

## SCIENCE VERSUS EMPIRICISM IN PUBLIC HEALTH WORK

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*Definition:* The Century Dictionary and Encyclopedia gives as one of the definitions of empiricism—"an undue reliance on mere individual experience".

In this sense, empiricism as the basis for effective public health work is often inaccurate, inefficient and expensive when measured by the better results obtained through the application of exact scientific information.

The French in endeavoring to build the Panama Canal made use of the empiric knowledge then existing in attempting to combat the hotbed of pestilential diseases which they found in Panama. It is said that each cross-tie in the Panama railroad, which is many miles long, is a monument to the death of some Frenchman sacrificed in the unsuccessful attempt to build the Panama Canal.

This failure in a large measure was due to the use of methods for control of diseases founded on inaccurate unscientific experience.

Contrast the thousands of deaths, the enormous sick rate, and this failure based on the false deductions of empiricism with the brilliant success of the American attempt. During the years which had elapsed between these two attempts to construct the Panama Canal, empiricism had yielded to science. Gorgás had accurate, exact, scientific facts as to the etiology, mode of spread and true methods of prevention and eradication of these pestilential diseases, instead of the exploded, mistaken theories used by the French based on supposed facts, the result of the deductions of experience.

Again today, contrast the status in yellow fever control with the appalling situation existing in 1878 under the empiric methods in yellow fever epidemics as related in the following quotation concerning a southern city:

"Less than one short year ago, there was enacted a tragedy which has no parallel in the annals of this country, and but few in the annals of mankind; a tragedy the

principal actor in which was the insatiate monster, Death. Along these streets and in these homes the heavy shadows of his dark wings fell, sweeping often into one common grave whole families, from the gray-haired sire down to the little babe which nestled in the crib. The very atmosphere was thick with his poisonous shafts, and it seemed inevitable that this beautiful and thriving city of this great valley was doomed to witness the extinction of her every son and daughter. Here, the wail of anguish and suffering went up from childless parents, parentless children, husbandless wives and wifeless husbands, until it touched the great humane heart of Christendom, and the fountains of charity were opened up, and a broad, steady stream flowed from every section; often coming in the form of a brave, philanthropic man, a fearless, devoted woman, or in limitless quantities of money or supplies to meet the wants of the suffering and to sustain the strength of the well. It was here that the heroes and heroines were born; it was here that they died."

Compare this death and destruction, together with the panicky flight northward upon announcement of yellow fever in the South and the attending shotgun quarantine and drastic inspection with enormous expense and destruction of property, with the sane and calm measures of today, consisting of screened isolation of the yellow fever patient and the destruction of the mosquito, with no thought of panic or extensive quarantine because accurate, effective, scientific methods of control now exist. Truly, scientific knowledge simplifies health measures.

In malaria, too, we know today that this disease is not a visitation either of providence or noxious gases but rather a visitation of a certain variety of mosquito. To banish this disease, science has shown it is necessary only to abolish the breeding places of this variety of mosquito. In the diagnosis of malaria, also, the old empiricism of the old style doctor with the confusion of typhoid fever, yellow fever and other fevers with malaria are a thing of the past, since the microscope reveals the blood picture and gives an accurate diagnosis of malaria.

At present in public health work in progressive communities, the basis for the termination of diphtheria

quarantine is the exact knowledge obtained through the examination of cultures from the nose and throat of patient and close contacts. Two cultures negative as to the diphtheria bacilli means safe to release. Where the release is made on the experience basis of a twenty-one day quarantine since the onset, some cases are held longer than is necessary, while others are released before contagion is gone. Thus we have an accurate method replacing an inaccurate, unsafe one.

Again, the positive reaction of a Schick test is a scientific indicator of a person's susceptibility to diphtheria, and the permanent immunization with toxin-antitoxin of such a person thus positively proven to be susceptible to diphtheria is an accomplishment of science over the empiric fallacious procedures of former days in attempting active immunization of the individual against diphtheria.

Formerly, in our epidemiological studies, we were satisfied under empiric methods to say whether cases of typhoid fever during an epidemic came from water, milk or other food, but today we want scientific data as to exact source of the contamination of these, whether the food-borne infection came from a typhoid case or a typhoid carrier. Cultures and microscope can determine the exact source, and adequate quarantine will eliminate the person spreading the infectious material to the water, milk or other food. You thus scientifically stamp out your epidemic.

Formerly, on basis of experience, we refused to terminate any cases of measles in less than 16 to 18 days from date of onset. Today, scientific accurate data has revealed that the contagious stage in measles is over by the end of the third day following the appearance of the eruption, so we release the patient from quarantine in five days instead of holding him as formerly for 16 to 18 days.

The former public health procedure based on empiric data of quarantining all cases of cerebrospinal meningitis resulted in many useless quarantines, while the scientific and other data now obtainable through spinal puncture and microscopic examination permit us to

quarantine only that infectious form of cerebrospinal meningitis due to the meningococcus and to exclude from a useless quarantine the tuberculous, simple and other varieties.

We need but recall the ravages, the panic and the feeling of helplessness of the populace in the presence of widespread typhus fever epidemics to get a vision of the blessings and benefits of scientific data to our people, to say nothing of the financial economy now that we know that by thorough delousing operations we will prevent and protect against this often fatal disease.

The allotted time does not permit us to cite other equally important victories of real science over former empiricism in connection with diseases in the realm of public health activities. Neither will time allow us to take to task the scoffers who declare no advance is being made in exact information and scientific data relating to preventive medicine as it concerns public health. Suffice it to recall the sense of security we all feel today, thanks to scientific contributions, as contrasted with the horror, ravages and panic of other days in the certainty with which epidemics of:—

- (a) Smallpox can be controlled by vaccination.
- (b) Typhoid fever can be controlled by sanitation, vaccination and quarantine of carriers.
- (c) Yellow fever can be prevented and controlled by screening of patient and destruction of the *Stegomyia* mosquito.
- (d) Malaria can be prevented and controlled by screening patient and preventing the breeding of *Anopheles* mosquitoes by drainage, oiling and other anti-mosquito eradication procedures.
- (e) Asiatic cholera and Bubonic plague are prevented and controlled by accurate, definite, scientific measures.

The accomplishment of all of these and many other results spell victory of science over empiricism.