

reaction controlled by a titration of a mixture of glycerinized positive serums.<sup>5</sup>

We had no false positives in eclamptics, as reported by Falls and Moore, but had several weak positive or doubtful reactions in cases which we finally concluded were nonsyphilitic. These seem to be more common in the pregnant than in the nonpregnant, but did not run parallel with toxicity, for they were observed in a number of healthy women with negative urinary findings, while they were absent in others distressingly toxic. They occurred much oftener with the heart antigens than with the syphilitic liver antigens.

The phenomenon reported by Menten, who observed positive reactions before parturition change to negative immediately after childbirth, has been observed by one of us (A. W. S.) in a woman whose positive reaction did not yield to treatment as intensive as was thought safe throughout pregnancy. Within a few days after delivery a frank negative was obtained, which again became positive in a few months in spite of treatment. The child is clinically and serologically negative at the age of 8 months.

The glycerinized positive control was checked in its work of protecting against too finely drawn tests by the use of 0.4 c.c. of serum, twice the maximum dose, as serum control. Anticomplementary action is very quickly shown by such a control, while, on the other hand, the danger of native amboceptor in such a quantity of serum was guarded against by testing each serum for amboceptor. The full dose of serum, 0.2 c.c., was combined with the full dose of blood suspension and one hemolytic titer of complement. If hemolysis resulted, the presence of at least 2.5 titers of native amboceptor was demonstrated, and no rabbit amboceptor was added to the tubes containing this serum. Since our serums have been inactivated for half an hour in the water-bath at 54 C., we have seen very few serums with this amount of native amboceptor.

In spite of the phenomenon of Menten, it is probable that the well known tendency toward latency of syphilis in women tends to produce a negative Wassermann reaction in a larger percentage of cases than in men, and we therefore feel certain that some syphilitics in both our groups escaped detection. Examination of the cord and placenta or of the dead infant will supplement the serum test in these cases. Accepting even our small percentage of positive results in the private cases for the general prevalence of syphilis among women, the estimate given by Pusey<sup>6</sup> would be swollen from 1,200,000 to 4,320,000 adult syphilitics in the United States. When the many women in the charity class and their high percentage of syphilitics are considered, an appalling figure is reached. The crying need for activity against this "third great plague," as it is called by Stokes, is today apparent to all. As an important stronghold of the enemy, we would emphasize the pregnant woman. If syphilis is diagnosed early, the lives of many children may be saved from destruction or deformity worse than death, and thousands of families every year preserved from the greatest torture of mind, as well as from bodily ills. Even though only 3 per cent. of the pregnant were found syphilitic, and only a third of these would escape detection by clinical means, the trouble and

expense of the routine Wassermann tests in the pregnant are fully justified.

#### SUMMARY

1. Our first series of private cases of pregnancy gave only 3.6 per cent. of positive Wassermann reactions.
2. Our second series of charity cases gave nearly 10 per cent. of positive reactions.
3. More than one third of these positive cases were detectable only by the serum examination.
4. Routine Wassermann reactions in pregnancy are amply justified by these findings.
5. A surprisingly large number of apparently non-syphilitic women give a history of frequent abortions.
6. The Wassermann reaction should be checked by searching for the spirochete and by postmortem examinations when possible.

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### A NEW TREATMENT FOR THE MORPHIN HABIT

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It is common knowledge that a person addicted to the use of morphin may gradually increase the dose of the drug without suffering toxic effects, so that in a few months he may take with impunity a dose that originally would have been fatal. In other words, he establishes an immunity to the drug; and it seems probable that the immunity is due to the presence of an antibody or antitoxin in the blood.

When later the morphin is withdrawn, the antibody remains in the blood unneutralized, and according to the theory that is generally accepted, it is this antibody that gives rise to the characteristic symptoms of nervousness, leg pains, sweating, nausea, vomiting, diarrhea, etc. These symptoms are relieved when morphin is administered, and the amount required to give relief is precisely the dose to which the morphinist has habituated himself. A less amount relieves the symptoms only in part, while an amount in excess of it gives again the toxic symptoms of morphin. Thus a morphinist can estimate pretty accurately an unknown dose that has been given to him by a physician; and the physician, by observing the alleviation of the patient's symptoms, can titrate in a sense the patient's antibody much as he titrates complement in vitro.

So physicians have come to believe that a definite antibody to morphin is formed in the blood, and that the unneutralized antibody is the cause of the withdrawal symptoms. Another explanation sometimes offered for the occurrence of the withdrawal symptoms is that morphin disturbs the normal secretory and excretory functions of the body, and by its prolonged use thus induces an autotoxemia. But it is by no means clear why this toxemia should suddenly fulminate when the morphin is withdrawn, and the lack of explanation on this point materially weakens this theory.

But whether there is present an antitoxin or an autotoxin, it is evident that some form of toxin is present, and the withdrawal symptoms of sweating, vomiting, and diarrhea would indicate that the body is endeavoring to eliminate it.

5. Stillians, A. W.: *J. Cutan. Dis.* 36:289 (May) 1918; *Am. J. Syphilis* 1:767 (Oct.) 1917.

6. Pusey, W. A.: *Syphilis as a Modern Problem*, p. 104.

## CUSTOMARY METHODS OF TREATMENT

The present treatment of chronic morphinism involves three principles, namely, catharsis, the rapid or gradual withdrawal of the drug, and the administration of belladonna or alkaloids derived from the belladonna group—the alkaloid most generally used being scopolamin. The purpose of catharsis is, of course, to effect an elimination of the toxins. The purpose of withdrawal of the drug is obvious. The purpose of the alkaloids seems to be to effect a stupor or intoxication and thus reduce the suffering caused by the withdrawal symptoms. Various other explanations are offered for the use of belladonna and the alkaloids, one being that the active principles of the belladonna group are physiologic antidotes capable of “unpoisoning” the patient. The explanation of “unpoisoning” seems a little fanciful.

With almost any form of treatment the patient suffers to some extent from the withdrawal symptoms of nervousness, restlessness, leg pains, nausea, vomiting, etc., and following the treatment there is a more or less protracted period of nervousness and insomnia. During the treatment, delirium may develop from the belladonna or scopolamin.

The Towns-Lambert treatment combines catharsis with the rapid reduction of morphin and the hourly administration of a mixture of belladonna, hyoscyamus and xanthoxylum.<sup>1</sup> Catharsis is effected with 5 grains of blue mass and five compound cathartic pills. When the bowels have moved freely, the patient is given two thirds or three fourths of his daily dose of morphin, and his initial dose of the belladonna mixture, which is given thereafter every hour through the day and night in increasing doses. Ten hours after the morphin has been given, the pills and blue mass are repeated, and when free catharsis has been effected, the patient is given one half of his former dose of morphin. In another ten hours the cathartics are again repeated, and after further free purging, the patient is given his morphin with the dose once more cut in half. This is the patient's last dose of morphin. Soon afterward there appears from the cathartics a characteristic green stool, and with its appearance the belladonna mixture is stopped and the patient is given castor oil to cleanse the intestinal tract. The treatment here sketched is modified to suit varying conditions.

The Sceleth treatment involves initial catharsis with the subsequent administration of a solution the chief ingredients of which are scopolamin and ethylmorphin hydrochlorid. The solution is tapered off toward the end of the treatment.

The Petty treatment involves catharsis, rapid reduction of morphin, and the administration of scopolamin.

The Sceleth and Petty treatments thus supplement catharsis and withdrawal by narcosis. The Towns-Lambert treatment supplements catharsis and withdrawal with a belladonna mixture that is given empirically and is supposed in some manner to relieve the craving for narcotic drugs. The treatment is presumed to relieve the craving for alcohol and tobacco as well as for morphin.

It is difficult to determine the value of the belladonna mixture of the Towns-Lambert treatment. Relative to this matter I can say that I have seen morphinists smoke constantly throughout the treatment when they

have not expected to lose their appetite for tobacco, and I am convinced that none of them would voluntarily have given up morphin if they had expected to relinquish only their cigars. I am inclined to believe that suggestion is one of the secret ingredients of the belladonna mixture.

In thus criticizing the Towns-Lambert treatment, however, I do not mean to discredit it. The treatment possesses unmistakable merit, and I am sure that suggestion cannot eliminate toxins from a morphinist's blood stream. Possibly the toxins are neutralized to some extent by the belladonna mixture, and probably they are eliminated to a large extent by catharsis. Elimination would appear to be of special value for the reason that the withdrawal symptoms of sweating, vomiting and diarrhea represent an attempt at elimination by nature.

At any rate my faith has been largely in elimination, and the idea suggested itself to me that elimination could be greatly augmented by giving the patient intravenous infusions of physiologic sodium chlorid solution, for this solution would be eliminated by the kidneys and intestine, and should carry the toxins with it.

Another apparent advantage of the intravenous solution is that it would dilute the toxins of the blood stream. To illustrate this mathematically: A man weighing 140 pounds would have approximately 7 pints of blood, and an intravenous infusion of 2 pints of saline solution would dilute the toxins of the blood to approximately three fourths of their original concentration. From this dilution of the toxins one would expect to see an amelioration of the withdrawal symptoms. The dilution would, of course, be temporary, for additional toxins would pass to the blood stream from the body tissues, but these toxins would in turn be eliminated with the excess fluid.

## AUTHOR'S METHOD OF TREATMENT

On these purely theoretical considerations I decided to attempt the treatment of chronic morphinism solely by elimination, supplementing a catharsis of the intestinal tract with a catharsis of the blood stream brought about by repeated intravenous infusions.<sup>2</sup> The patients were volunteers treated gratuitously at Mount Airy Sanatorium through the generosity of the superintendent, Dr. George E. Neuhaus.

The treatment of a case is typically as follows: The patient is put to bed and his morphin stopped entirely. He is put on a semisolid or a liquid diet, and is given cathartics as prescribed in the Towns-Lambert treatment. He thus receives three or four cathartic courses, consisting of 5 grains of blue mass with five compound cathartic pills, at intervals of approximately eighteen hours. Some hours after the last of these cathartic courses he is given castor oil. The patient receives from two to four intravenous infusions a day according to his condition. The standard infusion consists of 1,000 c.c. of 0.9 per cent. sodium chlorid in sterile freshly distilled water.

During the first few days of treatment the patient is given enough chloral, usually about 30 grains, at bedtime to insure a night's sleep. Hypnotics are an important element in the treatment, for the sleep they induce not only blots out large periods of discomfort, but

1. The mixture consists of:  
Tincturae belladonnae (15 per cent.) 62j  
Fluidextracti hyoscyami .....  
Fluidextracti xanthoxyli .....  
Gm. or C.c. 31j  
31i

2. The infusions were given from quart medicine bottles hung in an inverted position. A two-hole rubber stopper carries a short glass tube as an outlet for the solution, and a long tube reaching to the bottom of the bottle serves as an air inlet.

also fortifies the patient mentally and physically for the ordeal through which he is passing.

The semisolid or the liquid diet is continued as long as the patient feels any nausea, and he is kept in bed during the cathartic period and until all acute discomfort from the withdrawal of the morphin has disappeared.

As previously stated, the morphin is stopped entirely, and if at any time the patient complains unduly of his withdrawal symptoms, he is given a saline infusion instead of a hypodermic injection of morphin.

There seem to be no contraindications to the saline infusions, and patients have suffered no ill effects from receiving three or four infusions daily for a period of a week or more. One patient received infusions in thirteen days amounting to 50 per cent. of her body weight, and her physical condition improved greatly during this period.

The infusions do not produce a marked increase of arterial tension. An infusion of 1,000 c.c. is followed by an increase in blood pressure equivalent to about 5 mm. of mercury. The increase is of course temporary.

The repeated infusions do not produce anemia. There is a slight decrease in the red cell count and percentage of hemoglobin owing to the increase of the fluid element of the blood, but there is no destruction of the blood cells. The absence of anemia is clearly evidenced by the patient's marked improvement in color.

The infusions are followed by a marked decrease in the viscosity of the blood. The decreased viscosity lessens capillary resistance, and thus reduces the normal heart load. This is advantageous in reducing the tendency to cardiac weakness so often seen with the withdrawal of morphin. It is also advantageous in permitting the administration of large doses of chloral without embarrassment to the myocardium. It was not found necessary to give any of the patients cardiac stimulants.

Six patients were treated by the foregoing method. Their average age was 34 years. Their average period of addiction was twelve years, and their average daily dose of morphin, 7 or 8 grains. Three of them were addicted to the occasional use of cocain, and three of them had positive Wassermann reactions. The average patient was fourteen days in the sanatorium, and he received infusions during the first seven days. The average amount of saline solution administered to each patient during this period was 15,600 c.c. The average patient experienced discomfort from the withdrawal symptoms at different intervals during the first two or three days, but none of them can be said to have been markedly uncomfortable at any time. Most of them experienced considerable relief from the intravenous infusions, and thus the periods of discomfort preceding the infusions would amount to only a small total. After the stage of acute discomfort there followed a period of nervousness and sleeplessness. This nervousness was not constant, but manifested itself at occasional intervals for several days. The sleeplessness was not protracted, and the average patient took hypnotics for only four nights.

During the restless convalescent period, two of the patients were given the Towns-Lambert treatment (without morphin) as an experiment. Both of the patients had been addicts for more than twenty years, and their nervousness persisted at the end of the sec-

ond week, at which time the Towns-Lambert treatment was given. The nervousness diminished considerably following this second treatment. Their improvement would point to some specific potency in the Towns-Lambert belladonna mixture, though in reasoning from cause to effect one must consider also the probable efficacy of a second course of cathartics, and also the influence of suggestion. Suggestion may have been quite a factor with these patients, for they knew the Towns-Lambert treatment to be fully accredited and the infusion treatment to be merely experimental.

In addition to the six patients treated by infusions, another six were given the Towns-Lambert treatment simultaneously with the infusions. Before the Towns-Lambert treatment was begun, the patients were placed under observation for twenty-four hours, and during this period were given small doses of morphin as their condition required in order to determine the minimum twenty-four hour dose necessary to keep them comfortable. The rapid reduction in accordance with the Towns-Lambert treatment then followed with this amount as a basis.

The six patients in this series were milder cases than those treated only by infusions, and some of the subjects were private patients at Mount Airy Sanatorium. Their average age was 40; their average period of addiction was nine years; and their average daily dose of morphin was  $3\frac{1}{2}$  grains, this dose being one-half the amount in the first series. Four of the patients occasionally used cocain. Two of them had positive Wassermann reactions.

The first two patients received infusions only when they manifested discomfort under the Towns-Lambert treatment. The remaining four received infusions from the start. The average patient was given five infusions, and in the average case the infusions were not continued beyond the third or fourth day. The average patient was discharged on the seventh day.

With this combination of the Towns-Lambert treatment and the infusion treatment the patients suffered about the same discomfort from the withdraw symptoms as those treated by infusions alone, but they recovered more quickly from the subsequent period of nervousness. Some of them manifested a definite euphoria on the third or fourth day, and stated that they had never felt better in years. Thus it would seem that the infusion treatment combined with the Towns-Lambert treatment is better than the infusion treatment alone; but in order to determine the matter definitely it would be necessary to take two equivalent series of cases instead of two series of rather dissimilar cases such as I employed in my experiments.

I give here a brief summary of the individual cases of the two series:

#### SERIES I. PATIENTS TREATED BY INFUSIONS AND CATHARSIS

The patients in this series of cases were treated by infusions and catharsis, and their morphin was stopped entirely. When necessary they were given hypnotics during the first few days to combat insomnia. They were kept on semisolid or liquid diet while there was any tendency to nausea, and were kept in bed till all acute discomfort had subsided.

CASE 1.—A woman, aged 27, had used morphin for eight years, and was taking 8 grains a day hypodermically when presenting herself for treatment. The Wassermann test was strongly positive. She received seventeen infusions (each of 1,000 c.c.) during eight days of treatment. The first four

days she received 30 grains of chloral, or 15 grains of chloral with 15 grains of sodium bromid, at bedtime.

On the first day of treatment the patient was comfortable. On the second day she was restless during the afternoon and evening, and she vomited once or twice during the evening. On the third day she was restless and nauseated during the early morning, but she slept for several hours after receiving an infusion. She was restless again during the afternoon. After the third day she was allowed to be up and around. She felt a little nervous during the afternoons of the fourth and fifth days, but the nervousness was relieved by hot baths. After the fifth day she was free from nervousness, at ravenously and slept well. She was discharged the twelfth day.

CASE 2.—A man, aged 32, who had used morphin for eleven years and was taking 8 or 10 grains a day hypodermically, was given ten infusions over a period of five days. The first night he received 30 grains of chloral. The third night he received 15 grains. No hypnotics were administered the second night, or any night subsequent to the third. He had no trouble at any time with insomnia.

The patient was restless and nauseated during the evening of the first day, and vomited once or twice. He slept the greater part of the second day, and fell asleep while taking an infusion. He was comfortable on the third day, but on the fourth day felt nauseated after taking solid food. He was kept on a light diet for another couple of days, and had no further nausea or other discomfort. He was discharged on the thirteenth day.

CASE 3.—A physician, aged 37, who had contracted the morphin habit at 24, and had undergone several cures and several relapses, and occasionally used cocain, took his last cure seven months before entering the sanatorium, but one month before had recommenced the use of cocain and morphin. When admitted for treatment he was using 15 or 20 grains of cocain and about a grain of morphin daily.

He received a total of ten infusions in four days, and was given hypnotics the first three nights. He had some discomfort from nausea and leg pains on the second day, and was restless at times on the third day. He was discharged on the fifth day.

CASE 4.—A man, aged 43, had used morphin for twenty-four years, and was using 8 grains daily hypodermically when he presented himself for treatment. He was addicted to the occasional use of cocain. The Wassermann test was strongly positive.

With this patient the treatment was unnecessarily prolonged owing to the fact that he surreptitiously obtained morphin on the seventh day. He was a charity patient taking treatment under more or less pressure, and was never very wholehearted about giving up his morphin.

He received seventeen infusions during the first eight days, and four infusions on the four succeeding days. He received hypnotics only once—on the day following his self-administered dose of morphin. He was never markedly uncomfortable during the entire treatment, and he had no insomnia. His chief difficulty was a tendency to nausea and vomiting on taking solid food, and he was accordingly kept on liquid diet for a week. After the first day he frequently asked that his infusions be postponed, as he was feeling comfortable. But despite the fact that he evinced no acute withdrawal symptoms, he frequently complained of nervousness and restlessness. At the end of his second week he was therefore given a morphinless Towns-Lambert treatment as a matter of experiment. He showed considerable improvement after this treatment. He was discharged at the end of three weeks.

CASE 5.—A woman, aged 40, had used morphin for twenty years, and was taking from 8 to 12 grains a day hypodermically. She used cocain occasionally. The Wassermann test was strongly positive.

She received twenty infusions during the first eight days, and five infusions during the succeeding five days. The first five days she received 30 grains of chloral at bedtime. After this the hypnotic was tapered off, and during the following week the patient was at times troubled with sleeplessness.

On the first day of treatment the patient was entirely comfortable. On the second day she had definite withdrawal

symptoms: restlessness, leg pains, nausea and vomiting. The same symptoms were present, though in a less degree, on the afternoon of the third day, but they were considerably relieved by the infusions. The patient had no acute withdrawal symptoms after the third day, but each afternoon she complained of nervousness and restlessness. The nervousness was relieved by hot baths, but as it continued to recur each afternoon, the patient was given a morphinless Towns-Lambert treatment at the end of two and a half weeks. She improved after this treatment, but was still restless at times. As stated, the patient had a positive Wassermann reaction, and it is possible that her malaise may have been partly due to her syphilitic condition. She was discharged at the end of three and a half weeks.

CASE 6.—A man, aged 27, who had used morphin for seven years, and was taking 10 grains a day hypodermically, received eleven infusions in four days. He was given hypnotics the first four nights. He was restless during the afternoon and evening of the second day, but had no acute withdrawal symptoms. He seemed quite comfortable at all other times, and was often singing and whistling. He was discharged at the end of a week.

#### SERIES II. PATIENTS TREATED BY TOWNS-LAMBERT METHOD AND SALINE INFUSIONS

The patients in this series were given the routine Towns-Lambert treatment supplemented by saline infusions. Before treatment was begun, a patient was kept under observation to determine the minimum amount of morphin necessary to keep him comfortable for a twenty-four hour period. The initial dose then given with rapid reduction was two thirds of this minimum amount. Hypnotics were not necessary during the course of the Towns-Lambert treatment, since the patient was receiving morphin, and they were hardly practical, since the patient had to be disturbed every hour to receive his belladonna mixture.

CASES 1 and 2.—These two patients were men in their forties who had used morphin for about a year and were taking only 1 or 2 grains daily.

They were given the routine Towns-Lambert treatment, which was supplemented by two infusions during the last six or eight-hour period, this period being marked in both cases by considerable discomfort. The discomfort was not greatly relieved by the infusions, but on the following day both patients were in excellent condition and remarked on their well-being. Both patients were discharged on the fifth day.

CASE 3.—A man, aged 41, had used morphin for fifteen years and during this period had undergone several cures and several relapses. At times he indulged in cocain. When he presented himself for treatment he was using 8 grains of morphin a day by hypodermic injection.

The initial dose of morphin given in the Towns-Lambert treatment was 3 grains. He received nine infusions during the first five days of treatment.

On the second day the patient was restless for several hours before receiving his last dose of morphin. On the third day he was extremely nervous and uncomfortable during the latter part of the afternoon and early evening. He was then given 85 grains of chloral in broken doses, following which he slept intermittently through the night. After the third day he had no discomfort, and hypnotics were necessary only once subsequently. He was discharged the fifth day.

CASE 4.—A man, aged 26, who had used morphin for two and a half years, and was using 4 or 5 grains daily by hypodermic injection, and who occasionally used cocain, was given the Towns-Lambert treatment with an initial dose of  $1\frac{1}{2}$  grains of morphin. He was given seven infusions in four days. He showed no marked distress at any period of the treatment, though he was restless at times during the first four or five days. He had no difficulty from sleeplessness. He was discharged at the end of two weeks.

CASE 5.—A woman, aged 40, had used morphin for twenty-two years, and was taking 3 grains daily by hypodermic

injection when she presented herself for treatment. Occasionally she used cocain. The Wassermann test was strongly positive.

The patient was given the Towns-Lambert treatment with an initial dose of 1 grain of morphin. She received five infusions in three days.

The first night and the morning of the second day were marked by discomfort with some nausea and vomiting. (The patient was probably started with too small an initial dose of morphin.) The afternoon and evening of the second day were tolerably comfortable, though the patient at times complained of nausea. She managed to sleep the second night between her belladonna capsules. She was nervous and restless the third day, but experienced no acute withdrawal symptoms. She was given 15 grains of chloral and 15 grains of sodium bromid at bedtime, but spent a rather wakeful night. After the third day the patient had only one period of nervousness, this being on the fourth evening. She was given no further hypnotics. She was discharged the sixth day.

CASE 6.—A woman, aged 52, had used morphin for fifteen years, and was using 3 grains daily by hypodermic injection. At times she used cocain. The Wassermann test was strongly positive.

The patient was given the Towns-Lambert treatment with an initial dose of 1 grain of morphin. She received five infusions in three days. She was nervous and restless during the latter half of the second day. She was also nervous on the third day. There was some nausea accompanying the nervousness, but the patient vomited only once or twice. Her discomfort was considerably relieved by the infusions. She was given hypnotics on the third evening, but afterward slept well without them. There was no discomfort after the third day. The patient was discharged on the sixth day.

#### BROADER ASPECTS OF MORPHINISM

We should bear in mind that 75 per cent. of morphinists have contracted their habit through the careless administration of morphin by physicians; consequently they are by-products from the practice of the medical profession. A majority of the remaining 25 per cent. owe their habit largely to the former careless sale of morphin consequent on government negligence.

In regard to the present position of the morphinist: When the Harrison Narcotic Act came into force in March, 1915, it automatically stopped the supply of morphin available to addicts through legitimate channels. It did not stop the morphinist's physiologic need for the drug, however, and it did not provide medical treatment to remove this need. Consequently, while beneficent in its intent and doubtless beneficent in its ultimate and total result, the act imposes unwarranted suffering on existing addicts.

Even the victims of the morphin habit are entitled to a square deal, and it would seem that the least that could be done to alleviate their misery would be to register them and license them to receive their morphin at the hands of a duly authorized physician or government agent. Such a procedure would have the additional advantage of stopping the illicit traffic in morphin.

It would be better to cure these addicts, however, than to license them; and they must be cured in order to be reformed, for their disability is more physical than moral. They were neither cured nor reformed with the enactment of the Harrison act; they were merely designated as the prey of illicit dealers. These dealers create more morphinists; and by their extortion they impel their victims to prostitution and crime. Thus they bring confusion into the reforms originally purposed by the Harrison act.

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## PNEUMONIA FOLLOWING INFLUENZA (AT CAMP PIKE, ARK.)

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CAMP PIKE, LITTLE ROCK, ARK.

The existence of an epidemic of influenza at Camp Pike was recognized when 214 cases of influenza were admitted to the base hospital, September 23. The epidemic was foreshadowed by a steady increase in the number of admissions to the base hospital diagnosed as acute bronchitis. This increase began about September 1, and on September 18 there were fifty admissions with this diagnosis.

Beginning September 23, the number of cases showed a sudden and alarming increase. September 27, there were 1,037 new cases, and the number continued in the neighborhood of 1,000 a day until October 3, when the final decline began. During the period from September 20 to October 19, there were 11,899 cases of influenza. Table 1 gives the number of cases of influenza by days from September 1 to October 31, including those cases diagnosed as acute bronchitis during the first part of September, and also the number of cases of pneumonia having onset on each day.

During the two months covered by the table there occurred 12,393 cases of influenza and 1,499 cases of pneumonia. Only two patients died with a diagnosis of uncomplicated influenza (not confirmed by necropsy), while of the patients with pneumonia, 466 died. Of the patients with influenza, therefore, 12.1 per cent. developed pneumonia, and the mortality for pneumonia was 31 per cent. The mortality for the epidemic as a whole was 3.8 per cent. of those attacked by influenza.

The most striking feature of the epidemic was the extremely rapid spread of the infection throughout the camp. Starting September 22 in a regimental area situated in the extreme southwestern corner of the camp, the disease had within four days appeared throughout the camp proper, and four days later appeared in two outlying encampments, situated respectively 1 mile north and 3 miles east of the main camp.

No single organization escaped the infection, and during the thirty days from September 20, 23.3 per cent. of the total population of the camp suffered from the disease. The figures given herewith are based on a detailed study of 11,725 cases occurring between September 20 and October 14, and comprise practically the whole of the epidemic.

The disease displayed a striking selective incidence among the men who had been in camp less than one month. During the period from August 20 to October 1 there had arrived in camp 23,216 new men, and during October 553 additional men arrived. Among these