Book Reviews

The Making of the Broads. A reconsideration of their origin in the light of new evidence. J. M. Lambert, J. N. Jennings, C. T. Smith, Charles Green, J. N. Hutchinson. Preface by H. Godwin. Royal Geographical Society, London, 1960. 153 pp. Illus. 25s.

This is a remarkable study. The origin of the lakes known as *the broads*, which occupy portions of a number of river valleys adjacent to the North Sea coast and west of Norwich, England, has long posed a problem. In an earlier report based on a study of the vegetation and geology of the broads in the valleys of the Ant and Bure rivers, Jennings and Lambert suggested that the broads formed as natural lakes beyond the limits of an estuarine clay deposited during a recent transgression of the sea. Subsequent work by the authors on the relation of the vegetation to the underlying deposits helped to explain admitted gaps in the original theory and brought many new features to light. With the progress of detailed investigation of the stratigraphy of the broads in the Yare, Waveney, and Thurne valleys, the authors became convinced that the broads were the work of man, not of nature. Although the stratigraphy of the area was clearly revealed, hitherto reported local history provided no corroborative evidence for the new hypothesis.

However, study of early records by Smith disclosed the existence of an active peat industry in the area during the 12th century, which continued, although declining, into the 15th century. Still unclear was the probable time of the origin of the turf cutting and a reconstruction of the environmental relations of land and sea which would make possible the cutting of peat to depths varying from 6 to 16 feet over 2600 acres in an area now regularly subject to inundation. The remaining clue to the mystery was provided by the archeological evidence. The distribution of artifacts and a stratigraphic section in the vicinity of Yarmouth clearly indicate that from about the 7th to the 13th century the land stood 13 feet higher relative to the sea than it does today.

Each part of this study could stand alone, but the way in which detailed and specific aspects of stratigraphy, physiography, history, and archeology have been related to provide an elegant explanation of these conspicuous features of the landscape makes it particularly interesting to me.

The artificial character of the broads was originally suggested by the vertical walls of the basins, the presence of steep-sided blocks of peat occurring as islands within the basin or as continuations of the undisturbed alluvium, and the remarkably uniform depth of the basins, 3 to 4 meters below the present surface, as well as by their rectilinear margins, and their nearly horizontal floors. In addition, the peat and mud deposits of the basins eventually were recognized as unconformable to the surrounding and underlying peat, clay, and silt. The following interpretations are made: the vertical sides are the abandoned workings of the face; the undisturbed deposits were ridges used as causeways separating the workings; and the even depth of excavation suggests the limits to excavation posed by the presence of water. Boundaries shown on 19th-century tithe-award maps were found to coincide with patches and lines of vegetation still visible in some of the broads. In addition, although the association of the broads with the present pattern of the rivers and valleys initially suggested a natural origin, the characteristics of specific basins and the classification of the varied kinds of sites subsequently suggested to the authors that human activity would be governed by the distribution of peat which, in turn, reflected the underlying physiographic pattern.

Sixteenth century maps of the region showed specific broads, and nothing in the place names, or in the traditions of the area, suggested the turf-pit origin of the broads. Smith indicates that the word *broad* was applied to the area in a history written about 1670, and several 16th-century maps indicate the stability of the outline of several of the basins. However, search of the register of St. Benet's Abbey (the ruins of the abbey still remain) revealed the existence of a turf industry in the 12th century. These are the earliest references recorded. From records of the Norwich Cathedral Priory, from tithe records, and later from court rolls, deeds, and leases, Smith reconstructs the economy of peat production, including the approximate area covered, the costs and procedures involved in preparing the peat for use, the use of and the trade in peat, and estimates of the production. Using admittedly hypothetical estimates, based on population, probable use, amount removed, and rates of production of peat, the author concludes that the digging of the broads by hand is a "feasible possibility" over a period of several centuries.

Accounts of flooding in 1287 coincide with a beach deposit dated as 13th century by pottery. These physical events, in turn, coincide with the increased use of a scoop for digging peat under water and with increased costs of production associated with collection and preparation of peat in pits subject to inundation and standing water. This gradual submergence constitutes the beginning of the formation of the broads or lakes.

Inasmuch as the historical record begins at the time peat production had probably already reached a peak, the date of its initiation demanded evidence from another source. In part 3 of this study Greene has mapped separately the distribution of population in the estuary during six periods: Neolithic, Bronze Age, Early Iron Age, Romano-British, Early Anglo-Saxon, and the Danish settlements. The maps indicate that many broadland areas previously open in the Anglo-Saxon period were occupied by the Danish settlements. This apparently accounts for the high population density given by Domesday statistics. Finally, a stratigraphic section exposed by the construction of a generating station on the spit south of Yarmouth and other excavations made in the Yarmouth area clearly indicate that much of the area was well above sea level at that time. At the Yarmouth site a bed of beach sand and shingle

was found 17½ feet below the present sea level; in places mussel shells were found at the top of this bed. The authors are able to show that emergence of the land had begun by A.D. 600. The stratigraphic and historical evidence had shown that peat-digging took place during the period of emergence which ended early in the 13th century. This information, combined with the archeological evidence, made it clear that the basins were dug after the arrival of the Danes (about A.D. 900) and that the broads originated with the beginning of inundation and the close of the era of peat production. The authors point out that the recent origin of the broads necessitates a rapid rate of sedimentation in the basins inasmuch as many are now filled with deposits and some are known to have filled many years ago. They also note that the rates required are in excess of those customarily reported for lakes.

This poor recounting of the bare bones of the mystery is given here only because I hope to illustrate some of the diverse kinds of observations and facts which are skillfully woven together in this study. Beginning with a delightful preface by Professor Godwin, of Cambridge, the monograph is closely reasoned and written. Judicious handling of the mass of detailed observations is one of its striking characteristics. Although interdisciplinary research has become a cliche, this study is recommended to those who have forgotten or who wish to see again what the real article looks like. Send for your copy.

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Our Developing World. L. Dudley Stamp. Faber and Faber, London, 1960. 188 pp. Illus. 21s.

The central problem facing the diverse societies of this earth now, and for at least the next few decades, is the development and maintenance of levels of living which provide food and shelter adequate for the reasonable health of a rapidly expanding world population. To the layman in Anglo-America, Europe, and a few outliers elsewhere, this does not appear as a troublesome problem because adequate food supplies have been attained. The peoples of the well-fed areas constitute a minority of the world's population and probably a decreasing percentage of the total. In most of the rest of the world, nutritional levels are not sufficient and the prospects for future improvement are uncertain.

It is to this problem that Dudley Stamp addresses himself, and for the second time. In his earlier venture, *Our Underdeveloped World* (1953), his thesis was that the really underdeveloped lands, those susceptible to increased productivity given inputs of known techniques, were located in the mid-latitudes rather than in the tropics. He found the United States to be one of the underdeveloped countries. It was a novel thesis which helped to clarify our thinking about the nature of development.

In *Our Developing World* Stamp reexamines the problem in view of the changes in population and technology which have occurred since the early 1950's and makes use of the data which have become available since that time.

The immediate nature of the problem is indicated by a quote that Stamp uses from *The Future Growth of World Population* [U.N. Population Studies No. 28 (1958)]: "It took 200,000 years for the world's human population to reach 2,500 million, it will now take a mere 30 years to add another 2,000 million." Simplistic arguments of birth control or antibirth control dogmas to one side, societies in a world with nearly twice the present population must have drastically altered technology and social organization if they are to function. And the transition must be rapid. Here is the fascination for the social scientist.

Stamp discusses the changes in agricultural resources needed to enable societies of the world to keep pace with the population explosion. He finds that the habitable world is already inhabited, though with varying degrees of effectiveness in terms of food production. The two large areas of the world which at present make little contribution are the tropical regions of South America and Africa. We do not yet have the technological means for making these areas productive on other than a bare subsistence basis. Active research to this end is underway. (It is deplorable that the promising developments in the study of land use in the Congo have been arrested—and are likely to be lost —by the present disorganization in that territory.) Problems of tropical land use are noted briefly and with insights that reflect Stamp's considerable experience in Burma and Nigeria. The argument here is that tropical land conditions are so different from those of the mid-latitudes that both the local physical and cultural background must be studied before meaningful development can be undertaken. Mechanization, so useful in the mid-latitudes, has proved to be largely unsuccessful in the tropical lands. The probability is not that mechanization itself is unsuitable but that suitable techniques have yet to be developed.

The techniques of the Western World's agricultural revolution, which has taken place largely in the United States, and most drastically since 1950, are discussed in terms of their application in the underdeveloped countries. The heavy use of fertilizers on tillage crops, the potential use of soil structure conditioners, spray irrigation, and the use of antibiotics in livestock feed are all considered with respect to their obvious effects on yield and to the often awkward aspects of their use. Stamp concludes that by a modest diffusion of existing techniques we could feed several times our present population. The problem of diffusion is of course more difficult than the development of techniques.

Stamp states the need for an inventory of existing land resources and suggests a system of land classification to facilitate the inventory.

Further sections are on energy, water, and mineral resources. They are somewhat general and have been handled elsewhere in more analytical fashion by Ayres and Scarlot (1952), Harrison Brown (1955), and Bruce Netschert (1958).

Stamp concludes with several chapters on the relationships between the developed and the underdeveloped countries within the world exchange economy. He notes that many of the impoverished countries have little to offer on world markets that the developed countries cannot better supply for themselves and that attempts to increase the prosperity of these poor countries are therefore severely impeded. Stamp seems to feel that the United States is the main villain; he points out that this country raises severe barriers to imports from the underdeveloped countries and then offers these same countries massive aid which is resented. There are further comments on the less happy aspects of the behavior of American firms and American personnel abroad. The problem of the relationships between the developed and underdeveloped countries has