

What shall be our attitude in regard to these forms of treatment in an individual case? I think that it is best if we first attempt to carry out each one of the three treatments exactly according to the directions of Karell, Oertel and Widal, in suitable cases. Only in this way can we form a correct opinion of their principles and their utility. Each one of these principles of water removal is attended by certain difficulties in its practical application, and these can best be overcome at first by strict adherence to the rules laid down by the three authors. When we have done this a few times we shall be able to deviate from the regulations and modify them in detail. Then we shall be able to determine whether it is more advantageous in a given case to secure relief for the circulation by restricting the intake of water, by a salt-free diet, or by reducing the amount of albuminous food, which as a matter of fact reduces itself to forbidding or restricting the consumption of meat but sometimes also of milk. In the Karell treatment I consider it particularly important to adhere carefully to the four-hour intervals between the separate portions of milk allowed the patient. It is frequently necessary to use skim milk, as Karell advises, in order to accustom the stomach of the patient to the monotony of the milk diet.

The salt-free diet of Widal is theoretically easy to administer, but one is apt to encounter the opposition or lack of comprehension of the cook. It is hardly necessary to forbid any article of food if only it is given in its natural condition and without any addition of salt on the part of the human hand. Of the fresh articles of food only salt-water fish are to be excluded. The butter should be unsalted and the bread must be specially baked without salt. Of course all forms of preserved meat and fish as well as cheese must be avoided, for these contain a great deal of salt. Milk also can be permitted only in small amounts, for it contains about 2 gm. of sodium chlorid per liter. By giving chiefly cereals, oatmeal, rice, hominy, custards, jellies, puddings, fruit, and desserts, the lack of salt is made more endurable to the patient.

If we wish to allow a patient a certain amount of salt after he has been for some time on a salt-free diet, we should not content ourselves with the general direction that he shall use moderation in salting his food, but prescribe a definite amount that is allowed. The conditions are comparable to those in diabetes mellitus, in which instance it is necessary to give the patient the most precise directions. I, myself, manage in this way. I have the food prepared without salt just as during the strictest period; then I give the patient small, accurately weighed quantities of salt, say 2, 4, or even 6 gm., and permit him to add this salt to his food in whatever way he wishes during the twenty-four hours.

The dietetic measures are just as important in the treatment of circulatory disorders and renal diseases as is the dietetic treatment of the glycosurias. I should feel much gratified if what I have said should enable any to gain a deeper comprehension of the principles involved and to apply them more widely than before.

Berlin, N. W., Karl-Strasse 5b.

Absence of Puncta Lachrymalia (Bilateral).—A child, aged 10, suffered from epiphora since birth. An attempt was made to pick up the opening in the canaliculus in the left lower lid, without success. The right gland was partially removed through an incision at the outer margin of the upper lid. Not succeeding, both lachrymal glands were removed through the conjunctiva at outer angle of the upper lid.—L. Cole-Baker, *Proc. Roy. Soc. Med.*, July, 1910.

HOUSE QUARANTINE *

H. COHEN, M.D.

Assistant Chief of Bureau of Contagious Diseases,
Department of Health
CHICAGO

It is hard to separate the causation of disease in man from the influence which organized society exercises on him. The relations are many and complex, acting in divers ways, and not always with visible directness. For one thing, if you think of it, the important factor of heredity in the causation of disease is, truly and broadly considered, a social factor. And when we mention environment, the other half of the entire etiologic circle, it is readily seen that that in particular depends on the social aggregate and its intelligence and activities in behalf of the preservation of health for its composition and complexion, for the power of doing good or evil, for its influence on health and disease.

Man probably suffered from certain diseases and accidents in his pre-social days, but that the greatest percentage of man's present ills is socially caused, directly or remotely, is a certainty. Whereas the above applies, more or less, to all diseases, it is particularly applicable to the contagious diseases. Seed, soil and the planting of the seed are the three requirements in the causation of contagious disease; man himself fulfills two of these; he offers the soil and acts as disseminator of the seed through the avenues of social intercourse.

It follows that the control of contagious disease is a proper and necessary function of organized society. The individual is now considered an asset of the state, which would suffer loss by his illness or death, even if the effects were limited to himself. How much greater the mischief and loss is to the community in the case of contagious disease, anyone can readily see. And the community owes each of its citizens protection against contagious disease as well as against fire, against robbery and murder.

THE QUARANTINE PROBLEM

When the prevention of disease first claimed public attention, when it first began to be the concern of organized government, it was readily seen that the gathering of health statistics was of prime importance. And so it is, if properly utilized. Health statistics should furnish a guide as to proper health measures and methods; it should indicate to us the preventable leaks to life and health; it should be an aid, and not an aim. By itself it will accomplish nothing. We must not stop with that. Advanced and aggressive attitude and action is urgently needed in the control of contagious diseases.

In house quarantine, we have an important measure in the safeguarding of the well from the existing foci of infection. It is a truism to say that the essential features of the contagious diseases are their communicability, yet the fact needs emphasizing. There was a time when, owing to the lack of knowledge as to the cause, and by reason of the prevalence of superstition, epidemics of contagious diseases were attributed to visitations from heaven. Those times are, happily, passed. We now have a more exact knowledge of the cause of contagious diseases. We are now better able to cope with them because we more fully understand the actual determining cause, the various pathogenic bacteria, the contributing factors, and the means and modes of how these germs are carried from the sick to the well.

* Read in the Section on Preventive Medicine and Public Health of the American Medical Association, at the Sixty-first Annual Session, held at St. Louis, June, 1910.

But we must make intelligent application of this knowledge if we are to minimize these diseases. We believe that persistent application of the principles of preventive medicine will ultimately lead to the almost total eradication of contagious disease.

A survey of the premises of the quarantine problem brings to the fore the following as the most salient:

1. The patient the only original source of infection.
2. The patient and contacts the most dangerous carriers spreading infection.
3. Houses and objects such as bedding, clothing, toys, etc., harbor and give off infection.

How best to meet and circumvent the difficulties presented by these three factors is the crux of the quarantine question.

Before outlining the measures and methods here advocated and now in force in Chicago, let us dwell for a moment on conditions as they are with respect to the management of contagious disease and the many relations which it has to the public health. The statements here made are chiefly based on experiences in this work gained in Chicago. I am sure that they apply to a greater or lesser extent, to all larger towns and cities.

In our daily work we come in contact with people of all races and nations, people of all degrees of material welfare and educational status. We find the greatest disregard for the proper management of contagious disease, the greatest hindrances, due to the following causes:

1. The thralldom of inhumanizing poverty in which great numbers of the foreign-born population find themselves, with the woeful overcrowding attendant on it.
2. Ignorance and superstition—dense, miry and demoralizing—productive of a stupid disregard for all health regulations.
3. A peculiar nonchalance on the part of the semi-intelligent who think that they know it all and need not be taught how to properly care for a contagious case or themselves be subject to necessary restrictive measures.
4. The outright and outrageous assertion of self-interest against community interest on the part of some of the wealthy families and individuals in the community.

The following concrete instances elicited in a recent series of investigations to determine the exact mode of spread of contagious disease, will illustrate conditions as they are:

Series 1.—Diphtheria, six cases, two deaths. A child took sick with "sore throat." No physician was called in. The child grew worse and died. In the next house lived a relative of the above family whose daughter took sick several days later and also died. Four more cases rapidly developed in the surrounding families. Investigation showed that all had been visiting each other, had traded in the same neighborhood stores and otherwise neglected the most ordinary precautions.

Series 2.—Scarlet fever, four cases. First patient took sick on the eleventh of the month. The family in which the case occurred owned a small store, and through fear that the business might be interfered with, called no doctor. The case was not discovered until the fourth of the following month—nearly a month after it developed. Meanwhile the patient was out playing with other children, three of whom took the disease from her.

Series 3.—Scarlet fever, six cases. A boarder in a poor family returned from the hospital where he said he had a "sore throat" and a "breaking out." Eight days after his return a 19-year-old son of the family, who shared the same bed with the boarder, developed scarlet fever and two days later, two other children of the same family came down with scarlet fever. The three patients were removed to the hospital and the boarder was asked to seek another place. The house

was immediately disinfected. Within a week two more children came down with the disease.

Series 4.—A youngster who was delivering newspapers into a scarlet-fever-infected house, himself came down with scarlet fever. His playmate and companion who went around with him while delivering the newspapers, also took the disease.

Series 5.—A little girl convalescing from scarlet fever met her chum; the usual kissing and embracing ensued. Several days later the other little girl was stricken with scarlet fever.

The instances are innumerable, repeat themselves everywhere, and are well known to you. They go to show that the people are ignorant of the primary laws of contagious disease and of the danger that lurks in them. It proves that we have neither sense enough to protect ourselves, nor conscience enough to protect our neighbors. It indicates a degree of public lethargy toward the existence of preventable disease and death that harks back to the dark ages.

In another series of investigations to determine the source of infection of cases of diphtheria and scarlet fever reported during the period of a week, the following was learned from those whose direct connection with a previously existing case was definitely established.

1. Twenty cases were traced to the association with a patient in the immediate vicinity.
2. Ten cases were due to association at school with children in whom the disease was unrecognized.
3. Four cases were caused by contact at the playgrounds with children in whom the disease was mild or undeclared, or with convalescing patients.
4. Three cases were found to be the result of an unreported case.
5. Two cases owed their existence to previous cases in the family.
6. Many cases were attributed by the family to a "cold"—only a predisposing factor, if true. More likely, the first signs of the illness, particularly in diphtheria, were taken for a cold.

The lesson is the same no matter what superficial cause may be assigned. It is always association with a previous case, in one way or another.

In the poorer sections of the city, it used to be the usual thing to find mothers with diphtheria-sick children in their arms gossiping with neighboring women likewise with babies in their arms and with several older children clinging to their skirts. Tales of woe are exchanged, sympathies are extended, and disease is given in return. Children suffering from scarlet fever in the convalescent stage were almost always found outside when the weather permitted, with hands desquamating, neck perhaps swollen with suppurating glands, surrounded by a crowd of boys all gamboling on a vacant lot, all absorbing the insidious elements of contagion. Visiting and receiving callers during the quarantine period is quite the thing with certain classes of people. Allowing the inmates in contact with the patient, as well as the patient himself, to run loose on the streets and mingle with the well, is an almost universal practice.

When the people shall appreciate the enormity of the crime of throwing a burning fagot of contagion into a mass of disease-inflammable children, such practices as above will be no more. Then the burden of sickness, the host of innocently crippled children and the toll of death will be much less—very much less. That the danger of conditions as they exist has been theoretically recognized is attested by the laws and ordinances everywhere in existence, if not in force. In almost all cities there are adequate laws and ordinances which, if rigidly applied, would meet the problem. The fault lies with the lack of enforcement of the rules. The attempts at

enforcement are spasmodic: It usually takes an epidemic to stir the people into apprehension and the authorities into action. Here, too, in the very field of preventive medicine, that famous "ounce of prevention," has not yet been pounded into consciousness and practice. As a rule, the entire problem of the care and handling of contagious disease, the proper observance of quarantine, is at present left to the good or ill will of the variously constituted communities with their different grades of intelligence, material environment, hygienic knowledge and moral sense.

The practical measures now in use in advanced communities do not adequately take care of the situation.

Placarding premises harboring a contagious disease neither keeps the inmates in nor does it keep visitors out. It is a good measure, but in itself not sufficient.

Initial inspection of cases reported, where in use, establishes a perfunctory quarantine, but does not and cannot maintain it.

Termination by disinfection after the patient and contacts have mingled with the public and spread contagion broadcast is like locking the stable after the horse is stolen.

The needs of the situation are for better laws where the laws are deficient; for action tending toward the rigid enforcement of quarantine by prompt reporting, placarding and establishment of quarantine of infected persons and premises.

The need—the greatest need—is for a stringent thorough-going personal inspection of quarantined premises and cases they hold every day, or at least every other day. The need is absolutely to keep the inmates in and the outsiders out during the quarantine period. Those ordered to live away from home must be made to stay away. The exclusion of those living on the premises in a different and properly separated part of the house, as prescribed, from the rooms occupied by the patient and attendant must be enforced at all times. The need is for supervision of the means of taking in supplies into the infected house and particularly the manner of removal of articles from the premises.

In brief, there is need for personal knowledge of each case, the respective district, its inhabitants and the conditions obtaining there; there is need for bringing this knowledge to bear on each and every phase of the contagious disease situation; there is need for a man to be constantly on the ground to study, observe, teach, watch, correct and enforce the observance of quarantine as above outlined.

THE ENFORCEMENT OF QUARANTINE IN CHICAGO

In the beginning of December, 1908, the contagious disease situation as pertains to scarlet fever and diphtheria, became threatening. Neighborhood epidemics were springing up in every section of the city. It was feared that the experience of 1907, when half of the entire city was enveloped in scarlet fever, would be repeated. One of the worst local outbreaks occurred in the south side of the city and originated from several cases of scarlet fever found in the "peeling" stage, in a parochial school.

From Dec. 15, 1908, to Jan. 26, 1909, thirty-six cases of scarlet fever were reported in rapid succession from an area comprising 144 city blocks. Conditions in other sections of the city were similar. I then proposed the quarantine plan now in force, of which the following are the outlines:

1. The city was to be districted, for purposes of adequate control, into more or less equal divisions, taking into account

the extent of territory and the number and character of the population in the respective districts.

2. A quarantine officer and disinfecter was to be stationed in each district.

3. It was to be this officer's duty to enforce the observance of quarantine, to have an intimate knowledge of every case and its environment, to hem it in and hedge it in so that it would not give rise to other cases, to know when it was ready for disinfection, and to disinfect same when ready.

4. He was to report daily as to the condition of his district, the number of current cases, the number of inspections, the number of disinfections, etc.

This plan was applied to the district above referred to. On Jan. 30, 1909, strict quarantine of all infected persons, premises and contacts, was instituted. House-to-house calls were made by our inspectors each day or every other day, as conditions required. Working members of the family in which contagious disease existed were compelled to stay away from the infected premises; those remaining on the premises were properly kept away from the patient and attendant. The delivery of milk and other supplies to the infected premises and the removal of the necessary waste were regulated in accordance with the quarantine regulations. Semipublic places, such as grocery stores, bakeries, meat markets, candy stores, etc., were warned against admitting any one from infected premises. Visitors were barred and excursions prohibited. Quarantine became a fact.

Where cases were ready for termination, patients and inmates, premises and belongings, were disinfected, and quarantine raised.

The results obtained were very gratifying, in spite of the newness of the task. In the next nineteen days, but one new case appeared, on February 2, and it is probable that the infection dated prior to the beginning of rigid enforcement of quarantine. On February 20 only twelve cases remained in the district.

This experiment was repeated and tried out in two other districts widely different in complexion and distantly separated. One of these was taken under control on February 24 with forty-eight cases of scarlet fever and diphtheria in it at the time. In a month the number of cases were forced down to nineteen, a reduction of nearly 60 per cent.

At the same time we quarantined another district with thirty-three cases in it. At the end of a month the number of cases current were fifteen, a reduction of over 54 per cent.

Following the above experiments and their results, the plan was put into operation over the entire city, and applied to all cases of diphtheria and scarlet fever. This plan will now be described in somewhat greater detail.

It is readily seen that absolute isolation of the patient is the keynote of the entire problem. Not all cases are similarly situated with respect to the immediate surroundings. Some of the cases are located in fine residences, others in flats, still others in hovels. All throughout it is a process of adaptation to environment and all throughout the essential of isolation is kept in mind.

The patient and attendant are put into one or two rooms at one end of the house or flat. This part of the house is separated from the other rooms in the house by having the intervening door locked and sealed, provided there is a separate entrance to them. They should also contain all the necessary household facilities such as water, toilet and cooking facilities. Here the patient and attendant, nurse or mother, as the case may be, are required to remain during the entire quarantine period. No one is allowed to enter their quarters except the

attending physician and the health officer, when necessary for the purposes of control. The body and bed linens are to be disinfected before removed, the garbage and house sweepings are to be burned or disinfected, in fact, all the details of the hygiene of the sick-room are under surveillance of an officer of the health department.

Where such ideal conditions obtain, the workers of the family are allowed to go about their business without any interference, providing however, that at no time is there any direct or indirect contact between them and the patient or attendant. The part of the house which they occupy is, as said above, separated by a locked and sealed door from the patient's quarters. Where the bath-room, cooking and the other facilities of the house are in use by the patient, the workers must arrange for the use of these facilities elsewhere.

But ideal conditions are not found everywhere, as every one knows. In many cases the construction of the flat or house will not permit absolute isolation as above indicated; the family may occupy a four-room flat with only one outside entrance, where such arrangements as above outlined are manifestly impossible. Again there may be other children in the family and the people too poor to employ a nurse. It may be said that the greater the difficulties in the establishment of good quarantine, the greater the necessity for it. It is no dead subject; it is not cut and dried; it requires the exercise of sound hygienic principle, common sense and tact. Where the patient cannot be perfectly isolated, we insist that the working members of the family should live away from home while the case is in progress. If they remain at home, they are not allowed to continue at their occupations. These are essentials that we absolutely insist on.

We not only center our attention and efforts on the persons of the patient and the other members of the family, but we are, in this work, concerned with the innumerable details of human life in so far as they have a bearing on this problem. In flat buildings it frequently happens that there is one toilet for the use of two families living on the same floor. In such cases, the well family is instructed to arrange for toilet facilities elsewhere in the building, and the members of the family under quarantine are to use the nearest toilet.

Another important feature to which I want to call attention is the particular effort that is made to protect the other children in the same family where there is a case in existence from infection. From the health and humanitarian points of view, it makes no difference whether the second patient bears the same patronymic or not—whether it is Smith or Jones. We are, in a way, more responsible for a second or third case in the same family, because we ought to have anticipated and prevented it. In diphtheria, the problem is partially solved by immunization, but in scarlet fever nothing short of removal or rigid separation of the well from the sick in the family proper will save the susceptible.

This is not fully recognized. We owe protection only not to others outside of the family, but also to the members of the afflicted family. To this end mothers are especially warned to beware of the dangers of combining the duties of nurse and housekeeper where there are other children in the family. The families afflicted with contagious disease are guided and helped through the trying period of the illness in every way possible.

We aim to do the work in a scientific and sympathetic way. While it frequently becomes necessary to be insist-

ent and stern in order to protect the public health, no undue intrusion on the rights of the individual is practiced.

We recognize that the best results can be obtained by securing the good will and cooperation of those with whom our task lies. We try to make them conscious of the fact that they owe a duty to the community; to make them see their self-interest in the light of the community interest.

The correlative factors in this work, operating for or against it are the following:

- | | |
|-------------------------|---------------------|
| 1. Economic conditions. | 3. Hospitalization. |
| 2. Education. | 4. Policing. |

Economic conditions, poverty and its congener, ignorance, are by far our greatest opponents in this work. Rigid quarantine no doubt works a hardship on many poor families; it calls for a sacrifice of an altruistic character that many do not understand.

Education is our greatest ally. To bring knowledge to the ignorant and awaken a sense of duty in the careless is the first step. In a task of this kind, we can look for the full fruition of our work only when the poor and ignorant better understand their own interests in these matters and the well-to-do and well-informed have been sufficiently impressed with the necessity of giving thought to the interests of others. In this campaign of education the family physician occupies an important position. His efforts and influence should be freely given to the cause of health.

Hospitalization of contagious cases is, of course, the surest means of securing isolation of the patient. It is, unfortunately, impossible to always do that at present, both on account of the lack of adequate hospitalization facilities for contagious cases, and for the reason of an opposed public opinion to such a measure as universal hospitalization. It has, however, a two-fold bearing on the quarantine situation.

On the one hand, the rigid quarantine regulations induce many families to send the patients to the hospital; on the other hand, the fear of having the patient forcibly removed to the hospital in case quarantine regulations are violated makes them live up to these regulations.

It frequently becomes necessary to police the quarantined premises, when the people are careless and refractory and the danger of the spread of the disease is considerable. This always has a salutary effect. It convinces them that the department means business and they readily fall into line and are willing to learn and observe the regulations.

This system of quarantine enforcement in Chicago, as far as diphtheria and scarlet fever are concerned, has been in existence a year now. One year is a very short period for such an undertaking. The difficulties were many, and the means at hand, as far as money and men are concerned, were inadequate for the task in hand. Yet a considerable improvement in conditions was achieved, both as to the educational influence it had on the public, resulting in a changed attitude towards necessary health measures and a broader knowledge of the same, and also in its direct bearing on the morbidity of scarlet fever and diphtheria. This system of quarantine regulation and surveillance was inaugurated in May, 1909. It did not get well under way until about September. Here is a comparison of the number of cases reported during the twelve months preceding quarantine enforcement, with that following it:

COMPARISON OF NUMBER OF CASES REPORTED BEFORE AND AFTER
QUARANTINE ENFORCEMENT
SCARLET FEVER

1908 May	301	1909 May	455
June	287	June	382
July	203	July	261
August	173	August	210
September	297	September	342
October	608	October	514
November	841	November	684
December	914	December	686
1909 January	881	1910 January	688
February	590	February	671
March	644	March	692
April	587	April	600
	6,336		6,191

DIPHTHERIA

1908 May	254	1909 May	378
June	306	June	320
July	255	July	268
August	251	August	223
September	341	September	327
October	788	October	550
November	880	November	719
December	934	December	601
1909 January	745	1910 January	468
February	522	February	443
March	522	March	470
April	483	April	527
	6,281		4,924

As to scarlet fever, we see that from May 1, 1908, to May 1, 1909, 6,336 cases were reported; in the following twelve months 6,191 cases were reported, a saving of 145 cases. This in spite of strongly pronounced epidemic tendencies; this in spite of the fact that a comparison of the cases reported during the calendar years, 1908 and 1909, shows that there were 5,305 cases reported in the former and 6,242 in the latter, showing a preponderance of 937 cases of scarlet fever in 1909.

In the case of diphtheria, the results obtained were still more gratifying. From May, 1908, to May, 1909, 6,281 cases were reported. From May, 1909, to May, 1910, 4,924 were reported, a reduction of 1,357 cases; and here also more cases have been reported during the calendar year 1909, than during 1908.

The proper observance of quarantine has now come to the fore as an efficient means to control the contagious diseases. It does away with the weak points in handling contagion in a large city. It helps do away with the leak and dribble of careless individual negligence which does the community so much harm. As a preventive measure, it has emerged from the realm of theory, and has now firmly established itself by virtue of actual experience, which showed its necessity and practical utility.

1400 West Taylor Street.

ABSTRACT OF DISCUSSION

DR. B. FRANKLIN ROYER, Harrisburg, Pa.: Dr. Cohen has outlined a type of quarantine which is ideal in a large city, but which is applicable only in cities or towns of considerable size. It is not always possible to have the kind of supervision and espionage kept up in the country districts and small towns which is practiced in Chicago. In such places we must rely more on educating the family itself. Too often, I fear, a quarantine officer placards the premises, instructs the people as to what they are to do, and walks away. If he is in a hurry he may not go into great detail; perhaps he may not himself be sufficiently trained, if he is a layman, to go into detail of complete isolation and explain the necessity for keeping up isolation until the termination of the case.

An idea was well brought out this morning in Dr. Hemenway's paper, and perhaps it would make a very strong point in any suit if violation of quarantine comes to that point, to be able to say that the family was fully instructed and that the instructions handed them were printed in full detail. The Pennsylvania Department of Health uses such a circular of instructions for each communicable disease. It includes

details of isolation, describes the method for the disinfection of discharges, and at the conclusion of the leaflet an extract from the law is quoted. A similar extract from the law is printed on the placard. This plan not only instructs the householder, but offsets a plea of ignorance on his part. Physicians know what these circulars of instructions contain. It saves them a great deal of time and helps them in the work, and after all it is to them we must look for keeping up the domestic quarantine.

DR. SENECA EGBERT, Philadelphia: I think Dr. Royer will bear me out that in our great small-pox epidemics the plan of putting either one of the regular policemen or a special man sworn in as a policeman in the house in which the disease is, and keeping one there night and day, is a good one; that is, the plan of keeping the guard there, without allowing ingress or egress to those who might carry infection beyond the premises. Another thing is the necessity of common sense. There are a great many physicians who do not appreciate how valuable this is. You can make the routine disinfection and care of a room in a case of illness lasting two or three weeks very tedious and annoying. Boiling water can be had in almost any household, and most things that come from the room can be boiled with almost no trouble for the thirty minutes or the hour that is necessary for thorough disinfection. With a little bit of bichlorid solution and boiling water any household can accomplish the disinfection of dishes, clothing and the like, and with a little chlorinated lime or ordinary milk of lime in addition for the excreta, one has about all that is necessary. This simplifies the task of regular and persistent disinfection.

DR. I. D. RAWLINGS, Chicago: Dr. Cohen failed to mention a number of things I thought he would bring out. One thing is that the man who makes the first inspection, gives the instruction, gives out important literature (samples of which I supposed would be shown here under this paper), is a thoroughly trained medical health officer, who knows just exactly what instructions to give, exactly what to do, where to place placards, all the detail. He, while there, leaves instructions for the quarantine officer as to exactly what quarantine shall be established, says who shall be in that house, who shall go to work from that house, etc. This is all written down on a special blank and placed back of the red sign on the front door. The quarantine officer comes along the following day, removes this written statement of quarantine requirements, and in this manner knows exactly what instructions have been given the family by the medical inspector—has the full detail, and it is his duty to call every other day and see that the requirements are carried out.

We are living up religiously to our Rule 10, which says: "The members of the family who work out must (1) live in a part of the house remote from the patient and keep away from all persons coming in contact with the patient; or (2) room and board at another house; or (3) stop work and stay in the house.

DR. HYMAN COHEN, Chicago: It was my object in this paper to give a general review of the methods, not so much in detail, as in the broad sense indicating policies and lines of activity, or, rather, to indicate especially detail which I hoped would be brought out in the discussion. I want to answer some of the points made here by the speakers categorically. The statement that it is not possible to manage detail in the small communities is very true. It is not only not possible to do so in the smaller communities, but it is very often almost impossible to do so in the larger communities, where you work under the handicap of a limited appropriation. I have had to skip quite a good deal in order to come within the time limit; and many of the things mentioned as being left out are in the paper.

The repeated visits made and the oversight to see that the orders are followed out are just the points wherein the present system of quarantine inspection differs from the old system, in which the man would put a red card on the door and turn on his heel and walk off.

There are two essentials: information from the family, and then to give the family information as to managing the case; they want that; and the man must not leave the premises

on his initial trip before he imparts that information, and is satisfied that they fully understand the matter; and it frequently is necessary to get an interpreter when one is dealing with Italians and other foreign-born people who do not speak the language.

We have printed instructions. It would be interesting to find out how many of the hundreds given out are read intelligently and carefully. We are doing a great deal in the way of personal instruction of the family directly, or through an interpreter.

As to the physician's duties in case of contagious diseases, there is much to be said. There are all sorts of physicians in Chicago, as elsewhere. Some are antagonistic or careless; some are in sympathy with our work; but there is no one factor that is of as great importance in this entire situation as the physician factor. It is up to the physicians to "get next" to the progressive work that is being done in this line; for if they don't, they will be left behind; progress will be made in spite of their indifference.

We not only put a policeman at the door, but frequently two: one at the front entrance and one at the rear; and two means four, because they work in relays, night and day. It is important; it brings the people to a realization of the fact that we mean business, and it has a salutary effect on them.

Common sense and tact are the greatest factors. You cannot compel the members of a Chicago community, or any large community, to observe strictly any precaution they have never used before and perhaps have never heard of before. Many of these families have had a case of contagious disease for the first time; they do not understand the situation, and if you go at them abruptly you will lose out. This is where experience and tact come in. We try to have inspectors with common sense and education, so far as possible.

We allow nothing to come from the room without being thoroughly disinfected; and we supply bichlorid tablets; we make a solution in a wooden bucket right in the room, and not only are the linen bedding and the nurse's clothes disinfected, but also the bed-clothing, and the floor is mopped daily.

THE TREATMENT OF WOUNDS

A FIRST ARTICLE *

ALEXIS CARREL, M.D.
NEW YORK

In the actual condition of therapeutics, aseptic wounds generally heal in a few days. The more ambitious dreams of the surgeons of the pre-Listerian era have been fulfilled. Nevertheless, we have no right to believe that the treatment of wounds has reached its ultimate perfection. We must investigate whether or not it is possible to advance farther. In the treatment of wounds, we content ourselves by protecting the tissues against infection, and we leave to Nature the care of cicatrization. Would it not be feasible to act on the processes of reparation themselves and to activate them? The wounds which now heal in a few days could possibly be caused to heal in a few hours. The treatment of fractures would also be simplified. The development of methods for the stimulation of the growth of epithelial cells, for the inhibition or the activation of the proliferation of connective tissue, for the artificial production of osteogenesis, etc., would greatly improve the therapeutics of the ulcerations of the skin and of the lesions of peripheral nerves, bones and many other tissues or organs. This new evolution of surgery depends on the discovery, partial at least, of the laws of redintegration of tissues of mammals. Cicatrization and regeneration are the expression of the power to persist in its form with which all organisms are

endowed. We are deeply ignorant of the nature of this function of redintegration. It is, as is the function of nutrition, a fundamental property of living matter. To know its nature is as impossible as to know the nature of life. Besides this knowledge would be useless. From a metaphysic standpoint it would be interesting to discover *why* a wound heals. But from a scientific standpoint, it is infinitely more important to know *how* it heals, because it would then be possible to find what stimuli start the complex mechanisms of the regeneration of the tissues. Therefore, the physiologic phenomena of cicatrization must be investigated. It is true that the power of redintegration escapes our methods of research. But the physico-chemical processes which this power, as a directing idea, coordinates and harmonizes in view of the morphologic reparation, can be brought into the field of experiment. We must, therefore, analyze the mechanisms which are instrumental in the cicatrization of a wound, the factors which modify their functions, the stimuli by which they are started, and the causes of their reciprocal cooperation to the common work. Perhaps it will become possible to use some of these agents for the artificial activation of the regeneration of tissues and the treatment of wounds.

MECHANISMS OF THE REPARATION OF A CUTANEOUS WOUND

Since many centuries all surgeons know the anatomic processes of the cicatrization of a wound. On the open surface, granulations appear, and, by their contraction, bring closer to each other the edges of the epidermis. Then the epithelial cells wander on the granulous tissue and a new epidermis is formed. These phenomena can be divided into four periods: quiescent period, period of granulous retraction, period of epidermization and cicatricial period.

The experiments on which this article is based were performed chiefly on dogs. The cicatrization of wounds obtained by resection of a flap of skin was observed. The resected flap was of geometrical form, rectangular, trapezoidal or circular. In order that the edges of the old epidermis might be easily seen, I used black animals or I stained the edges of the wound with India ink. It was then possible always to distinguish the new from the old epidermis, and to follow accurately the variations of the dimensions. The dressing consisted of talcum powder and gauze or warm paraffin. The wounds were kept as nearly aseptic as possible. When they became infected the results were discarded.

1. *Quiescent Period*.—The quiescent period extends from the time of the resection to the time of the beginning of the granulous retraction. During the first days the dimensions of the wound do not vary. If we represent graphically by a tracing the time of healing the successive distances between two points A and B taken on the opposite sides of a rectangular wound, the tracing during the quiescent period is horizontal. Suddenly it inclines downward. It is the beginning of the granulous retraction. Often the immobility of the edges of the wound during the quiescent period ceases rather suddenly; there is no period of transition and the active period of reparation starts immediately. The main characteristic of the quiescent period is the great variability of its duration. In some cases it lasts only one or two days, while in others it lasts four or five days.

2. *Period of Granulous Retraction*.—At the end of the quiescent period the edges of the wound begin to advance toward each other. The tracing of the con-

* From the laboratories of the Rockefeller Institute for Medical Research.