sufficiently encouraging to justify continuation of the investigation.

261. *Henning, D.
*1968 *Exzessive-Niederschläge in Trockengebieten: Rekord-Niederschläge im Februar und März 1967 in Inner-Australien (Excessive precipitation in arid areas: record precipitation in February and March 1967, in the interior of Australia). *Wetter und Leben 20(1-2):1-9. MGA 19.11-454.

*At many stations of Central Australia, rainfall totals for February and March 1967 represented absolute records. The Alice Springs District space average for these months amounted to nearly 4 times the long run mean value. At a series of stations of this district, rainfall exceeded 600 percent of normals in February and 1200 percent in March. The February rainfalls were caused a.o. especially by the zonal pressure distribution within the equatorial trough. In March, a tropical cyclone was passing Alice Springs District and the 24 hour and the 48 hour rainfall amounts came up to 145 mm (5.70 inches), and 172 mm (6.77 inches), resp., in the southern part of that district. Results of the tremendous downpurs were disruptions of the few roads and rail lines, so that large areas of the Northern Territory were cut off from the rest of the continent for several weeks.

262. *Herm, D./ Paskoff, R./ Stiefel, J.
*1966 *Premières observations sur les alentours de la baie de Tongoy, Chile (First observations on the environs of Tongoy Bay, Chile). *Société Géologique de France, Compte Rendu 1966 (1):24. Abstract. BIGENA 32(10)E68-13059.

263. *Hervieu, J.
*1968 *Contribution à l'étude de l'alluvionnement en milieu tropical (Contribution to the study of alluvial deposits in a tropical environment). *Orstom, Mémoire 24. 406 p. Maps. BIGENA 32(10)E68-13505.

*This monograph on the sedimentary history of Madagascar is based primarily on studies on the western slopes of the island, an area which, due to its geographic position, geology, relief, vegetation, and soils, ideal for research on continental detrital sedimentation in a tropical environment. The evolution of alluvial deposits during the Tertiary and Quaternary is traced, and pedogenesis is discussed in detail.

264. *Hickman, K.
*1967 *Oases for the future. *Ekistics 23(137): 193-198.

265. *Hill, D. W.
*1968 *Mojave Desert-High Sierra topographical quadrangle map index. *Chalfant Press, Bishop, California. 116 p.

*Most of the U.S. Geological Survey topographical quadrangles of the Mohave Desert cover 15 minutes of latitude and longitude. They are the only current maps that contain many of the early place names, roads and trails of this area.

266. *Hillel, D.
*1967 *Runoff inducement in arid lands. Final Technical report. *U.S. Department of Agriculture, Project A10-SWC-36, Grant FG-Is-178.

*Artificially-increased runoff from slopes, concentrated in crop-planted areas, can help more efficient use of natural precipitation in agriculture. Laboratory experiments in Israel to reduce infiltration and thus increase runoff used rainfall simulators, later field tested. Varied soil type, and rainfall intensity and duration, provided varied results, with runoff-to-rainfall ratios as high as 80-90 percent under good conditions. Treatments included mechanical smoothing and compaction, and application of substances to bind, seal, crust, and waterproof surfaces.

267. *Hillel, D./ Rawitz, E.
*1968 *A preliminary field study of surface treatments for runoff inducement in the Negev of Israel. *International Congress of Soil Science, 9th, Adelaide, 1968, Transactions 1:303-311.

*The possibility of obtaining additional supplies of water by the artificial inducement of runoff can be important in arid regions. Various surface treatments can affect the infiltration rate and stability of the soil and thus determine the quantity and frequency of runoff. Several such treatments were compared in field runoff plots in which the rainfall pattern and runoff rates were monitored during two seasons. These treatments included: mechanichal compaction, sodic dispersion, fuel oil, cultivation, aggregation, control. An analysis is presented of seasonal runoff potential and of the performance of the various treatments (including total runoff yield, runoff ratio, average infiltration capacity, relation of runoff yield to storm size and total seasonal erosion). The formation of a layer of stable aggregates was found to reduce runoff to practically zero (especially during a drought season), whereas the formation of an artificial crust (e.g. with fuel oil, which had the triple effect of sealing, waterproofing and binding the soil surface) induced runoff in amounts exceeding 80 percent of seasonal rainfall.

268. *Hillel, D. et al.
*1969 *Soil-crop-tillage interactions in dryland and irrigated farming. Final technical report. *Volcani Institute of Agricultural Research, Technion. 310 p. Grant FG-Is-204. Available CFSTI as PB-190 438.

*The project was an attempt to find answers to a number of fundamental and practical problems related to soil management in an arid zone. Though the practice of tillage constitutes a major, and at times the major, cost item in crop production, it has not yet been studied adequately from the combined viewpoints of the agronomist, soil physicist and engineer. A coordinated effort was directed towards an examination of alternative tillage programs and practices in the contexts of dryland and irrigated farming under the conditions typically prevailing in Israel.

269. *Hills, E. S./ Ollier, C. D./ Twidale, C. R.
*1966 *Geomorphology (of arid lands). In E. S. Hills, ed., Arid Lands, a geographical appriasal, p. 53-76. *Metheun, London. MGA 19.11-501.

*Arid lands are hot regions, characterized by a low average annual rainfall, rare and spasmodic downpours, a large diurnal temperature range, and wind which in the absence of vegetation assumes great significance in shaping land surfaces. Illustrates the structure (block tectonics, shield and platforms, vulcanicity weathering), rivers and streams of arid lands, and wind action including land forms of sand.

270. *Hinchingbrooke, J.
*1968 *Trek to the Tibesti Range. *Geographical Magazine 40(12):1025-1033. Map.
*Travels through the Saharan mountain range on the borders of Libya and Chad.

271. *Hinrichs, E. N.
*1968 *Geologic map of the Camp Desert Rock quadrangle, Nye County, Nevada (scale 1:24,000). *U.S. Geological Survey. Geological Quadrangle Map GQ-726. ANAG(1968)02409.

272. *Hodges, C. N./Hodge, C. O.
*1969 *Power, water and food for desert coasts: an integrated system for providing them. *American Society for Horticultural Science, 66th annual meeting, Pullman, Washington, 1969, paper presented. 16 p.
*An integrated closed-environment system has been devised to furnish power-water-food for desert coastal areas, using waste heat from engine-driven electric generator sets to desalt seawater, and using the fresh water to irrigate vegetables planted in plastic air-inflated greenhouses. The operating facility on the Gulf of California and one planned for the Persian Gulf could bring needed development to the world's 20,000 miles of arid coasts.

273. *Hollard, H.
*1967 *Le dévonien du Maroc et du Sahara nord-occidental (The Devonian in Morocco and the northwestern Sahara). In International Symposium on the Devonian system, 1:203-244. *Alberta Society of Petroleum Geologists, Calgary. BIGENA 32(11)E68-15150.
*An attempt is made to establish the stratigraphy of the Devonian for this region, resulting in retaining 9 subdivisions; the formations assigned are present in a variety of facies, with maximum thicknesses present in the west and southwest of Morocco, and minimum in the southeast (central High Atlas and Tafilalt). English summary.

274. *Holmes, D. A./ Wright, J. C.
*1968 *The birds of Sind (West Pakistan): A review. *Bombay Natural Hist. Soc., Journal 65(3): 533-556. BA (51) 52457.
*It has been 45 years since a comprehensive account of the birds of the former province of Sind (West Pakistan) was published. Since then, the environment of the alluvial plains of Sind has been considerably altered by a very

extensive spread of irrigation canals, agricultural development and increase in population. These changes are still occurring. An up-to-date review of the avifauna of the alluvial plains is presented to indicate changes in status that heve resulted from the new environment. Most noticeable of the changes is the decline of the larger, wetland species, which is likely to continue. In contrast, it can be assumed that the population of many passerines has increased.

275. *Holz, R. K.
*1968 *The Aswan High Dam. *Professional Geographer 20(4):230-237.
*Few countries have tied such a high proportion of their hopes for political, social, and economic development to a single, massive project as has Egypt in the construction of Sadd-ie'aali, or the High Dam at Aswan. It may bring to the average Egyptian little or none of the benefits expected of it, however. This study documents the physical limitations of agricultural expansion in the Nile Valley itself, and reemphasizes the problem of Egypt's rapid and sustained population growth. In so doing, it concludes that the gains programmed for the dam will be more limited than planned, and further, that population increases may spread these gains so thin that their effects will be negligible among the fellaheen.

276. --- ---
*1969 *Man-made landforms in the Nile Delta. *Geographical Review 59(2):253-269.

277. *Hood, J. W./ Waddell, K. M.
*1968 *Hydrologic reconnaissance of Skull Valley, Tooele County, Utah. *Utah Department of Natural Resources, Technical Publication 18. 57 p. Maps. ANAG(1968)02431.
*The main ground-water reservoir in Skull Valley in unconsolidated Tertiary and Quaternary rocks, underlies about 230,000 acres: the drainage basin includes about 800 square miles. The source of all water is precipitation. Estimated average recharge and discharge is 30,000-50,000 acre-feet per year. Discharge is by evapotranspiration, wells, surface outflow, and underflow from the mouth of the valley. Estimated perennial yield of ground water is 10,000 acre-feet or less: any excess would be from storage. Chemical quality of water limits potential development: concentration of dissolved solids is 98-17,200 ppm. A considerable part of the water is saline: freshest water comes from streams and springs in the Stansbury Mountains.

278. *Hoogstraal, H., et al.
*1966-1967 *The Cheetah, Acinonyx jubatus Schreber, in Egypt. *Zoological Society of Egypt, Bulletin 21:63-68. Available CFSTI as AD-700 632.
*A cheetah, Acinonyx jubatus subsp., shot in the desert 15 kilometers north of the kilometer 125 marker on the Cairo-Alexandria road, appears to be the northeasternmost record of this animal in continental Africa. Cheetahs have been seen on several occasions during this century in the El Maghra, Qattara Depression, and Salum areas. A plea is made for effective preservation measures so that this animal will not become extinct in Egypt. The small skull of the 1967 Egyptian specimen is almost identical with one of the American Museum of Natural History from 60 miles south of Harrar, Ethiopia.

279. *Hooke, R. L.
*1967 *Processes on arid region alluvial fans. *Journal of Geology 75(4):438-460. BA (50) 117223.
*Alluvial fans were studied in the field, largely in the desert regions of California, and in the laboratory. Field study consisted of detailed mapping of parts of 4 fans and reconnaissance work on over 100 additional fans. Features mapped included the nature and age of deposits, material size, and channel pattern. In the laboratory small alluvial fans were built of mud and sand transported through a channel into a 5-foot by 5-foot box under controlled conditions.

280. *--- ---
*1968 *Steady-state relationships on arid-region alluvial fans in closed basins. *American Journal of Science 266(8):609-629. ANAG (1969)04442.
*In a system of fans the steady state exists when all of the fans are increasing in thickness at approximately the same rate. Laboratory and field observations suggest that the steady-state slope of an alluvial fan is determined by debris size, depositional process, and water discharge. Large fans have larger drainage basins and hence larger discharges than small fans. Consequently, fan slope generally decreases with increasing fan area. Under otherwise equivalent conditions, fans composed of coarse material are steeper than those composed of fine material, and fans built largely by debris flows or sieve deposition are steeper than fans on which fluvial processes dominated.

281. *Hooke, R. L./ Yang, H-Y./ Weiblen, P. W.
*1969 *Desert varnish, an electron probe study. *Journal of Geology 77(3):275-288.
*Desert varnish samples from Deep Springs Valley and Death Valley in California were studied with the use of the electron microprobe. Comparison of variations with data on the bulk composition of the fresh rock suggests that elements which increase outward may be supplied largely from external sources and that elements which decrease outward may be supplied predominantly from the underlying rock.

282. *Hurley, P. A.
*1968 *Augmenting Colorado River by weather modification. American Society of Civil Engineers, Journal of Irrigation and Drainage Division 94(4):363-380. MGA 21.3-673.
*An overall perspective on the promising potential for increasing winter precipitation over mountains of the upper Colorado River basin is presented in an engineering context for water development planners. The resulting augmented spring runoff, regulated by existing reservoirs, can provide additional water to meet growing demands for the region where present water supplies are becoming critically short. Increasing the November through April precipitation by 15 percent over 14,200 square miles of target areas generally located at elevations above 9500 feet will yield an average additional runoff of 1,870,000 acre-feet annually. This practical capability to enhance the winter snowfall should be developed by the mid-1970's through the outlined $25,000,000 applied research field program. Exclusive of initial research costs, regular production costs by weather modification are estimated at $1.00 to $1.50 an acre-foot for the new water. Average additional benefits are estimated to be 20 to 25 million annually, for a highly favorable benefit-cost ratio of about 10 to 1.

283. *Hou, H./ Chen, C. T./ Wang, H. P.
*1957 *The vegetation of China with special reference to the main soil types (translated title). *Acta Pedologica Sinica 5:19-49.
*English summary.

284. *Hoyanagi, M.
*1965 *Sand-buried ruins and shrinkage of rivers along the Old Silk Road in the Tarim Basin. *Journal of Geography, Tokyo 74(1):1-12, (2):55-75. MGA 17.8-469.
*Archaeological, historical, hydrological and climatic factors that may account for the abandonment of sites in the Takla Makan Desert in the Tarim Basin are discussed.

Abandonment of the sites is associated with the shrinkage of rivers and with the retreat of glaciers and their general fluctuation during historical times.

285. *Hsi, G./ Binder, G. J./ Cermak, J. E.
*1968 *Topographic influences on wind near Green River, Utah. *Colorado State University, Ft. Collins, Fluid Dynamics and Diffusion Laboratory, Technical Report CSU67-68GH-GJB-J.C54. Grant DA-AMC-28-043-65-G20. MIA 20.2-453.
*Actual terrain near Green River, Utah, was modeled to a scale of 1:800. The purpose of this study was to find the effect of topography on wind speed and wind direction. Field data are included in this report and comparisons between model and prototype data are made. Throughout this study, an ambient wind velocity of 4.57 mps was used and a neutral flow condition was maintained in the Army Meteorological Wind Tunnel.

286. *Hudson, J.
*1968 *The role of irrigation (in Syria). *Focus 18(8):8-11. Map

287. *Humlum, J.
*1969 *Water development and water planning in the southwestern United States. *Aarhus Universitet, Denmark, Institute of Economic and Applied Geography, Publication 4. 240 p.

288. *Hurley, T. A.
*1967 *Augmenting Upper Colorado River Basin water supply by weather modification. *U.S. Bureau of Reclamation, Office of Chief Engineer, Office of Atmospheric Water Resources, Denver. 36 p., maps.

289. *Ibrahim, K. M.
*1968 *Some important native browse and forb forage plants of northern UAR, their ecology in relation to range management. *Pakistan Journal of Forestry 18(2):155-166.
*Dominant vegetational and edaphic conditions of range land in the United Arab Republic (UAR) represent various stages of retrogression resulting from biological activities since the days of the Roman Empire. Meteorological data and soil classification may be taken as a qualitative standard for the adaptation of species in declined habitats of semi-arid regions. However, from the range management point of view, classification of associations upon phytosociological basis is more reliable than climatic or edaphic classification. The characteristics of the principal plant associations of the coastal belt of UAR and species best adapted for reseeding are presented. Ecological studies of many native forage plants of northern UAR indicate their importance in range improvement and range rehabilitation. Different characteristics of range plants such as palatability, reproduction and forage production vary from one association to the other.

290. *Ionides, M. G.
*1967 *Micro-irrigation by catchment tank. *Ekistics 24(142):252-255.

291. *Iorns, W. V./ Mower, R. W./ Horr, C. A.
*1966 *Hydrologic and climatologic data, 1965, Salt Lake County, Utah. *U.S. Geological Survey, Utah Basic Data Release 12. 84 p. MGA 19.12-29.
*Tables of climatological, ground water, water quality and surface water data; an outline and graphical presentation of station and well-numbering systems used; plus a map showing location of hydrologic and climatologic data collection sites. It is noted that, pending publication of interpretive reports, the basic data can be used by the public, water-well contractors, and consultants in planning water supplies.

292. *Iran, Meteorological Department, Climatological Branch
*1968 *Meteorological yearbook, 9th, 1964. *Iran, Meteorological Department, Climatological Branch, Tehran. 142, 31 p., map. MGA 20.2-28.
*Presents information from 166 climatological stations. Notes on the operation of the individual synoptic stations are provided in alphabetical order. The tables are arranged in geographical order from NW to SE. The 1956 notes on the accuracy of relative humidity values apply.

293. *Iranian Oil Operating Companies, Air Services
*1968 *Annual Weather Bulletin, 1967. *Iranian Oil Operating Companies, Air Services. 39 p. MGA 19.10-102/
*Yearly weather summaries for each of 8 of the ...mpanies' 10 stations: tables of averages and extremes a... of frequency distribution of meteorological elements and their monthly and yearly values; and climatological graphs, wind roses, and wind direction frequency charts. A map showing the locations of the weather stations, a list of the instruments used, and a table of coordinates, elevations, and index numbers of the stations precede the tabulated material.

294. *Ishag, A. H. O.
*1965 *A quantitative study of the potential recharge to principal aquifers in Kordofan Province of western Sudan. *University of Arizona, Tucson (unpublished M.S. thesis), 54 p.

295. *Isnard, H.
*1968 *Esquisse du climat de la Libye. *Méditerranée 9(3):247-260.

296. *Israel, Hydrological Service
*1969 *Hydrological Year-book of Israel, 1966/67. *Israel, Hydrological Service, Jerusalem. 142 p. MGA 21.2-520.
*This 21st yearbook contains tables and hydrographs of hydrological and chemical data of the gaging stations on rivers, wadis, main springs, and lakes for the period from October 1st, 1966 to September 30, 1967, as well as information on the silt content at some of the sites. Maps of the drainage basins and an index of springs are included. General above-normal rainfall, streamflow, and groundwater recharge are noted. Data presentation and methods of measurement at some of the gaging stations are given.

297. *Israel, Mahleket ha-mesidot
*1970 *Atlas of Israel: cartography - physical geography - human and economic geography - history. 2d English edition. *Survey of Israel, Ministry of Labour, Jerusalem; Elsevier, Amsterdam. 200 p.
*A great number of Israel's leading geographers and specialists in related fields collaborated with the cartographers and printing staff of the Survey of Israel in compiling and preparing this atlas. Topics in this comprehensive volume include cartography, geomorphology, geology, climate, hydrology, botany, zoology, land utilization, history, population, settlements, agriculture, industry and trade, communication and services.

298. *Israel, Ministry of Agriculture, Water Commission, Hydrological Service

*1968 *Hydrological year-book of Israel 1965-1966. *Israel, Ministry of Agriculture, Water Commission, Hydrological Service, Jerusalem 121 p. MGA 20.3-33.

*This volume, 20th in the series, contains the hydrological and chemical data for gaging stations of rivers, wadis, main springs, and lakes for October 1, 1965 - September 30, 1966. Ground water data are summarized on a map providing water levels and salinity contours in the aquifers of the coastal plain and foothills.

299. *Ivannikov, A. V./ Klochko, V. P./ Gatinsky, Y. G.

*1968 *Novyye dannyye po stratigrafii cerkhnemelovykh otlozheniy yuzhnoy Sakhary (Stratigraphy of the upper Cretaceous deposits of the southern Sahara). *Akademiia Nauk SSSR, Doklady 182(3): 662-665. BIGEOL 33(4)E69-06488.

300. *Jagannathan, P/ Raghavendra, V. K.
*1966 *Some aspects of hydrometeorology of Rajasthan. In Symposium on hydrometeorology of India with special reference to flood forecasting and warning, Proceedings p. 197-206. *India Meteorological Department, Delhi/ Indian Journal of Meteorology and Geophysics 17 (spec. no.).

*Arid Lands are as much characterized by variability of climate as by lack of water and every year is exceptional with a particular situation demanding greater attention than averages. Investigation of rainfall intensity and variability are extremely material in relation to soil conservation and agriculture. While the average annual rainfall of west Rajasthan is less than 10 inches and that of east Rajasthan between 10 and 20 inches, instances of heavy rainfall of 5 inches or 10 inches or over in a single day are many. Such falls are mainly associated with depressions/cyclonic storms of the monsoon season. Quite often a certain circulation type gives rise to very small amounts while another type creates only large amounts. A decrease or increase in frequency of daily rainfall amounts may indicate also fluctuations in frequency of circulation types. A study of trends in different frequency classes of rainfall in respect of 2 representative stations in the arid west Rajasthan and 2 stations in the semiarid east Rajasthan has been made. The variations in the frequency parameters are independent of the sunspot numbers but are significantly related to the geographical location.

301. *Jarvis, H. G.
*1968 *A game park in Angola. *African Wildlife 22(2):107-117.

*An expedition was made into the Parque Nacional do Iona located in southwestern Angola, encompassing 8000 square miles of wild and little explored country of deserts, semi-deserts and mountains. The first known ascent of the mountain known as Okomandchaihe was made. Some of the vegetation such as Welwitschia mirabilis is discussed.

302. *Jenkins, T./ Brian, C. K.
*1967 *The peoples of the lower Kuiseb Valley, South West Africa. *Namib Desert Research Association, Scientific Papers 35. 24 p. Map.

*The Namib Desert Research Station has been built on the site of a deserted Hottentot village, one of several scattered along the length of the lower Kuiseb valley as it makes its way across the arid Namib plain. Though slanted toward genetic/medical studies of the inhabitants, the descriptions of the natural environment in this paper are excellent.

303. *Jennings, C. W., comp.
*1967 *Geologic map of California (Olaf P. Jenkins edition), Salton Sea Sheet (scale 1:250,000). *California Division of Mines Geology. ANAG (1968) 05768.
*The explanatory sheet includes the index to geologic mapping used in compilation of the map; a stratigraphic nomenclature chart; photographs of crescentic dunes near the southwestern shore of the Salton Sea, and a view of Salton Sea area from Gemini V, 100 miles high; and a map indicating topographic quadrangles within the Salton Sea sheet, available from the U. S. Geological Survey.

304. *Jewitt, T. N.
*1966 *Soils of arid lands. In M. S. Hills, ed., Arid lands: a geographical appraisal, p. 103-125. *Methuen, London. MGA 19.11-84.
*Those arid soils are discussed in which soluble products of weathering are accumulated within the upper part of the profile as calcium carbonate and soluble salts. Much of the interest in desert soils is directed to: 1) the assessment of their value under irrigation, and 2) the best methods of irrigation and cultivation.

305. *Johnson, R. B.
*1968 *The Great Sand Dunes of southern Colorado. *Mountain Geologist 5(1):23-29. ANAG(1968)00180.
*The Great Sand Dunes National Monument is in the San Luis Valley of southern Colorado. Large areas of transverse, climbing dunes, barchans, longitudinal dunes, parabolic dunes of accumulation and of deflation occur in and adjacent to the Monument. They have all formed more or less contemporaneously, though different processes in different areas have created the various types. The San Juan and Sangre de Cristo Mountains are the original source of the sand; the immediate sources are the ancient natural levees and dry oxbow lakes of the Rio Grande.

306. *Johnson, R. M.
*1969 *Growth of indigenous bacteria in desert soil. *Arizona Academy of Science, Journal 5(4):240-242.

307. *Johnstone, M. H.
*1967 *Devonian of western and central Australia. In International symposium on the Devonian system 1:599-612. *Alberta Society of Petroleum Geologists, Calgary. BIGENA 32(11) E68-15176.

*The Devonian of western and central Australia consists of sedimentary rocks deposited in intracratonic basins. Devonian rocks fall into three divisions: (i) upper Devonian marine platform limestones and sandstones in the three western basins (ii) upper Devonian terrestrial, fish-bearing, quartz sandstone and associated siltstone and conglomerate; and (iii) poorly-known, probable lower and middle Devonian, red beds and evaporites, barren quartz sandstones and vertebrate-bearing quartz sandstone.

308. *Jones, F. W.
*1968 *The mammals of South Australia. *A. B. James, Adelaide. 458 p.
*This book is re-issued as originally published in 1923-1925, covering monotremes and carnivorous marsupials, bandicoots and herbivorous marsupials, and Monodelphia. Some present-day corrections have been interpolated, along with a bibliography indicating advances in knowledge through 1967.

309. *Jorgensen, C. D.
*1968 *Spatial relationships of Peromyscus longimembris (Coues) in Southern Nevada. *Utah Academy of Sciences, Arts and Letters, Proceedings 45(1):118-125. PA (51)58786.
*Deals with the tolerance levels of certain members within a population of P. longimembris at the Nevada Test Site. It is apparent that when one considers all home ranges of specific classes within the population to be equal, the probability of interaction becomes a function of the distance between recapture centers if the distribution of recapture centers is random. If the recapture centers are not random the distribution may become the factor which determines the probability of interaction. These small mammals were distributed randomly, except the males which tended to be somewhat aggregated. Generally, there was a clear ranking of classes within the population, some being much more tolerant of other classes than others, although there was considerable overlap. This ranking behavior could effect such parameters as sex ratios, relative survival rates, etc., all of which are vital in understanding population growth.

310. *Kaiser, M.N./Hoogstraal, H.

*1967 *Noteworthy recent tick records from Egypt. II: Hosts, distribution, and ecology of Rhipicephalus simus Koch. *Egyptian Public Health Association, Journal 42(6): 231-242. NAMRU-3-TR-15-69. USGRDR 69(20):39. Available CFSTI as AD-691 919.

*In Egypt, this species appears to breed chiefly in burrows of the Nile Grass Rat, also in hedgehog burrows, in the Nile Valley from Upper Egypt to the Mediterranean coasts of the Delta. Adults were taken most frequently from camels, also a few from domestic buffalo, cattle, and sheep. Notably, none was collected from domestic dogs or wild carnivores. Although R. simus is widely distributed in Egyptian cultivated areas, its population density here appears to be low. This is one of the few members of the Ethiopian Faunal Region tick fauna that ranges into Egypt. South of the Sahara, R. simus is a notorious vector of agents causing human and animal diseases.

311. *Kalenov, G.S.

*1968 *Ob osobennostyakh rasprostraneniya rastitel'nosti shchebnistykh (kyrovykh) poverkhnostei Ustyurta i Zaunguzskikh Kara-Kumov (Features of the distribution of the vegetation of the rocky (plateau) surfaces of the Ustyurt plateau and the Kara-Kum Range beyond the Unguz Depression). *Probl Osvoeniya Pustyn' 6: 28-35. REF Zh Biol, 1969, No. 10V590. BA (51) 52997.

*Atraphaxis spinosa, Salsola laricifolia, S. gemmascens, Anabasis salsa, and A. brachyata are found on the rocky surfaces of the Ustyurt Range and the plateaus formed by the weathereing of the Sarmatian limestones. Some difference in plant societies is observed on plateaus which are genetically alike but have different facies. Haloxylon ammodendron is widely distributed, being found on flat surfaces of different origins. However, depending on the conditions of its existence (density of the underlying rock and its depth, relative moisture, etc.) black saxaul shows differences in the height of the shrub, external appearance (crooked trunk and branches), color of the bark, etc. In the eastern half of the Kara-Kum Range across the Unguz Depression, black saxaul is associated with desert-sandy nonsaline rocky soils underlain by sandstone which is friable and of intermediate density as long as it is no deeper than 4 m. In the east of the area across the Unguz Depression and within the

limits of the development of the desert-sandstone rocky soils, H. ammodendron is an indirect indicator of the zone of relatively intense condensation of moisture at a depth of 1 to 4 m.

312. *Kalenov, G.S./Fedorenko, K.Y.
*1967 *Some characteristics of the distibution of vegetation in the sands of the Lower Kara-Kums (translated title). *Problemy Osvoeniya Pustyn' (2): 27-36. CBE 32:90.
*A detailed study is presented of the parent materials, depositional medium, texture, composition, and relief forms of the desert sands in an area on the southern edge of the lower Kara Kum desert and parts of the Amu-Dar'ya plains. The relationships of the geographic positions of the various kinds of deposits to the types of vegetation growing on them are described in detail. The ecological-geological associations are close enough to be of value in the photointerpretation of aerial photographs of the area.

313. *Kalinin, G.P.
*1968 *Interaction of surface and ground waters in different geographic zones. *International Association of Scientific Hydrology, Publication 76: 286-291. MGA 20.8-778.
*In the zone of excessive moisture, rivers are nourished by underground waters. In such regions, the growth of mean annual runoff follows the increase of river basin sizes. The relationships between the mean annual flow and the size of a river basin can serve as one of the criteria of the volume of groundwater discharge. In the zone of insufficient moisture, aquifers are nourished by surface waters. Analyses of the decreasing of mean annual flow and the use of water balance method allows for the evaluation of underground flow. A specific example of the groundwater flow calculation is given for rivers of one of the natural zones, and the character of changes in infiltration during the flood is shown.

314. *Kalugin, S.K.
*1967 *Subterranean waters of the Dzhezkazgan-Ulutau region of Central Kazakhstan (translated title). *Izd-vo "Nauka", Alma-Ata. 136 p. CBE 29:193.
*The area discussed is in Central Kazakhstan, west of Karaganda and southwest of Tselinograd (Dzhezdinskiy

rayon, Karagandinskiy oblast), and is a region well known for polymetallic mining operations. Recent discoveries of oil and gas deposits, a growing population, and attempts to improve the local agricultural economy have put heavy demands on the water supply of the area. The present book summarizes the results of studies carried out in this field over the last 10-15 years. Consideration is given to the stratigraphy and geologic structure of the rocks and the local geomorphology and climatology as they affect the availability and pollution of the groundwater.

315. *Kanodia, K.C./Gupta, R.K.
*1968 *Sand dune flora of western Rajasthan. I: Systematic list of trees, shrubs and herbs. *Bombay Natural History Society Journal 65(3): 681-695. BA (51) 51370.
*About 60% of the arid region of Western Rajasthan is sandy and of this a major portion is occupied by sand dunes, found mostly in Bikaner, Churu, Barmer, Jaisalmer and Jodhpur districts, though scattered patches also occur in Pali, Jalore, Sirohi, Jhunjhunu and Sikar districts. A preliminary record of the flora of some of these sand dunes based on the plants collected during the survey is made.

316. *Kasatkin, V.I.
*1969 *Pitanie lisitsy v polupustyne yugo-vostochnogo Zakavkaz'ya (Feeding of the fox in the semi-desert of southeastern Transcaucasia). *Zoologicheskii Zhurnal 48(2): 300-303. BA (50) 79387.
*In a semi-desert of southeastern Transcaucasia the diversity of the fox prey depends on numbers of the main ground species--Microtus socialis and Pallasiomys erythrourus. When the rodent population is thinned by control measures, the predator pressure on the remaining population is increased.

317. *Kataitseva, T.V.
*1969 *K biologii Dipetalonema evansi Lewis, 1882-parazita verblyudov (Biology of Dipetalonema evansi Lewis, 1882-, a parasite of camels). *Parazitologiya 3(1): 76-80. BA (50) 78346.
*The development of the camel's nematode D. evansi in the intermediate hosts. Aedes caspius Pall. till invasional stage was studied. The first 10 days of larvae development is described.

318. *Kaul, R.N./Chakravarty, A.K.
*1968 *Range development in west Rajasthan. *Annals Arid Zone 7(2): 258-264. BA (51) 46677.
*Climate, soil texture and chemical composition, grassland communities, rangeland reseeding, and rangeland management are discussed.

319. *Kelso, M.M.
*1969 *The conditions for economic growth of the arid lands. *Arizona Review 13(10): 6-15.

320. *Kemp, A.K./Durrans, K.L.
*1968 *Expedition to Tibesti. *Weather 23(8): 331-338. MGA 20.3-122.
*Two meteorologists from the Meteorological Office at RAF El Adem took part in an expedition during April 1967 which attempted to reach the little-known area of the eastern border of the Libyan Tibesti mountain range. The planned route was Tobruk, Benghazi, Agedabia, Gialo, Kufra, and then southwestwards towards the Tibesti range. This note briefly describes the climate of the route and their experiences on the expedition. A tabulation is given of some meteorological observations taken; general weather conditions are outlined. Abnormally high temperatures were experienced on the outward journey south of Kufra. Daily maximum temperatures exceeded 40°C as against an estimated mean maximum of 32°C. The excessive heat was instrumental in the failure of the expedition to overcome the difficulties of the terrain to attain their final objective.

321. *Khalmuradov, A.
*1968 *Statistika i nekotor ye svedeniya o rutovykh vo flore Uzbekistana (Statistics and some information about the rue family in the flora of Uzbekistan (USSR)). *Nauchnye Trudy Tashkent University 338: 36-39. BA (51) 45650.
Translated from Referativnyi Zhurnal Biologiya, 1969, No. 8V454.
*A list is given of 18 spp. of Rutaceae with notations about each life form, distribution by oblasts, and the nature of the habitat, with emphasis on the wide use of the members of this family in Uzbekistan as medicinal plants.

322. *Khan, N.

*1968 *Climates of West Pakistan according to Thornthwaite's system of classification of climates. *Pakistan Geographical Review 23(1): 12-36. Maps.

323. *Kharin, N.G.

*1967 *Reflectivity of the vegetation of the south-eastern Kara-Kums (translated title). *Problemy Osvoeniya Pustyn' (3): 44-51. CBE 32:91.

*Results are presented of a field study carried out in two areas of the Kara-Kum desert to determine the spectral reflectivity of the local vegetation for use in determining the optimum season and time of day for aerial survey programs. An electronic spectrometer operating in the 400-900 mm range was used. Cloud conditions during the measurement periods ranged from 0-2 or 3% cloud cover. Isolated areas of vegetation were investigated as well as large-area concentrations during two seasons (April to May and October to November). Field studies identified types of vegetation. Spectral brightness measurements of about 30 types of vegetation are tabulated for both periods of the year in the following wave lengths: 400, 450, 500, 550, 600, 650, 700, 750, 800, and 850. Several photo image color tones (color photography) were found to be usuable as photointerpretation keys.

324. *Khessal, S.E.M.

*1969 *Moglichkeit der Wasserversorgung im Kaiserreich Iran auf Grund der Bestehenden Geologischen und Klimatischen Verhaltnisse (Water supply possibilities in Iran based on existing geological and climatological conditions). *Tech. Hochschule, München, Facultat fur Landwirtschaft und Gartenbau (Ph.D. thesis), 21 p. Available (in German) CFSTI as N69-40881.

*Various possibilities are evaluated to improve the water supply in Iran by better utilization of irrigation water, diminished salt content in available water, cemented underground water reservoirs and surface dams in natural valleys, desalination of sea water, and increased surface plantings to control soil evaporation.

325. *King, W.E.
*1969 *Hydrogeology of the Rio Grande Valley and adjacent intermontane areas of southern New Mexico. *New Mexico State University, Water Resources Research Institute, Report 6. 141 p.

326. *Ko'odin, M.V.
*1968 *The results of Soviet research on desalting of water. *Soviet Geography: Review and Translation 9(6): 493-502.
*A review of Soviet research on saline-water conversion lists installations in operation or planned in the USSR. Long-tube vertical distillation, multistage flash distillation, vapor compression distillation, solar humidification, freezing, and electrodialysis are discussed. Significant progress is noted in the design and construction of large industrial conversion plants, notably at the Caspian Sea ports of Shevchenko, Bek-Dash, and Krasnovodsk, including a dual-purpose atomic plant with a 1-million thermal kw reactor at Shevchenko. But research and development is lagging on small-capacity desalting units suitable for small scatttered consumers under desert conditions.

327. *Korneyev, G.A.
*1967 *Ectoparasitic contacts between some mammalian species in great gerbil colonies (translated title). *Parazitologiya 1(3): 233-237. CBE 23: 103.
*Interspecies contacts among various mammalian species in a period of decreased great gerbil population were studied in the summer of 1964 in the northwest Kyzyl-Kum area. It has been observed that when the population of great gerbils (Rhombomys opimus) is sparse, small areas with a relatively dense mammal population remain in which interspecies contacts are relatively frequent. The transfer of ectoparasites among species in one of these areas was traced by tagging great gerbils with radioactive isotopes. Collections showed that ectoparasites (97% Xenopsylla gerbilli fleas) were transferred by other species, particularly midday gerbils (Meriones meridianus) and tiger weasels (Vormela peregusna). In some cases more than 20% of tagged fleas were found on these species, indicating the frequency of their contact with great gerbils and their possible epizootiological role in these conditions.

328. *Korotkevich, E.S.
*1967 *Poliarnye pustyni (Polar deserts). *Sovetskaia Antarkticheskaia Ekspeditsiia, 1955, Informatsionnyi Biulleten 65: 5-29. MGA 20.2-451.
*Discussions include characteristics of polar deserts of the Arctic and Antarctic and how they differ from tundras. The polar desert climate is one of constant frost, low moisture content, and solid precipitation. Both plant and animal life are fragmentary. Graphs showing annual radiation balance, geobotanical and zoogeographical classification of land areas, and physical geographical classification are included.

329. *Koshkelova, E.N./Dzhuraeva, Z./Frolov, I.P.
*1965 *Griby severnoi chasti Murgabskogo oazisa i zony vliyaniya 1-i ocheredi Karakumskogo kanala (Fungi found in the northern part of the Murgab oasis and in the immediate zone of influence of the Kara Kum canal). In Griby oazisov Vostochnoi Turkmenii (Fungi found in the oases of eastern Turkmenia), p. 3-254. *Referativnyi Zhurnal Biologiya, 1966, No. 12V228. BA 49(1) 9403.
*529 spp. fungi. The regular distribution and seasonal development patterns of the fungi are given according to ecological zones. A systematic list of fungi and alphabetical indexes of fungi and their host plants are included.

330. *Kovalevskaya, S.S., ed.
*1968 *Opredelitel' rastenii Srednei Azii. Kriticheskii konspekt flory Srednei Azii. T. 1 (Key to the plants of central Asia. A critical compendium of the flora of central Asia. Vol 1.). *Fan, Tashkent. 228 p. Referativnyi Zhurnal Biologiya, 1969, No. 8V388 K.
*Gives a list of all the wild species of higher plants in central Asia, including 19 families, 138 genera, and 533 species (from the family Lycopodiaceae to the family Gramineae).

331. *Kovda, V.A./Lobova, E.V. eds.
*1965 *Geografiya i klassifikatsiya pochv Azii (Geography and classification of soils of

Asia). *Izdatel'stvo Nauka, Moskva. Translated, 1968, by A. Gourevitch, for/ Israel Program for Scientific Translations., Jerusalem. 267 p. Available CFSTI as TT68-50439.

*Includes papers on the soils of the arid zone: classification of desert soils in the Asian continent, classification of irrigated soils, soils of specific countries lying within the desert region (Iran, Afghanistan, Syria, as well as the Turkmenian and Uzbekistan regions of the USSR), processes of desert-transformation of soils on alluvial deposits irrigated in the past, and microelements in desert soils and serozems.

332. *Kowalczewski, J.J.
*1968 *A method of evaluating and comparing human thermal stresses in different climates. *Institution of Engineers, Australia,/ Mechanical and Chemical Engineering Transactions 4(1): 55-61.

333. *Krekorian, C.O./Vance, V.J./Richardson, A.M.
*1968 *Temperature-dependent maze learning in the desert iguana, Dipsosaurus dorsalis. *Animal Behavior 16(4): 429-436. BA (50) 90404.

*The effect of body temperature on the learning of Lashley mazes I and II was studied with the desert iguana, Dipsosaurus dorsalis. Indices of learning were error scores, number of trials to criterion, and running time. Four temperature groups were studied. Variability within the experimentally naive group was less than that of the experienced groups. Results of this study indicate that body temperature is an important parameter of learning in heliothermic lizards.

334. *Krieger, M.H.
*1968 *Geologic map of the Saddle Mountain quadrangle, Pinal County, Arizona (scale 1:24,000). *U. S. Geological Survey, Geological Quad. Map GQ-671. ANAG 1968 (01770).

335. *Krishnan, A/Blagoveschensky, E.N./Rakhecha, P.
*1968 *Water balance of Prosopis spicigera community. *Indian Journal of Meteorology and Geophysics, 19 (2): 181-192. MGA 20.9-365.

*An experiment on water balance of a Prosopis spicigera community was conducted at the research farm of the Central Arid Zone Research Institute, Jodhpur. Various water balance components such as evapotranspiration and runoff are presented for different periods in the growing season of the vegetation. The evapotranspiration of the community in the sandy soils of Rajasthan during the months other than the monsoon months is surprisingly low. Prosopis spicigera trees extract moisture from a wide area and take the same from the layers below the kankar zone, usually at 1- to 2-m depth below their root penetrations. The role of condensation of water in vapor phase for the arid zone communities is indicated.

336. *Krutch, J.W.
*1967 *Baja California and the geography of hope. *Sierra Club, San Francisco, Exhibit Format Series 17. 170 p., map.

337. *Kuepper, W.C.
*1968 *Rainfall deficiencies of the plateau of Tanzania. *University of Wisconsin, Department of Geography (doctoral thesis), Contract Nonr-2300(09). 233 p. Available CFSTI as AD-703 233.

*Descriptive-explanatory climatology concentrating on those aspects of climate controls that make the Plateau of Tanzania unusually dry. Includes season-by season examination of rainfall patterns, and the unique aspects of the climatic and synoptic features of the atmosphere that create the seasonal and regional rainfall patterns.

338. *Kunin, V.N.
*1968 *The study of local waters in the deserts of the USSR. *Soviet Geography: Review and Translation 9(6): 469-488.

*A review of potential local fresh-water sources in the deserts for the use of livestock herds, herders' settlements, and extractive and other industrial enterprises. One of the most promising approaches is held to be the use of takyrs (clay pans) as catchment areas for ephemeral runoff of precipitation, which is then directed into natural aquifers or artificial underground storage cisterns. Another potential source of water is large perched ground-water lenses that could be tapped by paired wells to prevent the intrusion of salt water from below. Artesian waters in the desert which are far from areas of recharge are found to be largely saline.

339. *Kurkov, A.A.

*1967 *Sushchestvuet li problema usykhaniia Azii (Is there a problem of desiccation of Asia?)? *Akademiia Nauk SSR, Izvestiia, ser. Geograficheskaya 4: 152-155. (Full translation in/Soviet Geography: Review and Translation 9(1): 47-54, 1968.) MGA 19.5-348; MGA 19.7-452.

*On the basis of an extensive review of the literature the author examines the problem of the desiccation of the deserts of Asia in historical times. The discussion includes the hypothesis and evidence for climatic fluctuation and "progressive aridization of climate," retreat of the glaciers, intensification of the process of sand blowing, progressive reduction in the areas of lakes, salinification of soils and nature of human economic activity in desert regions. The author concludes that it is improper to regard the processes of "desiccation of the territory of the Asiatic deserts" apart from climatic variation.

340. *Kuznetsov, N.T.

*1968 *Vody Tsentral'noĭ Azii (Waters of Central Asia). *Izdatvo Nauka, Moscow. 271 p. MGA 20.5-5.

*Contains generalized data on surface waters in Central Asia whose hydrographic relationships have not been studied extensively so far. Various characteristics of the surface waters and their relationships with natural factors are presented together with descriptions of rivers, lakes and swamps; the basic paleontological periods in their development; discharge characteristics; ice formation; solid discharge; and chemical characteristics. Also the fundamentals in the development of water resources in Central Asia are discussed on the basis of their hydrological properties.

341. *Lafererère, M.

*1968 *Observations ornithologiques au Tassili des Ajjers (Ornithological observations at Tassili of Ajjers, central Sahara). *Alauda Revue Internationale d' rnithologie 36(4): 260-273. BA (51) 40791.

*An extensive listing of the species observed in this area, most observations made at Djanet where an oasis attracts many birds. The area is described physically and climatically. About 100 birds were observed, and they are listed along with the number observed and time of year observed.

342. *Lambert, G.

*1968 *L'adaptation physiologique et psychologique de l'homme aux conditions de vie désertiques. *Hermann, Paris. 312 p.

*Contains the results of research carried out over a long period at many different points in the Sahara, on the physiology of circulation and respiration, neurophysiology, hydromineral metabolism in relation to thermoregulation, psychophysiology. Constitutes the first book published in French that deals in such a complete and detailed manner with the biological aspect of human adaptation to desert life.

343. *Lavrenko, E.M./Sochava, V.B., eds.

*1956 *Geobotanicheskaia karta SSSR (1:4,000,000). *Akademiia Nauk SSSR/Botanicheskii Institut, Moscow.

344. *Lawrence, R.F.

*1968 *A contribution to the solifugid fauna of Southern Africa (Arachnida). *Transvaal Museum, Annals 26(3): 53-77. BA (50) 89817.

*Descriptions and figures of new or little known species of Arachnida from South West Africa, northern and eastern Transvaal and the northwestern Cape; supplementary descriptions of rare species which have not been collected since they were described, are given in a number of cases.

345. *----- -----

*1969 *A new genus of Psammophile scorpion and new species of Opisthophthalmus from the Namib Desert. *Namib Desert Research Station, Scientific Papers 37/53: 105-116.

*The author is of the opinion that the scorpion fauna of South West Africa, especially the littoral region, seems to be incompletely known. This paper describes a new sand-living scorpion from the Namib Desert, probably the first of the family Scorpionidae with well-marked psammophile characters to be recorded. The Opisthophthalmus were noted in the Kaokoveld and from Rehoboth. Drawings and photographs, with detailed descriptions.

346. *Lay, D.M.
*1967 *A study of the mammals of Iran. Resulting from the Street Expedition of 1962-63. *Fieldiana Zoology 54: 7-282. BA (50) 95628.
*The object of the Street Expedition was the procurement of a representative collection of all typical Iranian mammals, including as much life-history data as was feasibly obtainable during the field work. The expedition remained in the field more than 7 months, mid-June 1962 until mid-Feb. 1963, during which time most of the important distributional and zoogeographical areas were visited. The mammal collection included slightly over 1700 specimens, representing 97 sp., in addition to other material, such as birds, reptiles, amphibians, fishes, and miscellaneous invertebrates. Contents: a narrative itinerary paying particular attention to the nature of the country traversed between collecting localities; a detailed account of the ecological situation at each collecting locality; an annotated list of species obtained by the expedition in which all previous locality records are summarized for each species; a list of species reliably reported from Iran but not collected by the Street Expedition, a gazetteer of all Iranian localities from which specimens are known.

347. *Laycock, W.A.
*1969 *Exclosures and natural areas on rangelands in Utah. *Intermountain Forest and Range Experiment Station, Ogden, Utah,/Forest Service Research Paper. FSRP-INT-62. 49 p. Available CFSTI as PB-185 614.
*Lists 529 areas in Utah that have received little or no use by domestic livestock. Areas are indexed by county, elevation, date established, vegetation type, and type of animal excluded. Locations are further described by section, township, and range; vegetational information is also given.

348. *Lebon, J.H.G.
*1968 *The land and water use survey of north-central Kordofan (1961-1966). *Geographical Journal 134(4): 546-550.

349. *Lee, D.R.
*1967 *The geography of rural house types in the Nile Valley of northern Sudan. *University of California, Los Angeles (Ph.D. dissertation)/ Dissertation Abstracts 28(11): 4615B.
*This dissertation examines folk housing the Nile Valley of northern Sudan. House morphology is described, and the physical, historical, sociological and religious factors affecting house construction are analyzed.

350. *Lefranc, J.P.
*1966 *Le cénomanien fossilifère de la pointe sud du Tadémait, près Aoulef (Sahara central) (Fossiliferous Cenomanian deposits of the southern Tadémait region, near Aoulef, central Sahara). *Société Géologique de France, Compte Rendu 3: 136-137. BIGENA 32(10) E68-13384.

351. *Legrand, P.
*1967 *Le dévonien du Sahara algérien (The Devonian in the Algerian Sahara). In International Symposium on the Devonian System, 1:245-284. *Alberta Society of Petroleum Geologists, Calgary. BIGENA 32(11) E68-15151.
*The Devonian is present over the greater part of the Saharan platform, north of the ancient massifs of the central Sahara from the boundary with Morocco and Mauritania in the west to the Libyan frontier in the east. The Devonian in the Algerian Sahara is essentially subdivided into lithologic units in each basin but their position with respect to the standard chronographic scale is often imprecise.

352. *Leont'yeva, M.N.
*1968 *Distribution of sandy soils and the great gerbil (translated title). *Zoologicheskii Zhurnal 47 (9): 1422-1425. CBE 38: 202-203.
*Maps showing the distribution of the great gerbil according to soil and topography were made on the basis of field studies east of the Caspian Sea.

353. *Levi, M.
*1967 *Fog in Israel. *Israel Journal of Earth Sciences 16(1): 7-21. SMRA 3(12) W70-04915.
*Generally only radiational fog occurs in Israel; true advection fog is very rare. Typical fog-inducing meteorological situations include a warm upper anticyclone, a shallow surface pressure ridge in the wake of a cold front, influence of the Sudan Trough, an approaching Khamsin depression, and the passing of a weak, dissolving cold front. Fog occurs infrequently on the Israeli coastal plain, but is more common in the northern valleys of Israel and in parts of the northern Negev. It is important as a source of additional moisture supply for agriculture.

354. *Liapina, O.A./Ogul', I.N./Romanov, N.N.
*1966 *Atmosfernye zamutneniia po nabliudeniiam s vertoleta v predgor'iakh i gorakh zapadnykh otrogov Tian'-Shania (Atmospheric turbidity according to helicopter observations in the foothills and mountains of the western spurs of Tien Shan). *Glavnaia Geofizicheskaia Observateriia, Leningrad, Trudy 189: 154-159. MGA 18.9-495.
*A table giving data on the vertical-horizontal distribution of haze on the basis of helicopter flight data in July-August, 1964, a graph showing the vertical distribution of haze during flights in the Chirchik basin and diagrammatic representation of haze intensity in this basin are given.

355. *Liapina, O.A./Romanov, N.N./Pribylov, I.
*1966 *Atmosfernye samutneniia po nabliudeniiam s vertoleta v raĭone Gazli (Atmospheric turbidity according to helicopter observations in the Gazli region). *Glavnaia Geofizicheskaia Observatoriia, Leningrad, Trudy 189: 150-153. MGA 18.9-496.
*Data on the distribution of haze over the Gazli district are presented on the basis of 80 helicopter flights made in Sept. 1964. The temperature, humidity, and wind regime in the sounding layer are discussed. A graph showing the vertical distribution of haze at different times of the day is presented.

356. Omitted.

357. Omitted.

358. *Lieftinck, P.A./Sadove, R./Creyke, T.C.
*1968 *Water and power resources of West Pakistan; a study in sector planning, Vol. 1. *Johns Hopkins Press, Baltimore. 310 p. BA (50) 56265.
*This 3-volume series represents the core of the complete report made by the World Bank to the Government of Pakistan concerning the program for development of the Indus Basin. Volume I is a condensed version of the analysis and results of the entire study, and includes an evaluation of the Tarbela project, the problems of agricultural development, the interaction of agriculture with other sectors of the economy, the demand for power and means of meeting the demand, and areas of critical concern, such as the need for electrical interconnection within West Pakistan.

359. *Lippi, M./Sebastian, A./Mutabakani, H. el
*1969 *State attuale dell'organizzazione sanitaria e del nosografismo del regno dell'Arabia Saudita (Actual status of the health organization and nosography of the kingdom of Saudi Arabia). *Ital. Sci. Med. Trop. Parassitol, Arch. 50(3/4): 59-105. BA (51) 45357.
*In this brief review of the present status of health programs in Saudi Arabia, the increasing social assistance and health prevention and cure programs are emphasized. A network of hospitals and frontier quarantine services provide free assistance to all citizens. Among the most recent advances are the eradication of quarantine-type diseases and notable progress in the antituberculosis campaign, malaria, trachoma, dysentery and bilharziasis.

360. *Litvinov, N./Nesytov, Y.
*1968 *Pecularities of protection in deserts from radiation and chemical agents (translated title). *Voyennyy Vestnik 8: 106-108. CBE 38:382.
*The use of chemical weapons on deserts presents special problems in the protection of personnel and equipment. Collapsible shelters are needed since the desert offers limited protection. Individual means of protection (gas

masks, protective coats, socks, and gloves) can only be worn for 20-30 minutes in the desert heat. In addition, the face plate of gas masks rapidly "hardens" in the heat, and in sandstorms the breather valves get plugged. This makes necessary the use of means of collective protection: military and transport equipment with filtering and ventilating devices, pre-fabricated and inflatable frame shelters, etc. Two conditions complicate desert procedures for decontamination of equipment and personnel: lack of water and complexity of camouflage. Furthermore, wide troop dispersal makes difficult the centralized use of chemical sections. Calculated water consumption per 24 hr. is a minimum 6-8l per person, 30-70 l for servicing each piece of equipment, up to 300 l for decontamination of a tank. Each piece of equipment should have a water reserve of 200 l. With water availability, purification procedures should be taken by removing contaminants and by the use of protective grease, which can also be used for decontamination of personnel and equipment subjected to light contamination.

361. *Logan, S.E.
*1969 *Simple analytical model for the dust devil. *University of California, Lawrence Radiation Laboratory, Livermore. 28 p. NSA 23-24 (52514). Available CFSTI as UCRL-50667.

*A simple analytical model was developed for prescribing the velocity fields in a dust devil, a small vortex phenomenon common in arid regions. The proposed model has a viscous "inner" region (boundary layer) composed of a Prandtl layer and an Ekman inflow layer and an inviscid "outer" region of cyclostrophic balance. Observations indicated that to a good approximation the outer flow is a Rankine combined vortex. Linearization of the equation of motion allows a solution for the radial and tangential velocities in the boundary layer and for the depth of the layer in terms of two parameters obtainable from the observations: alpha(r), the inflow angle at the top of the Pradtl layer; and eta(r), a modified Ekman length determined by the outer flow. The vertical velocity field is then found by application of the continuity equation. The velocity fields were found to resemble a first-order solution by Kuo for convective atmospheric vortices, and compare reasonably with the measurements of Sinclair.

362. *Loomis, R.B.

*1964 *A new species of chigger (Acarina, Trombiculidae) from lizards of Western North America. *Great Basin Naturalist 24(1): 13-17. BA (50) 101076.

*Larvae have been found only on lizards from the desert areas of Sonora, Mexico, California and Nevada. The larvae were found attached in the axillary and groin areas, and in the "mite pockets" which are located above the front limbs of the saurian hosts. The seasonal occurrence of the attached larvae seems to be limited to the summer months, with records between the first of June and the end of August. The hosts were taken in or near rocky habitats.

363. *Lowe, C.H./Heath, W.G.

*1969 *Behavioral and physiological responses to temperature in the desert pupfish Cyprinodon macularius. *Physiological Zoology 42(1): 53-59. BA (51) 55678.

*The maximum thermal tolerance of 44.6 ± 0.05°C for C. macularius, in the Sonoran Desert in Arizona, appears to be the highest yet recorded for fishes. The thermally cycled natural environment produced higher temperature tolerances than did constant-temperature laboratory acclimation. Summer and winter thermal tolerances are markedly different, and winter-acclimated pupfish would die in several areas of their natural summer thermal environment in Arizona. Younger fish tend to select higher thermal microenvironments than adults in the same population, and successful behavioral thermoregulation at voluntary temperatures near death is commonly the case.

364. *Lucas, J.L./Loomis, R.B.

*1968 *The genus Hexidionis (Acarina, Trombiculidae) with the description of a new species from western Mexico. *Southern California of Academy Science, Bulletin 67(4): 233-239. BA (50) 61690.

*Seven species of chiggers belong to the genus Hexidionis Vercammen-Grandjean and Loomis. Distribution of genus includes: Southwestern USA southward to central Mexico. Hosts are reptiles and mammals. Distribution of genus includes northern Africa and adjacent Asia. Hosts are lizards. A key is provided to identify the species of Hexidionis.

365. *Mabbutt, J.A.
*1968 *Aeolian landforms in Central Australia. *Australian Geographical Studies 6(2): 139-150.
*Topics discussed are sand plains, dune systems, influence of wind regime on type, alignment, and elongation direction of dunes.

366. *Mabbutt, J.A./Sullivan, M.E.
*1968 *The formation of longitudinal dunes: evidence from the Simpson Desert. *Australian Geographer 10: 483-487.

367. *Mabbutt, J.A./Wooding, R.A./Jennings, J.N.
*1969 *The asymmetry of Australian desert sand ridges. *Australian Jr. Science 32: 159-160.

368. *Mace, A.C., Jr./Thompson, J.R.
*1969 *Modifications and evaluations of the evapotranspiration tent. *Univ. Arizona, Department of Watershed Management, for the/U.S. Forest Service, FSRP-RM-50. 20 p. Available CFSTI as PB-185 809.
*Reduced ventilation rate is the principal cause of heat buildup inside the original plastic evapotranspiration tent. After the tent was modified to increase wind movement, data indicated no significant increase in air temperature within the enclosure as long as it was fully occupied by vegetation. Future modifications should include a variable tent size and improved airflow measurements.

369. *Macfarlane, W.F.
*1968 *Adaptation of ruminants to tropics and deserts. Comparative functions of ruminants in hot environments. In M.S.E. Hafez, ed., The adaptation of domestic animals, p 164-182; p. 264-276. *Lea and Febiger, Philadelphia. 415 p.

370. *Mackitchie, F.
*1969 *Evaporation retarded by monolayers. *Science 163 (3870): 929-931.
*The reduction in the steady-state rate of evaporation of water by hexadecanol monolayers depends only on the air velocity above the surface and is independent of the absolute rate of evaporation up to air velocities of 40 cm per second. This indicates that the monolayer does not affect the vaporisation step but increases the size of the diffusion boundary layer.

371. *Major, J.
*1967 *Potential evapotranspiration and plant distribution in western states with emphasis on California. *Amer. Assoc. Adv. Sci., Washington, D.C., Publication 86: 93-126. BA (49) 103479. SWRA 2(20) W69-08308.
*There is no 1 to 1 correspondence between climates and vegetation types in the Western states. Even such factors as moisture, temperature, etc. which act directly on the plant were not operationally useful parameters.

372. *Malyukovskii, M.V.
*1968 *Obedinnenaya Arabskaya Respublika (Handbook of the United Arab Republic). Moscow. Translated, 1969. *Joint Pub. Research Service, Washington, D.C. Available CFSTI as JPRS-47631. 277 p.

373. *Mamedov, R.C.
*1967 *Areal distribution of solonets soils in Azerbaydzhan (translated title). *Akademiia Nauk Azerbaydzhan SSR, Doklady 23(5): 46-49. CBE 26:168.
*Efforts to improve and utilize the saline and alkali (solonets) soils prevalent in the lowlands of Azerbaydzhan have necessitated soil-mapping programs. Enough data have been collected to permit the compilation of a small-scale map which shows the areal distribution of 6 gradations of saline soils. In general, as might be expected, the soils become progressively more saline away from the upland areas and toward the low-lying basins (Apsheron area, the Karabakh Plains, south-eastern part of the Shirvan steppe, and the western part of the Mil'skiy-Muganskiy steppe).

374. *Marlow, B.J.
*1969 *Comparison of the locomotion of two desert-living Australian mammals, Antechinomys spenceri (Marsupialia: Dasyuridae) and Notomys cervinus (Rodentia: Muridae). *Jr. Zoology (London) 157(2): 159-167. BA (50) 84350.
*The locomotion of the marsupial Antechinomys spenceri, and the rodent Notomys cervinus, was studied by recording their tracks on long strips of smoked kymograph paper and by means of slow-motion cinematography. Although both animals occupy the same habitat and are similar in their general appearance, their methods of locomotion differ greatly, since Antechinomys leaps quadrupedally,

while Notomys leaps bipedally at fast speeds and runs quadrupedally at slower speeds. The means speed of both genera was 2.7 m/sec but the mean length of stride of Notomys was 51.2 cm compared with 44.3 cm in Antechinomys. The locomotion of the 2 Australian genera is compared with that of the North American Rodents, Dipodomys and Microdipodops.

375. *Martin, W.E./Bower, L.G.
*1966 *Patterns of water use in the Arizona economy. *Arizona Review 15(12): 1-6.
*The major objective is to estimate the value of water to the Arizona economy while at the same time projecting changes in the state's economic structure as the groundwater table declines.

376. *Marx, H.
*1968 *Checklist of the reptiles and amphbians of Egypt. *U.S. Naval Medical Research Unit 3, Technical Report, NAMRU-3-TR-32-69. 96 p. Available CFSTI as AD-701 324.
*Forms listed are those known or expected to occur in Egypt, including Sinai, and those reported from Egypt without further verification. From over 3400 specimens obtained, adequate distributional data are now available for most forms in Egypt. Maps showing collecting localities for each species are also presented for use in future sympatric and ecological studies.

377. *Maxey, G .
*1968 *Hydrogeology of desert basins. *Ground Water 6(5): 10-22. ANAG (1968) C4268. SMRA 2(3) W69-01013; 2(8) W69-02924; 2(9) W69-03238.
*Groundwater flow patterns of desert basins, which usually involve recharge in mountains and discharge in lowlands, are reviewed and illustrated by some detailed studies in the Great Basin of Nevada. Although delineation of most flow systems in Nevada has not been accomplished, integration of hydrologic, geologic, and chemical methods allow approximate portrayal of many systems, both local and regional. Adequate methods upon which to base planning for optimum development of water resources in desert basins are now available.

378. *Maxwell, R.A.
*1968 *The Big Bend of the Rio Grande, a guide to the rocks, landscape, geologic history, and settlers of the area of Big Bend National Park.

*Univ. Texas, Bur. Econ. Geol., Guidebook 7. 138 p. AMAG (1968) 01499.

*A complete geological description of the National Park is given in this semipopular guide to the region. Rocks of undifferentiated Paleozoic to Tertiary and Quaternary age are shown on a map and described. Details of the origins of various geomorphic features are included, along with an account of the general human history of the region.

379. *Kay, P.R.

*1968 *Gravimetric estimation of depth to aquifers in the Hazeva area, Arava valley, Israel. *Israel Journal of Earth Sciences 17(1): 30-43. BIGEMA 32(12) E68-15996.

*Aquifers in the Judea limestone extend from outcrops on the Negev uplands into the Hazeva area in the Arava valley; and form a continuous artesian system eastward to the western border fault of the Dead Sea graben. A gravity survey shows that the Hazeva area is part of a shallow intermontane basin in which the Judea limestone lies at depths of from less than 100 m in the southwest to 450 m on the east along the border fault of the Dead Sea graben. Within the graben the Judea limestone lies at depths of greater than 1000 m.

380. *Mazer A.

*1967 *Ration protidique et besoin en eau en climat tropical (Protein requirement and water need in tropical climate). *Bulletin Mem Fac Mixte Med Pharm Dakar 15: 194-199. BA (51) 53458.

*Protein metabolism and water metabolism are related, not directly, but by the intermediary of the requirements of thermolysis. Caution should be exercised in protein supplementation to the inhabitants of tropical countries. It is important to take into account these data in establishing rations for survival in the desert countries, where the critical problem is water. Diminishing the protein intake, in the face of being stranded in the desert, can only be advantageous.

381. *Mazor, E.

*1968 *Compositional similarities between hot mineral springs in the Jordan and Suez rift valleys. *Nature 219(5153): 477-478. BIGEMA 32(11) E68-14509. SNRA 2(18) M69-07342.

*Chemical composition of sites under consideration are almost identical, the Jordan Valley springs resulting from a past oceanic invasion, the Suez from deep seawater mixing with local groundwater.

382. *Mazor, A. Rosenthal, E./Ekstein, J.
*1969 *Isotopic and chemical tracing of mineral water sources in the south western Dead Sea Basin, Israel. *Journal of Hydrology (Amsterdam) 7(3): 246-275. WRA 20.10-709.

*The chemical composition of thermal and mineral waters along southwestern shores of the Dead Sea was investigated. The data included drilling information and 108 chemical analyses of different water samples, taken from 36 wells and springs.

383. *McDonald, J.E./Hughes, G.H.
*1968 *Studies of consumptive use of water by phreatophytes and hydrophytes near Yuma, Arizona. *U. S. Geological Survey, Professional Paper 486-F. 24 p. WRAG (1969) 02939.

*Studies of transpiration by several species of flood-plain vegetation and evaporation from water surfaces and bare soil were carried out near Yuma, Ariz. during 1961-66. Arrowweed, fourwing saltbush, quailbrush, bermuda grass, and cattail were grown under controlled conditions in tanks. Sites were on the flood plain of the Colorado River below Imperial Dam. Although the immediate area had moderately dense cover of preponderantly arrowweed, the environment was principally desert, with high temperatures, low humidity, and a long growing season. Annual consumptive use by the several species increased with volume of vegetation but use per unit volume decreased as plants approached maturity. Depth of water table strongly influenced evaporation from bare soil.

384. *McDowell, R.E.
*1967 *Factors in reducing the adverse effects of climate on animal performance. *American Association for the Advancement of Science, Washington, D. C., Publication 86: 277-291. WRA 19.7-76.

*With increasing pressures for higher total output and efficiency to meet demands from his animals, man is giving increased attention to providing environments, even under extreme conditions, that permit animals to express as near their genetic potential as possible and give maximum economic return. In most situations, including stabilized environments, means of alleviating effects of climate are already economically feasible, although air pollution and the buildup of toxic materials from animal waste contribute to as yet unsolved problems associated with such confined environments.

385. *McEvey, A.R./Middleton, M.G.
*1968 *Birds and vegetation between Perth and Adelaide. *Emu 68(3): 161-212. MA (50) 56721.
*A general account is given of the country and bird-life between Perth and Adelaide as seen on the Preliminary Survey of the 1st British Museum Harold Hall Australian Expedition in Dec. 1962. The country is divided into 3 broad Ecological Sections while, for ease of comparison, the route is divided into 8 arbitrary and smaller sections. A broad account of the vegetation for each section is given revealing some problems of habitat terminology and emphasizing the complex variety of vegetation, its general continuity in various forms suitable to a number of bird species despite the aridity of the central region. The number and variety of species of the central regions, and the habitat tolerance of many species, are shown as rather greater than might be expected. Despite the shortcomings of the data the semi-continuity of vegetation is seen as a factor of probable importance in this. The presence of an ecological gap west of Fowlers Bay is discussed.

386. *McGee, W. J./Hastenrath, J.L.
*1967 *Harmonic analysis of the rainfall over South Africa. *South Africa, Weather Bureau, Notos 15 (1/4): 79-90. MA 19.9-504.
*The rainfall climatology of South Africa is characterized by abundant precipitation at the time of increased influences from the Indian Ocean during summer in the eastern part of the country and by winter rainfall in southwestern Cape Province brought by disturbances in the westerlies. Regimes merge in the intermediate area. This spatial distribution of rainfall regimes across South Africa is described objectively by harmonic analysis.

387. *Milligan, J.H.
*1967 *Mineralized springs and their effect on Utah's water supplies. In Groundwater development in arid basins, symposium, Proceedings p. 43-50. *Utah State University, Logan.
*Inventory of mineralized springs with their hydrologic and geologic setting and quantity and quality of water reveals that most springs lying in the Great Basin drainage are directly associated with the fault pattern, bringing to the surface dissolved salts from underlying marine beds. The effect of these springs on river quality is considered.

388. *Mel'nik, I.../et al
*1968 *Summarnoe isparenie s perelogov, primykaiushchikh k Iuzhnomu Golodnostepskomu kanalu (Total evaporation from fallow lands adjoining the South Channel of the Golodnaya Steppe). *Meteorologiia i Gidrologiia 6: 68-74. HGA 20.4-411.

*Presents data on the diurnal, monthly, and seasonal evaporation from land not yet developed for agricultural production within the irrigated regions of the Golodnaya Steppe. The relation between evapotranspiration from fallow lands and evaporation from a water surface is examined. The components of the heat balance of fallow lands are specified.

389. *Mendelssohn, H./Marder, U./Yom-Tov, Y.
*1969 *On the decline of migrant quail (Coturnix C. coturnix) populations in Israel and Sinai. Israel Journal of Zoology 18(2/3):317-323. RA (51) 47314.

390. *Miller, R.L./et al
*1968 *Ground-water hydrology of the Chad Basin in Bornu and Dikwa Emirates, northeastern Nigeria, with special emphasis on the flow life of the artesian system. *U. S. Geological Survey, Water-Supply Paper 1757-I. 48 p. HGA 20.1-697.

*Three water-bearing units occur within the Chad formation. The upper zone yields water to wells, the middle from flowing artesian boreholes with heads ranging from a few feet to 70 feet above land surface throughout a 13,000 square mile area of the basin in Nigeria, and the lower zone also from flowing boreholes, though its areal extent has not been proved beyond the environs of Maiduguri. The investigation described here is concerned primarily with the middle zone, the source of water for nearly 200 flowing boreholes used as cattle watering points in the Nigerian sector of the Chad Basin.

391. *Milner, C./Hughes, R.E.
*1968 *Methods for the measurement of the primary production of grassland. *Blackwell Scientific Publications, Oxford. 70 p.

*Covers methods not only for grassland but also dwarf-shrub heaths and arid zone plant communities.

392. *Milton, D.J.

*1968 *Structural geology of the Henbury meteorite craters, Northern Territory, Australia. *U. S. Geological Survey, Professional Paper 599-C. 17 p. Maps.

*One of a series of contributions in Astrogeology prepared for N.A.S.A., this particular study being investigation of impact features of a series of some 12 meteorite craters 80 miles southwest of Alice Springs. It is evident the rock exposed in the crater walls and rims has been displaced outward. The floor of the Main Crater is sparsely covered with Atriplex. The Water Crater has been breached, resulting in a pre-impact drainage system being captured which sustains tree growth in its floor. Some of the smaller craters are now completely filled basins. The author observes that the consequence of human activities and livestock grazing in the vicinity has accelerated the erosion and other signs of deterioration in these smaller craters. A crater-by-crater discussion of structural details is given.

393. *Minashina, N.G.

*1968 *Soil formation and salt migration in the Murgab River delta. *International Congress of Soil Science, 9th, Adelaide, 1968, Transactions 1: 425-435.

*The Murgab River forms a dry delta in the southeastern Kara-Kum Desert. Alluvium present dates from the middle Quaternary. As the ancient delta dried, soils became degraded and easily windblown, with resultant accumulation of sand. Desert vegetation became established when remaining clay particles helped bind the sand and stabilize the surface. Under subsequent irrigation, an oasis soil is formed. The soluble salts present are migrating to adjacent soils in depressions and groundwater. Storage of silts, therefore, must be considered prior to further reclamation of this area by irrigation.

394. *Mishari, H.D.H.

*1968 *Towards full water utilization in Saudi Arabia. In Water for peace, 2: 832-841. *International Conference on Water for Peace, Washington, D. C., 1967. BIGEOL 33(7) E69-04631. SWRA 2(21) W69-08687.

*Saudi experts and teams of experienced international experts and consultants are employed in the evaluation

of the ground water resources of this desert kingdom. Drilling and aquifer testing, potentialities of subsurface dams and infiltration galleries, desalination, water costs in relation to use, land reclamation, and irrigation are some of the topics discussed.

395. *Mitchell, D./et al
*1966 *Direct measurement of the thermal responses of nude resting men in dry environments. *Pflugers Arch Eur. J. Physiol. 303(4): 324-343. BA (50) 81414.

*Two nude resting men were exposed for 2-hr periods to each of 25 dry environments, with air temperatures ranging between -12.8 C and 49.1 C and wind speeds between 0.67 m/sec and 4.94 m/sec. Graphs are presented to show the effect of ambient temperature and wind speed on the radiation and convection rate attained after 105 min, as well as on metabolic rate, sweat evaporation rate, rectal temperature and mean skin temperature. These graphs revealed some important aspects of the behavior of man's thermal control system. In particular the physiological conductance increased with increasing ambient temperature and then "saturated" at an ambient temperature near 35 C. This saturation resulted in a constant difference between rectal temperature and mean skin temperature irrespective of the environmental conditions.

396. *Mizutani, S./Suwa, K.
*1966 *Orthoquartzitic sand from the Libyan desert, Egypt. *Jr. Earth Sciences (Nagoya) 14(2): 137-149. BIOSIS 32(9) 168-11308.

*Sedimentologic analyses of eolian desert sands from Sakkara show the sand contains 94 percent quartz with accessory calcite and limestone, and is therefore orthoquartzitic.

397. *Mohammad, M.B.M.
*1965 *Further observations on some environmental conditions of Shatt al-Arab. *Biological Research Centre, Baghdad, Bulletin 1: 71-79. BA (51) 64722.

*The results of the present observations have shown that vertical gradients of salinity, temperature, and dissolved O_2 are present at the lower reaches of Shatt al-Arab. However, difference between surface and bottom

hydrogen-ion concentrations was perceptible only in the oceanic waters in the neighborhood of the deep terminal (Khor al-Amaya). The influx of the turbid waters of the rivers Tigris and Karun is the major cause of the low transparency observed.

398. *Mondal, R.C./Chakravarty, A.K.
*1968 *Nutrient content of some perennial pasture grasses of the arid and semi-arid lands of western Rajasthan. I: Protein and phosphorus content. *Annals Arid Zone 7(1): 55-61.

399. *Monod, T.
*1968 *Les bases d'une division géographique du domaine saharien. *Institut Fondamental d'Afrique Noire, Bulletin, sér. B: Sciences Humains 30(1): 269-288.

400. *Morris, A.S.
*1969 *The development of the irrigation economy of Mendoza, Argentina. Association of American Geographers, Annals 59(1): 97-115.
*The agricultural pattern of Mendoza, Argentina, has two main elements, an early-developed region of vineyards around Mendoza city, and a region to west, south, and east with more crop diversity and modern technology. Four principal factors contribute to the difference between these two, 1) climate; 2) the chronology of agricultural settlement; 3) land tenure; and 4) the manner of water provision. The Mendoza city region is associated with higher temperatures and longer growing season than the peripheral region, with earlier development of irrigated land, with backward forms of land tenure, and with only limited use of well water to aid river supplies. Both land tenure and water provision are changing factors with considerable impact on the rate of agricultural development. The probable qualitative effect of two further changes in water supply, high dams, and new water control legislation, is comparable to that of well use. By contrast, canal lining and river diversion are primarily quantitative additions with little developmental effect.

401. *Mountfort, G.
*1967 *Birth of a desert national park. *Geographical magazine 40(8): 665-670. Maps.
*Creation of Azraq Desert National Park in Jordan.

402. *Mower, R.W.
*1968 *Ground-water discharge toward Great Salt Lake through valley fill in the Jordan Valley, Utah. *U. S. Geological Survey, Professional Paper 600-D: 71-74. MGA 21.2-563.
*Groundwater in the northern part of the Jordan Valley is principally under artesian conditions in the valley fill of Quaternary age consisting of clay, silt, and sand. The water is moving generally toward the southeast shore of Great Salt Lake. The computed quantity of water discharging into Great Salt Lake from the valley fill in the northern part of the Jordan Valley is estimated to be a maximum of 7000 acre-ft/yr.

403. *Mower, R.W./Feltis, R.D.
*1968 *Ground-water hydrology of the Sevier Desert, Utah. *U. S. Geological Survey, Water-Supply Paper 1854. 75 p. Maps. MGA 20.6-820. ANAG (1969) 04469.
*A cooperative hydrologic study was made of the Sevier Desert to determine amount and location of recharge, discharge, pumpage, water storage, and pumping effects on water levels. Most recharge to groundwater reservoirs results from water entering alluvial fans as percolation from streams, irrigation ditches, and irrigated fields. Leakage from the Central Utah Canal is a major source of recharge to the water-table aquifer. Most of the groundwater is suitable for domestic and stock uses.

404. *Mozgovoi, A.A./Kornienko, E.P./Shakhmatova, V.I.
*1969 *Ascaris skrjabini sp. n.(Ascaridata) - parazit verblyuda. (Ascaris skrjabini sp. n. (Ascaridata): a parasite of the camel.) *Parazitologiya 3(2): 174-175. BA (50) 123415.
*This is the first record of ascarids in camels from Turkmeniya. A large size of spiculae and the presence of 2 pairs of double postanal papillae in male are the characteristic features of the species.

405. *Muffler, L.J.P./Doe, B.R.
*1968 *Composition and mean age of detritus of the Colorado River delta in the Salton Trough, southeastern California: *Journal Sedimentary Petrology 38(2): 384-399. ANAG (1969) 04462.
*The northwest landward extension of the Gulf of California structural depression is filled with fine-grained sandstones

and siltstones of the Colorado River delta. All are late Cenozoic and average 20,000 feet thick. Provenance is primarily from Mesozoic sedimentary rocks of the upper Colorado drainage basin. In view of the small percentage of exposed Precambrian rocks in the upper Colorado River drainage basin, the bulk of the acid-soluble detritus (as measured and cited above) probably consists of reworked detritus of Precambrian age.

406. *Mukhenberg, V.V.

*1967 *Albedo poverkhnosti sushi zemnogo shara (Albedo of the land surface of the globe). *Glavnaia Geofizich. Obs., Leningrad, Trudy 193: 24-36. MGA 19.1-371.

*Maps of the albedo of the surface of the continents for Jan., Mar., Apr., May, July, Sept., Oct., and Nov. Distribution of the albedo on the surface of the land over the entire world, and the annual variations of the albedo in the various climatic regions are examined. A table of the albedo of natural surfaces of the Earth is given.

407. *Mulay, B.N./Joshi, M.C.

*1967 *Study of the resistance to evaporation by certain Rajasthan Desert plants. In Symposium on Water Evaporation Control, Poona, 1962, Proceedings p. 249-256. New Delhi, UNESCO South Asia Science Cooperation Office (and the Indian) Council of Scientific and Industrial Research. MGA 20.8-425.

*The evaporation control of various Rajasthan Desert plants was investigated and data are presented on the amount of water absorbed by twigs and amount of water loss by twigs per square centimeter and per square meter of surface area.

408. *Mulders, M.A.

*1969 *The arid soils of the Balikh Basin (Syria). *University of Utrecht (thesis), 196 p. Utrecht, Netherlands. BA (51) 69210.

*Represents a study of soil forming factors and the genesis of the soils occurring in the Balikh Basin, Jazirah, Syria. Analyses were performed to obtain mineralogic composition of the different soil fractions, soil analytical data of the fine earth, and chemical composition of the fractions in order to evaluate soil genesis and to classify the soils. Factors of importance

for soil formation are dealt with in detail, including climate, geology, morphology, hydrology, mineralogy of the soil material, flora, fauna and land use.

409. *Müller-Stoll, W.R.
*1965 *The problem of water outflow from roots. In B. Slavik, ed., Symposium on water stress in plants, 1st, Prague, 1963, p. 21-29. *Junk, The Hague. BA 48(10)50996.
*In plants rooting in dry soil a reverse water stream and a water outflow into soil takes place, provided the shoots are treated with liquid H_2O. A soil of high diffusion pressure deficit sucks water from roots supplied with moisture by a downward flow of water absorbed by above-ground organs from the aerial source. This water outflow from roots into soil is a merely physical process caused by an inverted water saturation gradient between roots and soil. The possible ecological importance of such a moisture accumulation in the soil of the rhizosphere by a reverse flow from shoots through roots is discussed.

410. *Muravlev, G.G.
*1967 *Mountain and desert lakes in southern Kazakhstan, their resources and methods of economic development (translated title). *Akad. Nauk Kazakhskoi SSR, Alma Ata, Vestnik 23(10): 38-45. Translation available CFSTI as JPRS-45063. SWRA 2(15) W69-06073.
*The many thousands of small lakes, artificial reservoirs, and ponds in Kazakhstan were investigated to determine their basin structure, processes taking place in them, and volume and development of their resources. The desert lakes have little or no drainage and are mineralized in varying degrees. Rational and efficient utilization of these lake resources requires some transformation of the lakes by modifying the basin, water-salt balance, and composition of the organisms present in the lakes and shore areas.

411. *Murr, K.
*1969 *Hydrologische Forschungsstation in Saudi-Arabien (A hydrological research station in Saudi-Arabia). *Naturwissenschaftliche Rundschau (Stuttgart) 22(8): 357. MGA 21.3-97.
*The Leichtweiss Institute of Hydraulic Engineering and Subsurface Construction of the Technical University of Brunswick has established a hydrology and irrigation research station in Al-Hasa, an eastern province of Saudi

Arabia, a region of mild winters. Summer temperatures exceed 50 C, relative humidity is extremely low, and the salt content of the artesian irrigation water amounts to 2000 mg/l. The installation and its aims are described briefly.

412. *Murrow, R.
*1967 *New water bird for Egypt: a robot shadoof. *Ekistics 24(142): 256-260.

413. *Murzayev, E.M.
*1966 *Priroda sin'tsziana i formiorovaniie pustyn' Tsentral'noi Azii (Nature of Sinkiang and formation of the deserts of Central Asia). Moscow. Translated, 1967, by *Joint Publications Research Service Washington, D.C., as JPRS 40299. 621 p. Available CFSTI as JPRS 40299 or TT67-30944. MGA 19.6-13.
*Relief features of Sinkiang province and of the desert area are discussed: the climate in the area, the surface waters, the soil mantle and vegetation cover, and the animal kingdom inhabiting the area. The history of the formation of this Central Asian landscape is given; recent glaciation in the region is discussed. An extensive bibliography of source material is included.

414. * ----- -----, ed.
*1968 *Srednyaya Aziya (Central Asia). *Izd-vo "Nauka," Moscow. 484 p. CBE 40: 327.
*One of a series of monographs intended for use as a reference tool for geologists, agronomists, geographers, economists, meteorologists, and climatologists concerned with the development of Central Asia, including the Uzbek, Kirgiz, Tadzhik, and Turkmen Republics. Contains descriptions of the relief characteristics, geological structures, climatology, hydrology, and the fauna and flora of key areas in each of these republics. Natural resources discussed included minerals, water supply, water power, and related irrigation facilities and potentials. Included are a list of Russian and Latin names, and an index to the most important geographical names.

415. *Mustafa, E./Hus in, M. F.
*1967 *Some pathological aspects of animal schistosomiasis in the Sudan. ACTA Univ. Agr. Fac. Vet. 36(1): 107-110. BA (50) 72843.

*During the last 2 academic years, material from sheep and cattle inspected in Omdurman Central Abattoir was examined for the presence of Schistosoma bovis. The organs most seriously affected were the intestines, mesenteries and livers. Their gross appearance, which is fully described, along with the detection of S. bovis in mesenteric and portal veins, could safely be used as a diagnostic measure in abattoirs where no other means apart from naked-eye appearance are possible.

416. *Nagatani, R.M.
*1968 *The dynamic influences of diabatic heat sinks and the Himalayan mountain range on the vertical motion field over India. *University of Wisconsin (M.S. thesis), 80 p./U.S. Office of Naval Research, Contract Nonr-1212(07). STAR N69-12333. Available CFSTI as AD-675 804.

*Perhaps one of the strangest deserts to be found anywhere is the Rajasthan Desert of northwest India, also known as the Rajputana or Thar Desert. If the desert was once habitable land, the question arises as to what contributed to its deterioration and whether there are any possibilities of reverting back to its habitable state. Since vertical motions resulting from other effects are additive (in this model) to results from heating, other questions are those related to the effects of the Himalayas, such as the vertical velocities resulting from upslope and downslope motions caused by winds blowing against the Himalayas. Effects of nearby mountains on forced interior circulations are also included.

417. *National Center for Atmospheric Research
*1966 *Assessment of atmospheric effects of Lake Nasser. *International Association of Scientific Hydrology, Publication 71: 865-880. MGA 20.9-524. SWRA 3(12) W70-04756.

*The consensus is that the influence will be on the micro-to-meso scale. There seems to be little reason to expect that the moisture entering the atmosphere from the lake will, in the absence of any possibility of uplift to adequately low temperatures, result in clouds, much less precipitation. There is little expectation that the presence of the lake will have any significant influence on the frequency of occurrence or intensity of thunderstorms.

418. *National Research Council, Committee on Water
*1968 *Water and choice in the Colorado Basin; an example of alternatives in water management. *National Academy of Sciences, Publication 1689. 107 p.

*Report gives its attention principally to water problems and management in the Colorado River Basin as a means of providing a concrete example of the general suggestions presented in an earlier report. Chapter 5 is devoted

to several alternative fields for investment in regional economic development that could be at least equally beneficial. Thus, it suggests that choice with respect to water-management programs is in two dimensions: (1) between water programs and other programs, and (2) between alternative water-management programs.

419. *Neal, J.T.
*1968 *Playa surface changes at Harper Lake, California, 1962-1967. *U. S. Air Force, Cambridge Research Labs., Bedford, Mass., Environmental Research Papers 283: 5-30. MGA 20.4-838.
*Numerous environmental processes affect the development and stability of playa (lake-bed) surfaces. Of special significance are hydrologic processes that control the amount and flow of both surface and ground water, and climatic variations which in turn influence the hydrology. This report, in 6 parts, examines some aspects of the playa surface environment including Australian and Iranian playas. Ch. 2 describes microrelief changes that developed at Harper Playa, Calif., following flooding of the playa in 1965-66. The final section examines the possibilities of observing playa surface changes from satellites, using the present remote sensor technology. It also states that Gemini color photography and high resolution vidicon (TV) imagery are currently useful.

420. *Nechayeva, N.T./Prikhodko, S.Y.
*1966 *Iskusstvennye zimine pastbishcha v predgornykh pustynyakh Srednei Azii (Sown winter ranges in the foothill deserts of Soviet Central Asia). *Akademiia Nauk Turkmenskoi SSR, Ashkhabad. 227 p. Translated, 1968, by R. Karschon, under the auspices of the National Science Foundation, and available CFSTI as TT-68-50363. USGRDR 69(9): 8. HA (37) 1007.
*This work summarizes experiments in establishing perennial winter ranges of shrubs and half-shrubs in the foothill desert. It deals with the dynamics of the formation of phytocenoses, their life-span, processes of regeneration and competition, and environmental effects.

421. *Nel, J.A.J./Nolte, H.
*1965 *Notes on the prey of owls in the Kalahari Gemsbok National Park, with special reference to the small mammals. Koedoe 8: 75-81. BA (50) 68008.

*This study determined the gross composition of the diet of owls in the Park, and also gained insight into the distribution patterns of the smaller mammals. The material studied consists of regurgitated owl pellets, collected at 7 localities in the Kalahari Gemsbok National Park during April and Dec. 1963. The number of mammal individuals of each species or from each locality is given as well as the percentage composition by numbers and weight, expressed as a percentage of the total mammal component and not of the diet as a whole. The number of individuals of each species or from each locality for some reptiles and birds is also tabulated.

422. *Nelson, H.L.
*1968 *Climatic data for representative stations of the world. *University of Nebraska Press, Lincoln. 81 p. MGA 19.10-462.
*Presents climatic data, including elevation, temperature, and precipitation month-by-month and annual summary, that is representative of each state of the U. S. as well as each foreign country. The data included is sufficient to give a representative pattern of the major climatic types in each.

423. *Nevins, E.M.
*1968 *The sun, the sand, the silence. *Explorers Journal 46(2): 84-98. Map.
*Eastern Jordan.

424. *Newsome, A.E./Stephens, D.R./Shipway, A.K.
*1967 *Effect of a long drought on the abundance of red kangaroos in Central Australia. *CSIRO/Wildlife Research 12(1): 1-8. BA 49(16) 81945.
*About half way through the severest drought on record in central Australia, the numbers of red kangaroos, Megaleia rufa, were estimated on about 2,500 square miles of country just north of Alice Springs by aerial surveys. Four years later after the drought had broken a survey showed that numbers had fallen from 4914 ± 722 in 1962, to 2817 ± 641 in 1966. This was a direct result of the long drought because females cease breeding, young die in the pouch, and some adults also die during drought. The drought killed many trees in the mulga woodlands, so it was easier to see kangaroos in 1966 than in 1962.

425. *Nickerson, M.A./Meringhi, H.L.
*1966 *Three noteworthy colubrids from Southern Sonora, Mexico. *Great Basin Naturalist 26(3/4): 136-140. BA (50) 67438.
*This report concerns 3 rare species of colubrids from collections made during the summers of 1964 and 1966 in and around Alamos, Sonora, Mexico. They are: Dryadophis cliftoni Hardy, representing the 5th specimen reported and the 1st from Sonora; Sonora aemula Cope, 5 from within the city limits and a short distance south of Alamos, bringing the known number of specimens to 10; Sympholis lippiens rectilimbus Hensley, 2 specimens.

426. *Noble, D.C./Christiansen, R.L.
*1968 *Geologic map of the southwest quarter of the Black Mountain quadrangle, Nye County Nevada (scale 1:24,000). U. S. Geological Survey, Miscellaneous Geologic Investigations Map I-562.

427. *Norris, K. S.
*1967 *Color adaptation in desert reptiles and its thermal relationships. In W. M. Milstead, ed., Lizard ecology, a symposium. p. 162-229. *University of Missouri Press, Columbia. BA 49(9) 43822.

428. *Nurgel'Dyev, O.N.
*1969 *Ekologiya mlekopitayushchikh ravninnoi Turkmenii (The ecology of the mammals of the plains area of Turkmenia.) 259 p. Ylym, Ashkhabad. *Translated from Referativnyi Zhurnal Biologiya, 1969, No. 101506 K. BA (51) 58322.
*This book was written on the basis of a 16-year study of 12,285 mammals. Contents: a brief history of the study of mammals in the Turkmenian deserts, composition of the fauna and an ecological-landscape characterization of the species and a description of the biotopes, fluctuations in population size, "life forms" of mammals, the mammalian complex in desert biocoenoses and the trophic and spatial relations of mammals, seasonal phenomena in the lives of mammals (diet, migration, activity, reproduction, hibernation, molting, etc.); changes in the mammalian fauna of the southeastern Karakum Range as the canal passed through; aspects of the economic significance of mammals (pests and their control).

429. *O'Farrell, M.J./Bradley, W.G./Jones, G. W.
*1967 *Fall and winter bat activity at a desert spring in Southern Nevada. *Southwestern Naturalist 12(2): 163-171. BA (51) 64107.
*Bats were captured in a mist net at White Spot Spring, Desert Game Range, Clark County, Nevada during the months Sept. through May for a total of 21 mist net nights. Time of capture, air temperature, and wind conditions are given for each species.

430. *Oliver, J.
*1968 *Problems of the arid lands: the example of the Sudan. *Institute of British Geographers, Special Publication 1: 219-239.

431. *Omar, M.H.
*1968 *Potential evapotranspiration in a warm arid climate. In Agroclimatological Methods: Proceedings of the Reading Symposium, University of Reading, 1966, p. 347-353. *UNESCO, Paris. MGA 20.11-303.
*Presents results of measurements of potential evapotranspiration made in the Cairo (UAR) area. The first aim was to show how average monthly values of potential evapotranspiration from evapotranspirometer measurements in a small grass field can be corrected for advection effects so that average values representative of a large area can be estimated. The second was to compare the monthly values thus corrected with estimations by the Penman, Papadakis, Thornthwaite, and Harmon formulas. It appears that the Penman and the Papadakis formulas are useful for calculating potential evapotranspiration in a warm arid climate. Estimations by the latter formula are closer to the deduced monthly values. It is suggested that these formulas should be compared with accurate measurements in other arid and humid areas to determine their usefulness. The Thornthwaite and Harmon formulas underestimate potential evapotranspiration by about 35%.

432. *Orkild, P.P.
*1968 *Geologic map of the Mine Mountain quadrangle, Nye County, Nevada (scale 1:24,000).
*U. S. Geological Survey, Geologic Quadrangle Map GQ-746.

433. *Orshan, G.
*1969 *Use of vegetation as an indicator for soil properties under desert conditions. Final technical report, Oct. 1966-Apr. 1968. *Hebrew University, Jerusalem, Department of Botany. Contract DAJA 37-67-C-0238. Available CFSTI as AD-697246.

*Association analysis of desert vegetation: Specimens of 34 species of desert plants of the central Negev of Israel were studied. Normal and inverse association analysis was carried out and a good agreement was found between the vegetation units obtained by normal association analysis and the dominance ones. Block size did not markedly affect the vegetation units obtained. Soil moisture turnover: Rain water did not penetrate deeper than about 100 cm. Most available soil moisture disappeared from the upper soil layers during the first few weeks after the last effective rain. No marked difference between spring and late summer values of soil moisture of the deeper layers of soil were found. Sand cover and irrigation as affecting competition between leading desert psammophytes: Plant growth in loess-containing bags was better than in bags without. Increase in height of plants temporarily not irrigated was greater on sand during period without irrigation.

434. *Orshan, G./Gavish, U./Berovic, I.
*1963 *Use of vegetation as an indicator for soil properties under desert conditions. Final Technical Report, Oct. 1965-Dec. 1966. *Negev Inst. Arid Zone Research, Beer Sheva. 50 p./U.D.Dept. of the Army Contract DA-91-591-EC-3806. Available CFSTI as AD-680 935.

*Discusses root systems in sandy deserts as related to soil properties. 13 leading species, classified in 3 types, were excavated and described. Soil moisture was measured at 2 locations in the Negev desert during the summer of 1966, and its use by plants discussed. The effect of sand cover and irrigation on the competition between leading desert psammophytes was examined.

435. *Osborn, H.B.
*1967 *Variations in precipitation from thunderstorms in the southwest. *Conference of Severe Local Storms, 5th, St. Louis, Mo., 1967, Papers, p. 219-225/Amer. Meteorol. Soc. MGA 19.10-274. SWRA 2(20) W69-08309.

*Eleven years of records from dense networks of recording rain gages on 67 sq. mile Alamogordo Creek watershed (N.M.) and 58 sq. mile Walnut Gulch watershed (Ariz.) are indicative of thunderstorm patterns in the arid Southwest. Point intensities for 5 min. periods sometimes approached 10 in/hr. on the Walnut Gulch watershed, while on Alamogordo Creek they have exceeded 15 in/hr. Two exceptional storms at Alamogordo Creek produced over 3 in. of precipitation in 15 min. On the Walnut Gulch watershed, the runoff-producing portion of most thunderstorms lasted for less than 15 min. and covered less than 5 sq. mi. 90% of all thunderstorms lasted less than 30 min. Only with intense networks of rain gages is it possible to accurately measure the frequencies of thunderstorms of varying magnitudes and durations of 60 sq. mi. watersheds and on the semiarid rangelands of the Southwest.

436. *Ossandón, E.O.
*1967 *La estructura agraria en los oasis piemontanos de la Provincia de Tarapacá.
*Revista Geográfica de Valparaíso 1(1):41-62.

437. *Padula, E.L./et al.
*1967 *Devonian of Argentina. In International symposium on the Devonian system, II:165-199. *Alberta Society of Petroleum Geologists, Calgary. BIG/NA 32 (12):68-15710.
*The Devonian in Argentina is distributed in three basins which have had no intracontinental connections. The Northwest and the Cuyo basins opened into the Pacific, whereas in Patagonia, the submarine platform, Malvinas and Buenos Aires the Devonian may have been of Atlantic origin. In the Northwest basin, sediments rarely reach the middle Devonian. In the Cuyo basin and the Patagonian-Atlantic province, deposition reaches well into this time. In every one of the recognized basins numerous formations are described.

438. *Paldi, R.
*1968 *Persian (Arabian) Gulf and Gulf of Oman: an annotated bibliography for the years 1859-1965. *Food and Agriculture Organization, Fisheries Circular 117. 15 p. MGA 20.7-44.
*A compilation of 170 annotations on the Persian (Arabian) Gulf and the Gulf of Oman covering the literature published for the years 1859-1965. Entries are given in alphabetical sequence by author's name. The bibliography encompasses biological and physical oceanography subject areas.

439. *Paliwal, D.V./Maliwal, G.L.
*1968 *A statistical study of some indices of saline water irrigated soils of Rajasthan. *Annals of Arid Zone 7(1):127-131. BA(50)61076
*Surface soil samples irrigated by saline water were examined to determine the interrelationship between different indices such as pH, exchangeable sodium percentage, sodium adsorption ratio, gypsum requirement, electrical conductivity and total salt concentration of the saturation extract. Correlation between other factors although statistically significant is of low order and has extremely limited value in predicting one factor from another.

440. *Papillon, Marguerite
*1968 *Facteurs écologiques et phases chez le Criquet Pélerin, Schistocera gregaria (Forsk) (Ecological factors and phases of the Desert Locust, Schistocerca gregaria (Forsk).). *Bulletin Biologique de la France et de la Belgique 102(2):271-307. BA(50)89368.
*Together with the physical agents of the environment, density determines the fecundity of the parents and the viability of the progeny. Independent of any effect of over-population, the group effect has a considerable influence on the determinism of polymorphism in the hatchings.

441. *Parmenov, V. I.
*1968 *Bites of snakes and other poisonous animals (translated title). *Sovetskaya Meditsina 9:113-118. CBE 38:255.
*Among the 56 species of snakes known to inhabit the USSR, the most widely distributed poisonous species are the Viperinae common adder Vipera berus L., Renard's viper Vipera renardi, horned viper Cerastes cornutus, Radde's viper Vipera raddei, and the Caucasian viper. The blunt-nosed viper Vipera lebetina, indigenous to the Caucasus and the Central Asian republics, is one of the most poisonous. The carpet viper Echis carinata L. and the Central Asian cobra are also found in these areas. The Ussurian mamushi Agkistrodon blomhoffi ussuriensis is found in the steppes of Kazakhstan and the Far East. Bites from other poisonous animals, except wasps and honeybees, occur only in the southern areas of the USSR. The black scorpion, inhabiting Central Asia, the Crimea and the Caucasus, and the karakurt spider Latrodectus tredecimguttatus, inhabiting the Ukraine, the lower Volga region, Moldavia, Central Asia, the Crimea, and the Caucasus, are especially dangerous. The karakurt spider is considered the most dangerous of the 1068 species found in the USSR. The venom of scorpions, karakurt spiders, bees, and wasps is similar to snake venom, and antivenom sera prepared from cobra venom has been used for treatment. However, antikarakurt serum, prepared by the Tashkent Institute of Vaccines and Sera, administered in 20--60 ml doses is the preferred method of treatment.

442. *Peckham, R.C.
*1968 *Role of ground water in Texas Water Plan. *American Society of Civil Engineers, Proceedings Journal of Irrigation Drainage Division 94(IR1): 137-152. ANAG(1968)00196.
*The Texas Water Plan has given extensive attention to the availability of ground water in aquifers in the State. By the year 2020, approximately 5,400,000 acre-foot of ground water will be used in meeting the State's water requirements. There are approximately 5,000,000 acre-foot available annually from the major and minor aquifers of the State and approximately 365,000,000 acre-foot available from storage in aquifers which receive little or nor recharge.

443. *Pedgley, D.E./Symmons, P.M.
*1968 *Weather and the locust upsurge. *Weather 23(12): 484-492. AGA 20.10-448.
*During 1967 and 1968, there was a spectacular increase in the numbers of the Desert Locust, Schistocerca gregaria. This account briefly sketches the effects of rainfall and wind distribution on the locust population, gives summarized information on the two-year development and movement of swarms throughout Africa and the Middle East and relates

these to the weather during the same period. The build-up took place within the arid, central part of the invasion area where rainfall is particularly erratic. The maintenance of the swarms depended to some extent on their having reached swarm size and being able to migrate to less arid areas where conditions for their continued breeding existed.

444. *Pejml, K.
*1966 *Studie o kolisani klimatu v historicke dobe na zapadnim pobrezi Jizni Ameriky (Study on climate fluctuations in the historical time of the western coast of South America). *Hydrometeorologicky Ustav, Prague. 82 p. MGA 19.7-453.
*Drought indices computed for middle and north Chile, and related to the 1690-1930 period prove that the severest droughts occurred within 1781-1810. Fluctuations of climate in the median part of the western regions of South America are caused by extreme shifts of the ITCZ and by changes in magnitude of the Peruvian stream. Only fluctuations in, not changes of, climate were established.

445. *Percious, J.K.
*1968 *Geology and geochronology of the Del Bac Hills, Pima County, Arizona. *Arizona Geological Society, Southern Arizona Guidebook 3:199-207. ANAG (1969) 03229.
*The Del Bac Hills, located on the San Xavier Indian Reservation, approximately 10 miles southwest of Tucson, are of interest as an example of mid-Tertiary volcanic rocks common to southeastern Arizona. These hills are regarded geologically as the southernmost extension of the Tucson Mountains but structurally appear to form a portion of a north east trend segmenting the Tucson Basin and separating the Tucson and Sierrita Mountains. Lithologies of the area are similar to those in the upper part of the Tertiary sequence exposed in the "A" Mountain-Tumamoc Hill area. Radioactive dates for many of the units are provided.

446. *Perry, R.A.
*1968 *Australia's arid rangelands. *Annals of Arid Zone 7(2):244-249. BA(51)46676.
*The boundaries of Australia's arid rangelands are delimited and a comparison made of features of arid Australia and other arid parts of the world. The cattle and sheep industries, and their effect on rangeland resources, are described. The climate-land-vegetation-animal ecosystem, and the program of rangeland research are outlined briefly.

447. *Peru, Dirección General de Meteorológia, Lima
*1967 *Anuario Meteorológico, 1965. *Dirección General de Meteorológia. 127 p. MGA 20.4-34.

*Contains tabulated data for principal climatological and precipitation stations, synoptic stations, and sea water- and soil temperature-stations. The tables are prefaced by 4 pages of explanatory notes on the units of measurements and procedures used in observing and measuring the various elements (precipitation, temperature, humidity, etc.).

448. *Peterson, D.L.
*1968 *Bouguer gravity map of parts of Maricopa, Pima, Pinal, and Yuma Counties, Arizona (1:250,000). *U.S. Geological Survey, Geophysical Investigations Map GP-615.

449. *Peterson, J.T./Bryson, R.A.
*1968 *Influence of atmospheric particulates on the infrared radiation balance of northwest India. *National Conference on Weather Modification, 1st, Albany, N.Y., 1968, Proceedings p. 153-162. MGA 19.11-348
*Field study of Indian climate was conducted in late April 1966. The effects of quartz aerosols, water vapor, and carbon dioxide on infrared radiative transfer were considered. The data indicate that the difference between the infrared upward flux observed and that which is calculated is related to the amount of dust in the atmosphere.

450. *Pianka, E.R.
*1967 *On lizard species diversity: North American flatland deserts. *Ecology 48(3):333-351. MGA 18.11-455.
*Eight potential mechanisms for the determination of each species diversity are described and discussed, and data relevant to each are presented for a particular diversity gradient: namely that of the flatland desert lizards of western North America. It is concluded that ecological time, spatial heterogeneity, length of growing season, and amount of warm season productivity are all factors which determine the total number of lizard species occurring on an area, but that the most important single factor is the spatial heterogeneity (mainly vegetative) of the environment. It is suggested that climatic variability allows the coexistence of many different plant life forms, the variety of which in turn controls the number of lizard species.

451. * --- ---
*1969 *Habitat specificity, speciation, and species density in Australian desert lizards. *Ecology 50(3):498-502. DA(51)35547.
*From data demonstrating habitat specificity, it is concluded that Australian desert lizards recognize more habitats than North American desert lizards. The large amount of environmental heterogeneity and intimate mixing of habitats

in Australia allow many more lizard species to coexist there than in North America.

452. *Pillsbury, A.F./Degan, A.
*1968 *Sprinkler irrigation. *Food and Agriculture Organization, Agriculture Development Paper 88. 179 p.

453. *Pine, G.L.
*1968 *Devonian stratigraphy and paleogeography in Gila, Grahan, Greenlee, and Pinal Counties, Arizona. *Dissertation Abstracts 29(2):661B.

454. *Pinna, M.
*1968 *Sulla definizione dell' aridità. *Geografia nelle Scuole 13(4):137-140.

455. *Piper, A.M.
*1969 *Water budget of the Carson Valley, Nevada. *U. S. Geological Survey, Professional Paper 417-F. 8 p. MGA 21.2-568.
*The 100 square mile valley and the 887 square mile catchment of the Carson River draining the valley are described briefly. Annual runoff, most of which comes from the Sierra Nevada, varies both with altitude and horizontally; little if any is generated below 5000 feet. The need to know the water balance of the Carson Valley arose with the current drive for optimum land and water management in the arid parts of the U.S.

456. *Ponirovskii, E.N.
*1969 *Ob epidemiologicheskiom znachenii moskitov (Phlebotomidae) v ochagakh vistseral'nogo leishmanioza Turkmenskoi SSR (Epidemiological significance of mosquitoes (Phlebotomidae) in visceral leishmaniasis foci in the Turkmenian SSR. . *Meditsinskaya Parazitologiya i Parazitarnye Bolezni 38(1): 62-66. BA (50) 82896.
*Epidemiological role of sandflies as vectors of visceral leishmaniasis in the Turkmen SSR was studied. Observations were carried out in foci of visceral leishmaniasis in the mountainous Kara-Kalinsky area and in the sandy desert of southeastern Kara-Kums where a large number of cases were registered.

457. *Pontrelli, A.J.
*1968 *Mating behavior of the black-tailed jackrabbit (Lepus californicus). Journal of Mammalogy 49(4): 785-786.

458. *Prakash, I.
*1968 *Eco-toxicology and control of Indian Desert Gerbil, Meriones hurrianae (Jerdon): Food preference in the field during monsoon. *Bombay Natural History Society, Journal 65(3): 581-589.

*Food preference of the Indian desert gerbil during monsoon was determined by identifying unconsumed plant species lying near burrow openings and comparing with those in surrounding plant communities. Economic losses to grasses by gerbils is discussed.

459. *Prakash, I./Purohit, K.G./Kametkar, L.R.
*1967 *Intake of seeds of grasses shrub and tree species by three species of gerbils in Rajasthan desert. *Indian Forester 93(12): 801-805. RA (50) 56932.

*Intake of seeds of various grass, shrub and tree species, which are of importance as fodder and are used in afforestation and sand dune fixation work, and their palatability index was studied. Seeds of Cehchrus ciliaris, Eragrostis ciliaris and Erianthus munja are lowly preferred among grasses and those of Acacia species, Azadirachta indica, and Aerva tomentosa among tree and shrub species. If these species of plants are more commonly used for soil conservation work, the damage to seeds by gerbils will be comparatively less than that to other species seeds of which are preferred by the rodents. The consumption of seeds with pulp of Zizyphus nummularia was maximum and they can be used as medium for poison-baiting these rodents.

460. *Prokopovich, N.P.
*1969 *Some geologic problems in reclamation of arid lands. *U.S. Bureau of Reclamation, Sacramento. 52 p. Available CFSTI as PB-185 873. USGRDR 69(22): 71.

*The large-scale reclamation of arid regions may involve importation of waters which are geochemically strange. This could cause drastic changes in the chemical and physical properties of some fine-grained unconsolidated deposits. Leaching of saline clays, or an increase of their salt content due to migration of salts, and associated ion exchange reactions, flocculation and deflocculation could modify the engineering properties, particularly plasticity and permeability of clayey soils. Surface application of water and/or overdraft

of ground water may cause land subsidence. This paper discusses the general character of some of these processes and the need for their recognition and analysis by geologists prior to reclamation. Some modifications of standard laboratory tests, for example treatment of arid materials with project waters prior to the testing, could be particularly useful in planning developments in desert environments.

461. *Quinn, F.
*1968 *Water transfers: must the American West be won again? Geographical Review 58(1): 108-132. Maps.
*Meeting the demands for municipal industrial water supply in the Western urban oasis.

462. *Radwanski, S. A.
*1968 *Field observations of some physical properties in alluvial soils of arid and semi-arid regions. *Soil Science 106(4): 314-316. ANAG(1969)04979. SWRA 2(16)W69-06515. BA(50)77894.
*Some physical properties of soils as observed by the soil surveyor in the field are micro-lamination and self-sealing often-recurrent phenomena affecting moisture movement in the soil profile. In irrigated deserts this can cause formation of salt crusts either on the surface or within the profile.

463. *Rafyi, A./Maghami, G.
*1967 *Contribution a l'étude de quelque parasites du sang du mouton et de la chevre en Iran et dans les pays voisins. *Institut Razi, Tehran, Archives 19:77-86.
*A study of some blood parasites found in sheep and goats in Iran and neighboring countries.

464. *Ramachandran, G.
*1967 *Rainfall distribution in India in relation to latitude, longitude and elevation. *Indian Journal of Meteorology and Geophysics 18(2):227-232. MCA 19.4-343.
*An analysis of the normal rainfall of 167 observatory stations distributed over India and the neighborhood has been made using regression equations representing monthly and annual rainfall as a linear function of latitude, longitude and elevation above sea level. Other factors influencing rainfall, such as orographic effects, are noted.

465. *Rasulov, M.
*1967 *Deserts of the western part of the Karshi steppe (translated title). *Uzbekistanskoy Geograficheskoye Obshchestvo, Izvestiya 19:73-78. CBE 33:124.
*Migratory sand dunes in this area present several obstacles to the operation of agricultural communities. A combined ground and aerial survey and wind observations from the Mubarek weather station form the basis of an analysis of the types of dunes present, their methods of formation, and methods for prevention of further migration. Emphasis is on seasonal variations in wind directions and speeds, with additional graphic data on precipitation, temperatures, and occurrences of dust storms.

466. *Rathjens, C.
*1968 *Schichtflächen und Schnittflächen im Trockenklima (Bedding and erosional surfaces in arid regions). *Regio Basiliensis 9(1):162-169. BIGENA 32(10)E68-12614.
*Cuestas developed under arid climatic conditions are examined in the eastern Iranian upland, southern Afghanistan, the Thar desert, Turkey, and the southwestern U.S. Prevalence and stability of steep slopes, characteristics of pediments, and the close relationship between surface form and geologic structure are principal factors in the development of cuesta landscape.

467. *Ratschiller, L. K.

*1966 *Sahara: correlazioni geologico, litostratigrafiche fra Sahara Centrale ed Occidentale, con note geologiche generali e brevi cenni sulle possibilità petrolifere dell'Africa Nord-Occidentale. Universita degli Studi de Trieste, Istituto di Geologia, Pubblicazioni 46/ Museo Tridentino Scienze Naturali, Trento, Memorie 14(1):53-293.

*Presents a lithostratigraphic correlation between the areas of the Central and Western Sahara based on the author's personal geological studies and explorations from 1957-1964. Illustrated by a correlation chart, a geological and a tectonic sketch map of the Sahara and the bordering territories, and an extensive photograph collection (298). Short geological notes regarding the oil research in northwestern Africa, and references to international stratigraphical nomenclature are included.

468. * --- ---

*1968 *Lithostratigraphy of the northern Spanish Sahara. *Museo Tridentino di Scienze Naturali, Trento, Memorie 18(1).

*Covers the coastal area between the Moroccan border and Punta Siete Cabos, the northeastern area of Spanish Sahara (Smara - El Farisia), and the Peleozoic uplife of Sequen - Doloaa - Guelta Zemmur. Presents lithostratigraphic sequence outcropping, documented by columnar sections, correlation tables, and lithostratigraphic maps.

469. *Reese, H. C. et al

*1969 *Area handbook for the Hashemite Kingdom of Jordan. DA-PAM-550-34. *U. S. Government Printing Office, Washington, D. C. 373 p. Available CFSTI as AD-701 369.

*Supersedes DA-PAM-55034 dated 1 July 1964. Designed to be useful to military and other personnel needing a convenient compilation of basic facts about the social, economic, political, and military institutions of the area.

470. *Reich, B./Arntsen, A./Walters, J.K.

*1968 *Israel and the eastern Arab states: a stratigic source book. Research Analysis Corporation, McLean, Virginia, Report RAC-P-46. 99 p. Available CFSTI as AD-698 200.

*Makes readily available a brief appraisal of factors of strategic significance in the area. Accompanied by charts, tables, and other supporting data, as well as references. Intended to provide the user with an understanding of the complexity of the situation, and sources for more detailed examination of the subjects discussed.

471. *Reiner, E.

*1968 *Die wirtschaftliche Entwicklung West-Australiens. *Angewandte- und Sozial-Geographie 12(2):33-41. Maps.

472. *Riess, R. O.
*1969 *"The Middle East": the problem of geographic terminology. *Journal of Geography 68(1):34-40.

473. *Riordan, P.
*1970 *Weather extremes around the world. *U.S.Army Natick Laboratories, Technical Report 70-45-ES. 38 p.
*Includes map of world and continental weather extremes, and North American weather extremes, with comments on the reliability of the records shown: highest/lowest temperatures, largest ranges, greatest and least amounts of precipitation for various durations, maximum precipitation variability, highest solar radiation, highest wind speed, and other phenomena. Both absolute extreme and the most extreme annual averages and given for most elements.

474. *Rodis, H.G./Hassan, A./Wahadan, L.
*1968 *Ground-water geology of Kordofan Province, Sudan. *U.S.Geological Survey, Water-Supply Paper 1757-J. 48 p.
*Describes results of a reconnaissance hydrogeologic investigation and the nature and distribution of the groundwater resources with respect to their availability for development. In 1962 withdrawals from Nubian and Umm Ruwaba aquifers in the southwestern part of Kordofan were approximately 600 million gallons annually, a rate of draft that could probably be continued almost indefinitely without significant depletion of the supply. Nubian aquifers in northern Kordofan need extensive exploration by test drilling before their economic potential can be properly evaluated.

475. *Romanov, N.H./Liapina, O.A./Pribylova, I.L.
*1966 *O pyl'nykh buriakh v raione Gazli v sentiabre 1964 (Dust storms in the Gazli region in September 1964). *Glavnaia Geofizicheskaia Observatoriia, Leningrad, Trudy 189:160-162. MGA 18.9-353.
*Oases of desert storms that developed in the Gazli district in the Kyzyl-Kum of Uzbekistan are described. In addition to desert storms, dust drifts, and dust devils were observed, frequently preceding a desert storm.

476. *Rose, C. W.
*1968 *Evaporation from bare soil under high radiation conditions. *International Congress of Soil Science, 9th, Adelaide, 1968, Transactions 1:57-66.

477. *Rosenthal, E./Eckstein, Y.
*1968 *Temperature gradients in the subsurface of the Dead Sea area, Israel. *Israel Journal of Earth-Sciences 17(3):131-136. MGA 21.1-766.

*Two distinct temperature gradients were discerned in the subsurface of the southwestern part of the Dead Sea. Correlations between lithological changes and heat gradient are indicated. Conclusion that the temperatures of groundwater there derive from deep circulation and are controlled by temperature gradients is confirmed.

478. *Ruf, E.
*1967 *Nitrates dans les eaux du sud de Madagascar (Nitrates in the waters of southern Madagascar). *Malgache, Comité National Malgache de Géologie, Tananarive, Semaine Géologique, Compte Rendu, 1966, p. 75. BIGENA 32(11)E68-14403.
*High nitrate content noted in wells in southwestern Madagascar as opposed to the low percentages in subsurface waters generally is the result of organic pollution.

479. *Ruiz Huidobro, O. J.
*1968 *Descripción geológica de la hoja 7e, Salta, provincias de Salta y Jujuy; carta geológico-económica de la República Argentina, escala 1:200,000 (Geologic description of sheet 7e, Salta, Salta and Jujuy provinces; geologic map of Argentina, scale 1:200,000). *Argentina, Instituto Nacional de Geología y Minería, Boletín 109. 47 p.

480. *Rumney, G. R.
*1968 *Climatology and the world's climates. *Macmillan, N. Y. 656 p.
*Textbook. The section on classification of climates includes a description and comparison of the Köppen and Thornthwaite systems. Coverage of deserts in North and South America, southern and northern Africa, Australia, and Asia.

481. *Rush, F. E.
*1968 *Water-resources appraisal of Clayton Valley - Stonewall Flat area, Nevada and California. *Nevada, Department of Conservation and Natural Resources, Water Resources - Reconnaissance Series, Report 45. 54 p. Map. SWRA 2(3) W69-00935, 3(8)W70-03231.
*The area covered is 80 miles north to south, 60 east to west, with a population of less than 1,000. Bounded by mountains, most available groundwater is stored in valley-fill alluvium 600 or more feet thick. Most recharge is stream water from the mountains, since precipitation in the Valley is 5 inches. The water is fair to poor quality for agricultural use, and marginal in quality for drinking. Perennial yield is estimated to be 22,000 acre-feet per year in Clayton Valley, from 100-3,000 acre-feet per year in the smaller valleys of the area. There is extensive tabulated data included.

482. *Rush, F,E./Glancy, P.A.

*1967 *Water-resources appraisal of the Warm Springs - Lemmon Valley area, Washoe County, Nevada. Nevada, Department of Conservation and Natural Resources, Water Resources-Reconnaissance Series, Report 43. 70 p. ANAG(1968)07115.

*The Warm Springs-Lemmon Valley area in western Nevada covers about 900 square miles and includes 11 valleys. Younger and older alluvium form the valley-fill reservoir and are the principal sources of groundwater. Maximum thickness in places is 1,000 feet. Inflow is from precipitation, runoff, imported water, and inflow of groundwater through consolidated rock and alluvium. Very few large-capacity wells have been drilled. Some water is not fit for human consumption.

483. *Saint Amant, J. A./Hulquist, R.G.
*1969 *Palaemonetes paludosus collected in the Rio Hardy and Colorado River, Baja California. *California Fish and Game 55(3):252. BA(50)123458.
*Freshwater shrimp collected in this area, March-June 1968, included large numbers of adult males, females carrying eggs, and juveniles, indicating this species is well established. Water at the 3 collection stations were also inhabited by marine shrimp and fish.

484. *Salem, M.Z./Hole, F.D.
*1969 *Soil geography and factors of soil formation in Afghanistan. *Soil Science 107(4):289-296. BA(50)89333.
*Afghanistan is located in the low-latitude desert and steppe belt of the Asiatic climatic system. Orographic uplift of air accounts for most of the precipitation. Cultivable soils, mostly alluvial, sierozem, and brown, occur scattered throughout 40 percent of the total area. The remaining 60 percent of the country is in high mountainland (20 percent) and drylands (40 percent). In lowlands, desert soils developed on Quaternary deposits. Carbon-14 dates reported from northern river terraces indicate that some soils of the plains are between 5,000 and 15,000 years old, while soils on the interfluves of the lowlands are considered to be still older. Eight soil profiles shown in detailed sketches are representative of major agricultural districts, of which 5 are desert soils. Five generalized maps of Afghanistan show topography, radial pattern of drainage, climatic types, vegetation, and soils.

485. *Satyanarayan, Y./Saxene, S. K./Gaur, Y. D.
*1966 *Studies on dune ecology. I: Vegetation of stabilized dunes. *Tropical Ecology 7:163-170. BA (50)56777.
*The two types of dunes occurring in the tract under investigation in the Rajasthan are stabilized and coalesced transverse dunes with active crests. The climate is characterized by low rainfall, extremes of temperatures, low relative humidity, and relatively high wind velocities. Although soils of both type dunes are alkaline, with low amounts of organic matter and total soluble salts, soils of the stabilized dune and at the base of the coalesced dune have more total soluble salts and better water holding capacity than those of the active crest of the coalesced dune because they have been formed over gravel. The vegetation in these stable areas therefore has the greater density and composition.

486. *Schamp, H.
*1967 *Kharga, van der Oasis magna zum Neuen Tal (Kharga, from the oasis Magna to the New Valley). *Erde 98(3):173-202. Map. SARA 3(11)W70-04412.
*Kharga, one of the largest of the Egyptian oases, was included in the area of the Western Desert selected for land reclamation and resettlement. The first 5-year program (1960-1965) provided

approximately 100 deep wells, furnishing irrigation water for the cultivation of nearly 50,000 acres as compared with only 6,000 formerly. Origin of the groundwater in the area is not yet identified, but current estimates from known supplies indicate that even larger acreage may be brought under cultivation. The extreme desertic conditions of the surrounding environment make the Kharga Oasis development of interest, since its success could provide a pilot for similar water-short areas.

487. *Schoff, S. L./Moore, J.E.
*1968 *Sodium as a clue to direction of ground-water movement, Nevada Test Site. *U.S.Geological Survey, Professional Paper 600-D:30-33. MGA 21.2-565.
*Sodium dissolved in water generally stays in solution. It is the predominant cation in groundwater in volcanic aquifers in this area, but is usually lacking in alluvial and carbonate-rock aquifers in southern Indian Spring valley south of the Site. The low content of sodium in the water of the Indian Spring Valley shows that the water has not migrated into the valley from the Site.

488. *Schulze, B. R.
*1969 *The climate of Gobabeb. *Namib Desert Research Station, Scientific Papers 37/53:5-12.
*The Namib Desert Research Station, situated at Gobabeb on the northern bank of the dry Kuiseb River, is some 60 miles southeast of Walvis Bay and about 35 miles in from the Atlantic coast. Its altitude is 407 meters above sea level. Instrumentation provides measurement of atmospheric pressure, surface air temperature, soil temperature, humidity, wind direction and force, precipitation, evaporation from a class A pan, and sunshine duration.

489. *Shanan, L./Evanari, M./Tadmor, N.H.
*1967 *Rainfall patterns in the central Negev Desert. *Israel Exploration Journal 17(3):163-184. Map.

490. *Shata, A./Knetsch, G./Degens, E.T./Munnich, O./El-Shazli, M.
*1962 *Geology, origin and age of the ground water supplies in some desert areas of the UAR. *Institut u Désert d'Egypte, Bulletin 12(2):61-124.

491. *Shneyer, M. S.
*1967 *Development of research in the multi-discipline study and mastery of the desert areas of Central Asia and Kazakhstan (translated title). *Problemy Osvoyeniya Pustyn (3):90-92. CBE 32:105.
*Proposals for future work under the aegis of the various Akademiias covered such fields as desert irrigation, ground- and surface water studies, classification of deserts, methods of combatting mobile sand belts, and climatological studies.

492. *Shul'ts, V. L.
*1968 *Reki Afganistana (Rivers of Afghanistan). *Srednеaziatskii Nauchno-Issledovatelskii Gidrometeorologicheskii Institut, Trudy 42(57). 172 p. MGA 20.7-10.
*Brief information on the basic physiographic factors determining streamflow and on the state of the art in the hydrology of the rivers of Afghanistan. The river net is divided into the basins of the Amu-Daria and Indus rivers, and of the Seistanskaia Depression. Unlike those of Soviet Central Asia, these rivers, particularly of the Depression, are fed principally by rainfall. This results in widespread mud flows, making the Afghanistan rivers less suitable for water utilization without more extensive regulation than in Soviet Central Asia.

493. *Sillitoe, R. H./Mortimer, C./Clark, A.H.
*1968 *A chronology of landform evolution and supergene mineral alteration, southern Atacama desert, Chile. Institution of Mining and Metallurgy, London, Transactions 77B(744): 166-169.

494. *Simons, M.
*1967 *Deserts: the problem of water in arid lands. *Oxford University Press, London. 96 p., maps.
*Section on sources of water includes material on water from below ground from exotic rivers, from other areas, and from the sea, as well as on increasing rainfall and changing climate. Desert plants, animals, and climate are also discussed.

495. *Simpson, E. S.
*1969 *Contributions on the status of arid-lands research: Ground water in Australia. *U.S.Army Natick Laboratories, Technical Report 70-5-ES. 22 p., map.
*Essentially all exploitable ground water of the Australian arid zone is contained in the pore spaces of relatively flat-lying sandstones and limestones occurring within the major sedimentary basins. Although the quantity of stored water is immense, at least half is too mineralized for irrigation use. Annual recharge from rainfall is probably a fraction of the amount in storage. Outside the sedimentary basins, small to moderate supplies of groundwater may be obtained from fissures in older crystalline rocks, or from relatively thin surficial deposits of unconsolidated sand, if the local water table is not deeper than the depth of fissures or the bottom of the sand.

496. *Sinadskiy, Y. V.
*1968 *Study of the desert areas of Central Asia and Kazakhstan (translated title). *Akademiia Nauk SSSR, Vestnik 12:121-123. CBE 41:305-306.
*A brief account of papers given at the 2d All-Union Conference on the Study and Utilization of the Desert Areas of Central Asia. See also #491, Shneyer (1967), above.

497. *Smith, H. H. et al
*1969 *Area handbook for Iraq. *U.S.Department of the Army, Pamphlet 550-31. 420 p. Available CFSTI as AD-687 755.
*Covers physical environment, historical setting, social structure, religion, government, armed forces, public order and safety, communication systems, and transportation.

498. *Smith, H. T. U.
*1967 *Past versus present wind action in the Mojave Desert region, California. *U.S. Air Force Cambridge Research Laboratories, AFCRL-67-0683. Available CFSTI as AD-665 137. STAR N68-19827.
*The major products of wind action in the Mojave (dunes, sand sheets, deflation basins, and deeply abraded rock surfaces) are interpreted to have been formed during a past arid interval followed by an extended time of relative eolian quiescence. Present-day wind action is believed to represent a relatively recent reactivation. These findings have significant implications for playa morphology and stratigraphy.

499. *--- ---
*1968 *Nebraska dunes compared with those of North Africa and other regions. In Loess and related eolian deposits of the world. *International Association for Quaternary Research, 7th Congress, Boulder, 1965, Proceedings 12:29-47.
*Compares sand dunes of the Nebraska Sand Hills with those of North Africa in areal extent, size, type, conditions of origin, drainage patterns, mylticycle eolian activity, and proximity to belts of loess.

500. *Smith, K. G.
*1964 *Frew River, N. T.; 1:250,000 geological series, sheet SF/53-3, international index, explanatory notes. *Australia, Bureau of Mineral Resources, Geology and Geophysics, Canberra. 15 p. BIGENA 32(11)E68-00603.
*In the plains and uplands of the arid Frew river area, north of Alice Springs, there are low outcrops of Precambrian and Paleozoic rocks occurring mainly as ridges in the Davenport Range where tectonic activity is mainly confined. Quaternary cover of sand, soil, and alluvium surrounds minor outcrops in the plains.

501. *Snead, R. E.
*1968 *Weather patterns in southern West Pakistan. *Archiv f. Meteorologie, Geophysik, und Bioklimatologie, ser. B, 16:316-346. Available CFSTI as AD-685 975.
*The area is one of transition between the Indian summer monsoon system to the east, and the winter cyclonic system of southwest Asia to the west, and as such receives scanty, unreliable rainfall averaging less than 254 mm per year from

several storm types. Six main weather patterns cross the region: large subtropical anticyclonic high pressure cell that predominates most of the year; western depressions originating over the Mediterranean; Arabian Sea cyclones; local thunderstorms and dust storms; a modified monsoon pattern; and eastern depressions originating over the Bay of Bengal or central India.

502. *Snead, R. E.
*1969 Physical geography reconnaissance: West Pakistan coastal zone. *University of New Mexico, Publications in Geography 1. 55 p. Reports field work sponsored by Coastal Studies Institute, Louisiana State University, under auspices of the ONR Geography Branch, Contract No. Nonr 1575(03), Task Order No. NR 338 082.
*Describes the physical and cultural features of the West Pakistan coastal zone between the Iranian and Indian borders. The coastal zone includes rocky headlands, pocket bays, lagoons, and wide alluvial plains extending in places 80 miles inland. In addition to coastal landforms, the paper discusses ports and fishing villages, as well as a summary of the main motorable roads.

503. *--- ---
*1970 *Physical geography of the Makran coastal plain of Iran. Final report, reconnaissance phase. *University of New Mexico for Office of Naval Research under Contract N00014-66-C-0104. 715 p.
*Preliminary results of a reconnaissance conducted 1968 along the Makran coastal plain of Iran. Covers physical geography, including changes taking place during the Quaternary. Land use, landforms, photographic interpretation, and other supporting data (climatic tables, plant species, analysis of sand and rock samples, marine shells, radiocarbon dating of shell samples, as well as a glossary of Iranian and Pakistani words and gazetteer of place names) make this report a comprehensive one for this little known area. Accompanied by a 779-item bibliography.

504. *Snead, R.E./Frishman, S.A.
*1968 *Origin of sands on the east side of the Las Bela Valley, West Pakistan. *Geological Society of America, Bulletin 79:1671-1676. Available CFSTI as AD-682 820.
*The large sand complex in the area is thought to have been derived from the nearby mountain ranges rather than from an exposed continental shelf. Sea level changes and Recent tectonism complicate the sequence of events.

505. *Sosic, M. V. J.
*1968 *Hydrogeological appreciations of the province of La Rioja. In International Conference on Water for Peace, 1967, Washington, D. C., *Water for Peace 4:928-932. SWRA 2(18)W69-07358.

This province in Argentina's arid northwest has a considerable reserve of underground water, little exploited and incompletely investigated. Eight hydrogeologic zones are discussed on the basis of quality of water, depth of water, demand for water, river systems, well yields, soil salinity, and regional economy. Of these eight, 4 of the most propitious areas for rational underground water exploitation are indicated.

506. *South Africa, Department of Foreign Affairs
*1967 *South West Africa survey, 1967. *South Africa, Department of Foreign Affairs, Pretoria. 190 p. maps.
*Covers geographical features, population, history, economic conditions, etc.

507. *Spain, Servicio Meteorologico Nacional
*1967 *Resumen anual de la observaciones meteorológicas, año 1961 (Annual resume of meteorological observations, 1961). *Spain, Servicio Meteorológico Nacional, Madrid. 703 p. MGA 19.9-155.
*Tables. Gives not only annual data, but monthly and daily from selected climatological stations in Spain and the Spanish colonies in North Africa, including atmospheric phenomena, rainfall map for natural precipitation regions, temperature, relative humidity, wind speed and direction, mean evaporation, etc.

508. *Srivastava, A. S.
*1970 *Recent massive locust plague in India and Middle Eastern countries and its control. *Labdev Journal of Science and Technology, B (Life Science),8(1):14-18. BA(51)69457.
*Desert locust activity in India since 1954 and in Iran, Afghanistan, Pakistan, and India since 1966 is presented, with special reference to the condition of scattered individual desert locust and their breeding and activity.

509. *Stace, H. C. T. et al
*1968 *A handbook of Australian soils. *Rellim Technical Publications, Glenside, South Australia. 434 p.

510. *Staffeldt, E. E.
*1969 *Microorganism study, desert fungi. Final technical report. *California Institute of Technology, Pasadena, Jet Propulsion Laboratory; New Mexico State University, Las Cruces, Department of Biology, for NASA-CR-10535, Contracts NAS7-100, JPL 951602. Available CFSTI as STAR N69-35465. 10 p.
*Fungal isolates were extracted from soils removed under desert conditions in Chile, Egypt, Oregon, Wyoming, Hawaii, and the White Mountains, California. Complete fungal description charts are submitted, including order, family, genus, species, colony characteristics, and sexual or asexual reproductive aspects.

511. *Stander, G. J./Van Vuuren, L. R. J.
*1969 *The reclamation of potable water from wastewater. *Water Pollution Control Federation, Journal 41(3:1):355-367. BA(50)94293.
*A biological-chemical pilot plant has been initiated at Windhoek, South West Africa, for a future one million gallon per day reclamation plant to help solve the water shortage problem there. The processes incorporates flotation, ammonia stripping, recarbonization-stabilization, sand filtration, foam fractionation, chlorination, and activated carbon filtration.

512. *Stepanyan, L. S.
*1969 *Observations on the falcon (Falco pelegrinoides babylonicus Sclater) in Central Asia (translated title). *Moskovskogo Obshchestva Ispytatelei Prirody Otdel Biologicheskii, Byulletin 74(6):37-48. BA(51)64100.
*New data are presented on the distribution, numerical abundance, nesting ecology, post-nesting and winter life habits in the USSR of the palearctic desert falcons of this group.

513. *Straesser, M.
*1968 *Grosse Salzsee Nordamerikas (Great Salt Lake of North America). *Erdkunde 22(4):284-294. MGA 20.9-767.
*Discusses river inflow, level and area fluctuations as related to climatic changes, water budget with reference to precipitation and evaporation, long term and annual fluctuations, groundwater inflow, salinity, sediments, marine life, and recovery of salt from the Lake.

514. *Strydom, N. B. et al
*1966 *The metabolic cost of marching at 3 mph over firm and sandy surfaces. *Internationale Zeitschrift f. Angewande Physiologie Einschliesslich Arbeitsphysiologie 23(2):166-171. BA(49)44160.
*Determined the energy cost of walking over sandy and firm surfaces, and compares the physiological responses of recruits recorded while walking over these surfaces. The average oxygen intake of 11 young men walking over loose sand carrying loads of about 50 pounds each as compared to walking on a firm surface shows an increase of 80 percent. Average pulse rate and rectal temperature were significantly higher during the march over sand. The increased physiological strain was obvious.

515. *Subrahmanyam, V. P.
*1967 *Incidence and spread of continental drought. *International Hydrological Decade, Reports on WMO/IHD Projects 2. 52 p. MGA 20.1-352.
*Presents the current status of research on problems associated with droughts in general and of continental drought in particular:

nature of drought phenomena and interpretation of aridity in the light of climatic classifications, definitions of drought and various concepts underlying formulation of such definitions, evolution and use of indices for the quantitative evaluation of drought magnitude, criteria employed, assessment of droughts with special reference to their incidence, spread, frequencies and persistence.

516. *T'ang, Hsi-K'o

*1961 *Relationship between distribution of vegetation and ground water in arid and semi-arid areas of China (translated title). *T'u Jang, Peking?, 7:34-38. Translated, 1968, by Joint Publications Research Service, and available CFSTI as JPRS 45823 (p. 43-53). MGA 20.11-654.

*Describes a surveyed 40 square kilometer area with an extremely arid climate (annual rainfall less than 10 mm) in the environs of T'o-k'o-sun Hsien, Sinkiang Province. The area included Gobi sand dunes and oases with depth to ground water fluctuating from one meter to several decameters. The relationship between vegetal cover and ground water is presented. Five main divisions of the area by depth-to-ground water and the corresponding plant cover are given. Each of these ground conditions and plant covers are discussed in relation to depth-to-ground water and salinity. Results of similar surveys of areas along the middle reaches of the Yellow River in Inner Mongolia are similarly presented and discussed. An annotated profile of vegetation and ground water level in the environs of Ho-shun-chuang along the intermediate shoals in Inner Mongolia is shown.

517. *Tanner, W.W./Banta, B.H.

*1966 *A systematic review of the Great Basin reptiles in the collections of the Brigham Young University and the University of Utah. *Great Basin Naturalist 26(3-4):87-135. BA(50)67445.

*One of a planned series of analyses of reptile specimens taken from the Great Basin and now deposited in the major institutional respositories of the western U. S. This report emphasizes the species occurring in the region and specimen locality data, and gives summarized data demonstrating variation of certain morphological characters. Seventeen lizards and 24 snakes are covered.

518. *Taylor, C. R.

*1968 *Hygroscopic food: a source of water for desert antelopes? *Nature 219(5150):181-182.

519. *--- ---

*1968 *The minimum water requirements of some East African bovids. *Zoological Society of London, Symposia 21:195-206.

*Several wild East African bovids are reported capable of surviving in arid regions without drinking. Minimum amounts of water required by eland, oryx, and Grant's gazelle, whose ranges include the hot arid sub-Sahara, are compared with the amounts required by buffalo, wildebeest, and Thomson's gazelle, whose ranges are limited by availability of water. Frequent droughts have provided a severe selection pressure for frugal use of water during the relatively short period in which zebu cattle

have been resident in East Africa. Thus the water requirements of these animals provide a yardstick for evaluating the rate at which water conserving mechanisms evolve. The development of these mechanisms is only one aspect of the complex of adaptations determining the limits of a specie's range.

520. *Taylor, C. R.
*1969 *The eland and the oryx. *Scientific American 220(1):88-95. *Survival without drinking is possible for these animals because their food contains almost all the water needed. Even in droughts the leaves of the acacia, the eland's preferred fodder, are 58 percent water. The leaves of a shrub, Disperma, and other fodder preferred by the oryx contain little water by day but may average 30 percent water at night. Thus the amount of water each animal can obtain by feeding is more than the animal needs for survival in a moderate environment when dehydrated, and closely approaches the quantities necessary for survival under desert conditions.

521. *--- ---
*1969 *Metabolism, respiratory changes, and water balance of an antelope, the eland. *American Journal of Physiology 217(1):317-320.
*The eland is a large East African antelope which can survive prolonged droughts in hot deserts without drinking. This ability is partly due to a low respiratory water loss relative to oxygen consumption at night. Each night the eland has a low body temperature, and as its temperature falls, its respiratory rate decreases while the amount of oxygen extracter from the inspired air increases. For a given rate of oxygen consumption, therefore, the volume of expired air and the amount of water lost through respiratory evaporation decreases.

522. *Terjung, W. H. et al
*1969 *Terrestrial, atmospheric and solar radiation fluxes on a high desert mountain in mid-July: White Mountain Peak, California. Solar Energy 12(3):363-375. MGA 21.2-117.
*Presents some of the major radiation data of a high desert mountain (approx. 14,000 feet elevation) peak during a typical day in mid-July. The daily amounts of solar radiation and net radiation exceeded most of those reported in the literature.

523. *Thole, G.
*1967 *Die Republik Mali. *Geographische Berichte 12(4):257-284. *English summary p. 283-284.

524. *Thomson, D.A./Mead, A.R./Schreiber, J.R.
*1969 *Environmental impact of brine effluents on Gulf of California. *U.S.Office of Saline Water, Research and Development Progress Report 387. 196 p. MGA 20.12-22.

*The establishment near the extreme northern end of the Gulf of California on the arid Colorado delta of a nuclear powered dual purpose desalination and power plant has been the subject of international discussion. The effluents at the lower yield of gallons per day would constitute a "river" of heated brine, certain to have an impact of uncertain magnitude on the physical environment and an unknown effect on the biota. Several recommendations growing out of the study of this group are described.

525. *Thrower, N. J. W.
*1970 *Land use in the southwestern United States from Gemini and Apollo imagery. Association of American Geographers, Annals 60(1):208-209 + Map Supplement 12.
*Gemini and Apollo satellite photography of the area, including the dry deserts of California eastward into Texas, is superior in quality to that of any major region of the U.S., exhibiting a diversity of land use characterized by aridity. It is probable that initial interpretation of land use abroad will be in similar environments where techniques developed from the examination of the southwestern U.S. will be most helpful. The land use map under review is at a scale of 1:1,000,000. It delineates cropland, hard rock mining sites and oil fields, grazing land, woodland and coniferous forests, airfields and ground transportation linkages, settlements, bodies of water, and the predominant land type of the area - desert.

526. Tibbitts, G. C., jr.
*1966 *Groundwater resources of Ash Shati' area, Kingdom of Libya. *U.S.Geological Survey, Open-file Report, July 1966. 184 p. SWRA 3(9)W70-03306.
*Flowing wells, springs, and dug wells yield water of fair to good chemical quality supply a string of oases in the area. The depression locally receives very infrequent runoff from ephemeral streams rising in the north, but never from the adjacent sand sea to the south. Precipitation averages about 5 mm annually, but in many years no rain falls. Sandstone of Devonian age is the important aquifer of the area. Contemporary recharge of groundwater is scant and infrequent. Discharge of water through wells and springs has increased, but about 43 percent is wasted. This excess causes waterlogging, and evaporation deposits salts in the soil sufficiently to alter soil structure and stunt or preclude growth of grops.

527. *Tinkle, D. W.
*1967 *Home range, density, dynamics, and structure of a Texas population of the lizard Uta stansburiana. In W. M. Milstead, ed., Lizard ecology, a symposium, p. 5-29. *University of Missouri Press, Columbia. BA(49)43828.
*In western Texas this species has an essentially annual population turnover and most of the properties of the population are adjusted to this fact. Immigration, emigration, and movements are limited. The home range is small.

528. *Travis, B.V./Lee, H.H./Labadan,R.M.
*1969 *Arthropods of medical importance in America north of Mexico. *U.S.Army Natick Laboratories, Technical Report 69-2-ES. 347 p.
*The occurrence of insects and other arthropods of medical importance in America north of Mexico is summarized on the basis of review of most of the available references in the scientific literature. Includes for each major group a listing of species and subspecies, with biological and distributional data, tabulations of diseases or disease organisms transmitted, and literature citations.

529. *Triumph Press, Inc.
*1966 *Map of Lake Powell, Colorado River, Glen Canyon area, Utah-Arizona. *Triumph Press, Inc., Los Angeles. Kym's Guide 27.
*Scale 1 inch to 5 miles. Descriptive text and illustrations on verso.

530. *--- ---
*1968 *Map of Baja California, Sea of Cortez (Gulf of California. *Triumph Press, Inc., Los Angeles. Kym's Guide 6.

531. *--- ---
*1969 *Map of the Colorado River, Lake Mohave. *Triumph Press, Inc., Los Angeles. Kym's Guide 5.
*Scale 1:62,500.

532. *Tromp, S. W.
*1969 *Integrated physiological research required in developing arid and semiarid countries, with special reference to the health and economic development of these areas. In C. C. Hoff and M. L. Riedesel, eds., Physiological systems in semiarid environments, p. 195-202. *University of New Mexico Press, Albuquerque. MGA 21.2-310.
*Integrated research and teamwork by meteorologists, physiologists, and other specialists will be needed to solve the many problems facing populations living in arid regions.

533. *Troxel, B. W.
*1968 *Possible relationship of faults in the Mojave Desert to the San Andreas fault. *Stanford University, Publications, Geological Sciences 11:281. (Abstr.)

534. *Tunisia, Service de la Météorologie Nationale
*1969 *Probabilité des pluies en Tunisie. Its Etudes Météorologiques 1. 37 p. charts.
*Precipitation probabilities based on data acquired by 80 synoptic, climatological, and pluviometric stations, 1931-1960. Diagrams shown by percent, year, and season, with chart of annual norms.

535. *Turner, F. B. et al
*1969 *Density and composition of fenced populations of leopard lizards (Crotaphytus wislizenii) in southern Nevada. *Herpetologica 25(4):247-257. BA(51)58806.
*This species exists in Rock Valley, Nevada, at low densities sustained by good adult survival and maximal life-spans of at least 7-8 years. Adult males have a higher rate of survivorship. One clutch of eggs per year is typical, but occasionally 2 clutches may be laid, or none.

536. *--- ---
*1969 *A demographic analysis of fenced populations of the whiptail lizard, Cnemidophorus tigris, in southern Nevada. *Southwest Naturalist 14(2):189-201. BA(51)47157.

537. *Tuttle, D.M./Baker, E.W.
*1968 *Spider mites of southwestern United States and a revision of the family Tetranychidae. *University of Arizona Press, Tucson. 143 p.
*125 line drawings illustrate characteristics of 40 new species, with a bibliography, index of spider mites, and index to genera of host plants.

538. *Uhlig, D.
*1969 *Koenig-Faisal-Projekt Haradh: Ein Siedlungsvorhaben in der Wueste Arabiens (King Faisal Haradh Project: a settlement project in the Arabian Desert). *Wasserwirtschaft 59(6):171-176. MGA 21.1-660.
*Brief discussion of soil and climate in the Wadi as Sobha area, with data on the water requirements and supply, irrigation system, water drainage, agriculture, settlement and transportation.

539. *U.S.Agency for International Development
*1970 *A.I.D. economic data book: Africa. *U.S.Agency for International Development, Washington, D. C., Statistics and Reports Division. 341 p. Available CFSTI as PB-190 284.
*Revision of 1968 report (PB-180 910). A general reference for the area, with information on political divisions, population trends, production, trade, foreign exchange, education.

540. *--- ---
*1970 *A.I.D. economic data book: Latin America. *U.S.Agency for International Development, Washington, D. C., Statistics and Reports Division. 321 p. Available CFSTI as PB-190 286.
*Revision of 1968 report (PB-180 908). Includes Argentina, Chile, and Peru, and Mexico. Covers general information and data on population and production, trade and investment, foreign exchange, education, as well as agriculture, minerals, and power.

541. *--- ---
*1970 *A.I.D. economic data book: Near East and South East. *U.S.Agency for International Development, Washington, D. C., Statistics and Reports Division. 243 p. Available CFSTI as PB-190 287.
*Revision of 1968 report (PB-180 909). Includes general information and data on population, production, trade, education, as well as agriculture, industrial production, and power.

542. *U.S.Air Weather Service
*1967-1969 *U.S.Naval Weather Service world-wide airfield summaries. V: Australia, South Pacific, Antarctica. VI(1): South America (Argentina, Brazil, Uruguay). VII: Central America (Mexico, etc.). VIII(2): U.S.A. (Rocky Mountains and Northwest Basin). *U.S.Environmental Science Services Administration, Ashville, North Carolina. MGA 19.5-40, 19.8-455, 21.2-294.
*Almost entirely data. Parts of a series of compilations including climatological summaries for selected airports and for the climatic areas in which they are located. Presented by country, then arranged according to numbered climatic area and by increasing WMO Station Index Numbers. Glossary of terms, and locator list of stations.

543. *U.S.Army Electronics Research and Development Activity, Ft. Huachuca, Arizona

*1968 *United States Army Meteorological Team Data (RDT&E Spt), Yuma Proving Ground, Arizona, Central Meteorological Observatory, November 1968. *U.S.Army Electronic Research and Development Activity, Ft. Huachuca, Arizona Meteorological Support Activity. 66 p. MGA 20.11-94.

*Tables. Meteorological data include wet bulb global temperature, wind direction and speed, snow-soil temperature, temperature gradient and ozone; precipitation, station pressure, psychrometric, and solar radiation observations; wind rose; daily maximum wind gust; hourly average for the month; and a monthly climatological summary.

544. *U.S.Department of State, Bureau of Public Affairs, Office of Media Services

*1966-*Background notes:

1968 Angola. Rev. ed., 1967. Publication 7962. 5 p.
Chad. Rev. ed., 1966. Publication 7669. 5 p.
Chile. Rev. ed., 1968. Publication 7998. 6 p.
Ethiopia. Rev. ed., 1968. Publication 7785. 5 p.
Kenya. Rev. ed., 1968. Publication 8024. 6 p.
Muscat and Oman. Rev. ed., 1968. Publication 8070. 4 p.
Peru. Rev. ed., 1968. Publication 7799. 5 p.
Saudi Arabia. Rev. ed., 1967. Publication 7835. 4 p.
Yemen. 1968. Publication 8170 4 p.
Yemen, Southern. 1968. Publication 8368. 4 p.

545. *U.S.Environmental Sciences Services Administration, Environmental Data Service

*1968 *Climate atlas of the United States. *U.S.Environmental Sciences Services Administration, Environmental Data Service, Washington, D. C. 80 p. MGA 20.3-29.

*Presents a series of analyses showing the national distribution of mean, normal, and/or extreme values of temperature, precipitation, wind, barometric pressure, relative humidity, dewpoint, sunshine, sky cover, heating degree days, solar radiation and evaporation. The map projection has been standardized to allow accurate comparison and correlation of the various climatic elements and their patterns.

546. *--- ---

*1968 *World weather records, 1951-1960. 6: Antarctica, Australia, oceanic islands, and ocean weather stations. U.S.Environmental Sciences Services Administration, Washington, D. C. 605 p. MGA 20.3-37.

*Sixth and last volume of the 1951-1960 data. Tables of mean monthly and mean annual pressure, temperature, and precipitation are prefaced by editorial notes on sources of data, grouping of stations and arrangements of data, adjustments for homogeneity,

conversion of units, and methods of averaging. Station notes are given for each group of stations. Conversion tables, alphabetical indexes by area or country and by 10-degree bands of latitude, and maps of Antarctica, and the Indian, Atlantic, and Pacific Oceans are appended.

547. *U.S.Geological Survey
*1968 *Aeromagnetic map of the Hot Creek Range region, south-central Nevada (scale 1:250,000). U.S.Geological Survey, Geophysical Investigations Map GP-637.

548. *--- ---
*1968 *Ground-water levels in the United States, 1961-65: Northwestern states. *U.S.Geological Survey, Water-Supply Paper 1845. 199 p.

549. *--- ---
*1968 *Ground-water levels in the United States, 1961-65: Southwestern states. *U.S.Geological Survey, Water-Supply Paper 1855. 125 p.

550. *--- ---
*1969 *Map of flood prone areas (in Arizona). *U.S.Geological Survey.
*Flood prone areas overlaid on the following 7.5' quadrangles: Fowler, Paradise Valley, Phoenix, St. Joseph, Tempe, Tucson, and Winslow. Scale 1:24,000.

551. *--- ---
*1969 *Water resource investigations in Texas. *U.S.Geological Survey.
*Scale ca. 1:3,000,000. Selected references on verso.

552. *Utah, University of, Ecology and Epizoology Research Group
*1969 *A study of the ecology and epizoology of the native fauna of the Great Salt Lake Desert, 1968. Annual summary review. *University of Utah, Ecology and Epizoology Research Group, Report 145. 248 p. Available CFSTI as AD-700 149.
*During 1968 over 5,000 vertebrates were collected and processed for disease analysis, including rodents, other mammals, and birds. In addition, some 6,700 ectoparasites associated with these animals were collected, including ticks, fleas, mites, and lice. Topics discussed covered ecological investigations of the native fauna, disease ecology investigations, improvement of diagnostic techniques research, and faunal development.

553. *Van Husen, C.
*1967 *Klimagliederung in Chile auf der Basis von Haeufigkeitsverteilungen der Niederschlagssummen (Climate classification in Chile on the basis of frequency distribution of precipitation totals). *Freiburger Geographische 4. 133 p. MGA 20.2-14.
*The precipitation conditions in Chile are investigated and a criterion for the climatic classification developed on the basis of frequency analysis of the monthly precipitation. The precipitation aggregates were formed out of the separate precipitation totals for the 3 months each of summer and winter. Of the zones distinguished from one another by definite hydric characteristics is the zone of total annual drought (30 degrees to the equator).

554. *Van Rooy, M.P.
*1966 *Regional analysis of South African rainfall for the 12-month calendar period ending June 30. *South Africa, Weather Bureau, Notes 15(1-4):13-28. MGA 19.9-505.
*An anomaly index measuring the relative local degree of rainfall abnormality is used to analyze the rainfall over South Africa for a time unit of 12 months ending June 30. Informative regional patterns are obtained of the probability distribution for exceptionally dry, wet, and normal periods, and of the anomaly index distribution for outstanding dry and wet periods.

555. *Van Zyl, F.D.W.
*1967 *Water resource planning in Australia. *Tijdschrift voor Economische en Sociale Geographie 58(6):306-315.
*Examines the Snowy Mountains and the Ord River schemes.

556. *Vazhev, A.P. et al
*1968 *Epizooty of plague in southeast Kara Kum, 1964 (translated title). *Akademiia Nauk Turkmeniya SSR, Izvestiya, ser. Biologicheskikh Nauk 1:73-78. CBE 31:90-91.
*A schematic map of the local epizooty of plague first observed among great gerbils in the Kara Kum Desert in 1964 is shown. This epizooty, characterized by microfoci consisting of one or several gerbil colonies, was presumed caused by unfavorable conditions in the preceding winter (low temperatures and late snows). It was most active in the central part of the designated area. Despite high rodent population, percentage of infection was not high, probably due to the chronic nature of the infection, low incidence of infection in gerbil fleas, and lack of contact between colonies because of thick vegetation.

557. *Venkataraman, S./Krishnamurthy, V.
*1967 *Radiation climate over India. *Indian Journal of Meteorology and Geophysics 18(1):39-44. MGA 19.4-246.
*Use of data of bright hours of sunshine to estimate radiation receipt is examined. Monthly normal radiation maps based on estimated solar radiation values for 52 stations are presented.

558. *Verstappen, H. T.
*1968 *On the origin of longitudinal (seif) dunes. *Zeitschrift f. Geomorphologie n.f. 12(2):200-220.

559. *Viala, R.
*1967 *L'établissement de la saison des pluies à Bamako et dans le Mali pendant l'année 1962. *Annales de Géographie 76(413):60-74.
*Buildup of the rainy season in Mali varies. In 1962 precipitation developed very irregularly, both in time and space. Mali was for some time in the oscillation zone of the intertropical front. Most rains have issued from tornados. These disturbances, the violence of which lessens as the intertropical front moves north, seem to be associated with the mobility of the front activated by the surges of the monsoon. Their frequency and the activity of the squall line accompanying them determine the characteristics of this intermediate period, the volume and distribution of the precipitations as well as the distribution of temperature.

560. *Vinogradov, B.V.
*1967 *Principal trends in the development and use of aerial methods for the multi-discipline study of the arid zones of the USSR (translated title). *Problemy Osvoyeniya Pustyn (2):37-46. CBE 32:110.
*Aerial survey methods and photointerpretation techniques used chiefly by the Aerial Methods Laboratory in studying desert areas of the USSR are described, including scales at which photography is taken for various areas, purposes, seasons, and times of day. Extensive aerial survey coverage and a multiplicity of photointerpretation keys have been developed. A five-step program for future operations covers all aspects of photogrammetric and aerial surveying procedures used in mapping desert terrain: botanical, soil, geological, geomorphological, and hydrological investigations.

561. *Vitale, C. S.
*1968 *Annotated bibliography on the climate of French Somaliland. *U.S.Environmental Data Service, WB/BC-101. 34 p. MGA 20.6-32.
*A total of 47 items, with abstracts, compiled from available sources containing climatological and meteorological data for the area. A natural scale indicator has been employed to obtain scales, in the absence of printed information. Chronological arrangement, with author and subject index.

562. *Wallace, C. N.
*1969 *Water out of the desert. *University of Texas, El Paso, Southwestern Studies 22. 48 p., maps.
*An historical survey of water resources and their development and future potential in the El Paso, Texas, vicinity.

563. *Wallén, C. C.
*1966 *Arid zone meteorology. In E. S. Hills, ed., Arid lands: a geographical appraisal, p. 31-51. *Methuen, London.
*Discusses macroclimatic and microclimatic influences, Penman's and Thornthwaite's methods, Koeppen's classification, and the Meigs map. The concluding section on human interference presents well-known facts on deforestation, phreatophytes, rainmaking, and evaporation suppression.

564. *--- ---
* 1966 *Agroclimatological studies in the Levant. In Agroclimatological methods: Proceedings of the Reading Symposium, 1966, p. 225-233. *UNESCO, Paris. MGA 20.11-61.
*Discusses a general approach to the problem, available data, methods of analysis used, and general conclusions reached. Special attention was paid to problems of water balance, using Penman's potential transpiration calculations satisfactorily. Methods of representing the variability of climate factors are discussed. Comparisons of the Levant climate with that in other areas of the world are made, and the agricultural implications of climate are summarized.

565. *Waller, P. P.
*1967 *Vorlaeufiger Bericht ueber eine Reise nach Afghanistan: Hilmend-und Nangahar-Bewaesserungs projekte (Preliminary report on a journey to Afghanistan: Hilmend and Nangahar Irrigation projects). *Erde 98(1):61-70. Maps.

566. *Ward, P.
*1967 *Touring Libya: the western provinces. *Faber and Faber, London. 102 p.
*A guide to Tripolitania, Sabratha Farwa, Nlub, Zliten, and Ghadames.

567. *--- ---
*1968 *Touring Libya: the southern provinces. *Faber and Faber, London. 103 p. Maps.

568. *Watt, G. A.
*1967 *An index of comfort for Bahrain. *Meteorological Magazine 96(1144):321-327.
*Discusses summer climate of Bahrain in terms of human comfort, an assessment obtained by working out values of effective temperature.

569. *Watt, G. A.
*1968 *A comparison of effective temperatures at Bahrain and Sharjah. *Meteorological Magazine 97(1155):310-314. MGA 20.9-63.
*Extends investigation of effective temperature at Bahrain (see #568, above) to Sharjah and compares the results with those at the former. Data used cover the period 1962-1966. The results suggest that Sharjah has a slightly more pleasant climate than Bahrain during the summer months because of the prevalence of a dry katabatic wind during the morning. Conditions at both places during the afternoon are largely comparable in spite of a greater average wind speed at Sharjah.

570. *Weir, J. S.
*1968 *Seasonal variation in alkalinity in pans in central Africa. *Hydrobiologia 32(1-2):69-80. BA(50)17692. SWRA 2(20)W69-08301.
*The alkalinity and pH of pans on Kalahari sand varies with the physical nature of the pan, the range being attributable to local soil differences. Some pans have been deepened or had water pumped into them to provide drinking points for game animals. The alkalinity of "pumped" pans is determined by the alkalinity of the water pumped in and when this took place. There is no correlation between variations in the numbers of game animals recorded at pans with differences in bicarbonate alkalinity. Fish, turtles, or insects living either in permanent or temporary pans have to withstand a wide range of alkalinity fluctuation during the year.

571. *--- ---
*1969 *Studies on central African pans. III: Fauna and physico-chemical environment of some ephemeral pools. *Hydrobiologia 33(1):93-116. BA(50)96234.
*A continuation of the studies described for #570, above.

572. *Wells, P. V.
*1970 *Postglacial vegetational history of the Great Plains. *Science 167(3925):1574-1582.
*Radiocarbon-dated macrofossil and pollen records from the plains region of central North America indicate that areas now occupied by grassland or desert vegetation were wooded during the Wisconsin glacial stage. Fossil pollen sites in present deserts include the Llano Estacado, and the Laramie Basin in southeastern Wyoming.

573. *Went, F. W./Slemmons, D.B./Mozingo, H.N.
*1967 *The organic nature of atmospheric condensation nuclei. *National Academy of Science, Proceedings 58(1):69-74. BA(50)73548.

*Both in a desert and in a montane forest, where no air pollution through human activities exists, large numbers of solid condensation nuclei are formed every day. In the photochemical condensation process of molecularly dispersed terpenes in the atmosphere, carbon-like so-called "combustion nuclei" are formed that cluster together into microscopically visible condensation nuclei.

*574. *Werner, Y. L.
*1968 *Distribution of the Saharan Spheonops sepsoides (Reptilia: Scincidae) in Israel and Jordan. Herpetologica 24(3): 238-242. BA(50)73065.
*This species of skink occurred in 3 or the 4 sandy areas of Israel. Its eastern range limit, as known to date, is in the Wadi Arava, and the northern at Atlit. The occurrence of this north African lizard in the Wadi Arava necessitates the postulation of a connection (at least in the past) between the sands of northern Sinai and those of the Wadi Arava. The latter's dunes are bisected by the Israel-Jordan frontier, so the observations reported here warrant the addition of this species to the fauna of Jordan.

575. *Westbrook, J. H.
*1969 *Relationship of hourly durations to the daily maximum temperature. *U.S.Army Natick Laboratories Technical Report 69-87-ES. 8 p.
*Durations of temperatures within 10 degrees F of the maximum for 365 hot summer days from the upper Midwestern U.S. are compared with those at Yuma, Arizona, and found to be similar.

576. *Wheeler, S. S.
*1968 *The desert lake: the story of Nevada's Pyramid Lake. *Caxton Printers, Caldwell, Idaho. 133 p., maps.

577. *Whetstone, G. A.
*1970 *Interbasin diversion of water: an annotated bibliography. Prepared for *Water, Inc., Lubbock, Texas, as *Texas Tech University, Water Resources Center, Contribution 70-2. 323 p.
*Abstracts of 1,020 references, with the emphasis on those portions of articles cited dealing with interbasin diversion. Chronological arrangement, with author and geographic indexes, the latter of great value. A second volume is in preparation.

578. *White, G. F.
*1967 *Changing role of water in arid lands. *Arizona Review 16(3):1-8.

579. *Whittow, G. C.
*1967 *Climatic effects on physiological functions. *American Association for the Advancement of Science, Publication 86:233-246. NGA 19.7-68.

*Deals with the physiological control of the mechanism of heat loss and the physiological consequences of the activation of these thermo-regulatory devices. Conclusions indicate that the heat-loss mechanisms of the ox can be activated by heating the skin alone, the heat-loss center in the hypothalmus alone, or the skin-heat loss center-and other tissues simultaneously. These changes are likely to be of considerable importance to an understanding of how well animals withstand a hot environment.

580. *Whyte, R. O.
*1966 *Use of arid and semi-arid land. In E. S. Hills, ed., Arid lands: a geographical appraisal, p. 301-361. *Methuen, London. MGA 19.11-505.
*The factors to be considered in land classification are grouped by independent variables such as geomorphology, geology, and climate, and dependent variables such as soil, water, and vegetation. The latter change in relation to each other and to the 3 independent variables. In this paper data on the 6 variables are synthesized, and land units and systems are indicated. Land use along humidity gradients, conservation and management of vegetation, animal and crop husbandry, hybrids for the semi-arid zone, and trees in the desert are subjects of the other sections.

581. *Williams, G. E.
*1969 *Flow conditions and estimated velocities of some central Australian stream floods. *Australian Journal of Science 31(10):367-369. MGA 21.1-646.
*In the Outback roads are rendered impassable at the first downpour; consequently, velocities and discharges are unknown for most central Australian floods. A study of some of the sandy channels in the Lake Eyre basin made following the 1967 floods indicated that the relation of bed forms and flow regimes to the Froude number could be used in estimating maximum velocities in some ungaged streams. Measured velocities and gage heights for the Todd River at Alice Springs and corresponding F values are tabulated. Large-scale ripples present in the sandy bed of the river at the recession of the flood were similar to those most common in the sandy channels of the Lake Eyre basin.

582. *Williams, M. A. J.
*1968 *A dune catena on the clay plains of the west central Gezira, Republic of the Sudan. *Journal of Soil Science 19(2):367-378. BIGENA(32)E68-16251.
*Fixed dunes occupying 400,000 acres in the west central Gezira probably originated as channel deposits laid down by former distributaries of the Blue Nile. Minor eolian re-sorting took place, followed by plant colonization and dune stabilization. Erosion of the dunes is locally active, resulting in exposure of the underlying clays. The catena comprises leached sands on the dune crests and illuvial loams and clays in the swales.

583. *Winkler, E.
*1968 *Die Besaesserungswirtschaft im Tunesischen Medjerdatal. *Oesterreichische Geographische Gesellschaft, Mitteilungen 110(1):79-84. Maps.

584. *Wollman, N.
*1968 *The water resources of Chile: An economic method for analyzing a key resource in a nation's development. *Johns Hopkins Press, Baltimore. 279 p. SMRA 2(5)W69-01654, 3(2)W70-00699.
*The water resources of Chile are examined in detail because of a long tradition of irrigated agriculture and the availability of better hydrological data than can be found elsewhere in Latin America. Treated are such topics as use of water for irrigation projects, projection of agricultural water use, waste treatment, costs, quality, and geography. There is no foreseeable water shortage if supplies are compared with projected requirements, but there will be local shortages in drier irrigated areas in the north.

585. *Wulff, H. E.
*1968 *The qanats of Iran. *Scientific American 218(4):94-100. *Underground aqueducts provide 75 percent of the water used in Iran.

586. *Wyndham, C. H. et al
*1967 *Physiological reactions of desert Bushmen in hot-dry and hot-humid conditions. *Internationale Zeitschrift f. Angewandte Physiologie Einschliesslich Arbeitsphysiologie 24(4):315-319. BA(49)45743.
*A hot-humid environment may be used to study physiological reactions of desert dwellers, and to compare them with the reactions of other populations.

587. *Young, R.A./Martin, W.E.
*1967 *The economics of Arizona's water problem. *Arizona Review 16(3):9-18.

588. *Zakharov, P. S.
*1966 *Kharakteristika i geograficheskoe rasprotsranenie pyl'nykh bur' (Characteristics and geographic distribution of dust storms). *Mezhvedomstvennyi Nauchnyi Sbornik: Meteorologiia, Klimatologiia, Gidrologiia 2:19-23. MGA 18.11-356.
*The dust or black storms observed frequently in arid regions are described, and a map showing their frequency in the agricultural zone of the USSR is presented.

589. *el-Zarka, S. el-D.
*1968 *Rehabilitation of the fisheries of an inland saline lake in the United Arab Republic. *Gen Fish Council, Mediterranean Studies Review 35:21-43. BA(50)62396.
*Lake Karoun has recently undergone drastic chemical changes which have increased salinity progressively to its present range between 19 and 29 ppm, due to slightly brackish drainage water entering the lake, and high evaporation. Because of the unfavorable effect on most of the fresh-water original fish fauna, the commercial catch dropped from 4,000 tons in 1920 to an average of 1,000-2,000 tons in subsequent years. To compensate, the lake was stocked with fish of marine origin, some species of which succeeded in spawning, and their production now constitutes 46.7 percent of the total catch. Others are unable to breed and their fry have to be transplanted continuously. The catch data for the period 1961-1966 is analyzed to determine seasonal fluctuation and regional distribution.

590. *Zimmerman, R. C.
*1969 *Plant ecology of an arid basin, Tres Alamos-Redington area, southeastern Arizona: Vegetation and hydrologic phenomena. *U.S.Geological Survey, Professional Paper 485-D. 51 p. MGA 20.12-65.
*Geology, stream flow, and vegetation of the 750 square mile San Pedro Valley in the basin and range physiographic province with an average annual rainfall of 12 inches are described. The study reveals that drainage area, geology, and flow regimen are probably the 3 most important controls in the distribution of valley-floor vegetation. With increasing drainage area, the valley floor widens, and aquifers in the alluvium sustain base flows. Given an optimum combination of valley-floor width, thickness of alluvium, and sustained flows, the vegetation may be a closed-canopy forest of cottonwood, willow, ash, sycamore, walnut, and hackberry. Variations in the plant cover can thus be explained in terms of current conditions or processes, though the processes may occur either frequently or infrequently.

591. *Zubenok, L. I.
*1965 *Worldwide evaporation maps (translated title). *Glavnaya Geofizicheskaya Observatoriya, Leningrad, Trudy 179:144-160. Edited machine translation available CFSTI as AD-684 655.
*World maps are given showing evaporation for the year and for each separate month for 1,460 points located on all continents except Antarctica and mountainous regions, showing evaporation zonally distributed outside the tropical latitudes. Deviations are observed close to shore lines where cyclonic and monsoon circulation develops because of a reduction in radiation balance for these territories. Distribution of evaporation in the tropical latitudes depends mainly on the distribution of the radiation balance. A maximum evaporation of more than 250 cm per year is observed in the Sahara. Spring and fall maxima are observed in the equatorial latitudes.

592. *--- ---
*1966 *Rol'isparenija v teplovom balanse sushi (Role of evaporation in the heat balance of land surfaces). In M.I.Budyko, ed., Sovremennye problemy klimatologii, p. 57-66. *Gidrometeoizdat, Leningrad. MGA 18.12-236.
*Analyzes the role of evaporation in heat balance and discusses moisture conditions of continents in relation to the ratio of evaporation to evaporativity. Results obtained with Budyko's method based on the interrelationship between components of the heat and water balances discussed and presented in maps and graphs, show that evaporation accounts for the principal part of the heat in the heat balance in humid regions, and reduces to practically zero in tropical deserts.

593. *Zumwalt, E. V.
*1969 *The last frontier: America's arid public lands. *Arizona Review 19(12):1-5.
*Adapted from a paper delivered at the International Arid Lands Conference, University of Arizona, June 1969, the article concerns the potential, use, and management of America's arid lands, particularly those public lands under federal control.

594. *Zwittkovits, F.
*1966 *Die Karstformen im Wadi Garawi (Arabische Wueste, Agypten)(Karst features in the Garawi wadi, Arabian Desert, Egypt). *Oesterreichische Geographische Gesellschaft, Mitteilungen 108(2-3):287-295. BIGENA (32)E68-16119.
*Karst forms in this area and their formation are discussed, along with short summaries of the geologic setting and climatic conditions in the area, an east-west depression 40 km long; of the effects of chemical weathering in arid regions; and of the chemical versus eolian formation of sculptured boulders in the area.