

Occupational Health on Farms

By HENRY N. DOYLE

HEALTH AGENCIES have many as yet undischarged responsibilities toward rural Americans. To comprehend the responsibilities of official agencies for occupational health on farms, it is useful to grasp the extent of industrialization of American agriculture.

The population of the United States in 1910 was 92 million. Today, it is 166 million, an increase of 80 percent. In 1910 there were 322 million acres of cropland. Today there are 350 million acres of cropland, an increase of only 9 percent. Yet, this acreage produces more than enough food for our expanded population. It is estimated that 310 million acres will supply our 1960 population, thanks to the increase in productivity per acre. Improved soil management, such as erosion control and the use of fertilizers and other agricultural chemicals, including pesticides and weedkillers, have contributed part of this gain. Power machinery has increased the farmer's capacity to plow, sow, harvest, and manage livestock. Furthermore, market crops now grow on about 75 million acres formerly used to grow feed for the horses and mules which have been replaced by power machines.

Mechanization has made it possible for farms to produce more than enough for our present needs through the efforts of only 6,500,000 farm workers, or 11 percent of our working popu-

lation, whereas in 1910, 11,600,000, or 31 percent, were employed in agriculture.

The number of American farms in 1954 was 5,425,000, as compared with about 6,600,000 in 1910. More important, half of our present farms produce nine-tenths of the crops. This concentration offers a striking parallel to many industries in which a small number of large companies account for a high percentage of the total production.

Even as large manufacturing concerns tend, with large-scale operations, to employ the latest advances in mechanization, so, and frequently to a greater degree, large farms tend to employ mechanical equipment. The capital investment associated with many of the new mechanical farm devices often runs to a sum which is not economical for a single-family farm.

Some idea of how mechanization has progressed in farming may be obtained from United States Department of Agriculture statistics which reveal that between 1941 and 1952 the number of tractors increased from 1.7 million to 4.4 million (159 percent), the number of grain combines from 225,000 to 940,000 (318 percent), and the number of mechanical corn-pickers from 120,000 to 635,000 (429 percent). The increase of total power on American farms during that period exceeded 70 percent. Farm output per man now has approximately doubled in the 15 years since Pearl Harbor.

Agricultural changes during the past generation, therefore, have come to create new working conditions even as industrialization changed working conditions in mines and mills.

How do these new conditions affect the health and safety of farm workers? Farming is intrinsically hazardous. Injuries have always been frequent on farms. Although statistical

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evidence is lacking, experience has led us to expect many injuries from the handling of farm horses. A limited survey in one county within the past 6 months showed that 8 out of 29 recent accidents were associated with horses. Even with mechanization, farmers tend to keep a few horses. Of 44 farms visited in this survey, 36 had at least one horse. The total was 182.

Other farm animals also, particularly bulls, present hazards to farm hands. Injuries from the use of sharp or heavy tools or the stress of heavy lifting also are common farm afflictions, frequently resulting in chronic conditions, herniation, paraplegia, or impairment of vision.

The danger of infections from injuries incurred on the farm must be considered much greater than that in industry. This danger is heightened by the nature of the working environment, the inaccessibility of first-aid facilities, and the absence of interest in giving prompt care to minor wounds and other dermatological conditions. The prevalence of the tetanus hazard on farms is well recognized by physicians, but other organisms also must be considered.

A number of bacterial diseases are associated with agricultural work. Brucellosis, or undulant fever, is thought to be the most common one, but reliable statistics are lacking. It is not likely that all brucellosis is correctly diagnosed or that all diagnosed cases are reported. One factor contributing to the incidence of brucellosis is that rather than call upon a veterinarian, many farmers themselves vaccinate cattle and thereby risk accidental infection. Other diseases of significance on farms include anthrax, erysipeloid, leptospirosis, tularemia, bovine tuberculosis, and various forms of salmonellosis.

By occupation, the farmer is exposed also to viral and rickettsial diseases, including equine encephalomyelitis; psittacosis, Q fever, and Rocky Mountain spotted fever. There is a long list of mycotic diseases, of which actinomycosis and histoplasmosis are examples. A number of parasitic diseases also are potential farm hazards.

Moving from these biological hazards to physical agents, we find that farm work involves exposure to extremes of temperature,

both high and low. Heat exhaustion and heat stroke undoubtedly affect many farm workers. Another condition of possible significance is skin cancer, produced by prolonged exposure to the sun's rays.

The increased use of machines has brought a whole group of hazards new to agriculture. Noise exposures, for example, may now be sufficient to affect the hearing of farmhands who operate machines for extended periods. When more is learned about the problem of vibration, it may also be found to have adverse health effects on agricultural workers. Maintenance and repair work on farm machinery introduce hazards associated with welding.

Accidents incurred in the use of farm machinery represent one of the major categories of farm hazards. Accident rates in agriculture are far above industry as a whole. In 1954 only the mining and construction industries had higher death rates: Agriculture had 60 fatal work accidents per 100,000 (a total of 3,800) as compared with a rate of 25 per 100,000 for all industries. The injury rate, according to the National Safety Council, was 4,930 per 100,000 as compared with 3,240 per 100,000 for all industries.

Hazard From Chemicals

In addition to biological and physical hazards, the industrial hygienist who looks at present-day farming is struck forcibly by the number of toxic chemicals in use. Although many of these are soil conditioners and fertilizers involving little hazard, the majority are insecticides, fungicides, rodenticides, nematocides, and weedkillers which are employed specifically because of their toxic properties. While some are comparatively safe, nearly all present some degree of danger, and some must be classified as extremely hazardous. In particular, the heavy metals, such as lead, arsenic, and mercury, the halogenated hydrocarbons, and the organic phosphates present serious potential dangers to the people using them and sometimes to others working or living in the vicinity.

In dealing with industrial exposure to hazardous materials, we frequently express the view that any material, regardless of toxicity, can be used safely provided that proper

control measures are employed. The same philosophy might be applied to agriculture, but assurance of proper control measures is harder to obtain, at least at the present time. The reasons are apparent. Industrial operations are usually performed in a fixed location where exhaust ventilation or other suitable control methods are feasible. Industry has been subjected to fairly extensive and intensive educational programs on health and safety for at least a generation. Large companies usually have full-time safety and medical departments alert to potential dangers. Furthermore, personnel of insurance carriers and official agencies make frequent visits to industrial plants to check for possible hazards.

On the other hand, agricultural workers generally have little idea of the hazards of handling and applying powerful chemicals. Although most chemicals of this type carry warnings on the container labels, the tendency is to pay little or no attention to the labels, particularly if a material has been used previously without untoward incident.

Moreover, the methods of application are almost as varied as the materials used. Many of these methods present dangers that would not be tolerated in manufacturing establishments. For example, the application of fumigants such as carbon tetrachloride in connection with grain storage may employ techniques that would horrify an industrial hygienist. A recent farm survey observed workers tying handkerchiefs over their faces to protect themselves from heavy concentrations of carbon tetrachloride.

The hazards of farm life are not to be ignored. And they are not ignored although much remains to be done to protect the farmer's health.

Health Services for Farm Workers

Occupational health programs are conducted in official agencies either because of laws specifically concerning industrial working conditions or because of broad powers regarding the protection of health. Virtually all such programs were introduced to cope primarily with problems associated with manufacturing, and, sometimes, also mining. Few

of them gave much thought initially to the farm worker. In recent years, certain State officials have devoted attention to specific farm problems brought to their attention. For example, in Florida, in 1952 there were 46 claims for parathion poisoning filed; in 1953, there were 45. The Florida State division of industrial hygiene has since conducted an educational campaign among citrus grove and truck garden owners on the hazards of insecticides and preventive measures.

Also, California has conducted investigations of the high incidence of occupational disease among its agricultural workers. In 1954, of 23,101 reports of occupational disease in California, 3,143 (13.6 percent) were for agricultural workers.

In addition to purely occupational influences, the health of many farm workers is affected by environmental factors that are much less significant among present-day urban workers. Farm laborers, especially migrant workers, sometimes must live where housing and sanitation levels are far below those now considered as acceptable or safe. Large numbers of workers move from one State to another in pursuit of peak season farm work, and they stop at places where waste disposal is primitive, where water supplies are of questionable quality, where food spoilage is difficult to prevent, and where protection against flies and other disease carriers is absent. With this mobile population, numbering more than the citizens of several States, public health considerations demand far more than control of the traditional occupational diseases. In addition to basic sanitation, there must be answers to knotty questions of medical care for individuals not eligible for service available to permanent residents. Otherwise, it is reasonable to expect that transient workers will be permitted to carry communicable disease to every community that summons their services.

While rural health services can use all available community resources, occupational health personnel must not overlook their special responsibility. Industrial hygienists, in checking the working environment in factories and mines, are also concerned with the water supply, washing facilities, waste disposal, and food sanitation. Nor should they neglect these

points with respect to farm work, or, for that matter, in other situations where rural workers are housed temporarily, as in construction camps. Since such responsibilities also rest upon other personnel in State and local health agencies, policies for the best utilization of available man-hours must be developed to meet the individual situation. It is important, however, to recognize the place of environmental and medical care services in the occupational conditions of agricultural workers.

South Dakota and Iowa Programs

As stated before, a number of State occupational health officials have concerned themselves, to a limited extent, with specific or selected health needs of agricultural workers. To the best of our knowledge, however, no agency has ever considered the total need, with the objective of ascertaining the extent and severity of health problems on the farms of its State. This approach, which has been applied effectively by the States in planning logical and sustained programs for the improvement of worker health in industry, must now be used in agriculture if we are successfully to protect and improve the health of the farm family and its helpers.

The first stirring of activity in this direction came in 1955, when the South Dakota Department of Public Health requested assistance in planning an occupational health program for the State. In response to this request, the Public Health Service suggested that the program be developed to give industry and agriculture equal consideration from the start. To help develop such a program, the Occupational Health Program of the Public Health Service assigned a veterinarian to South Dakota in September 1955. Through this project it is hoped to evaluate the effectiveness of certain

survey techniques and to develop useful information regarding occupational health problems and methods for their attack.

Coincidentally, during 1955 the State University of Iowa Medical School established an Institute of Agricultural Health which will study similar questions in Iowa.

It is significant, we believe, that these related projects were independently conceived and started at this time. Although the existence of health and safety hazards on the farm has been recognized by public health authorities for some years, the South Dakota and Iowa programs represent the first positive steps taken toward a comprehensive approach to the problem.

While some findings from these two States may become available relatively soon, other States need not wait for them before taking stock of the adequacy of their activities with respect to this particular segment of the employed population. Indeed, because of variations in crops, climate, soil, and other factors, problems will be found to differ in each locality, and all States can contribute appreciably to scientific knowledge while carrying out a public health activity of real merit.

The subjects which need exploration are numerous. Study needs to be made of the toxicology and proper application of chemicals, of the safe use of mechanized equipment, of the general health status of agricultural workers as compared with the rest of the population, of the effectiveness of educational measures, and of the availability of health resources.

This is a new and complex field confronting the industrial hygienist. Occupational health needs on the farm may not be readily anticipated, but in every State where agriculture is a significant industry, an earnest beginning should be made to meet this public health responsibility.