

always to bear in mind; or hematogenous infections anywhere. We are too apt to make all infections direct extensions through neighboring tissues, and I don't believe that is always the case by any means. We had two or three cases, one in particular which I recall of basilar meningitis, when we could find nothing but an infection of the ethmoid cells, and there was not, as in some of the mastoid cases, any particular expression of the meningitis in the neighborhood of those ethmoid cells.

## PHARMACOLOGY IN THE WAR\*

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It is the problem of the war for a country to meet and to defeat not only the human enemy, but the forces of nature. Severe necessity arises in many forms, in many new garbs. That, however, brings out one of the compensations of the war: Necessity is the mother of invention, of conservation, of efficiency. The happy-go-lucky ways of peace no longer suffice. Every form of human endeavor is forced to the supreme effort.

Let us see what part the subjects of pharmacology and therapeutics have played and can play in the struggle. What in particular our own country has done and can do in this field.

The very opening of the war emphasized the problems of infections. The brilliant successes of serum therapy have robbed infections of much of their terror; but there was still far too much that remained unsolved. There was still a large scope for improvement in antiseptics. Everyone is familiar with the notable advances in this direction made by the Carrel technic and the Dakin hypochlorite and chloramin compounds. Both inventors are closely identified with our country. Other promising antiseptics have also been introduced, and may lead to further achievements in the conquest of infections. I need only to refer to the acridin dyes, and to the new mercury compounds introduced by Schamberg. The invention of new local antiseptics may also lead to further developments in the field of systemic chemotherapy.

Tetanus has been conquered by the prophylactic inoculations. In the early days of the war, however, these were not always feasible; and who knows when similar emergencies may again arise? In such cases, the terrors of the disease were enormously mitigated, and according to the German reports at least, lives were undoubtedly saved, by the use of the magnesium injections. Their efficiency was essentially discovered and made safe by an American physician, Dr. S. J. Meltzer.

Almost equal in importance to the problem of infections was the problem of prompt and safe anesthesia. There will, perhaps, always be differences of opinion as to the relative value of the various anesthetics. There can be no doubt, however, that for certain purposes at least, nitrous oxid has peculiar advantages. Its extensive acceptance by the allied armies is largely owing to American influence.

There is still room for many improvements in anesthesia; and there is no doubt that pharmacology can

contribute materially, not only to the invention of new anesthetics, but to their judicious selection and efficient administration, for the various purposes.

I have chosen these examples rather at random from others that might be named, to illustrate the task of pharmacology to meet old problems, modified quantitatively rather than qualitatively by the established conditions of warfare.

The later introduction of flame and gas warfare raised a large number of pharmacologic problems. The popularization of the wax treatment of burns emphasized the abuses engendered by secrecy in medication. It was found that the complex and secret foreign preparation was in no sense superior to a suitable grade of simple paraffin. It could also be shown that practically nothing could be expected from the addition of antiseptics and other agents to solid paraffin films. While negative results are not as desirable as positive results, they should serve to prevent useless clinical experimentation, and thus permit the direction of investigative energy into more useful channels.

Gas warfare has created a new field for applied pharmacology. The chapter of volatile irritants was suddenly raised from a minor to a major importance. The loose generalities that had been current would not have furnished the detailed knowledge necessary for the vital problems of military defense and offense.

Another very important group of problems was created by the shortage of many drugs, due to the increased demand for certain remedial agents under war conditions; the use of basic materials in munition manufacture; and especially the general interference with trade.

The uncompromising realism of the war suddenly awoke us to the fact that internationalism was as yet a dream. In this dream, most nations had overdone the principle of the division of labor, so that they had become dependent on others for the supply of many of their vital needs, and thus had sacrificed the essentials of independence to the fetish of economy.

Through the principle of internationalism, the business of introducing and manufacturing new chemotherapeutic agents had become largely a German industry. When we were shut off from this industry by the war, the first effect was a general sense of helplessness. Soon, however, this was replaced by the reaction of effort. There was created a great opportunity, as a challenge to the nation to ascertain its real needs, and to supply its deficiencies from its own resources.

Until sources of supply could be found or devised, it was necessary to do without many of the drugs to which we had become accustomed.

This may not be as great a misfortune as many would have supposed. The demand for many drugs was an artificial one, fostered by commercial enterprise, as had often been pointed out. What years of preaching could not accomplish in the way of testing out a restricted materia medica was accomplished by necessity at one stroke. As was to be expected, the results show that many of the drugs could be spared without great disadvantage, and some with actual advantage. Nearly every physician has found it necessary to "give up" some of the drugs that he prescribed before the war; and nearly every one must have noticed that the return to the older standard drugs was, in many cases, not detrimental to the patients. It is to be hoped that this lesson will be

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heeded, and that the war will have weeded out many of the products of commercialized over-enthusiasm. It behooves us to take care that this advantage is not lost by the introduction of equally or more worthless or unnecessary imitations and substitutes.

Great as was the need and the value of abridging the needless over-drugging, it was equally needful to supply those drugs of real value which were unobtainable because of the war, such as the organic arsenicals, and a proper selection of local anesthetics.

Here, our difficulties were due mainly to our own laws. The reason why this country could not be self-sufficient in these products was largely because the manufacturers of the drugs had been granted a monopoly, which placed us entirely at their mercy. This was due to the retention of patent laws and procedures adapted to conditions very different from those that now obtain. In this respect no other country had been so short-sighted or bound by tradition. As soon as Congress awoke to the seriousness of the situation and removed the fetters of its own making, the manufacturers had no great difficulty in supplying the legitimate needs of the country.

This advantage has been gained by emergency legislation of a temporary character. It is to be hoped that this legislation will be replaced by a carefully planned, permanent scheme of protection, so that these benefits may not be ended with the war.

### VENEREAL DISEASE CONTROL IN THE ARMY \*

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Venereal diseases, according to Surgeon-General Gorgas,<sup>1</sup> are the greatest cause of disability in the Army and present the most serious communicable disease problem of the war. In meeting this large problem, the Army is aiming to get maximum results by applying basic epidemiologic principles through sound administrative measures and controlling its methods by the statistical study of results.

#### EPIDEMIOLOGY

Compared with most other communicable diseases, the venereal diseases are well understood. Their causative organisms have been discovered, and the methods of transfer of infection are thoroughly known.

The three principal venereal diseases, syphilis, gonorrhea (including all gonococcus infections) and chancroid, are spread essentially by contact. The commonest manner of transfer is through sexual intercourse, and all the other ways of spread may well be regarded as incidental or secondary to transfer through promiscuous sex relations. As long as venereal diseases are prevalent there will be many infections through other methods than sex contact, for example, the transmission of syphilis from the mother to the unborn child, the spread of syphilis through kissing

or by the use of common drinking or eating utensils, the gonorrheal infection of the eyes of the child in the birth canal, the infection of eyes by fingers soiled with gonorrheal discharges, and the infection of children with gonorrhea through contact with soiled objects in the household.

The problem of control is simplified by the fact that these diseases do not exist in the lower animals and are not carried by them. Neither is the transfer of infection by inanimate objects common, as the causative organisms tend to die out rapidly away from the human body.

Another important fact in the epidemiology of venereal diseases has a very direct bearing on methods of control. These diseases are spread principally by disease carriers, persons who appear to be well and regard themselves as healthy, but who are nevertheless capable of transmitting infection.

#### CONTROL

The methods of control of venereal diseases are essentially the same as those of other preventable diseases limited to human beings and spread by contact. We cannot include in these methods, as in some diseases, the artificial immunization of individuals, because no successful methods have been discovered.

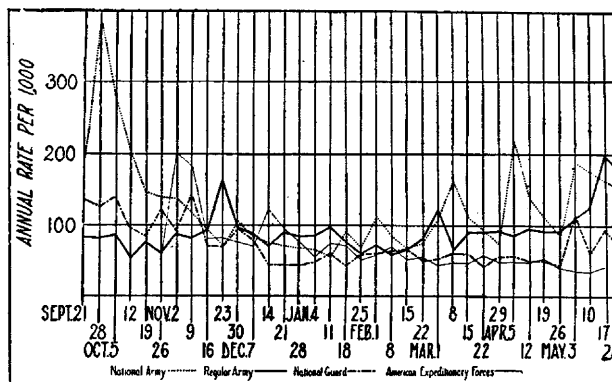


Fig. 1.—Annual venereal disease rates per thousand men in the National Army, Regular Army, National Guard and Expeditionary Forces by weeks for the period from Sept. 21, 1917, to May 24, 1918, inclusive.

We have at hand, however, methods that are capable of reducing venereal diseases to an almost insignificant amount. These methods are the prevention of infective contacts, through various measures, later to be described, and the early treatment of persons who have been exposed in spite of these measures. The method of the treatment of persons after a known or suspected exposure is illustrated by the dropping of silver nitrate into the eyes of the new-born child to insure against gonorrheal infection, and by the early, or prophylactic, treatment of soldiers after a known or possible exposure to venereal infection.

Control of venereal diseases has been totally inadequate in civilian life because public health authorities, with few exceptions, have until recently felt little responsibility for the control of these diseases, which, taken together, have no rival, not even tuberculosis, in their importance as a public health problem. They are highly prevalent, very destructive, and most preventable.

#### THE SIZE OF THE ARMY'S PROBLEM

In the Army, venereal diseases exceed all of the other more serious communicable diseases in the total

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1. Gorgas, W. C.: The Venereal Diseases and the War, Soc. Hyg., 1918, 4, 3, 39.