the course of social evolution. If we succeed, individualism working collectively will triumph over medieval collectivism.

The influence of the evolutionary conception may be seen again in our attitude toward social problems such as disease and crime. These are not inevitable conditions to be treated by curative measures only. They are to be attacked with all the knowledge of hereditary and environmental factors we can command, and finally eliminated by the evolution of a type of man and a form of society in which such excrescences will be non-existent. We are no longer content with our lot, merely because things have been as they are within the memory of man or because we see no prospect of immediate change. Things have changed in the past and we want to change them in the future. We are not content to let evolution take its course with us, we want to make it go our way. Thus the insight into social changes which evolution brought has given a habit of mind that will brook no restriction upon the human spirit. As with philosophy, we have the change incident to an outlook upon a dynamic as opposed to a static world.

In conclusion, we have shown that science feeds the spiritual as well as the material man. Science deals with what we can measure and weigh, is wholly impersonal, is a thing of the intellect rather than of the emotions. But the intellect and the emotions are not separate entities of the mind, rather the mind is a unit which has its intellectual and its emotional sides. The raw material of scientific fact is susceptible of unlimited organization within the mind and this process of organization gives play to our spiritual nature. If we have made our point, the progress of science has given the spirit of man far more than it has taken away.

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MEASURES FOR PROTECTING WHEAT-FLOUR SUBSTITUTES FROM INSECTS

READERS of SCIENCE may be interested in work being done to prevent the loss of wheat-flour substitutes due to insect attack. Many of the millers and dealers who handle the cereals which the Food Administration is now requiring as substitutes for wheat flour have always recognized them as being subject to insect attack to such a degree that it has been considered poor policy to handle them extensively during the summer months.

The amount of embryo which is included in a flour, and the coarseness of the product are usually taken as an index of susceptibility to insect attack, coarse flours with the most embryo being the most susceptible. The wheat-flour substitutes and other cereals contain embryo, are relatively coarse, and are known to be highly susceptible to insect attack.

Millers, dealers and consumers, will handle more of the susceptible cereals than usual this summer and, unless unusual care is taken to protect them, the requirement of the Food Administration may result in an increased loss of food and thus defeat the object of the government. However, such losses can be prevented and, if proper precautions are taken, the handling of wheat-flour substitutes need not lead to serious complications with insect pests. The division of entomology and economic zoology in cooperation with the department of animal biology at the University of Minnesota, and the Minnesota State Food Administration have been outlining recommendations and methods for aiding the millers, dealers and consumers of Minnesota in preventing losses of wheat-flour substitutes. The measures are preventive and it is proposed to cover the state with propaganda before any serious trouble has arisen.

The millers are probably the best prepared for the new conditions. The operators of the large flour mills in Minneapolis have learned from experience that these cereals must be carefully handled and they were the first to anticipate complications arising from the war-time emergency. The cereals which are put upon the market in sacks are not permitted to remain in storage but are hastened to the con-

sumer, if possible, in less time than is required for the development of the insects beyond the egg stage.

The cereals which go out in sealed packages are heated to about 85° C. at the time of packing. This temperature will kill all stages of insects and if the packages are tightly sealed such products are practically free from insects' attack, unless they are stored in badly infested places. When the insects have access to packages, they will enter through any cracks which they may find and in cases of bad infestation they will make holes through the wrappers and boxes. To protect themselves against losses while these cereals are in the possession of retail dealers, many of the large milling concerns are turning the cereals over to the dealers with only a "sound on delivery" agreement.

It is with the retail dealers and the consumers that this work is particularly concerned. With the millers protecting themselves by rapid transit and the "sound on delivery" agreement the liability of loss devolves upon the retail dealers and the consumers. The retail dealers and consumers must protect themselves against the introduction of undeveloped insects in the cereals. In many of the retail stores where proper precautions are not taken the insects are present and ready to infest the sacked cereal and even that in sealed packages may be destroyed or infested with eggs. Cereals not destroyed in the store may contain eggs which either did not hatch during the short period after leaving the mill or were deposited while in the infested store. The result is that the homes are very apt to become infested. Dealers are recommended to adopt the miller's policy of rapid handling of cereals and to take proper precautions in the sanitation of their stores. Instructions are being sent out to the dealers emphasizing the responsibility resting on those who handle wheat-flour substitutes and warning them of the serious losses which may result if they permit the cereals to be exposed to insect attack.

Consumers are instructed to buy small quantities of cereal, to avoid "sealed package" cereals when the packages are broken or contain holes, to heat "sacked cereals" just as soon as they are taken home, and to use great care in storing all wheat-flour substitutes. If the millers and dealers are able to eliminate their loss by the rapid handling of cereals the loss which our country will experience will depend upon what the consumer does to eliminate loss after the cereal reaches him.

The heating of the cereal to kill any stages of insects which it may contain will protect the consumer against the infestation of the home and in addition it will reduce to the minimum the loss caused by cereal insects. A method of heating cereals in the oven has been simplified and standardized as a result of a series of experiments on heat conduction in cereals and fatal temperatures of the insects infesting them.

The problem in heating is to obtain a condition in which the minimum temperature in any part of the cereal is well above the fatal temperature of the insects, about 45° C. at 24 per cent. of relative humidity. At the same time the temperature in the hottest part must be kept well below the heat which will injure the cereal. about 94° C. This can be done by placing the cereal in pans about two inches deep and heating it in the oven until the surface of the cereal reaches 85° C. At this point the fire should be turned out, in the case of gas, gasolene, or kerosene ovens, and the cereal should be left in the closed oven for forty-five minutes. If a coal or wood stove is used, the oven door should be opened when the top of the cereal reaches 85° C. and the fire should be kept low during the forty-five minutes. Temperature curves representing the temperature of the top, center and bottom of such a pan of cereal show that the center of the cereal reaches a temperature between 55° and 60° C. and that it remains above the fatal temperature for insects for about half an hour.

Since thermometers which indicate high temperatures are not in reach of all housewives, a wax has been standardized to melt between 82° and 85° C. and is to be manufactured under the direction of the Food Ad-

ministration. The wax is furnished in small pieces packed in boxes which will cost the consumer five cents for a season's supply and is to be distributed to the retail dealers through the jobbers. The directions are very simple and explicit, for one has only to place some wax upon a piece of paper on top of the cereal and heat until the piece of wax melts to a grease spot which will be 85° C. Then it is recommended that the cereal be mixed and left in the oven for forty-five minutes as stated above.

Warnings with regard to the proper storage of the cereal after it has been heated make it clear that the cereal will remain free from insects only when stored where no insects can get at it.

The cereals used in the heating experiments have been submitted to various cooking processes by the department of domestic science at the University of Minnesota and no injury was apparent even when the cereals were heated to a temperature of 95° C.

This work has been undertaken in anticipation of a condition which seems very certain to develop. With the cooperation of the millers in "sterilizing" and rapidly handling the cereals, of the dealers in increased sanitation and in furnishing consumers with "heat-testing wax," and finally of the consumer in heating the cereal when it reaches him, it is hoped that our country may be aided in its effort to conserve the food needed to win this war. Similar campaigns in other states might aid in reducing a loss which seems inevitable if no unusual measures are taken.

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SCIENTIFIC EVENTS

THE PROGRESS OF BIRTH AND DEATH REGISTRATION IN THE UNITED STATES

THE recent inclusion of Hawaii has extended beyond the limits of Continental United States the area for which the Census Bureau annually collects and publishes death statistics. Within this area now reside about 73 per cent. of the total population of Continental United States and Hawaii. It comprises, in all, 27 states, 43 cities in other states, the District of Columbia and the territory of Hawaii. East of the Mississippi the only states not included are Alabama, Delaware, Florida, Georgia, Illinois, Mississippi and West Virginia, while west of the Mississippi the only states included are California, Colorado, Kansas, Minnesota, Missouri, Montana, Utah and Washington.

The annual collection of death statistics from states and cities maintaining adequate registration systems was begun by the Census Bureau in 1902, the first report covering the calendar years 1900 to 1904, inclusive, and for each succeeding year a separate report has been published. The original registration area contained 40 per cent. of the total population of the country. It remained unchanged until 1906, since which year it has shown an almost uninterrupted increase in geographical extent and in proportion of total population, until at present it contains nearly three fourths of the country's inhabitants.

In birth registration highly satisfactory progress has been made during the past two years, although there are still a number of states in which adequate death registration prevails but in which the registration of births has not yet reached a sufficiently close approximation to completeness to justify the acceptance of the local records by the Census Bureau. The birth-registration area, as at present constituted, comprises 19 states—the six New England states, New York, Pennsylvania, Maryland, Virginia, North Carolina, Kentucky, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Utah and Washington—and the District of Columbia. This area is estimated to contain about 51 per cent. of the total population of the country, as against about 31 per cent. when the collection of birth statistics was begun, a little more than two years ago, from an area comprising the six New England states, New York, Pennsylvania, Michigan, Minnesota and the District of Columbia.

This growth, in so short a time, is gratifying. It is, however, unfortunate that in the United States the registration of vital phe-