

In the modern cultivation of medicinal plants the purpose is not so much to increase acreage as to make the plants larger producers of active constituents, in one way or another. As Floyd W. Parsons rightly says: "In an era of national scientific research the farmer will not seek to supply the increased demand for a product of the soil by simply adding additional acreage, but will discover a way to get more of the product from each acre cultivated. So in the factory, the management will not serenely assume that a larger output entails more men, but rather that the solution involves an increased production per individual." These are results of scientific research in the industries.

A report in a bulletin on research of the Chamber of Commerce of the United States says that American industry is spending about \$70,000,000 annually on scientific research. The bulletin states that about one-half of this sum is spent by American manufacturers in the conduct of laboratory research, while the remainder is expended in experimental and development work plants. The further statement is made that, as a result of scientific research work, approximately one-half billion dollars are saved annually by industry in this country.

"The value of scientific research, both from an economic and industrial standpoint," the department bulletin says, "has never been so fully appreciated as at the present time. The problems of the recent war forced science and its research activities to the front in all civilized countries. It is now realized by leading manufacturers that scientific investigation is a necessary adjunct to efficient coöperation. A utilization of the scientific knowledge now available, and a sympathetic coöperation in the free interchange of such information will lead to the adoption of improved manufacturing processes and do much to obviate the danger of ignorant destructive competition. The realization of this fact is shown by the 500 or more firms now maintaining laboratories for industrial research."

There is an interdependence of the professions and the industries—in practice, in trade and commerce, and an interrelation in scientific investigation. E. G. E.

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## DANGERS PRESENTED BY THE FREE SALE OF LIVING PATHOGENIC CULTURES.

FROM THE FRENCH—BY WM. H. GANO.

An interesting article has recently been published in *Annales d'hygiène publique et de médecine légale*, pointing out the dangers of the unrestricted sale of living pathogenic germs, which could be used for criminal ends.

The affair of one Girard directed the attention of the writer toward the matter.

This Girard was accused of having poisoned several persons, upon whose lives he had effected insurance in his own favor.

Girard did not expiate the crime for which he was convicted—because he died before the courts passed sentence upon him—but the information obtained against him showed the method he used in order to realize his diabolical designs.

When he was mobilized, Girard had already an experience with the police—he was surprised in the very act of robbery. A search of his domicile disclosed tubes of microbic cultures, ampuls of strychnine sulphate and of potassium cyanide, some cocaine, a number of pharmaceutical preparations, a microscope, and a work on toxicology. Questioned by the military judge, Girard replied

that he devoted himself, for amusement, to the microscopic examination of microbes. An order of "not sufficient evidence" intervened—an expert having testified that this individual presented numerous psychological defects.

Emboldened by this immunity Girard felt encouraged in his criminal projects, and continued to interest himself in microbic cultures which seemed to him capable of causing death, without leaving traces, as mineral or vegetable poisons will do. He purchased works on medical law, a book on typhoid fever, a high-power microscope, an oven, and all the necessary material and apparatus for growing bacteria. It was found that he had purchased cultures of anthrax and other bacilli from two firms in Paris, and that he renewed these supplies periodically.

At a given time, M. Delmas and five other persons, M. and Mme. Pernotte and their three sons, were stricken with typhoid fever. But these six persons recovered. The five members of the Pernotte family were stricken simultaneously with typhoid symptoms—it was evident that their contamination was due to one and the same cause.

It was established that Girard frequented the Pernotte home; that he went there in the morning and that he always waited in the dining-room; that the servants ate the same food as the master, but that they did not drink the same water—the Pernotte family drinking the water from a "water cooler." As the domestics remained immune it was properly surmised that the trouble came through the drinking water, and it was believed that Girard poured cultures of the typhoid bacillus into the "water cooler" during his visits; this hypothesis became more probable when it was learned that one of the supply houses had, about this date, made several deliveries of typhoid bacilli to Girard. The judge expressed astonishment that persons foreign to the medical sciences could so easily procure these dangerous agents.

Upon request of the court it was shown that after adding 1 cc of typhoid culture to 1 liter of filtered drinking water, 25% of the bacilli were living after standing 7 days; in beer, 8% were living at the end of 24 hours; the acidity caused the germs to disappear in less than 24 hours, when placed in wine or cider. The Girard affair is not the only one showing the need of strict regulation in this matter—a case has occurred in Germany analogous to that of Girard: One Hopf procured from a well-known firm in Vienna some thirty different pathogenic microbic cultures, among others—cultures of typhoid, anthrax, cholera, plague, botulism, tetanus, all with criminal intent; he confessed to having administered to his *third wife* typhoid bacilli in chopped meat.

Since 1904 regulations concerning the circulation and manipulation of these germs have been vigorously enforced in Germany, but the Hopf case has provoked new and more severe supervision.

There has been a bill proposed in the French Chamber of Deputies to strictly regulate the delivery of cultures of living pathogenic germs, and to confine such delivery to persons who are scientifically qualified to care for and handle the same.

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