careful study of the clinical history is, however, often conclusive. The contractions are normal for hours, and the child in good condition. Then comes a period of perhaps only an hour or two of very severe pains, long and hard, with short intervals, after which the fetal heart tones are wanting.

It is very important, therefore, to watch the uterine contractions with great care in long and hard labors, and especially toward the end of labor, when excessive contractions are more apt to occur. The diagnosis of the contractions is easily made by watching the patient and noting the hardening of the uterus by laying the hand on the abdomen. The diagnosis of the condition of the fetus is made by counting the fetal heart tones. Whenever there is danger, the heart tones should be counted every ten to twenty minutes.

The management of excessive contractions to prevent fetal death is to control the contractions. The best means is the hypodermic injection of morphin, and anesthesia. One-fourth grain of morphin is generally sufficient in the first stage of labor. If necessary, this dose could be repeated, for at this time there is not very much danger of morphin affecting the child. In the second stage, ether may well be combined with morphin, or substituted for it. Should the obstacle to delivery that excites the excessive uterine contractions be at the obstetric outlet, that is, should the head be on the perineum and held back by a tense, unyielding vulvar ring, episiotomy should be done. If the head is not at the vulva but down in the pelvis, and the cervix is well dilated, and if, in spite of morphin and anesthesia, the danger to the child is great, forceps may be applied. As a rule, however, forceps will increase the danger of fetal asphyxiation and should not be used unless an easy and quick extraction is possible.

MORTALITY FROM THE USE OF FORCEPS

The prevention of intrapartum death in case of bad presentation involves the correct management of these forms of dystocia, and cannot be entered on in detail in this paper. In regard to the deaths due to forceps operations, it must be said that forceps are employed much too frequently—often on account of the entreaties of the patient and her friends, often to hasten the labor for the convenience of the physician. Whenever forceps are used for these reasons, and the child is lost, its death is rightly charged against the operation, which is not far removed from the category of malpractice.

There is a great difference in the danger of high forceps and low forceps. The former has been used far too much in contracted pelvis. We have learned that other operations are safer both to mother and to child. Cesarean section or hebosteotomy is in proper cases to be chosen, while the induction of premature labor must be considered in cases seen early enough in pregnancy. Above all, these cases should be studied long and with care. Exact diagnosis, not only of presentation and position, but also of station, should be made. One who rushes into a high forceps operation thinking he has to do with a head in the pelvis, and then is astounded to find that he must exert all his strength to extract a child that is dead or dying, should learn that obstetrics has advanced in recent years, and that the high forceps is an operation that is very nearly discredited.

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THE LATER HISTORY OF THE TYPHOID CARRIER H. O.

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In two previous articles, the history¹ of a typhoid carrier, H. O., and his treatment by typhoid vaccine² have been reported. The more recent developments in his case show that he was not cured by the vaccination or by the extirpation of the gallbladder, and that after an interval of many months, during which typhoid bacilli could not be found in the feces, he infected other persons.

Through the courtesy of Surgeon R. M. Woodward, medical officer in command of the United States Marine Hospital in San Francisco, I have had the privilege of drawing on the records of the hospital for the greater part of the material here presented.

REVIEW OF THE EARLIER REPORTS

The sailor, H. O., was sick with typhoid fever in the United States Marine Hospital in San Francisco from Nov. 15, 1907, to Jan. 15, 1908. During a period of four years, from March 6, 1908, to March 19, 1912, he worked on several steamships, but most of the time on the *Acme*. During this period he infected twenty-seven officers and sailors with typhoid fever. Four of them died. An investigation by the San Francisco Department of Health into the cases on the *Acme* brought H. O. under suspicion as a carrier and the source of the infection. He was studied in the City and County Hospital for a period of two weeks in December, 1911, but typhoid bacilli were not found by the city bacteriologist in a series of examinations of his feces, undoubtedly owing to intermittence in the discharge of the bacilli in detectable numbers.

The State Board of Health later gathered circumstantial evidence which pointed to H. O. as a carrier responsible for the cases, and a specimen of feces obtained March 3, 1912, was found to contain many typhoid bacilli.¹ H. O. did not handle or serve food on shipboard, and it is probable that the infection was transmitted to his comrades in various ways, but chiefly through the water in a cask from which the men dipped drinking water.

March 19, 1912, Surgeon James M. Gassaway offered to admit H. O. to the United States Marine Hospital. Since that time, except for a short period of parole, H. O. has remained voluntarily at the hospital, although technically under quarantine by the California State Board of Health. Every effort has been made by the staff of the hospital to free him from the carrier state.

The article by Currie and McKeon² takes up the history at this point. Between March 28 and Oct. 14, 1912, specimens of feces were examined weekly and biweekly at the laboratory of the United States Public Health Service in San Francisco. The typhoid bacillus was isolated twelve times, but not later than June 19. Examination of the urine consistently give negative results.

In an attempt to cure H. O., an autogenous typhoid vaccine was administered between April 27 and June

1. Sawyer, Wilbur A.: A Typhoid Carrier on Shipboard, *THE JOURNAL A. M. A.*, May 4, 1912, p. 1336.

2. Currie, Donald H., and McKeon, F. H.: History of a Typhoid Carrier, *THE JOURNAL A. M. A.*, Jan. 18, 1913, p. 183.

28, 1912, in ten doses increasing from 25 million to 1,500 million bacilli. As typhoid bacilli could not be found in the stools from June 19 to October 14, a period of nearly four months, it was suspected that the treatment had resulted in a cure, but Currie and McKeon held their final conclusion in reserve pending more prolonged observation.

PERSONS INFECTED DURING THE PATIENT'S PAROLE

When the long series of examinations of the feces of H. O., made at the laboratory of the United States Public Health Service, and also two examinations made Aug. 9 and 27, 1912, in the State Hygienic Laboratory, had failed to reveal typhoid bacilli, it was agreed by Surgeon Woodward, the California State Board of Health, and the Health Department of San Francisco that it would be safe to release him temporarily from quarantine. He was discharged from the hospital, Oct. 14, 1912. He signed an agreement to report to the Marine Hospital for examination once a month for six months. It was understood that this provisional release from quarantine would be made permanent at the end of that time if his condition remained satisfactory. He reported according to the agreement, and examination of his feces continued to give negative findings. He was employed from Oct. 20, 1912, to about Jan. 10, 1913, as winch driver on the steamer *Noyo* of the coastwise lumber trade.

Nov. 15, 1912, a seaman, O. H., from the *Noyo* was admitted to the United States Marine Hospital in San Francisco for typhoid fever. He recovered and left the hospital Jan. 14, 1913.

Another seaman from the *Noyo*, F. C., was admitted to the same hospital for typhoid fever, Dec. 23, 1912. He had a severe and typical attack. The Widal test was positive. He died, December 28.

Jan. 9, 1913, a sailor, L. K., ill with typhoid fever, entered the United States Marine Hospital in Los Angeles. He had been on the *Noyo* from Dec. 16 to 24, 1912, and in all probability had been infected between those dates. The diagnosis was confirmed by a positive Widal test. This patient recovered.

It seemed highly probable that these three sailors had received their infection from H. O. while working with him on the *Noyo*, a ship previously free from typhoid fever. The captain and crew of the *Noyo*, knowing about the experience on the *Acme*, suspected that this was the case. As a result H. O. was discharged about Jan. 10, 1913, and the seamen's union asked the Marine Hospital to make an investigation.

The investigation was made by Passed Assistant Surgeons D. H. Currie and H. G. Ebert of the United States Public Health Service. It showed that the conditions on the *Noyo* were favorable for the transference of typhoid fever from a carrier among the crew to the other sailors. The men secured their drinking water from a dilapidated water tank having a common drinking cup tied to it. In using the cup the hand was partially immersed, and pollution of the water in the tank was inevitable. Moreover, this tank was situated near the water-closet, which was in an unclean condition at the time of the inspection. The investigators suspected that H. O. was the source of the infection and recommended that he be again placed in quarantine at the Marine Hospital, and that the nature of the water containers used on coastwise vessels entering the port of San Francisco be called to the attention of the State Board of Health.

The investigators expressed the opinion that a tight container for drinking water with a faucet would greatly lessen the chances of infection if a carrier were aboard, and that the arrangement exemplified on the *Noyo* was a constant menace to sailors. The conditions for transfer of infection on the *Noyo* were very similar to those found earlier on the *Acme*.¹ The open water-cask of the latter vessel had furnished an obvious opportunity for the transfer of infection.

The series of typhoid cases on the *Noyo* stopped when H. O. was discharged, just as the long series on the *Acme* had abruptly terminated when he left that ship.

Jan. 17, 1913, H. O. was readmitted to the United States Marine Hospital in San Francisco, and was again placed under quarantine by the State Board of Health. During the three months of his parole he had infected three persons, one of whom had died.

REMOVAL OF GALLBLADDER

Examination of the feces of H. O., Dec. 27, 1912, and Jan. 23 and Feb. 6, 1913, failed to reveal the typhoid bacillus, but it was present in a specimen obtained January 28. This positive specimen proved that the patient was still a typhoid carrier, a conclusion already reached on account of the infections on the *Noyo*.

At that time the existing literature gave considerable assurance that chronic carriers discharging typhoid bacilli in their feces usually owed their condition to a diseased gallbladder, and that its extirpation would result in a cure. After mature consideration Surgeon Woodward recommended removal of the gallbladder, and H. O., anxious to be freed from the danger of harming others, consented to be operated on. Feb. 12, 1913, Surgeon Woodward operated on H. O. and removed the gallbladder and its duct. H. O. rapidly regained his usual good health.

The gallbladder, contrary to expectations, contained no gallstones and was normal. A painstaking bacteriologic examination at the laboratory of the United States Public Health Service in San Francisco showed that the contents of the gallbladder did not contain typhoid bacilli, although colon bacilli and a few other organisms were present. In this carrier the gallbladder was not the focus at which the intermittent infection of the intestinal contents originated. It may, nevertheless, have been a place favorable to the multiplication of typhoid bacilli received in the bile from a focus in the liver, if such a focus existed.

After the operation, frequent examinations of the feces of H. O. were made. Nine examinations from March 4 to April 1 were negative. April 8, 1913, a specimen was obtained from which the typhoid bacillus was isolated. The removal of the gallbladder, like the treatment with typhoid vaccine, had failed to cure the carrier state. In necropsies it has been shown a number of times that the gallbladder of a typhoid carrier may be free from typhoid bacilli. Bindseil,³ Messerschmidt⁴ and Goebel⁵ have reviewed the literature and have presented cases of their own. In five out of

3. Bindseil: Bakteriologischer Sektionsbefund bei einem chronischen Typhusbazillenträger, *Ztschr. f. Hyg. u. Infektionskrankh.*, 1913, lxxiv, 369.

4. Messerschmidt, T.: Bakteriologischer und histologischer Sektionsbefund bei einer chronischen Typhusbazillenträgerin, *Ztschr. f. Hyg. u. Infektionskrankh.*, 1913, lxxv, 411.

5. Goebel: Bericht über das Sektionsergebniss bei zwei chronischen Typhusbazillenträgern, *Ztschr. f. Hyg. u. Infektionskrankh.*, 1914, lxxviii, 555.

twenty-two thorough necropsies on chronic typhoid carriers, the typhoid bacillus was not present in the gallbladder. In the series of twenty-two cases, the typhoid bacillus was not infrequently found in the gallbladder and in the bile ducts of the liver, usually in the contents, and sometimes in the walls. In rare instances it was found in the spleen, and in single instances in the bone marrow, lung, and (in the presence of tuberculous lesions) in the suprarenal and kidney.

LATER EXAMINATIONS

From April 10, 1913, to April 7, 1915, a period of two years, the feces of H. O. were examined seventy-one times and typhoid bacilli were found in only three specimens, obtained Nov. 28 and Dec. 5, 1913, and Feb. 11, 1914. During the last fourteen months of this period, forty-two examinations were made and all gave negative results. In the examinations a suspension of the feces in broth or sterile water was streaked over the surface of Endo or Drigalski medium, or both. After proper incubation the typhoid-like colonies were studied further by cultural and serologic methods.

ISOLATION OF THE TYPHOID BACILLUS FROM THE STOMACH CONTENTS

When the examinations of feces had given negative results for over a year, Assistant Surgeon N. E. Wayson, medical officer in charge of the laboratory of the United States Public Health Service in San Francisco, used a method suggested by Carnot and Weill-Hallé.⁶ On two occasions he obtained bile for examination by feeding H. O. 150 c.c. of olive oil on an empty stomach and removing the stomach contents one hour later through a stomach tube. After allowing the stomach contents to stand, he removed and examined the lower layer, containing the bile. In the first specimen, obtained Jan. 26, 1915, typhoid bacilli were not found, but an organism was isolated which resembled the paratyphoid A bacillus. From a second specimen, obtained in the same way, March 16, 1915, the typhoid bacillus was isolated. An examination of the feces eight days earlier had been negative. The finding of typhoid bacilli in stomach contents containing bile showed that H. O. was still a carrier, March 16, 1915, and suggests that the bacilli may have come with the bile from the liver.

ISOLATION OF THE TYPHOID BACILLUS FROM FECES OBTAINED BY PURGATION

April 12, 1915, H. O. was given podophyllum in the evening. The following morning magnesium sulphate was administered. During the next twenty-four hours three stools were obtained. The first was firm, like most of the stools from H. O., and the second was soft. Typhoid bacilli could not be found in these two specimens. The third stool was semifluid, and Dr. Wayson found that it contained typhoid bacilli in large numbers. During the preceding fourteen months, typhoid bacilli had not been found in the feces of H. O.

When H. O. was being investigated by the State Hygienic Laboratory in March, 1912, a semifluid stool containing very many typhoid bacilli was obtained after the administration of fluidextract of cascara and magnesium sulphate.¹ It was suspected that active

peristalsis increased the number of typhoid bacilli in the feces by stimulating the flow of infected bile (or other material), or possibly by enabling more of the typhoid bacilli to survive some unfavorable condition in the intestinal contents.

VIRULENCE OF THE TYPHOID BACILLUS FROM H. O.

That the typhoid bacilli from H. O. were highly virulent had been repeatedly shown by severe and fatal cases among the sailors who came in contact with him. Additional evidence was obtained through an accident in the State Hygienic Laboratory.⁷ June 15, 1914, an assistant engaged in making an anti-typhoid vaccine attempted to transfer with a pipet a suspension of live typhoid bacilli of the strain originally obtained from the feces of H. O., March 3, 1912. A small amount of the suspension was drawn against the tip of the tongue and the teeth. The mouth was at once washed out repeatedly with 50 per cent. alcohol. Nine days later the symptoms of typhoid fever began with headache. The course of the disease was mild and brief. The temperature did not go above 39.6 C. (103.2 F.) and returned to normal on the ninth day of the illness. The Widal test was negative at the onset, but strongly positive later. This accident showed not only that the typhoid culture isolated from H. O. was virulent, but also that a culture which had been grown on nutrient agar for two and a quarter years and transferred at least monthly was still capable of producing typhoid fever in human beings.

SUMMARY AND CONCLUSIONS

1. Although frequent examinations of the feces of the typhoid carrier H. O. gave negative results for four months after he had been treated with autogenous typhoid vaccine, he infected three persons when subsequently released from quarantine on parole. The total number of persons infected by this carrier is thirty, including five who died.

2. In a further attempt to cure this carrier, the gallbladder and its duct were removed surgically, but the typhoid bacillus was found in the feces several times after the operation. Examination of the gallbladder showed that it was normal and that its contents were free from typhoid bacilli.

3. After forty-one successive examinations of feces during a period of fourteen months, all with negative results, the typhoid bacillus was isolated from stomach contents containing bile.

4. Certain typhoid carriers are unusually dangerous and must be controlled by quarantine or other adequate supervision.

7. Sawyer, W. A.: A Typhoid Infection Contracted in the Laboratory, *Month. Bull. California State Board of Health*, 1914, x, 80.

6. Carnot and Weill-Hallé: Method for Determining the Presence of the Bacillus Typhosus, *abstr., Paris Letter, THE JOURNAL A. M. A.*, Jan. 16, 1915, p. 260.

Health Leaflets.—The Bureau of Public Health Education of New York City, in cooperation with neighborhood societies, publishes and distributes monthly neighborhood chronicles in the form of a four-page health leaflet, containing on the first page local news of the particular district of the city from which the leaflet will be distributed. They will be issued from about ten different sections of the city. The remainder of the matter in the leaflet will be the same in each. The remainder of the matter in the leaflet will be the same in each. This is expected to be an effective means of reaching the public in regard to health matters which affect them most closely. The leaflets will be distributed from house to house by the neighborhood associations.