

We could also envisage the spreading of the crossbred cattle from the herd now in its sixth successful year at Mtwapa where it has developed resistance to coast ills and gives high milk yields. Future herding methods might include the organized night grazing which is helping to stimulate higher yields at Mtwapa. The principles of settlement development have been revealed by the work of our prize-winning researcher, who has observed the decline of ribbon, crossroad and ferry point settlement on the Mtwapa ferry route, counterbalanced by growth on the route of the relatively new Mtwapa bridge. Some effects of Kenya's foreign trade links have been seen locally; sisal is no longer exported to South Africa, and coal, which used to be imported from South Africa to the Bamburi cement works, now comes from sources as far away as Vietnam and the U.S.A. Encouraging examples of the growth of industry in Kenya have been observed: how the oil refinery at Mombasa has built up a local skilled labour force, and how exports of cement have steadily increased to many destinations in the western Indian Ocean. On the other hand, the decline of the dhow trade is very clear; the competition of modern motor vessels, new consumer goods and new East African industries supplying old needs, the attraction of greater opportunities for employment in the oil-rich Persian Gulf states, and political uncertainty on the East African coast have all contributed towards the severe curtailment of dhow arrivals at Mombasa.

As well as examination pressure, which limits time and necessitates persuasion, there are other difficulties. There is the initial problem of finding sufficient local topics for every pupil each year. Beyond the more obvious studies others may be suggested by consulting well known textbooks covering East Africa and also East African periodicals. I have found that thumbing through the telephone directory has harvested a small crop of research institutions and business concerns to which attention might usefully be directed. As the school locality becomes exhausted the attention of fifth formers might be focussed upon their home areas during their vacation. In due course I hope to set pupils, either individually or in groups, to investigate or to revise a previous study of topics such as these: a geological feature, a water table studied through wells, erosional forms, evidence of changes of sea level or of the extent of a lake, the influence of altitude on flora and fauna, cloud types and patterns habitually observed off the coast or inland, individual agricultural, industrial or transport concerns, a routeway, a rural settlement pattern or the form of a rural or urban settlement.

A major difficulty is that virtually all the ideas, plans and stimuli must come initially from the teacher. Most pupils at this level are not sufficiently mature to think out research programmes, interview people profitably and make individual investigations. I have found it best to allocate topics to pupils according to their personal ability and to their other H.S.C. subject(s), so that they may benefit from the advice of other teachers; any fortuitous advantage, such as a relative well-placed within an industrial concern, may also be taken into account. Each pupil needs to be presented with a detailed plan of his research, including copious questionnaires to arm him for his interviews lest he waste the time of those who submit to his interrogation. In 1965 the willingness of those who were approached to give information was very encouraging; this, of course, obliges one to prepare carefully for interviews and ensure punctuality.

At the writing stage a great deal of guidance is needed as to the arrangement of text and illustrations. Even at fifth form level the text is likely to need a good deal of correction — more, for instance, than entry into the Essay Competition allowed me to make in 1965. I hope to find time to correct and edit a duplicated edition of the set of essays, a copy of which will be sent to each of the persons who helped. At the writing stage also there is need for coaxing to get the work finished before thoughts of examinations kill enthusiasm. In this respect the Uganda Geographical Association Essay Prize Competition is a boon; with a prize offered and a deadline set it provided a very useful stimulus for the 1965 group. Although the prize may never come to Shimo la Tewa again, we shall continue to submit our entries, and wish the Competition every success.

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RESEARCH NOTES

During the past year several geographical research projects of East African interest have reached completion, and many new ones have been started. Whilst many projects mentioned in previous issues of the *Review* continue, the present note aims primarily to draw attention to recently completed work and to recent and forthcoming publications.

In Uganda, work on several projects by members of the staff of the department of geography at Makerere University College has produced interesting results. *Mr. B. W. Langlands* has published a very useful *Bibliography on the distribution of disease in East Africa* (Makerere University College Library, 1965), and continues his bibliographical interests with a biannual *Uganda bibliography* which contains numerous references to material of geographical interest and is published in the *Uganda Journal*. *Mr. Langlands* has also published in the same journal a note on maize cultivation in Uganda from 1860 to 1920, and is preparing for publication similar notes on banana and cassava cultivation in Uganda. *Mr. P. H. Temple* has published a study of Nakasero market, Kampala, in the *Uganda Journal*, and, together with *Mr. J. C. Doornkamp*, a study of 'Surface, drainage and tectonic instability in part of south-west Uganda' in the *Geographical Journal*. *Mr. Temple* has also been involved in an interdisciplinary research project on Lolui Island in Lake Victoria and is to edit a book setting out the results of the project. *Mr. B. S. Hoyle* has completed his doctoral research on the seaports of East Africa, and it is hoped that this will be published by the East African Publishing House, Nairobi (for the E.A.I.S.R.) towards the end of 1966. *Dr. A. M. O'Connor* has written *An economic geography of East Africa* which should also be published in late 1966 by Bell in their new series of *Advanced Economic Geographies*.

An increasing interest in medical geography is being shown in the Makerere Medical School; *Miss Paula Cook*, an Oxford geographer with a training as a medical statistician is to undertake there a study of the distribution of cancer of the oesophagus in Uganda. *Mr. R. Baker*, a candidate for the M.A. degree in African studies at Makerere, is making a comparative study of four government ranching schemes in Uganda and is also preparing a paper on 'Spain in modern

Africa'. Two members of the East African Institute of Social Research are working on problems of geographical interest in Uganda: *Mr. E. Gerken* is studying the impact of industrialization and urbanization on social change in rural communities in Uganda; and *A. F. Robertson* is investigating social change in Bugerere County (Buganda). Within the Economic Development Research Project at the E.A.I.S.R., *Mr. F. Nixon* is working on the location of industry in East Africa. With the assistance of several Makerere students of geography, *Professor G.F. White* of Chicago is planning to make a sample survey of water resources and water utilisation in various parts of Uganda and western Kenya. The research projects of two former postgraduate students in the department of geography at Makerere have now been successfully completed in the United Kingdom: *Miss B. J. Turner* (University of Leicester) has gained the degree of Ph. D. for her thesis on 'The composition, pattern and survival of savanna woodland in Bunyoro'; and *Miss G. Wilson* (St. Aidan's College, Durham) has gained an M.A. degree for her study of electricity in Uganda. *Mr. M. Safier* has almost completed at the University of Chicago, his thesis on industrial development in East Africa.

Geographical research in Kenya has focussed recently upon the social and economic problems of the area. *Professor W. T. W. Morgan* has edited a collection of studies of the Nairobi region now in the press, and *Professor S. H. Ominde* continues his studies of the population geography of Kenya and has devoted particular attention to aspects of population migration. This has resulted in the publication of papers in the *Proceedings of the East African Academy* (1964) and in the *Cahiers d'Etudes Africaines*, and also in the reading of a paper at a conference on African demographic problems held in Lagos in January 1966. *Dr. R. S. Odingo* continues his studies of settlement schemes in western Kenya, and *Mr. R. B. Ogenko* has advanced his research on the economic geography of Kenya with special reference to the dairy industry and to the production and distribution of electricity. *Mr. F. N. Owako's* research on the agrarian problems of Machakos District has reached an advanced stage, and *Mr. K. G. McVicar* has embarked upon a survey of the geographical manifestations and implications of cultural change in those parts of Nairobi which are exclusively inhabited by Africans. In the United Kingdom, *Miss C. Washbourn* is working at Cambridge on material collected during fieldwork in Kenya on the shorelines and sediments of the Nakuru Basin, with special reference to a 600 ft. shoreline well-preserved to the north of Nakuru; *Miss Washbourn* hopes to return to Kenya shortly to undertake further field investigation.

The newly-instituted department of geography at University College, Dar es Salaam, has embarked on an important programme of field research under the direction of *Professor L. Berry*. The project aims to collect and analyse a representative selection of East African topographic maps and air photographs with a view to the publication of practical work handbooks suitable for H.S.C. and university students. The interpretation of the materials will be supplemented by fieldwork which will consist primarily of traverses and sample studies. Two other research projects of relevance to Tanzania are taking place elsewhere: at the London School of Economics and Political Science, *Mr. B. A. Dato* is studying the external trade relations of Zanzibar; and at the University of California (Los Angeles) *Mr. A. Mascarenhas* has completed a thesis on the urban development of Dar es Salaam. *Mr. J. L. Newman*, who is based on the E.A.I.S.R. at Kampala, is studying the geography of subsistence change among the Sandawe people of Tanzania.

THE CLIMATE OF AFRICA

THE CLIMATE OF AFRICA. B. W. THOMPSON. v, 147 pp. 132 maps. 18 x 20 inches. Oxford University Press: Nairobi, London, New York, 1965. Price 150s.

The publication of this climatic atlas by the Director of the East African Meteorological Department marks a highlight in a period of particular achievement in meteorological research in East Africa. A programme of forecasting research was begun in 1958, aimed at developing methods of short period rainfall forecasting, and, whilst forecasting remains difficult, a new approach to synoptic analysis has been developed, pioneering the use in low latitudes of pressure analysis at all levels in the troposphere. This permits dynamical reasoning to be employed in prognostication and encourages closer study of the complex inter-relationship between tropical and extra-tropical weather. It is the author's attempt to apply this new approach to the explanation of climate in Africa that makes the atlas a stimulating and useful contribution to tropical meteorology. Developments in tropical meteorology, following the increased accumulation of data during and since the Second World War, were focussed mainly on the analysis of synoptic-scale disturbances in oceanic areas, particularly the Caribbean and Central Pacific: lack of adequate data made the application of new ideas to continental areas largely speculative. In order to focus attention on Africa, the largest land-mass in the tropics, a symposium on tropical meteorology was held in Nairobi in 1959, under the joint auspices of the World Meteorological Organization and the Munitalp Foundation. A grant from the Munitalp Foundation made possible the publication of this atlas.

The basic difficulty facing any meteorologist in Africa is illustrated by the first map showing the location of radiosonde and radiowind stations in and near Africa which were utilised in the preparation of the upper-air charts. It has long been recognized that clues to the explanation of tropical weather lie in the upper air. With such a sparse network of upper-air observations in some areas, there is little hope of complete success. This is followed by a series of maps of Africa on a scale of 1:22m, showing the mean annual total radiation (expressed in cal. per sq. cm. per day), the average daily values for each month of the year, the mean annual number of hours per day of bright sunshine, and the mean values for each month of the year. Values of radiation are of vital importance in estimates of evaporation and the author shows how the available data can be extended or amplified by using radiation figures computed from sunshine data. Both these series of maps show the stations, and in the case of radiation the actual values, used in drawing isopleths. In view of the uneven distribution of observing stations this is most useful, and it is a pity in some ways that maps were not included to indicate the varying density of observations used in compiling rainfall, temperature and humidity maps.

The following twenty nine maps are concerned with rainfall: the mean rainfall for the year and for each month; the average number of days with rain of amount 1 mm or more for the year and for each month; and three maps to show the first month of the year and the number of subsequent consecutive months during each of which the mean rainfall is 50, 75 and 100 mms. These latter maps are most useful in assessing the mean duration of the growing