

mouth of more than two weeks' duration, and especially if it possesses an indurated margin, raises the question of cancer. Syphilis, tuberculosis, and some rarer lesions are ordinarily to be considered in diagnosis, as well as the "precancerous" fissures, dental ulcers, and leukoplakia. If syphilis, we do not now wait for the therapeutic test, but we get a Wassermann test. Again, with syphilis, one must remember that the presence of syphilis does not exclude cancer. In fact, it favors the diagnosis of cancer, for syphilis is one of the most common antecedent facts in the history of cancer of the mouth.

Tuberculosis of the tongue and mouth is almost invariably secondary to tuberculosis elsewhere, and is also a late rather than an early manifestation of the disease.

The ulcer due to a jagged tooth or to an ill-fitting plate depends for its recognition upon the presence of such a tooth or plate. When one of the "precancerous" lesions is present and there is doubt as to whether cancer has already begun, excision of the lesion by a good margin is the procedure to be advised. Such a specimen may be examined immediately in frozen sections, by a pathologist, and if the report is positive that cancer is present, the radical operation for cancer of that situation should be done at the same sitting, and under one anesthesia.

The radical operations for cancer of the tongue, jaw and palate are serious and mutilating operations. Cures result in some of the early and favorable cases, but the best treatment will always be the prophylactic treatment which removes the causes and the results of chronic irritation before the change to malignancy has taken place. By the prophylactic treatment of these "precancerous" conditions the dentist has the opportunity to be of great service to his fellow men in preventing, or procuring early treatment for these most serious forms of malignant disease.

A STUDY OF DIPHTHERIA CARRIERS.

BY D. M. LEWIS, M.D., NEW HAVEN, CONN.,

Epidemiologist, Board of Health.

THERE are two factors which should make this subject timely: first, the unappreciated known fact that measles is followed by diphtheria; secondly, that a so-called experiment

based on certain knowledge of the first factor has given rational results as well as demonstrating what should be the simplicity of control of the disease.

Having shown results from consideration of the first factor,¹ namely, lessened cases and deaths than the surrounding cities under similar conditions, during the first half of the year 1917, I was much concerned to find the months of October and November producing an increasing wave of reported cases over the previous fall. I was also impressed with the frequency of demonstrable carriers, neighborhood as well as house, in connection with the reported cases. In that I have shown that active carriers in the larger per cent. are nasal, and can be picked out definitely from ordinary head colds, I obtained the services of two trained nurses to round up every available carrier. There were two essential points: first, to make a complete survey of all of school age; and, secondly, those not of school age in neighborhoods where there had been cases but no demonstrable carrier in the house. Having picked the two nurses after a practical examination as to what could be seen by the eyes with reference to three children, one a true carrier, one an ordinary head cold, and the third a normal individual, I showed them how to take a nasal culture and set them to work. School days they went through all the grammar school grades and on Saturdays through house-to-house neighborhoods, paying attention only to noses and only to apparently definite or suspicious diphtheria noses. I have shown previously the similarity of the streptococcus nose to diphtheria, and the need for isolating these; so that, while I killed two birds with one stone, this study is based on true diphtheria. While I have no exact figures, it was estimated that approximately 35,000 children were seen by these two nurses during the two months. The important point was that there were 687 cultures taken by them. There were a few scattering instances where the diagnosis was certain, and either the child refused to allow the procedure, or where, for conserving time, the culture was taken later by me on isolating the individual. The net result was 34 nasal carriers of school age, to which there were added 23 others of school age, found either by the school nurses, physicians or teachers, or by the department in our work. Approximately .2% of our school population were carriers then, if we had all accounted for. Of 12 other

demonstrated carriers found during this period, 2 were in adults and the remainder in children not of school age. There was insufficient time to more than scratch the surface of the neighborhood survey, so that any comparison with those of school age is lacking. Having previously shown the predominant age, that of ages 5 to 15, I was assured that the larger portion of the problem was solved. The other months of 1917 had yielded me 47 carriers.

Grouped by ages and sex, these 116 carriers were as follows: 12% males under age 5, with 13% females; 30 and 33%, respectively, under age 10; 5% each under age 20; while over age 20 there were 2% females.

Of these carriers, 14% were found in connection with a reported case. Of such carriers, 15% were found in the family, 20% each in other families in the house or immediate neighborhood, while 45% were non-residents, temporarily residing here but bringing their lesions with them.

Five per cent. of the total number either gave the history of, or were known previous cases of, the disease. Half of that per cent. had had cases of the disease in the family during previous years, although the carrier had not had it. A very characteristic case of such has been related in another paper.²

In 3 instances the carrier was one of a family living in the rear of the grocery store run by the parents. Similar contact with dry goods was shown by 2 instances. The latter number was also found with reference to rooming-houses.

In isolated instances it was possible to show that in 4 instances one carrier had made one other nasal carrier; in 8 instances one carrier had made 2 other carriers, and in a like number 1 carrier had made 3 further carriers. The multiple instances were frequent in families and explains, as I have shown, the immunity of certain families.

In 4 instances the carrier was a recent case of measles, 2 were known previous streptococcal gripes, and 1 was a convalescent whooping cough. There were 6 instances where the history was that of a similar recurring discharge or they were carried on my index as a previous carrier. The balance gave either no dependable history or merely that the onset was an ordinary head cold. In 2 instances a most remarkable finding was the following: consecutive anterior nasal cultures showed a pure strepto-

coccus for upwards of one week, to be replaced by predominating K-L or pure cultures in one case. The other case was the reverse. There was neither time relation nor neighborhood factors in common.

In 15 instances there was patency of the nares and the discharge, as well as accompanying irritation cleared within one week after the treatment began. As contrasted with this 14% mentioned, 39% were clear only after 2 weeks, 35% under 4 weeks, while 12% lasted six weeks or over. In all cases when patency of the nares was obtained and the swab could be passed into the posterior nares, the process cleared rapidly. I have shown in another article³ why such obstinate carriers are possible.

In no instance of this series, as in no instance of several hundred such carriers that I have observed, has any carrier developed the disease. In 2 instances only, have young physicians, fearful from perhaps both lack of experience as well as the visual picture of the condition, given antitoxin. Primary anterior nasal, so-called diphtheria, is not a disease. That the carrier so made by inoculation and one who has never had the disease, may absorb some toxin is apparent in some babies. In this series there were 2 under age 1. Both are of sufficient interest to record.

CASE 1. Baby B., aged 6 months. A culture from the father walking into a physician's office showed K-L. As the patient was cultured from routine only, and not from clinical aspects, and was working in a large factory, I made a visit to his residence and found the following: With his wife and the baby mentioned, he had removed the week previously from a larger city. The baby had a very typical unilateral excoriating nasal discharge which, the mother stated, had been present some few weeks. Not really ill, the baby had not had medical attention. The throat was normal and, other than an apparent moderate anemia, there was no evidence of toxin absorption. The mother stated that at first there had been times when she thought the baby was a little feverish. With the institution of routine treatment there was a complete cure at the end of ten days, with a return of improved color of mucous membranes, which the mother noted as well. Neither parent had previously had the disease to their knowledge, although it is possible that the father, who at this time did not have clinical diphtheria, had had the

same previously, and since had recurring follicular types, of which the present attack was one, and that he had previously infected the baby.

CASE 2. Baby F., age 1. An older sister, age 7, had been found in the school a nasal carrier. Family included also a boy age 4. The latter was manifestly from the lesion the oldest carrier, the girl and baby being recent ones. At the time and during the month that it took to cure the baby there were no signs of toxin absorption in the baby.

Proof that such nasal carriers acquired their immunity during the process could be obtained only by Schick reactions previous to and following such carriage. This, in my experience, is the only value of the procedure and is as impractical as are the other fields of its use as compared to the clinical knowledge learned at first hand in the field.

One of the most interesting features is the infectiousness of the carrier. Not having sufficient assistance to painstakingly trace each carrier, and that one's relation to preceding or future carriers, with relation to cases, makes the matter one of practical inference of repetition of instances rather than actual statistics. There is good clinical evidence that the recurring chronics are less case-infectious than the acute carriers made by that carrier. It was the rule to find the second or third carrier before there was any reported or found cases, and the latter were more closely connected with the recent carrier as to being playmates. While we generally see such a sequence there is rarely to be found the possibility that primary faucial diphtheria makes nasal carriers. Of this series there were two such. One is the father of Case 1, and the other is related at length as being in the same category as the infected articles stored for years in a house which finally give rise to a case on being handled.

CASE 3. While caring for two younger children with German measles, Mrs. C. had an ordinary follicular tonsillitis. One week later the boy, age 9, now ready for discharge from measles, had a nasal discharge, and would have been seen by me but for the fact that his sister, age 6, was coming down with the measles and the placard remained on the house. Two weeks later, when called upon because the latter case was convalescent, I was told by the mother that

the girl had just developed a sore throat which had just been cultured as suspicious of diphtheria. Examination of the mother and older girl in the family showed nothing, while the boy showed a unilateral atypical discharge. Cultures showed K-L in both the nares of the boy and the throat of the girl. The following day I obtained the history given of the mother, as well as the fact that during the preceding month the boy had had contact outside the house with but one boy, and that one after the discharge began. Further inquiry revealed the fact that 16 years previously the mother had lost one child with diphtheria. Cultures from the older sister and the father, as well as the boy acquaintance mentioned, were negative. That from the mother, who showed no inflammatory reaction of the throat, showed a few very suspicious organisms. While an almost unbelievable period for holding an organism in the tonsil, the following facts warrant consideration: a total absence of sore throats during the 16 years; that the girl's faucial diphtheria followed two weeks after the development of the boy's nasal discharge rather than at the beginning of that time, and coincident with the onset of the attack of her measles; lastly, total absence of carriers or cases of the disease, previously during one and one-half years and three months since, in that neighborhood. Practically, the case is related as a similar analogy also to the possibility of reinfection of urethritis, which is admitted up to 10 years, but raises a laugh after that time. In other words, there is need to absolutely disprove nasal delivery boys, etc., as not having infected the boy's nose, proving the rule rather than the exception. This rule is strengthened by the fact that I have had absolutely no recurrent cases and no secondary cases of the disease during 1917, and but one recurrent case in 1916, when the isolation hospital returned a case, a visible nasal carrier, though a reported double negative culture. Such also happened the preceding year and once the present year.

Treatment of the carriage is of the utmost importance, since literature abounds with so varied measures. The latter all depend, unfortunately, on the demonstration of the carriage as manifested by the organism without regard to the local conditions. I am on record as to carriers showing a pathological picture (Case 3 even as merely suspected corresponds), and would show that the duration of the carriage

under treatment is in accord. Personally, being an unproven though suspected case of nasal diphtheria after a service in the South Department of the Boston City Hospital, able on occasions to discharge false membrane from my left nares for a period of months, I found relief only through the continuous use of gum camphor, as advised by Dr. Leland. On the basis that with increased resistance the recurrence of acute attacks would be diminished, both in frequency and intensity, I continued its use and did not have a septal operation for the pre-existing deformity, at that time markedly increased, as advised by others. From 1901 until 1903 such treatment continued to ease numerous acute recurrent attacks. From that time, with a knowledge of the use of eucalyptol, I used a 1% solution of both ingredients in mineral oil with even better results. For the past ten years I have had an absence of acute attacks, even with possibly an unusual number of so-called head colds. From my appreciation of my first year's study of diphtheria in 1914, in its relation to my personal case, I have used the solution constantly in nasal carriers in the following manner: constant inhalation by means of dropper, nasal swab or atomizer every one hour in a 1% solution for all individuals over age 5. As frequently irritant in younger individuals, a one-half per cent. solution gives the same results. Its therapeutic use is added cause for commendation as against using first a watery antiseptic and later an oil protective, in performing a simple operation that can be done by any mother or an older child easily. I have personally tested out the hypochlorites followed by oil, and cannot demonstrate any advantage. I would point out that its use is hourly for days and weeks as contrasted with the present-day literature of failure with such antiseptics when used once or twice a day, or with other gases when exposure is for a stated exposure once daily. Incidentally there may be seen the same good results in all nasal carriers of streptococci and pneumococci. For two years I have replaced formalin fumigation with nasal disinfection with this solution and have an accurate knowledge that the hundreds of ounce bottles that I have left with any variety of respiratory carriers has been of great aid in present disinfection and in future prevention. The secret at the basis is to saw away at the partial or complete blocking of the anterior nares until a passage is obtained. When obtained, it is the

rule to obtain negative cultures repeatedly, as well as to have the local irritation signs clear up, clinically giving knowledge as well, that the cure is complete. I say complete—it is not appreciated that at some future time the individual may again present an acute picture found in connection with reported cases in the neighborhood or found, as in two instances, by the survey of the school as known carriers the previous season.

Importance of Carriers. I have shown that secondary and return cases are absolutely dependent on family carriers. It is possible to assert with a marked degree of confidence that neighborhood secondary cases are dependent upon the extra-family or extra-house carrier. When such a condition exists, and from the frequency of such with reference to a reported case which has been shown, there continue neighborhood cases until that one is found. I know of no unknown problem or mystery of infection that is not explained by an eventually demonstrated carrier. When the majority or all in the neighborhood are found, one understands why each and every present-day procedure of protecting others, whether in terms of milk bottles, clothes and individuals, fails unless you have locked up in that house the carrier. Boards of health should be liable for every carrier. To aid in finding him, medical detectives must have as effective a system as the police for rounding up burglars before they do damage or, having done damage to catch him. If, then, every bar of the present-day procedures is thrown down and placards as well as restrictions placed against the carrier, we can safely permit, as we do here, conduction of even raw food business, can make home treatment possible under any condition, and, finally, can teach the public to fear a very definite visible condition in the well individual, rather than that inside a placarded house of a case—the condition is similar to the summer open garbage can and its million flies. It makes possible personal liberty; it restores the rights of the public. It is humiliating to a sanitarian that the victim dead of the disease must be placed in a hermetically-sealed coffin, must have a private funeral, while the cause of that illness is outside among the crowd of playmates, friends, and the morbid curious who otherwise would not be there, and this one again exposing others to infection. If the carrier who made the one ill had not been previously found it should be a part of the health authorities' responsibility to invite a

public funeral in order to then find among the dead's intimates the carrier. It is not infrequent that the exposure was at a party where other neighborhood, and even other community children were present, and it has been impossible to reach all such children. The field work must be extended to safe milk, along the present-day lines of safe water and typhoid. Clean up and keep cleaned up, the farms and dairies in terms of individuals who may be found to be carriers. We used to grade premises to control contagious diseases; we now grade milk similarly. The future in either case is to grade the individuals.

Results. What have we to show for prevention? The last severe epidemic of measles comparable to the one of 1917 was in 1906. During that latter year there was no especial prevalence of diphtheria for the first seven months; then suddenly, without anything in common, began an outbreak. For the five remaining months there were 35 deaths, with 9 more during the next three months of 1907. During a similar period in 1917 there were 8 deaths, although I have stated early in the paper that the frequency of cases during the early part of the period was as alarming as at the start of the previous epidemic. For the first three months of 1918, there were 5 deaths, or a total of 13, as against 44. Further, we have halved the deaths of latter 1917 and early 1918, as compared to those of the year previous. Such positive results bespeak for the rationality of the continuous operation of detectives for finding carriers, when two months of such work can produce said results.

Summary. The continuous search for carriers in controlling diphtheria is an exact sanitary measure of prevention.

All individuals with acute catarrhal nasal conditions are the potential acute nasal diphtheria carriers; it requires the presence of a chronic carrier, generally also nasal in type. The permanency of the former when made a carrier is dependent on the degree of nasal obstruction.

All individuals convalescent from any respiratory disease, however mild, constitute the largest proportion of nasal carriers of diphtheria. Investigation of all such individuals and their isolation, if carriers, is the essential basis of control of diphtheria.

In general, cases follow the production of acute nasal carriers by chronic ones.

Responsibility for any frequency of the disease is solely that of health authorities.

REFERENCES.

- ¹ Contagiousness *versus* Communicability, Interstate Medical Journal, Vol. xxiv, No. 9.
- ² Practical Points Concerning Diphtheria, New York Medical Journal, February 16, 1918.
- ³ Application of the Factors Controlling Carriers of Communicable Diseases, Interstate Medical Journal, Vol. xxv, No. 1.

A PLEA FOR A LEGITIMATE TRIAL OF SCIENTIFIC MEDICAL METHODS IN CHRONIC INTESTINAL CONDITIONS BEFORE RESORTING TO SURGICAL INTERFERENCE.*

BY MABEL D. ORDWAY, M.D., BOSTON.

IN view of the recent popularity of operations for removal of the cecum and a portion of the colon in conditions where there is no foreign growth and no serious constipation amounting to obstipation (in which conditions the Mayo Brothers and others believe operation necessary, while in those above mentioned they consider it culpable), for an alleged benefit that such procedures have upon idiopathic epilepsy and other conditions of nervous system irritability, it seems pertinent to offer the following case. Although not studied with the extreme scientific accuracy possible in such institutions as the Rockefeller Institute or in our own Evans Memorial for Scientific Research, the case was followed with sufficient intelligence to prove that study in such institutions is necessary if progress in medicine is desirable. Much has been said and still is to be said of the vicious circle existing between the nervous and digestive systems. There scarcely exists a neurasthenic or psychasthenic, so called, who has not had a disturbance of some part of the digestive system at some period of his disease. To break this circle is surely of importance. We all know that in a neurotic individual sudden shocks will at times cause vomiting and diarrhoea, which rest and time will readjust, and that constipation even of a severe type has been brought about, at times indirectly, by psychic disturbances. The complicated, sympathetic nervous system, with its far-reaching relations with the internal secretory system, will continue to reward us for our attention to its miracles. Of great value also are certain investigations into psychic conditions, with their

* Read before the New England Women's Medical Society, March 21, 1918.