potent factor of all in determining whether meat shall be tender or tough, of high quality or of inferior quality.

Histological examination of muscle fibers of animals which have received the same feed-lot treatment shows characteristic differences in size, structure, and arrangement of fibers, membrane, and connective tissue. The meat of no two animals behaves in like fashion when subjected to a number of tests which have been developed.

As a check against these observations muscle from a number of the bureau's inbred families of guinea pigs has been examined. Some of these families are the consummation of 29 generations of continuous brother-sister matings. They have the same genetic characters and throughout a period of years have behaved with remarkable uniformity when measured by such yardsticks as rate of growth, size, frequency, and vigor of litters, longevity, and resistance to diseases.

Examinations to date have produced striking similarities in the muscle structure of the meat from guinea pigs of the same inbred families, with characteristic dissimilarities in that of guinea pigs of different families.

Tenderness in Meat May be Hereditary

Here, then, is a working hypothesis which promises much. Observations with small laboratory animals have borne out theories gathered when working with the larger meat animals. The smaller animals are of known breeding, free from genetic variation.

No factors known to influence the tenderness and palatability of meat have been purposely bred into these animals. Yet many or all of the factors influencing quality in meat have no doubt been segregated in them. It remains to determine them and to learn how they behave.

If it could be assumed that a single factor, unlinked with other factors, is responsible for tenderness, the problem would be simple. If many factors are concerned, the problem is more complex. These factors may be dominant or recessive, but in any case it is theoretically possible to produce animals which will breed true.

The ultimate aim will be to develop strains of the larger domestic animals that will breed true to a definite standard of quality. They will be superlivestock, not perhaps in size, nor in weight-gaining ability, but in the quality of their products.

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MEXICAN Bean Beetle's Damage Severe After Record Winter Survival

The Mexican bean beetle survived the winter of 1928–29 in the southern and eastern Atlantic States in the largest numbers hitherto recorded and as a result beans were seriously injured during the season of 1929 where control measures were not practiced. The beetle is now known to be present along the Atlantic Coast from Georgetown County, S. C., to northern New Jersey. It was reported as far south in South Carolina as Dorchester County. To the northeast it has spread into three counties of Connecticut.

In Michigan its spread increased 40 miles westward, but the beetle apparently did not survive in Ingham County, where it was found last

year. Likewise in Indiana it spread 20 miles west, into Kosciusko County, but could not be found in Whitley County, where it was found in 1928. In southern Indiana it reached the Illinois line at Vincennes in Knox County, 20 miles west of the 1927 limit of distribution in that section. Considering the new infestations in Hardeman County, Tenn., and Benton, Tippah, and Lowndes Counties, Miss., together with those given above, it would appear as if this pest will gradually spread over the Mississippi Valley. (Fig. 128.)

Reports from the Southern States indicate that the beetle has been more numerous and injurious than at any time since it reached the eastern part of the United States.

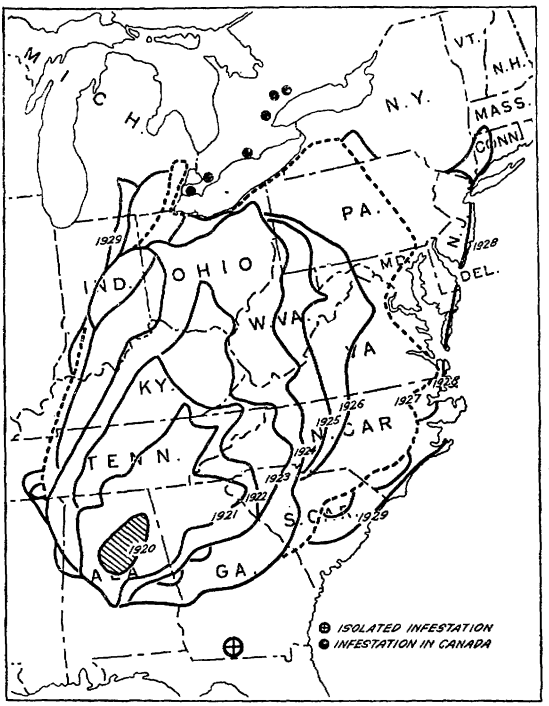

FIGURE 128.—Distribution and spread of the Mexican bean beetle in the Eastern States, 1920–1929

Important Bean Districts Invaded

For the first time since its discovery in the East in 1920 the Mexican bean beetle has invaded the important bean-growing districts of the Eastern Shore section of Maryland, Virginia, and Delaware. Fortunately this extensive bean acreage is on level land which is well adapted to the use of power or tractor driven spraying machinery. A large number of the growers and canners in that section equipped themselves early in the season to treat the bean crop, and the result has been in general a satisfactory control of the pest, especially where liquid spraying has been practiced, the best results being obtained by the use of magnesium arsenate. By the use of 8-row sprayers a large acreage can be covered effectively at a minimum expense, and the successful control of the beetle in this important bean-growing area now appears certain.

Hibernation records obtained in Ohio for four years compared with records obtained in Alabama for eight years, and in other Southern States, indicate that the survival of the Mexican bean beetle depends to a large extent on the minimum winter temperatures. The survival in the Southeastern States is many times greater than the survival in the Northern States. It seems quite likely that the Mexican bean beetle will not survive the winters in either Michigan or New York in sufficient numbers to build up a population that will cause great damage to the bean crop except during mild years. During the past

few years the insect has become rather abundant by late summer in Chautauqua County, N. Y., along Lake Chautauqua, but is scarce in Erie County, immediately to the north. While it has not as yet caused any damage in the bean districts of Michigan or New York, it should be watched carefully.

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MIGRATORY-BIRD Refuges to be Increased Under New Conservation Act

In passing the migratory bird conservation act, the Seventy-first Congress gave its approval to the adoption by the Federal Government of a comprehensive plan for bird protection through the creation of refuges. The act, which was signed by the President on February 18, 1929, authorizes the provision of funds to survey, acquire, and establish large tracts of land and water throughout the country, to be maintained thereafter and for all time as sanctuaries for birds of species that migrate between this country and Canada. Unquestionably the act comprises the most significant and important item of Federal legislation enacted for the protection of wild life since the passage 11 years before of the migratory bird treaty act. By the nature of its provisions it indicates public acceptance of the sound principle that game laws and regulations on hunting can not alone be relied upon to maintain forever our native birds and animals.

The truth is well established that modern conservation methods in wild-life administration, while not failing to take due cognizance of the effect on game of the annual kill by the gunners, must also give equal attention to the less direct influences of civilization and industry. The changes produced by many forms of industrial activity in the natural environment of the native wild creatures, make it more and more difficult for them to live. Among such influences are deforestation, with its attendant destruction of cover, stream pollution, damaging fires, and drainage. These matters, particularly drainage and the diversion of water from natural reservoirs and channels, are influences of such vital significance to water birds, mammals, and fish as to suggest the axiom that in order to protect wild life Americans must protect its habitat. In this brief axiom is comprehended the purpose of the migratory bird conservation act.

In their earlier history American wild-life conservation policies were chiefly concerned with the enactment and enforcement of measures that restricted hunting, and at that time the need for action to preserve the habitat was not so apparent. Then it was of obvious and immediate importance to curb the slaughter of game for the market, and to modify the laws that permitted spring shooting, a pernicious practice under which in some localities certain species of game birds might legally be taken without restriction as to numbers for nine months of the year. It was evident also that nothing less than action by the Federal Government would serve to bring about the harmony of effort so necessary for the uniform protection of the migratory birds that twice every 12 months visit practically every section of the continent from the Arctic regions to the Gulf coast and beyond.