

pædias, supplementary literature and periodicals and in other ways to correct the techniques of study. Among the advantages claimed for the system are: that it facilitates meeting the needs of gifted and other unusual students; that a large variety of vocational subjects can be made available; that the teaching load of the staff can be lightened; that educational costs per pupil can be decreased and that courses on the college level can be offered to high-school students who cannot attend college. So promising were the results apparent in the schools in which the system was being tested in 1929-1931 that the Carnegie Corporation and the Carnegie Foundation for the Advancement of Teaching made a grant to the University of Nebraska of five thousand dollars in November 1931, for the purpose of carrying on research in this field. Further publicity was obtained for the experiment by an address delivered at a meeting of the American Council on Education in May last by Prof. Reed of the University of Nebraska. While specially adapted for meeting the needs of small rural high schools the system might, it is believed, prove a valuable aid in large schools also.

EDUCATION in India in 1929-30 is reviewed by the Educational Commissioner with the Government of India in a pamphlet recently published by the Government Central Publication Branch, Calcutta (pp. 76; Re. 1-4 or 2s.). Statistics show some advance, but at a lower rate than in the preceding year. The number of scholars in institutions of all kinds increased by three per cent and amounted to approximately five per cent of the entire population. Distributed by communities, the school enrolments expressed in percentages of the total population of each community were: Parsees 22, Europeans and Anglo-Indians 19, Indian Christians 14, Sikhs 7, Buddhists 5.6, Mohammedans 5.4, Hindus 4.8, others 2.5. As an indication of the state of education of the Mohammedan community (59 millions) as compared with that of the Hindus (164 millions) these percentages are misleading, for it is almost solely in the lowest two grades of the primary schools that the Mohammedans outnumber (in proportion to total populations) the Hindus. In university and intermediate education, including the professional schools, there are six Hindus for every Mohammedan. The increase in the number of students in the teaching departments of the sixteen Indian universities was at the rate of twelve per cent. Enrolments in technical and industrial schools, in which a large proportion of the scholars were Mohammedans, showed a decrease of more than ten per cent, and agricultural colleges and schools a decrease of five per cent. Medical colleges and schools showed an increase of ten per cent and there were small increases in commercial, engineering and veterinary colleges and schools, and in schools of art. A statistical summary of education in the United States of America for 1929-30, published as Bulletin 20 of 1931, provides some striking contrasts with the Indian statistics. The total enrolment in schools of all kinds was 25 per cent of the entire population, as compared with India's 5 per cent; teachers numbered 8 per cent of the population and women teachers outnumbered men by four to one, whereas in India they numbered 0.2 per cent and the women are in a minority of one to nine; the number of girls under instruction in the United States was approximately the same as the number of boys, but in India there were four boys to one girl.

## Calendar of Nature Topics

### Greatest Frequency of Typhoons in the China Seas

The typhoons of the China Seas are revolving storms of great violence. The majority originate among the island groups of the western Pacific, between about 6° and 20° N. lat., and especially among the Ladrone and Western Caroline Islands. Their tracks lie at first towards the west-north-west; they generally pass near or across the Philippine Islands and either strike the coast of China or 're-curve' over the ocean and continue north-eastwards towards Japan, growing in size and decreasing in intensity. They may occur in any month, but are most frequent from July to October and especially in September. Many ships have been lost during typhoons, and over the land they cause violent rains and disastrous floods. The tropical cyclones of the Bay of Bengal also reach their greatest frequency in September, but individual storms are rarely so severe as later in the year.

### Delayed Salmon

Absence of sufficient water in rivers, due to prolonged drought in very dry summers, causes autumn-running salmon to congregate in numbers in the sea off the river mouths. The changes normally associated with river life, however, may still proceed—abstinence from food, the assumption of the spawning coloration, the growth of the jaws of the males and the erosion of scales. During such a period of enforced waiting, the numbers are reinforced by fresh arrivals from seawards. Experimental netting in the north of Scotland in 1915 and 1920 showed that in waiting salmon, marked and later recaptured before being able to ascend into fresh water, loss of weight was an accompaniment of other bodily changes. Six fish averaging 11.5 lb. in July showed an average loss of 1.33 lb. when recaptured during August and September. A 14 lb. male fish lost 3 lb. in 67 days waiting. The proportion of fish showing scale erosion reached 84 per cent in August and 99.5 per cent in mid-September. The actual erosion of scales in the beginning of August was slight. In the middle of September it "extended round the whole of the periphery of the scales of male fish, and quite two-thirds of the edge of the scales of female fish were disintegrated" (Menzius, 1925).

### Control of the Tsetse Fly

One of the greatest barriers to progress in Africa is the tsetse fly (*Glossina pallidipes*) and the nagana disease of cattle which it spreads. The presence of the fly is linked with the vegetational type of the region and with the game animals which subsist upon the vegetation; so that the destruction of vegetation and of game animals have both been advocated and in some areas carried out. In Zululand, in clearing the buffer belt surrounding the Umfolozi Reserve, 26,162 game animals, including 15,130 zebra, 2,987 duiker, 2,173 bush-buck and 3,456 wart-hog, were killed between June 1, 1929 and November 15, 1930.

A method of catching the flies in large specially designed traps has been devised by R. H. T. P. Harris, and promises to solve a difficult problem without recourse to whole devastation of flora and fauna. September is the month when the tsetse flies are most numerous, and in September 1931, 2,088,508 were caught in the traps, reckoning by measure at

6,000 flies to a quart measure (*South African J. Sci.*, 29, 495; 1932). The year's total catch was much more than 7 millions, and that in spite of the fact that only for the last four months of the period had the traps approached their full number of just over one thousand.

It is clear that the fly population can be enormously reduced by trapping flies in their habitat amongst game animals; and the author suggests as a sound method of control, first, the creation of special game reserves in fly areas, so that the flies may be concentrated in definite localities in association with the game; second, the removal of most game animals in the territory surrounding the reserve, so that the flies may be isolated as well as concentrated; and third, the trapping of the flies in the concentrated reserve.

#### Luminescence in Nature

Now that darkness falls earlier and the plankton population of the shallow waters of the sea is still at a high level, opportunities increase for observing luminescence from the shore, due to the presence of *Noctiluca* or ctenophores or many other common forms. At the opening session of the American Philosophical Society's meeting at Philadelphia on April 15, 1932, Prof. E. Newton Harvey suggested that luminescence had been evolved from one of the biochemical reactions underlying ordinary respiration. Between luminescence, most familiar in the light of fireflies or the glow of bacteria, due to the reaction of luciferin and oxygen through the intermediary of the enzyme luciferase, and the hydrogen acceptor mechanism involved in the oxidation of food substances, he found a close analogy. But in the latter case carbon dioxide is set free, whereas in the former no carbon dioxide is released and the oxidised luciferin quickly loses its oxygen and is once more in a condition to react. Most luminescence is intermittent and is generally caused by some stimulus (for example, the breaking of waves, the stroke of an oar, the disturbance caused by the movement of a boat) and under natural conditions it may have protective value, may serve as a signal between members of a species, or in the darkness of the deep sea may illumine the depths, but these are unproved guesses. But what purpose the continuous, non-stimulated glow of bacteria may serve, not even the credulous naturalist has ventured to guess.

#### Stubble Cultivation

An early harvest gives a great opportunity to attack the weed population, already weakened by the shading action of the straw crop. Unfortunately, on heavy land the tearing up of hard-baked stubble has been no easy matter with the farmers' own implements, although hired steam traction sets have long been used to fulfil this need. With modern tractors and implements of sturdy construction, it is possible to make sufficient tilth on the surfaces of the stubbles to germinate weed seeds at the first shower, and at the same time the established weeds are uprooted and checked. One of the great advantages of the tractor is that it provides the power to carry out these operations thoroughly and rapidly, making the best use of the restricted time available. If dry conditions continue, the runners of grassy weeds may be combed out and burnt. The growth of seedling weeds is allowed to proceed for some time, when the green stuff is ploughed in and has a

certain manurial value. An alternative to the above procedure is to plough up the stubbles at once without attempting to get rid of any viable weed seeds. This has the advantage that heavy land is at any rate safe for the winter, whereas if merely broken there is the risk that it may lie too wet for ploughing for long periods late in the year.

### Societies and Academies

#### DUBLIN

Royal Irish Academy, June 26. F. D. GREEVES: An investigation on the penetrating radiation from potassium. Measurements of the absorption of the  $\gamma$ -radiation from potassium chloride by use of a Geiger tube counter. The value obtained by Mühlhoff was confirmed with a different geometrical arrangement. The background of cosmic and local radiation was found to vary with weather conditions, being less intense during rain. H. O'NEILL HENCKEN and H. L. MOVIVUS: The cemetery cairn at Knockast, Co. Westmeath. In August and September 1932, the first Harvard Archaeological Mission in Ireland, under the direction of Dr. H. O'Neill Hencken, assistant curator of European archaeology in the Peabody Museum of Harvard University, excavated at Coolatore, Co. Westmeath, a large cemetery cairn of the Bronze Age. This contained in all 44 burials of which 4 were skeletons and the remainder cremations. Unlike most such grave-mounds, this contained no central burial with 'secondary interments' grouped about it, but an unprecedented number of graves scattered through it. From the pottery, bronze knives, etc., found with the burials, it was evident that they covered a considerable part of the Bronze Age from about 1500 B.C. to somewhat after 1000 B.C. The human remains have been studied by Mr. H. L. Movivus of Harvard. He has found that the skeletons conform on the whole to the general type of Irish Bronze Age skeletons, but believes that the cremating people probably belonged to a different physical type. J. DOYLE and W. T. SAXTON: Contributions to the life-history of *Fitzroya*. *Fitzroya* is an interesting link between the cupressinean and callitrichean conifers. It possesses an apical archeogonial complex with a pollen tube directed to the top of the prothallus. The tube grows early and invaginates the prothallus deeply while the latter is still vacuolate. The pro-embryo is variable and the variations are discussed. They seem to be derivatives of two types of early pro-embryo, a four-celled pro-embryo completely filling the archeogonium and one with four cells occupying a considerable part of the archeogonium with a fifth free nucleus in the upper part. The mature pro-embryo commonly fills the archeogonium and is fully septate. J. J. NOLAN and P. J. NOLAN: Further observations on atmospheric ionisation at Glencree. In a survey of more than four years' observations, it is shown that the control exercised by the condensation nuclei on the equilibrium of ionisation is very weak. Certain diurnal variations in the ionisation are found and the question of a diurnal variation in the rate of ion production is examined. R. W. DITCHBURN and Miss C. J. POWER-STEEL: Notes on resolving power (2). The resolving power with a microphotometer. The paper describes experiments on the resolving power of an optical system (for example, telescope or spectrograph) when photographic methods are used. The