

from irrigated fields, and even then the labour of felling is greatly enhanced and leisure correspondingly restricted.

Prof. Hutton illustrated the point by describing the comparative agricultural years of the Angami and Sema Nagas, emphasizing the much more continuous labour of the latter on their dry fields, and the much greater leisure enjoyed by the former as well as a greater economic surplus from their irrigated terraces. This gave the Angami a much richer and more colourful social life, since more leisure and wealth are available for the fifth and sixth needs. Moreover, a concentration of population is possible, with consequent political influence and stability. He suggested further that the absence of leisure in dry cultivation may be a contributory factor in the specialization of village industries like pot-making and weaving, which (in the Naga Hills) are often alternatively practised in one village and *taboo* in a neighbouring one, and may thus have contributed to the formation of occupational castes. He described the difficulty, enhanced by ritual considerations and by the absence of perennial forest, of effecting a change from a dry to a wet economy; but when once achieved, such a change leads to much greater independence on the part of individual villagers and tends to reduce the power of individual chieftains.

Dr. E. R. Leach, who followed with a paper on dry rice cultivation in Burma and Borneo, took a very different view from Prof. Hutton. He repudiated any general dichotomy in the wet and dry cultivation, regarding them as complementary rather than alternative methods of agriculture, and treating the administrative condemnation of dry rice cultivation as based on incomplete knowledge and mere prejudice; advocates of a change from dry to wet, he said, ignore problems such as that of redistribution of labour involved in the change. Dr. Leach had worked out a most detailed analysis to compare the labour and results of three methods of agriculture: 'slash and burn' methods of cultivating on dry ground, cultivating with the hoe for dry or wet rice, and cultivating with the plough. The difference between them, he said, is more fundamental than that between dry and irrigated rice. His general conclusion was that the cultivation of dry rice is more productive in yield per unit of labour than wet

rice unless the plough be used. This conclusion, he maintained, is confirmed by the preference both among the Kachin of Upper Burma and the Dusun of Borneo for the cultivation of dry rather than wet rice where both methods were available. He suggested that the Angami terracing is due to military considerations rather than economic. With the plough, of course, the area cultivated by a normal household can be so much increased that there is a much greater economic surplus.

Prof. Christoph von Fürer-Haimendorf discussed the two preceding papers in the light of his experience on the north bank of the Brahmaputra in Assam, where the Apa Tani tribe, using hoes and not ploughs, support a population of 1,000 to the square mile on irrigated rice, of which they have a considerable surplus to trade for cattle and cloth to the neighbouring Dafas, who live in comparative poverty on the cultivation of dry rice, also by the use of the hoe, and have repeatedly to shift their villages as land becomes exhausted. This supported Prof. Hutton's view that irrigated rice is economically more profitable than dry. The Apa Tani system of wet cultivation preserves all the soil fertility and yields a perfectly balanced agricultural economy. The Apa Tani are a peace-loving people whereas it is the Dafas who have a bias towards war.

In the discussion that followed, it became pretty clear first that there was general agreement that, *provided* a long enough cycle of rest can be depended on, dry cultivation of the hillsides, which may be the only possible form of cultivation, need not in the long run be destructive of the soil fertility, or at any rate is not so wasteful or deleterious as administrative and forest officers are inclined to assert; and secondly, that the question of the economic return of irrigated as compared to dry rice, per unit of labour expended, depends very largely on the rainfall and on the presence of a perennial water supply, a point which largely accounts for the different views put forward by Prof. Hutton, from his experience of the Assam hills, and by Dr. Leach, whose experience is of the drier climate of Upper Burma.

It was perhaps a pity that the discussion of primitive techniques was so largely limited to agriculture; but the importance of the subject was not left in any doubt.

## NEWS and VIEWS

### Prof. G. R. Goldsbrough, C.B.E., F.R.S.

PROF. G. R. GOLDSBROUGH'S retirement from the chair of mathematics at King's College, Newcastle-upon-Tyne, breaks a long and distinguished association with the College. He is an old student of the College, who returned to it in 1919 as lecturer in applied mathematics; in 1928 he was promoted to a professorship, and he has been head of the Department of Mathematics for the last three years. His research work has been mainly on two lines: in hydrodynamics he has made important contributions to the dynamical theory of the tides, and in astronomy he has elucidated the classical problem of the divisions in Saturn's ring. He was elected to the Royal Society in 1929. His interest in astronomy and geodynamics has been of special value in connexion with the work of the University Observatory at Durham. In addition to teaching and research, Prof. Goldsbrough has taken a leading and influential

part in administrative and other activities in the University, and his sound judgment and advice have been greatly appreciated. He was sub-rector of the College for the period 1942-47; and among many other duties he undertook the arduous task of chairmanship of the Joint Recruiting Board. He was awarded the C.B.E. in 1948. His colleagues and old students will wish him in his retirement many pleasant years of fruitful activity. He has been succeeded at King's College by Profs. A. E. Green and W. W. Rogosinski (see *Nature*, September 18, p. 445).

### Biological Chemistry at Aberdeen:

Dr. W. O. Kermack, F.R.S.

DR. W. O. KERMAK, for many years in charge of the Chemical Laboratories of the Royal College of Physicians, Edinburgh, has been appointed to the recently established chair of biological chemistry in