

tubes wound in parallel. The filament leads are threaded through the bore of one of the tubes and the grid-driving potential is supplied through an inner conductor of the other. At the filament end of the coil, each side of the filament is connected to the tubes via a condenser, the other end of the coil being earthed. Thus the filament current and grid-driving voltage are delivered at the required location with the driver and filament transformers maintained at earth potential. The article describes and illustrates the apparatus in some detail.

## ISO-MAGNETIC CHARTS OF THE GLOBE

IN a series of articles which have appeared in issues of the quarterly journal *Terrestrial Magnetism and Atmospheric Electricity* (commencing with the issue dated December, 1940), Prof. Sydney Chapman gives the results of his valuable investigation of the general form which iso-magnetic curves should take on magnetic charts of the globe, and of the interrelation between the curves for certain components of the earth's magnetic field.

The magnetism of the globe assumed in the first-named investigation is that due to a 'dipole' centred upon an axis of the earth. Although this simplification only roughly corresponds to observed facts, and although in a generalized discussion local irregularities of the earth's field cannot, of course, be taken into account, some interesting and instructive geometrical features are shown to exist, knowledge of which can be applied with advantage in the construction of magnetic charts. Examples are: the shape of the curves near their nodes and singular points, the correspondence and relation of nodes and foci, and the course of the iso-lines near the magnetic (or dip) poles.

In the second branch of his investigation, Prof. Chapman develops and demonstrates a method of testing the mutual consistency of data derived from iso-magnetic charts of declination and horizontal intensity. Normally, the charts are produced independently. The line-integral of the magnetic force round a closed contour on the earth's surface can be used to calculate the intensity of current electricity passing between atmosphere and earth within the boundary. Direct measurement of air-earth current, however, shows that the current is actually much too small to be effective on the scale of the charts; and if significant values are obtained when the line-integral is taken, derived from chart readings of declination and horizontal intensity, round a vanishingly small area, the inference to be drawn is that errors exist in the data. These may originate in either of the charts or in both, and will probably be due to actual errors in the placing of the iso-lines by the chart constructor. In this case the position of such lines may be improved by trial even in the absence of fresh data; and since horizontal intensity is in general less well determined than declination, substantial improvement in charts of horizontal intensity may be possible by this means.

Prof. Chapman has recently extended his investigation to isopors representing *secular change* in the values of the elements, a problem of considerably greater complexity. The results are published as Notes VII and VIII of the series, in the issue of *Terrestrial Magnetism* of June, 1942.

Isoporic curves, more particularly over the oceans, are to a large extent inferential, since with the sources at present in existence for procuring observational data they are of necessity based on unevenly scattered and relatively scanty information, very largely obtained from fixed land observatories.

Secular change in the earth's magnetic field is itself subject to change which is sometimes quite rapid in limited areas. Consequently, a complete picture of the changes occurring over the whole globe at any one time must always be an ideal attainable only in retrospect.

The lack of mutual consistency detected by Prof. Chapman in areas on the charts he has examined emphasizes the need of additional observations of secular change in particular regions of the globe.

W. M. WITCHELL.

## PUTREFACTION IN CATTLE HIDES

THE best method of drying hides is to lace them flat in a frame and dry them with access of air to both sides. Some delay between flaying and the suspension of the hide for drying is inevitable. Commercial practice has allowed this delay to extend to several hours, sometimes to 1-2 days. Experiments were therefore carried out at Kano in Nigeria and at Isiolo and Mombasa in Kenya ("Results of Delayed Drying Trials in Nigeria and Kenya", *Bull. Imperial Institute*, 40, No. 2; 1942). These three places represent a series of conditions of increasing atmospheric humidity and, to a less degree, increasing mean shade temperature, Kano having considerably the driest and slightly the coolest mean shade temperature and Mombasa the wettest and warmest.

In the experiment at Kano the hides were divided into two lots; one lot was given an arsenical dip immediately after flaying, the other lot was given an arsenical dip at the end of the delay period. Arsenical dips, if sufficiently strong, have some bactericidal effect. During the delay period the hides were folded hair out and left in the sun. Drying was in the sun. The dried hides were shipped to England and tanned for sole leather. The hides arsenicated before delay from the 8- and 16-hour periods showed no grain damage. Hides arsenicated before delay but left for longer periods and hides arsenicated after delay all showed slight grain damage in the finished leather. Except for this superficial damage the hides all proved to be sound. There was no damage due to *Dermestes* beetles.

In the experiments at Isiolo and Mombasa the experimental hides were divided in the line of the backbone, one side suspended for drying within two hours of flaying, the other folded and put in the sun for delay periods up to thirty-two hours. Drying was in the sun. In these hides there was a striking difference between the control and those with delayed drying. All the control half-hides were perfectly sound; the delay half-hides showed varying degrees of putrefaction, worse in the Mombasa hides than the Isiolo hides and increasing with the length of delay. All the control hides were free from damage by *Dermestes* beetles; the delay hides showed considerable damage both on the grain and in the carium, increasing with the degree of putrefaction. It should be noted that delay and control half-hides were shipped in the same bale. Although considerable putrefaction occurred in some cases it is

interesting that the effect on the hide was strictly local. Sole leather from the damaged hides compared with sole leather from the control hides gives similar figures as regards resistance to abrasion, apparent density and water absorption. Nevertheless, it was proved that delay between flaying and drying causes considerable putrefactive damage, especially in a humid climate.

D. JORDAN LLOYD.

## FORESTRY IN ASSAM

ASSAM is still one of the most undeveloped provinces of India, in spite of the long period it has been under British Administration. This is in the main due to the considerable area occupied by the hill districts inhabited by various tribes whose chief method of livelihood is by the practice of shifting cultivation, that most wasteful of agricultural methods. The backward condition of these peoples must be attributed to the guiding rule of British administration that the customs of the people should not be interfered with, once tribal warfare and other practices incompatible with modern ideas had been stopped. The consequence is that, in spite of the lapse of well over half a century since forest conservation began to be introduced into parts of Assam, forest reservation has made little progress in the hill districts. Even in the Lushai Hills, we read in the "Report of Forest Administration in the Province of Assam for the year 1940-41", by C. Mackarness, Senior Conservator of Forests (Shillong, Assam Govt. Press, 1941) "A Forest Regulation has been proposed and a draft submitted to Government which in a modified form has been forwarded to the Governor-General in Council for assent." The report on this subject continues: "The hill districts of Assam possess an inadequate proportion of Reserved or Protected forests which provides one reason for erosion and flood damage." It may be asked, it is being asked with increasing pertinence, when will the Governments of the British Commonwealth of Nations—for the matter is equally urgent in many of them—face up to this question of the enormous damage and waste which is increasing annually through deforestation erosion and flood damage. It may be that the War may prove the salvation of these Assam hill districts, since it would seem apparent that for military purposes communications are being opened up in what has heretofore been a wild mass of more or less inaccessible hill tracts.

Another factor on which evidence is forthcoming in this report is the want of collaboration between the Agricultural and Forestry Departments, no new thing unfortunately in the Empire, as recent reports have shown here in Great Britain. In spite of the vigorous opposition of the Assam Department a part of the Jamira forest has been disforested for permanent cultivation. It has since been found that this is impossible owing to the hilly configuration, as has been pointed out by the forest officers and since confirmed by the settlement operations. To the Forest Department will fall the task of endeavouring to reafforest the area. The Government policy vis-à-vis the large area of so-called Unclassed Forests in which no reservations have been made appears to be dangerously vacillating, in spite of the fact that a considerable proportion of the forest revenue comes from these large tracts amounting to some 16,000 sq. miles, and that protection for some of the area must be of vital importance to the country as a whole.

An item in the report of interest to those who have studied the question of the preservation of the fauna of India and elsewhere is the reservation of a considerable tract of forest as a sanctuary for wild buffalo in North Lakhimpur. Assam was an early leader in India in the formation of such sanctuaries, the first being for rhinoceros.

The report merits careful study; it includes special notes on the work of the departmental research officers. It is also a model which might be followed, for it includes a number of excellent photographs depicting various forestry operations and also three pictures taken by honorary forest officers in game sanctuaries of wild buffalo, sambhar and—a striking portrait—of a tiger advancing in the jungle towards the spectator.

## FORTHCOMING EVENTS

(Meeting marked with an asterisk is open to the public)

### Monday, October 12

INSTITUTE OF PHYSICS (at the Royal Institution, 21 Albemarle Street, London, W.1), at 10.30 a.m.—Discussion on "The Education of a Physicist"; at 2 p.m.—Discussion on "Training for Research in Industrial and Applied Physics".

SOCIETY OF CHEMICAL INDUSTRY (YORKSHIRE SECTION) (under the auspices of the Chemical Society, Leeds Area Local Section, in the Chemistry Lecture Theatre, The University, Leeds), at 6.30 p.m.—Dr. F. Fairbrother: "Radioactive Isotopic Indicators"

### Tuesday, October 13

CHEMICAL ENGINEERING GROUP OF THE SOCIETY OF CHEMICAL INDUSTRY (joint meeting with the INSTITUTION OF CHEMICAL ENGINEERS) (at the Geological Society, Burlington House, Piccadilly, London, W.1), at 2.30 p.m.—Mr. E. F. MacFaggart: "The Production of Radium".

INSTITUTE OF FUEL (at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2), at 2.30 p.m.—Mr. W. M. Selvey: Presidential Address. Dr. Arno Carl Feldner: "The Analysis and Testing of Coal in relation to its Properties and Utilization" (Melchett Lecture).

ILLUMINATING ENGINEERING SOCIETY (at the E.L.M.A. Lighting Service Bureau, 2 Savoy Hill, London, W.C.2), at 5 p.m.—Mr. R. O. Ackerley: "Seeing is Believing" (Presidential address).

### Wednesday, October 14

SOCIETY OF CHEMICAL INDUSTRY (FOOD GROUP) (at the Chemical Society, Burlington House, Piccadilly, London, W.1), at 2.15 p.m.—Dr. Magnus Pyke: "Vitamin Content of Certain Vegetables"; Mr. A. J. Curtin Crosbie: "New Beer Disease Organisms"; Mr. Alan H. Ward: "Location of Vitamin-B<sub>1</sub> in Wheat".

### Friday, October 16

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS (at the Literary and Philosophical Society, Newcastle-upon-Tyne), at 6 p.m.—Annual General Meeting. Mr. J. Ramsay Gebbie: Presidential Address.

### Saturday, October 17

NUTRITION SOCIETY (at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1), at 11 a.m. and 2.15 p.m.—Conference on "Trace Elements in relation to Health"

### Sunday, October 18

ASSOCIATION OF SCIENTIFIC WORKERS (SOUTH WALES AREA) (at the Royal Hotel, Cardiff), at 10 a.m.—Conference on "Science for Victory".\*

## APPOINTMENTS VACANT

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

LECTURER IN MECHANICAL OR ELECTRICAL ENGINEERING in the Cannock Chase Mining College—The Director (H), County Education Offices, Stafford (October 14).

GAS ENGINEER and MANAGER of the County Borough of Warrington Gas Undertaking—The Town Clerk, Town Hall, Warrington (endorsed 'Engineer and Manager') (October 16).

ASSISTANT AGRICULTURAL ORGANIZER to the Holland County Council Agricultural Education Committee—The Principal, Agricultural Institute, Kirtton, Boston, Lincs. (October 17).

TEACHER FOR DAY AND EVENING ENGINEERING CLASSES—The Principal, County Technical College, Gainsborough, Lincs.

WOMAN LECTURER IN PHYSIOLOGY—The Principal, Liverpool Physical Training College, Barkhill Road, Liverpool 17.

LECTURER IN ENGINEERING at the Achimota College, Gold Coast—The Secretary, Overseas Manpower Committee (Ref. 391), Ministry of Labour and National Service, Hanway House, Red Lion Square, London, W.C.1.