

since been added to, but they have never been controverted because Beaumont's book is largely a report of factual observations.

His studies were the subject of a Classic of Science in the SCIENCE NEWS LETTER of July 4, 1931. (Volume XX, Page 10).

*Science News Letter, September 30, 1933*

#### ENTOMOLOGY

### Insects Use Many Devices To Live Through Winter

**L**IKE BEARS, ground-hogs and other warm-blooded animals, many species of insects sleep through the winter. But their hibernation habits assume many strange patterns, unlike those of larger and more familiar creatures. Some of these insect hibernation habits were described in a talk on "How Animals Spend the Winter," given by Austin H. Clark of the U. S. National Museum, under the auspices of Science Service.

Many insects, like some butterflies, wasps, bees and flies, live through the winter as adults, hidden away in some snug retreat, said Mr. Clark. A few warm days in winter often bring them out, and they fly around until the returning cold puts them to sleep again. More familiar, of course, are the cocoons containing the chrysalids of moths, which school children bring in for their first nature study lessons.

But not all cocoons contain chrysalids, Mr. Clark continued. Some butterfly species spend the winter as full-grown caterpillars, hidden away in loose cocoons. In the first warm days of spring these caterpillars change into the chrysalids from which the adults finally emerge. Still other butterflies live through the winter as caterpillars partly grown which in the spring complete their growth and then become adults.

Most of those butterflies called fritillaries, in color golden brown with silver spots on the under surface of the hinder wings, lay their eggs in summer. The little caterpillars that issue from these eggs lie quietly on the ground and will not eat until the following spring. For six or even seven months, through the heat of the late summer and the cold of winter, they are completely passive, waiting for the proper time to begin to eat. A few butterflies and many different moths spend the winter in the eggs which are laid in summer but do not hatch till spring.

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#### DEMOGRAPHY

## Recovery Program Aims at Human Resource Conservation

### Migration From Farms to Villages, Rather Than to Cities, Seen as Solution to Population Shift Problem

**"C**ONSERVATION of our natural resources" was a slogan when the other Roosevelt was president, and for a generation it has had a great hold upon our imaginations.

The relation of the natural to the human resources of the nation is one of the most vital problems of today. In addition to the emergency matter of the NRA and its re-employment campaign, there is the long-time important problem of population in relation to agriculture and industry.

Few people seem to realize the significance of the declining birthrate. Dr. O. E. Baker is one of those among the economists who has studied this problem, and his conclusions, arrived at from his vantage point as the Department of Agriculture's senior agricultural economist, are significant. The need of conserving human resources is even more urgent than that of conserving the natural resources.

#### Not Enough Children

"The conservation of natural resources," Dr. Baker says, "has been recognized in all plans for national development. But no plans have recognized, as an objective in a national policy, the even more urgent need of conserving the human resources. Not enough children are being born in the nation now to maintain permanently its present population."

Fundamental in the agricultural situation is the fact that the land resources of the United States exceed those of all Europe, excluding the U. S. S. R., and are of a similar magnitude to those of China and India; whereas the population of the United States is about 125,000,000 and is unlikely to exceed 150,000,000 as compared with 350,000,000 in Europe, excluding the U. S. S. R., and probably 800,000,000 in China and India. Since exports of foodstuffs from the United States are decreasing, while agricultural technique continues to advance, it is clear that either agricultural production must be restricted or the

diet of the American people must trend in the direction of those foods that require relatively large areas of land for their production. Fortunately, these are the same foods that many people greatly need.

The uncertainty in the situation relates to the persistence of urban unemployment, with its retarding effect, not only upon the use of the more expensive foods, but also upon migration from the farms to the cities.

#### Unemployed Older

Prior to the depression, agricultural recession raised serious problems in many "submarginal" areas. The net migration from farms, largely in such areas, to cities and villages exceeded 6,000,000 during the decade 1920-1929. These problems arising from agricultural recession will persist in some areas, but in other areas urban unemployment is now inducing equally urgent problems of agricultural settlement. All the unemployed are growing older, and many are becoming unemployable. There were 34 per cent. more people in the United States over 65 years of age in 1930 than in 1920, and the increase in number will be even greater by 1940. Local studies of the "back to the land" movement reveal a surprisingly large number of people over 50 years old.

Moreover, so long as the migration of young people from the farms to the cities and villages is retarded by inability to obtain employment, each year will add many thousands to the farm population. In 1932 the increase in farm population was, apparently, 1,000,000, the net movement from cities to farms exceeding 500,000, while the excess of births over deaths was nearly as great. If migration from farms is balanced by migration to farms during the decade 1930-1940, there will be about 2,250,000 more males over 20 years of age on farms in 1940 than in 1930, and nearly 1,200,000 of these will be operating farms, if the 1930

ratio persists. Furthermore, most of these men will have little capital and will be living in the poorer farming regions, for it is in such regions that young people are most numerous. An increase of one-fifth in number of farms, mostly in areas of hilly or poor land, will accelerate the loss of soil fertility and tend to lower both the productivity and the standard of living of the rural people.

If migration to the cities is resumed in its predepression magnitude, Dr. Baker sees the population of the nation beginning to decline within a few decades, because of the much lower birth-rate in the cities than on the farms. There are now not within 25 per cent. enough children under five years of age in the large cities of over 100,000 population to maintain their population

permanently stationary without migration from rural territory or immigration from abroad, while in the smaller cities the deficit exceeds 10 per cent.

The solution of the dilemma, in Dr. Baker's opinion, appears to be through migration from the farms to the villages rather than to the cities, associated with decentralization of many urban industries, suburban development, and much part-time farming. In the village and suburban (rural nonfarm) population there is about a 25 per cent. surplus of children above the number needed to maintain a stationary population, and it seems reasonable to hope that the village birthrate may become stationary before a deficit develops. In the farm population the surplus is, at present, 40 to 50 per cent.

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#### ARCHAEOLOGY

## Road Roller of Prehistoric Road Builders Found in Yucatan

**W**HAT IS BELIEVED to be a prehistoric American road roller, forerunner of the steam-roller that levels out modern highways, has been discovered in Yucatan.

The roller, a piece of stone 13 feet long and over two feet in diameter, was a giant cylinder which archaeologists believe was used by slaves, captives, or willing laborers who pushed it over the road surface to smooth and level it.

Discovery of the roller, now broken in half, was made by an expedition sent out by the Carnegie Institution of Washington with the aim of following one of the famous Mayan roads from end to end. The road in question leads out from Coba, once an important Mayan city, to Yaxuna, which lies 62½ miles away. Today the line of the highway is obscured by wild vegetation so that traversing it is difficult.

The expedition sent out by the Carnegie Institution was led by Alfonso Villa, young Yucatecan schoolmaster who has assisted in scientific studies of the living Mayas. Twelve Mayan Indians accompanied Sr. Villa. The party was three weeks pushing its way through the 62 miles of bush and forest.

The road they followed was once a magnificent highway 30 to 34 feet wide, and raised several feet above the surface level of the ground. The Indian

engineers built retaining walls for their roads and filled the space between with boulders and small stones to fit the chinks. The upper layers were finer in quality, and the top was of finely broken rock hammered or rolled into a hard level surface and then coated with mortar cement. Modern Indians in Yucatan call the old stone roads *sacbeob*, which means white roads. Under a dazzling sun the "great white ways" of the Indian civilization must have been impressive to see.

It was on the highway, toward one side, that the five-ton stone roller was found, probably where it was left by builders or repair men centuries ago.

Harry E. D. Pollock of the Institution staff, who has studied the ruins of Coba, estimates that the road was built before the end of the seventh century A.D.

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#### ARCHAEOLOGY

## Mexican Clay Horses Recall Spanish Conquest

**F**UNNY little horses of baked clay have been discovered among broken pottery unearthed by government archaeologists in excavations downtown in Mexico City.

The horse figures are among the earliest efforts of American natives to represent in art the strange animals white men brought from Europe. Horses ridden by Cortez and his followers were the first in the New World since geologic ages when wild horses in various stages of evolution, roamed the country and vanished.

How mysterious the anatomy of the horse seemed to the amazed Aztecs is well shown in the little clay statues. Although one horse has a rider on him, and another a pack on his back, the two look more like dogs.

The Aztecs called the Spanish horses "mazatl" or deer. In the only Indian version known to describe the conquest of Mexico City, a document preserved in Aztec by the Spanish monk Sahagun, the natives speak of supplying deer-food for Cortez's deer.

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One Colorado hospital for mental diseases has a "hostess" on its staff, a graduate nurse especially trained, who introduces each new patient to the ward nurse, shows him around the hospital and keeps in touch with him for the first ten days of his stay.



EARLY AMERICAN ROAD-ROLLER

Broken pieces of a huge stone cylinder that was once laboriously pushed by Indian-power over the famous "White Ways" of Coba.