Federal Government, goes back even before the Department of Agriculture was organized and includes some publications of the Commissioner of Patents. My reason for stopping at a point over a decade ago is that these are the dates of the excellent bibliographies compiled by Miss Jessie Allen, librarian of the Bureau of Plant Industry. In the introduction to one of these, Miss Allen states that, "Some appraisement has been made for subjects upon which there are many contributions, the brief and less important ones being omitted. For subjects on which there are few publications all have been included." Thus any error in the figures is in increasing their size for the less important crops or diseases.

Obviously such a means of measuring the importance of plant diseases can have no validity in the case of many small and highly specialized crops where the publications of a small group of enthusiastic workers or even one investigator—or for that matter a single paper—easily assume undue importance. Nor could we expect to compare too closely, succulent vegetables with grains. But it may be possible to obtain a measure of the apparent relative economic importance of diseases in the culture of crops which have a not too widely different value per acre, are marketed in somewhat the same way, and produced by more or less comparable groups.

Such a unit is apparently found in the crops classed together as "grain crops" for statistical purposes in the publications of the U. S. Department of Agriculture. For such crops this means of measurement must have real significance, unless there has been something radically wrong with the administration of plant disease work in this country over a period of half a century. Most of this work has been tax-supported and the obligation to see that most of the money was spent where most needed must have been generally recognized. Indeed, it would probably have been enforced by popular pressure.

If such figures are to be used as a means of evaluating the relative importance of diseases in different crops, some adjustment must be made for the value of the crop; the most obvious method seems to be to divide the number of pages published by the value of the crop concerned in millions of dollars. This has been done, using the average value of the crop for the ten-year period 1910–1919 as a basis of computation. Several other periods were tried with no difference in the order of the various crops. Some of the results of this summary are given in Table 1.

For comparison with these crops, it may be noted that the disease indices computed on the same basis for grapes and the important tree fruits—all vegetatively propagated—are over 30 and that for potatoes over 20.

TABLE 1

RELATIVE ECONOMIC IMPORTANCE OF DISEASE IN VARIOUS "GRAINS" AS INDICATED BY VOLUME OF PUBLICATION IN U. S. A.

	Total pages	Disease index (corrected by value of crop)
Flax	426	14.2
Rice	205	4.9
Barley	526	3.5
Wheat	3526	3.4
Sorghum	305	2.3
Oats	1178	1.8
Rye	94	1.5
Corn	1941	0.8
Buckwheat	0	0

Whatever may be one's opinion of the validity of this method of appraising the importance of diseases in the culture of a crop, there are probably few who will take exception to the fruits being placed far above the grains in this respect or to the order of most of the "grain" crops in the table.

In this it is at least worthy of comment that the highest six are largely self-pollinated under natural conditions, rye and corn chiefly cross-pollinated, and buckwheat heterostylous and thus always cross-pollinated.

There can be no point in emphasizing too much the fact that at least up to 1927 no single page had been devoted to diseases of buckwheat in the literature reviewed. Indeed, the only reference to the subject found so far is the statement in Robbins and Ramaley's text,[3] "It is singularly free from insect pests and fungous diseases." To be sure, buckwheat is not a major crop, nor on the other hand is it negligible. Its average farm value per year for the period 1910 to 1919 was over 16 million dollars, and in 1920 the farm value of the crop in New York State was over 6 million. Serious epidemics of disease in crops valued at 6 millions have not gone unnoticed in New York State during the past 25 years.

Any one who is unwilling to accept the significance of a correlation between the striking freedom from disease and the fact that the plant can reproduce only by crossing (a condition comparable to that in all the higher animals) should at least advance some other hypothesis.

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ARTIFACTS IN CANADIAN RIVER TERRACES

ARCHEOLOGY frequently yields finds tantalizing in their incompleteness and implications, which do little more than point the way for future work. It is in this class that we must place the few rough artifacts found this past summer in the terraces of the North Saskatchewan and Peace rivers, in Alberta.

[3] "Plants Useful to Man," p. 184.

Along the North Saskatchewan, about three miles southwest, or up river from Edmonton, are the gravel pits from which are taken much of the road and construction gravel used in the city. Reports of the occasional occurrence of bones in the gravels prompted an examination which resulted in the recovery of eight more or less fragmentary and waterworn unfossilized horse bones of a large and a small species, a section of unidentified antler and several artifacts. With one exception the bones had been removed by the workmen, who report that they are found haphazardly scattered at any depth in the gravel, apparently none of them articulated.

The artifacts found *in situ* in the pit walls consist of a large quartzite core, two large quartzite flakes, one seemingly retouched into a rough sidescraper, and pieces of petrified wood and chalcedony. The core lay near the bottom of a gravel-streaked clay pocket in the terrace surface, the other pieces in the upper portion of the gravel. Professor P. S. Warren, of the department of geology, University of Edmonton, kindly inspected them before they were moved and agreed that they were not intrusive; that the overlying material indicated that they had been buried by the action of the river while it was still at the level of this terrace. Apparently, the natives had sought stones suitable for tools and weapons at periods of low water, the scrap material left behind being covered by subsequent flooding. A search of the loose, disturbed gravel produced two roughly flaked waterworn quartzite cobbles and several questionable pieces.

In his study of the glaciation of this area Professor Warren has prospected the source of the terrace gravel, an exposed bank of boulder clay capped with glacial lake silt, for bones or fossils. He has seen nothing to indicate that the bones commonly found in the gravel were derived from that source, which may mean that they are remains of animals dying in the valley at the time the terrace was forming.

At present we have no means or data for computing the age as indicated by the change in river level, a drop of about eighty-five feet (measurement by aneroid).

A similar situation apparently exists along the Peace River. In the course of railroad and highway construction a large pit has been excavated in an old terrace, one hundred feet above present water level, at the west end of the bridge crossing from the town of Peace River. Unfortunately, the three or four roughly flaked waterworn quartzite cobbles which can be classed as artifacts were all found in loose or disturbed gravel; their association with the formation depending partly on their condition. The one bone secured, a metatarsal, is from an animal comparable in size and form to *Cervus canadensis,* and was down about eighteen feet in the gravel.

Although these things tell us nothing of the former inhabitants of Alberta, they do help to define the ground where we may ultimately find their history.

Junius Bird
American Museum of Natural History

A NEW OUTLINE MAP OF NORTH AMERICA FOR PHYTOGEOGRAPHERS

During the preparation of a series of distribution maps showing the geographical ranges in North America of several hundred species of bryophytes, some of nearly all the available outline maps issued by various publishers were tried out, one after another. Each one of them was found to be unsuitable in some way, at least for my purposes. The map which was most nearly satisfactory, and which was found to reproduce very well, was one lithoprinted in Ann Arbor as No. 21B in "The Geographical Institute's Series of Maps and Graphs," under the sponsorship of Professor Robert B. Hall, of the department of geography, University of Michigan.

As this map went out of print just as it was becoming most useful to me, Professor Hall very kindly agreed to prepare a map specifically designed to meet my needs and those of phytogeographers in general. For help and advice in the selection of what such a map should show, I am very grateful to many botanists, especially H. H. Bartlett, E. T. Wherry and F. J. Hermann; also to G. M. Stanley, of the department of geology, University of Michigan.

The new map has just appeared as "North America–205C" in "Hall's Series of Maps" published by John Wiley and Sons. It is printed from copper plates on $8\frac{1}{2} \times 11$ inch stock and presents a combination of features of various kinds not found on other outline maps. For instance, the Aleutian Islands and the Lesser Antilles both appear, as well as the entire Arctic American Archipelago and all Greenland (Bonne's projection). With the exception of the Arctic Circle and the Tropic of Cancer, which are indicated separately, latitude and longitude are indicated at ten-degree intervals. The most important drainage systems are shown, yet not enough in detail to clog when the map is reduced one half to two thirds in publication. Further features, very important in the light they shed on geographic distribution of plants, are (1) the Fall Line (after Loomis[1]), (2) the total extent of Pleistocene glaciation (after Antevs[2] and Daly[3]) and (3) the maximum extent of the Wisconsin stage of the Pleistocene in eastern North America (after Leverett and Taylor,[4] Leverett[5] and Antevs[2]).

[1] F. B. Loomis, "Physiography of the United States," viii + 350. New York, 1937.

[2] E. Antevs, *Bull. Geol. Soc. Amer.*, 40: 631–720, 1929.

[3] R. A. Daly, "The Changing World of the Ice Age," xix + 271. New Haven, 1934.

[4] F. Leverett and F. B. Taylor, U. S. Geol. Surv. Monogr. 53. Pp. 1–529. Washington, 1915.

[5] F. Leverett, *U. S. Geol. Surv. Prof. Paper* 154-A: 19, Fig. 5, 1929.