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BEANS, MAIZE AND CIVILIZATION

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THE DICTIONARY DEFINES CIVILIZATION IN VARIOUS WAYS, one being "a state marked by progress in general", a rather flexible definition and one open to convenient interpretation. A way of life and of living which to one person may sum up to civilization may be scorned by another accustomed and conditioned to a different way of life.

It is customary to refer to the way of life worked out and practised by several groups of Indians, who were scattered from Mexico well down the western part of South America, as civilizations. The beginnings of these civilizations, we are wont to say, extend back a thousand or maybe even a bit more than two thousand years.

The limitations ascribed to what constitute a civilization are as endless as the number of opinions which may be had on the subject. To me my laboratory where I may do research, my library and symphonic music are *desirable adjuncts* to what I think of as civilization. To my gardener these same things are meaningless and he has a vague understanding even of the words which indicate these concepts. "Civilization" to that gardener is a word which indicates something which he presumes to be desirable but just what is not too clear. Certainly it does not include the adjuncts mentioned in the above lines. One of my friends, a competent demographer, writes that in a *desirable* civilization "Certainly people should have enough to eat in order to maintain good health and vitality. They should enjoy adequate shelter and sufficient public health and medical care

to eliminate high rates of infant mortality and insure a reasonably long life. They should enjoy also the advantages of education and have available at least some of the modern means of transportation.”

I am acquainted with regions in Central America where all of these desiderata are lacking. Many large areas lack the most of them and yet I am sure that the majority of people living in them do not miss these advantages especially nor do they consider themselves to be living in an undesirable civilization. There can be no doubt, however, that these things are desirable in a civilization and that when we speak of a “modern civilization” it is principally these things which we mean to indicate.

The beginnings of a civilization which may have attained high levels in the arts and sciences are obscured in a very ancient past. A civilization, of any level, must have a basis and the basis is agriculture. Agriculture, in any civilization which is progressive, must be efficient and produce enough food to release a large portion of the population for other kinds of work. Workers in industry, transportation, education, public service, the arts and sciences must be fed by agriculture without having to toil in the fields themselves.

The most stable sources of food are plants, and as far as the American civilizations that reached a high level of attainment are concerned plants were the only available source of a constant food supply, or at least well developed supplies.

Two thousand years are few for the development of a civilization from a nomadic beginning, few because it must have taken a very much longer time to “tame” and bring to use those plants upon which a stable culture could be based. We are all quite willing to take off our hats to the man who expounded the theory of relativity (which I suspect few of us understand) but more we owe to that man, unknown and unsung, who found that by cultivating a primitive bean, he could enjoy a bit more leisure than that to which he had been accustomed. Here was a man of wisdom!

Maize did not “just happen” and yet most probably it was almost as complicated a group of plants a thousand or two thousand years ago as are the native kinds to be found in the highlands of tropical America today. The beans cultivated in tropical America, the best in the world of that day, did not

come for the asking. They must have been selected through that laborious and slow process of trial and error unconsciously done. If this thesis is correct then there must have been a period of time at least equally great and probably many times greater during which the plant was evolving, under cultivation and selection, to the kinds that were known and grown by the Indians at the time of the discovery of America by the Spaniards.

The story is not one of maize alone, although that is a story of outstanding interest, but of other plants as well,— in America principally the tremendously important field bean. It helped to balance a diet and to make civilizations possible.

The development of a food plant is the process of centuries rather than of years. The development of two principal, and complementary food plants as well as a number of minor ones which served for the basis of a civilization is an accomplishment of no mean scope.

People of these past ages were probably little different from the peoples of today when it came to preference of a place to live. Extending from Mexico down through Central America and again in the Andes of South America are highlands that certainly are as delightful to live in as anywhere on this globe. It seems more than likely that the ancient peoples who inhabited this part of the world lived principally in the highlands, just as the present population does today.

The progenitor of maize must have come under cultivation in the past where people were. If most people were in the highlands, as we assume, then maize may have had its origin there; and perhaps at more than one place. Dr. Edgar Anderson, astute student of maize, has expressed the opinion to the writer that if the kinds of maize were less important plants and ones less subject to contempt by the conventional systematist, that these same systematists might well classify them into more than one species.

The relatives of the common field bean (*Phaseolus vulgaris*) and of the scarlet runner bean (*Phaseolus coccineus*) are all in the highlands. The cultivated kinds certainly must have come from these upland areas. It seems more than reasonable that beans and maize developed in the same area at approximately the same time. Taken together they add up to the

basis for the development of a civilization, a civilization that with either beans or maize alone could never have developed.

In interisthmian North America, between Tehuantepec in Mexico and Panama, the most advanced civilizations, if we may judge by the splendor of the ruins which are indications of former grandeur, were in the lowlands or at least in relatively low lands. The most impressive ruins, of former Mayan empires, exist from Copán in Honduras northwestward through Guatemala to encompass, finally, almost all of the Yucatan peninsula.

If it is true that the most impressive old civilizations were in the lowlands then why do we assume that the principal food plants, without which these civilizations could not have developed, originated in the highlands?

Maize is an astounding plant in more ways than one. One of its characteristics is that the type of maize that grows and produces well at one elevation does not usually do well at a different elevation. Could this, then, be an added reason to suspect that maize is lowland rather than highland in origin, that the civilizations developed where they did as a consequence of its presence? Some types of beans are less selective than maize in choice of altitude at which they will grow. The scarlet runner types of beans, however, grow only in the highlands and could not have been developed in the lowlands, and taken to the highlands. The nearest relatives of the common field bean are native of the highlands. I believe that these are indications that the beans were developed, with complementary maize, in the highlands.

First, it seems possible that the lowland civilizations developed in a relatively short period of time, perhaps in no more than two thousand years and possibly in much less time. Considering the probable slow development of a set of complementary food plants this short interval seems to indicate that the development had already started elsewhere, in fact that the development had reached a high level.

There are indications of civilizations over much of the highland area of Tropical America and more are being discovered constantly. These are where it would be expected to find them and that they are cruder than their lowland counterparts is no reflection upon them. They are no doubt older. The old

highland cultures left little in the way of monuments or ruins by which they may be judged unless by their very lack they may be judged.

These old highland cultures, incipient ones if you like, must have flourished and then declined just as the later Mayan civilizations did. The reason for the decline we can only surmise.

Indians must have spread out from the nuclei of older highland cultures, whether before or after the decline, or both, is of little importance. The important thing is that they must have taken their food plants with them as they migrated. If the diffusion from the old highland centers was slow then there would have been ample time for the beans and the maize to become acclimated and even, through mutations or otherwise, to form new variations. The spread of peoples would hardly have been more rapid than the ability of the principal food plants to adapt themselves to a migration to the lower mountain slopes and valleys and finally to the lowlands. Once an equable climate were reached and the food plants acclimated, then there were available the ingredients for a renaissance to surpass even the older civilizations.

The more that one studies the development of civilizations, from the viewpoint of the food plants on which they were based, the less one is likely to think in short periods of time for these cultural beginnings. Plants are to a certain extent plastic and plants under cultivation often seem more plastic than others, perhaps because we observe them more closely. However, a certain amount of intelligence is necessary in the recognition and selection of chance variations or mutations and from crude beginnings in both man and plants this again adds up to time.

The ancient Maya, if so we may distinguish them from their still more ancient prototypes, built up a civilization that is presumed to have spread from the north central section of Petén at Uaxactun (Guatemala) through all of the surrounding area, covering all of Yucatan and reaching to the slopes of the mountains to the south. In the southwest it reached as far as Copán in Honduras where one of the finest centers of the Maya Old Empire was founded and built up.

The spread of the cultural empire may have been accompanied by the spread of the Mayan agricultural system and the plants on which it was based, — maize, beans and a number

of lesser plants. On the other hand, it is possible also that the agricultural basis for this diffusion of culture from Petén was already present in much of the area, having come down from the highlands with the protomayan.

John M. Longyear III has recently published¹ a fine article on the occupation of Copán in Honduras by the Mayan. The idea is expressed that the occupation was principally by the ruling class of Mayans who came into a valley already populated by people of a relatively low cultural level. This ruling class or theocratic group is assumed to have been responsible for the classic civilization developed there. Longyear believes that the eventual breakup of the cultural structure was due to the priestly group packing up and leaving. The directive force gone the common people merely moved back to their maize patches, abandoning the religious center which had never had much meaning to them.

The cultural Mayan Old Empire declined due, quite possibly to failure of agriculture on which it was based. The decision to pack up and go, mentioned above, may have been based on the increasing difficulty of holding the group together in a failing agricultural economy. The New Mayan cultural empire developed in northern Yucatan and lasted some 700 years before complete desintegration.

Conjectures about the reasons for the decline of the Mayan civilizations are many. Among them are pestilence, conquest by more savage peoples; invasion of the agricultural lands by grass, which the Mayans could not combat with the tools which they had.

Possibly the decline was due to a combination of causes which well may have been based on failure of the food supply and aggravated by excessive human population. The failure of agriculture to produce enough food for what was possibly an overpopulated land in which the soil was becoming annually less productive through primitive agricultural practises was perhaps the most important reason for the decline. Possibly the necessity and difficulty of getting sufficient food drew workers from the services, and even from among the artists and scientists. Such a breakdown in the division of labor on which the civilization was based would eventually result in the breakdown

¹ A historical interpretation of Copán Archeology, in Sol Tax (ed.) *The Civilization of Ancient America*, 86-92. 1951.

of the civilization itself. A poorly fed population, it may be pointed out, is more susceptible to diseases which may cause epidemics, in addition to the deficiency diseases that are always present under such conditions. Intellectual activity decreases as preoccupation with the pangs of hunger increases.

It is difficult to imagine that the Mayans would have left their center of culture in western Honduras and in adjacent Guatemala for other than a major disaster. That disaster I believe was the inability to produce enough maize and beans on the available land to feed the expanding population and to maintain the division of labor. The logical result of that disaster would have been malnutrition and the diseases which follow it, and the breakdown of the civilization due to unbalance.

Present day populations in Central America are largely concentrated in the highlands. The principal food plants of these peoples are the same ones that made the ancient civilizations possible. These food crops are cultivated, for the most part, in a way which is probably not radically different from that used during centuries, and with no more thought to preserving the soil.

The population of all Central America is increasing rapidly. New lands and new horizons are no longer abundant. Lands presently unsettled, and many of those settled, are mostly submarginal or worse as far as agriculture is concerned. The rich and unoccupied farm lands, which are to be found in the American tropics according to some visionaries, just do not exist. If rich lands existed they would not be unoccupied!

The highlands probably were never very rich agriculturally except in restricted areas, principally near active volcanoes. A primitive and principally extractive system of agriculture is constantly reducing the productivity of the land and of its carrying capacity.

Many Central Americans say that the natural resources of their countries are underdeveloped. A more realistic view of the situation might be useful, always keeping in mind what happened to the indigenous civilizations on the same lands when presumably they were pristine. The food plants available to the peoples of today are more numerous than they were in Mayan times but still possibly as much as ninety percent of the foods consumed are the same ones that the Mayans and the protomayans knew so well.

Agricultural production, among the major subsistence crops, in Central America is woefully low and as a result a very much greater area of land must be tilled just to feed the people than should be the case. The people of Central America, as a whole, have an insufficient amount to eat. Malnutrition or, perhaps better said, inadequate nutrition contributes largely to the generally low status of health as well as contributing to the widespread illiteracy. To continue the circle, poorly fed and sick agriculturists are not good farmers and, to continue again, it takes more of them to produce the necessary minimum of food to carry the population. The principal occupation, and preoccupation, of too large a portion of Central Americans is producing that necessary minimum of food.

With a world from which to draw new crops and new food plants we have a decided advantage over peoples who knew a more restricted world. We have implements and techniques that were unknown to the ancient peoples on whose land we live. But we have the same lands, used many centuries more, it is true, and lands which were never very good. It is past time that we should begin to conserve our badly depleted lands and to teach our peoples a rational kind of agriculture so that we may continue to grow the beans and maize that are going to continue to be our principal sources of food as long as there are any of us here.

We should not demand that our sloping and tortured fields produce in increasing amounts the food which our rapidly increasing populations desire. Under prevailing agricultural systems the tendency is for less production rather than more. The breakup of the Mayan culture doubtless was signalled by fertile humans and increasingly infertile lands with the concomitant decrease in productivity. Finally a situation developed where far too large a portion of the population had to devote itself to the production of food in order to live. Agriculture no longer was sufficiently productive to release a large portion of the population to the pursuits essential to maintain a civilization.

The best of agricultural techniques, the best food plants that we have in addition to those that may be developed by our geneticists and other researchers, will avail little if some way can not be found to keep the population at a level where it may be sustained adequately by the produce of the land. To produce