

Autopsy of three of the animals failed to reveal any macroscopic hæmorrhages in the nervous system. The marked atrophy of all the thigh muscles, especially of the extensors, was confirmed.

There was a superabundance of carotene in the diet (yellow maize) and there was no evidence in the eyes or the teeth of any vitamin A deficiency. The colour of the teeth was, if anything, better than that of the normal control animals. This point is of importance, since Irving and Richards¹ have reported that degenerative changes are observed in the nervous system of rats on a vitamin A deficient diet. In their experiments, however, the chief changes were seen in the medulla.

At no stage in the development of the paralysis was there any evidence of a peripheral neuritis such as might be attributable to an aneurin (vitamin B₁) deficiency, namely, pain and tenderness of the affected limbs when these were palpated. Moreover, clinically the syndrome of progressive paralysis did not resemble the paralysis produced by vitamin B₄ deficiency in rats^{2,3}. B₄ deficiency in rats results in the adoption of a hunched position 'walking high' on the hind-legs with a progressive loss of co-ordination³.

It appears unlikely that vitamin C can be involved in the production of this syndrome.

α -tocopherol, whether given by mouth or by injection in the form of the acetate, at the stage when foot-drop was noticed, was unable to arrest the steady progression of the weakness.

The possibility still exists that some other component of the E complex may be involved. In view of the fact that whole maize was used it appears unlikely that the diet could have been E deficient, in spite of the fact that clinically the syndrome fairly strongly resembles the picture of vitamin E deficiency. In any event the paralysis is unlikely to be due to an α -tocopherol deficiency.

The possibility remains that the lesions may be due to marked vitamin D deficiency in one of two ways:

(1) Vitamin D may be necessary for the proper nutrition of the nervous system.

(2) Since the paralysis so far has been observed only in severely rachitic rats, the lesion may be

secondary to a mechanical complication as a result of the rachitic process having affected the vertebrae, especially in the lumbar region. I am indebted to Dr. N. Sapeika for this suggestion.

It is of interest to note that Greenberg, Boelter and Knopf⁴ reported observations on rats on a low calcium diet which accorded with the description of neurological lesions in rachitic rats described by Boer, Arons and van der Ryst⁵. Van der Ryst and Arons⁶ also used the Steenbock No. 2965 diet, and they described paralysis and hæmorrhages in the nervous system in 75 per cent of rachitic rats on this diet. They did not conclude, however, that the symptoms were due to lack of vitamin D.

The simplicity and the purity of the diet used in the experiments recorded in this note render it unlikely that the syndrome observed is due to a poison or toxin.

It remains possible that the symptoms resulted from protracted vitamin D deficiency, or that some other vitamin is necessary for the proper nutrition of the nervous system. Although it seems most unlikely that the vitamin E complex is involved here, it should be noted how closely the paralysis described in these experiments resembles the paralysis seen in the hind limbs in vitamin E deficiency. On this rachitogenic diet the forelimbs were never affected. This is unlike vitamin E deficiency paralysis.

Further studies on the histology of the nervous system and the affected muscles, as well as of the prophylactic role of vitamin D and certain other vitamins, are in progress.

I wish to thank Prof. W. F. Rhodes for his interest in this investigation. The photographs are 'stills' taken from a moving picture record made by Mr. L. Lewis.

¹ Irving, J. T., and Richards, M. B., *J. Physiol.*, **94**, 307 (1938).

² Reader, V., *Biochem. J.*, **24**, 1827 (1930).

³ Kline, O. L., Elvehjem, C. A., and Hart, E. B., *Biochem. J.*, **30**, 780 (1936).

⁴ Greenberg, D. M., Boelter, M. D. D., and Knopf, B. W., *Science*, **89**, 18 (1939).

⁵ Boer, J., Arons, P., and van der Ryst, M. P. J., *Arch. Neerl. Physiol.*, **22**, 594 (1937).

⁶ Van der Ryst, M. P. J., and Arons, P., *Arch. Neerl. Physiol.*, **23**, 592 (1938).

FORESTRY IN BALUCHISTAN

THOSE who have visited Baluchistan, even if such a visit was confined to Quetta only, will know that most of the country, the total area of which is 126,000 square miles, of which 53,000 square miles are under British administration, is mountainous with broad upland valleys and that there is a striking lack of trees and a general absence of vegetation. Barren, sunburnt, rugged hills scored by rocky precipitous gorges, the slopes with scattered dots representing juniper or olive stunted trees, alternate with bare stony plains. Parts of this country, as is the case with the adjacent Seistan and Iran, are fertile enough once water can be brought to them. The rainfall is low, 5-15 in. (the latter in the highlands), but is not so deficient that it could not support, and did once support, a better type of vegetation. Examples are noted of forests having disappeared within the last fifty years, notably around Quetta and near the

railway, around Fort Sandeman and Loralai, near Tomagh State Forest, and so forth. It is held that desert conditions are advancing from the west and that these conditions are due to the improvident and unchecked habits and actions of the population—felling, lopping, bark stripping, and excessive and continuous goat browsing, in which the nomads are probably the worst offenders. Erosion is very severe, and one stream which has been under observation is reported as carrying away as much as 450 tons of soil in an hour. Many of these facts have been known for the last three or four decades, but they have never received really serious attention by the administration, and such forest service as there has been has been negligible and of inferior status.

Attention has been directed to the present position of affairs in a "Note on a Tour of Inspection of Baluchistan" by S. H. Howard, acting inspector

general of forests (Government of India Press, Simla, 1940), and the report comes none too soon if the remnant of vegetation and the forests in the highlands are to be saved from extermination.

It is a curious reflection on British administration that in so many parts of the world at the present day the similar problem of the man-made desert being brought about by the unchecked acts of the people upsetting to the ordinary laws of Nature is presenting itself to the British administrator.

Juniper (*Juniperus macropoda*, Boiss.) is one of the chief species of the country, and there are remnants of an old forest at Ziarat. The wood of this tree could, says Mr. Howard, be used for pencils, slate frames, picture frames, and so forth, for which a sale might be developed, or a local factory might pay. This presupposes that a greater protection of the forests is introduced by Government and that the Government forest area should be raised from 0.6 per cent of the country (its present extent) to something nearer 20 per cent. Other tree species are olive (*Olea ferruginea*) and khanjak (*Pistacia Khinjuk*). Of these, rough statistics appear to show that a juniper takes 40–180 years to grow one foot in girth (a 6-ft. tree is 250–1000 years old), an olive coppice shoot about 35 years to grow one foot girth, and a khanjak about 25 years. The principal minor product is Ephedra, but Artemisia, Hyoscyamus, Datura, juniper berries and perhaps Pyrethrum are other possibilities. In the highlands one of the chief species is the beautiful chilghoza or silver-barked pine (*Pinus Gerardiana*).

Of course, in so dry a country fuel becomes an important problem. There appears to have been a great development in its supply during the last few years with a corresponding high level of expedition in extraction. This scheme would be disquieting in so barren a country, and Mr. Howard makes recommendations which would certainly appear to be required, that a chief forest officer from the Imperial Forest Service should be appointed, and that the forestry question in Baluchistan should be treated as a question which has become of serious importance if the conditions of life of the population are to be improved instead of the country being permitted to fall into a state of greater desiccation and denudation.

FORTHCOMING EVENTS

[Meeting marked with an asterisk is open to the public.]

Saturday, March 22

ROYAL PHOTOGRAPHIC SOCIETY (Scientific and Technical Group) (at 16 Princes Gate, London, S.W.7), at 3 p.m.—I. Annual General Meeting; II. "Airscrew", a 16 mm. Sound Film, illustrating Design, Manufacture, Precision, etc.; III. A Demonstration of some Captured German Cameras by a Service Officer.

Tuesday, March 25

ROYAL INSTITUTION (at 21 Albemarle Street, London, W.1), at 2.30 p.m.—Sir James Jeans, F.R.S.: "The Physical Condition of the Planets".*

ROYAL ANTHROPOLOGICAL INSTITUTE (at 21 Bedford Square, London, W.C.1), at 3 p.m.—Miss B. Blackwood: "Some Arts and Industries of New Guinea and New Britain" (Films).

Wednesday, March 26

ROYAL SOCIETY OF ARTS (at John Adam Street, Adelphi, London, W.C.2), at 1.45 p.m.—Sir Richard Gregory, Bart., F.R.S.: "Discovery and Invention" (Aldred Lecture).

Thursday, March 27

BRITISH PSYCHOLOGICAL SOCIETY (Industrial Section) (at 55 Russell Square, London, W.C.1), at 1.20 p.m.—Dr. Marie Jahoda: "Some Remarks on Incentives to Work".

Friday, March 28

ASSOCIATION OF APPLIED BIOLOGISTS and SOCIETY FOR EXPERIMENTAL BIOLOGY (Joint Meeting at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1), at 12 noon.—Discussion on "The Relationship between Pure and Applied Biology". 12.5 p.m.—Prof. P. A. Buxton: Opening Address. 12.35 p.m.—Prof. W. B. Brierley will speak from the Botanical side. 2.15 p.m.—Dr. V. B. Wigglesworth, F.R.S.: "Malaria and War". 3 p.m.—Dr. M. A. H. Tincker: "Aspects of the Application of Growth Substances to Practice".

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS (at the Mining Institute, Newcastle-upon-Tyne), at 6 p.m.—Mr. W. T. Bottomley: "The Economics of the Design of Condenser Plant and Cooling Water Systems, applicable to Power Stations".

APPOINTMENTS VACANT

APPLICATIONS are invited for the following appointments on or before the dates mentioned:

PRINCIPAL OF THE LEEDS COLLEGE OF TECHNOLOGY—The Director of Education, Education Department, Calverley Street, Leeds 1 (March 29).

TEACHER OF SPEECH TRAINING in the Aberdeen Education Committee's Schools—The Director of Education, Education Offices, Municipal Buildings, Castle Street, Aberdeen (March 29).

LECTURER IN MECHANICAL ENGINEERING SUBJECTS in the Schools of Technology, Art, and Commerce, Oxford—The Chief Education Officer, City Education Office, 77 George Street, Oxford (April 2).

HEAD OF THE MECHANICAL AND CIVIL ENGINEERING DEPARTMENT of Sunderland Technical College—The Secretary, Technical College, Sunderland (April 5).

ASSISTANT PROFESSOR IN THE DEPARTMENT OF GLASS TECHNOLOGY—The Registrar, The University, Sheffield (April 18).

UNIVERSITY LIBRARIAN—The Registrar, The University, Sheffield (April 18).

PROFESSOR OF ZOOLOGY at Bedford College for Women—The Academic Registrar, Royal Holloway College (University of London), Engelfield Green, Surrey (April 21).

ASSISTANT LECTURER IN PHYSIOLOGY—The Secretary, The University, Edmund Street, Birmingham 3 (April 25).

RADIUM OFFICER—The Secretary, Radium Institute, 1 Myrtle Street, Liverpool.

ASSISTANT ENGINEER FOR THE DRAINAGE AND IRRIGATION DEPARTMENT, Malays—The Crown Agents for the Colonies, 4 Millbank, London, S.W.1 (quoting M19316).

REPORTS AND OTHER PUBLICATIONS

(not included in the monthly Books Supplement)

Great Britain and Ireland

Carnegie Trust for the Universities of Scotland. Thirty-ninth Annual Report (for the Year 1939–40) submitted by the Executive Committee to the Trustees on 10th February 1941. Pp. iv+86. (Edinburgh: Carnegie Trust for the Universities of Scotland.) [122]

Other Countries

Bericht über des Geobotanische Forschungsinstitut Rübel in Zürich für das Jahr 1939. Von E. Rübel und W. Lüdi. Pp. 152. (Zürich: Geobotanische Forschungsinstitut Rübel.) [102]

Canada: Department of Mines and Resources, Mines and Geology Branch: Bureau of Mines. Stabilized Roads. By R. H. Pieher. (No. 800.) Pp. v+41 (3 plates). (Ottawa: King's Printer.) 25 cents. [102]