of operation in this case would be considerable owing to the frailty of the patient's general condition and her inability to accomplish much exertion on account of the cardiac condition.

These are but examples of certain classes of cases in which biliary drainage by the duodenal tube has given satisfactory results. There will be no doubt that there is a definite field of usefulness for it, and more extended experience will probably give indications for its further development.


Perhaps the most remarkable feature of the history of leprosy is the almost complete replacement of the world-wide contagious theory of its origin by the hereditary theory of its causation during the nineteenth century, largely based on the book of Danielsen and Boeck of 1848, who looked on the occurrence of a second case within a single family as indicating collateral descent and an affirmative of whether the parents was diseased or after the birth of a child—as evidence of hereditary causation, and completely ignored the possibility of family or household infection. A second and non-contagionist theory of spontaneous origin. The absence of hereditary propagation of leprosy in the descendants of Scandinavian lepers living under more favorable hygienic conditions after migrating to the United States of America; the frequency of infection in lepers tropical climates of Europeans free from all hereditary taint; the spread of epidemic leprosy in Oceania so far too rapidly to be possibly accounted for by heredity; and the rapid loss of sexual powers of adult male lepers and want of development of such powers in young lepers, has already greatly shaken the hereditary theory before Hansen's discovery finally established the infectivity of the disease, although the precise mode of communicability still remains to be determined and has to be discussed in the light of recorded cases.

The Communicability of Leprosy.

As the result of an analysis of answers to questions sent to a number of medical men in leper countries in 1862 the Royal College of Physicians of London reported leprosy "not to be contagious or communicable to healthy persons by proximity or contact with the diseased," and that there was therefore no justification for segregation measures. As the disease results from the habit of stopping all action in that direction and urged the repeal of all laws empowering isolation of lepers. Yet Dr. N. C. Macnamara, I.M.S., with great experience of leprosy came to the same conclusion in 1863. During the past twenty years reports from India, constituting a large majority of the total reports received by the College, further opposition to whose view was soon forthcoming from actual workers in the tropics. Thus, Drogard-Lauré recorded a number of infections in 1869; all the thirteen doctors reporting leprosy from the British Guiana Leprosy Commission of 1875 favoured contagion; W. Macn. collected many cases and stated the whole case in favour of contagion in 1877-79; Brosse, with long experience in that country, also advocated contagion in 1879, and Billings of British Guiana, in an important work on leprosy (1881), found evidence of contagion in 67 per cent. of 137 cases without heredity which he closely investigated. In 1876 Hansen refuted the hereditary theory in Norway and supported the communicability of the disease and in the next decade Vital, Bocq, Leloir, and Besnier took the same view in France, and, with the exception of the Indian Leprosy Commission of 1891, to which a strong anti-contagionist was not endorsed. In 1879, Sir Jonathan Hutchinson's view, first put forward in 1863, that leprosy was "fish-eater's goiter"—but subsequently repeatedly modified until "commensal communicability," apart altogether from fish diet, was acknowledged—also a prebacteriological theory of only historical interest. **Delivered before the Tropical Diseases Section of the Royal Society of Medicine.**
Conditions favouring the Spread of Leprosy.

The most important of these is a low stage of civilisation, such as existed in Europe during the leprosy prevalence in the Middle Ages, and still persists among the poorer classes in India, China, Africa, and Polynesia, etc., and to some extent in Norway and Iceland, in the form of one-roomed lodgings with overcrowding and promiscuity; great snow holes, as in the Sandwich Islands and in Norway at certain seasons; absence of all fear of the disease—social ostracism of leper families, on the contrary, having been followed by temporary disappearance of leprosy in South Africa in 1793; and epidemics in Louisiana in 1785 (White); a low state of morals and sexual promiscuity, as in Europe in the Middle Ages (G. Newman), and recently in Hawaii, where it is recorded that only those Europeans who had intimate associations with Hawaiians have become lepers; and the same is low in British Guiana and other tropical countries; and such social customs as eating with the fingers out of the same dish and smoking a common pipe, as in Hawaii. The Chinese believe in sexual infection of leprosy, and also in benefit being derived from passing on or "selling" the disease in this way, as the ignorant in some parts of England still believe in regard to venereal diseases; but the proved discharge of lepra bacilli from the nose and mouth in sneezing, coughing, or readily accounts for infection through close contact with lepers, including sexual relations. Deficiency of protein and fresh vegetable diet has also repeatedly been stated to predispose to leprosy, and probably furnishes the only available explanation of the badly curtailed results that has pointed out that animal proteins are largely absent from the diets of the leprosy-afflicted races of Africa, India, China, etc.

Leprosy Incidence and Climate.

Leprosy is prevalent from Iceland to the equator, so that climate alone appears to have little influence on its occurrence. Nor should a study of the rates per mile that I have collected shows that very high leprosy incidence, such as 5 per mile and upwards, only occurs within the tropical zone in places with a high rainfall, nearly always from 60 to 80 inches or more a year, thus having a hot moist climate, which may possibly be favourable to the survival of the lepra bacilli for a longer time outside the human body, facilitating infection. Thus, in Central Africa we have recent records of rates per mile of 5.0 in French Guiana, 5.2 in North Nigeria, 13.0 in French Equatorial Africa, 20.0 in Abyssinia, 20.3 in the Kameruns, and 60.7 on the Ivory Coast; in Asia, 10.7 in the Dutch East India Island of Ambon, and, according to Kernmorgen, 44 in the Straits Settlements; in Canada, 0.0 in New Zealand, 0.0 in the Loyalty Islands, and 66.7 in the Marquesas Islands, while in Hawaii the rate has been 11.88; in tropical America we have records of 5.1 in Barbados, 16.0 in Trinidad, 20.0 in French Guiana, and 25.0 in Dutch Guiana, all appallingly high incidences when we recall that in the West Indies lepers can be found in any one of the streets of all large towns, the rate is barely 0.5 per mile.

Between the tropics and 35° latitude, as well as in some tropical countries, the leprosy rates per mile are comparatively low, 1.17 in South Africa and British Guiana, Egypt, Algeria, Argentina, etc.; while in colder latitudes the highest rates I have so far found recorded are 3.0 in 1896 and 1.1 in 1907 in Iceland; 1.91 in 1856 in Norway before isolation measures were adopted; 1.95 in Japan, and 1.56 in Cyprus. In considering the influence of temperature we must bear in mind that during the long winter months of high latitudes the people are closely crowded in houses artificially warmed to a high degree, so that if the infection is mainly a house one, as was immediately the case in the cold climates of the cold countries as Iceland and Norway may easily be more favourable to the communication of the disease than those in places between 35° latitude and the tropics with climatic conditions favourable to open air life during the greater part of the year, and the incidence of leprosy just described is easily understood.

Group Infections in Newly Attacked Countries.

Owing to the incubation period of leprosy commonly extending to from two to eight years or more and the insidious onset of symptoms, it is naturally exceedingly difficult to trace the source of infection in places where the disease has already become widespread. For example, in Austria, the number of new infected cases is a number of striking instances are on record, such as the following: In Cape Breton Island the first case was a French woman aged 52, from whom infection was traced to five of her children, all born after she was attacked, two grandchilden, a stepson, an attendant of one of the leper sons, and a man who had slept with one of the last two, and in any one of the cases three persons not related to the family being thus among the victims. In the Louisiana outbreak of 1866 a French woman was again the first leper; three of her four sons, one of two daughters, a servant in the same community, and eight miles away, a young woman who nursed the first patient, and a young man who slept with one of the infected sons, were all attacked within a few years. Again, in the Melem disease of Madagascar in 1856, in the case of 78 cases of leprosy were traced to infection introduced into a previously free district by six lepros Russians coming to reside there as servants—examples which will suffice to prove that other favourable circumstances the slow and insidious communication of leprosy from case to case is possible. In Natal two natives returned from the Cape after living there with a leper woman and both developed the disease two years later, with the result that leprosy became widespread among all the neighbouring previously uninfected tribes, over 100 cases being known at the end of forty-two years.

Modes of Infection.

The general history of the spread of leprosy over the world and its progress in newly infected countries thus leaves no doubt that the disease is in some way communicated directly or indirectly from one patient to another through the contagious bacillus. The exact mode or modes of infection, however, remains unsolved. It is well known that the bacillus can be transmitted from one person to another by contaminating the organism and infecting animals with it, so we have to fall back on recorded histories of cases for indications of the conditions under which the disease is communicable, and the most probable change of leprosy bacilli into the human body, for the purpose of studying which I have now collected 700 instances, analysed in the following table, in which the probable source of infection was noted.

Table of 700 Recorded Cases of the Probable Source of Infection in Leprosy.

<table>
<thead>
<tr>
<th>Mode of Infection</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjugal</td>
<td>85</td>
<td>12.14%</td>
</tr>
<tr>
<td>Cohabitation</td>
<td>45</td>
<td>6.14%</td>
</tr>
<tr>
<td>House</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Room</td>
<td>35</td>
<td>5.0%</td>
</tr>
<tr>
<td>Bed</td>
<td>64</td>
<td>9.14%</td>
</tr>
<tr>
<td>Attending on lepers</td>
<td>139</td>
<td>19.42%</td>
</tr>
<tr>
<td>Leper playmate</td>
<td>23</td>
<td>3.28%</td>
</tr>
<tr>
<td>Close association with leper</td>
<td>113</td>
<td>16.14%</td>
</tr>
<tr>
<td>Wet nurse</td>
<td>1</td>
<td>0.0%</td>
</tr>
<tr>
<td>Wearing leper's clothes</td>
<td>3</td>
<td>0.43%</td>
</tr>
<tr>
<td>Vaccination</td>
<td>4</td>
<td>0.57%</td>
</tr>
<tr>
<td>Inoculation from leper</td>
<td>3</td>
<td>0.43%</td>
</tr>
</tbody>
</table>

In considering these figures it is worth recalling that the stock arguments of the anticontagionists were that the disease was rarely transmitted from husband to wife and vice versa, and was very rare among attendants on lepers, yet many such instances are recorded among housemates, roommates, and bedfellows, who slept with lepers. Thus it is not impossible that 25.7% of the total number of lepers in the world were infected by lepers before the disease was communicated. Although there are occasionally cases of infection to which the contact was short, as in three instances in which infection was traced to sleeping on a single occasion with a leper woman, the man developing leprosy after ten months, and one and two years respectively after living with a leper child. Many of the cases in which infection followed cohabitation between a healthy and a lepros subject were European males living with lepros native females in tropical countries, while a number of the cases of infection took place in temperate climates, such as Norway. There is, however, evidence that conjugal infections are comparatively uncommon in proportion to the frequency of this form of infection, for example, it was found in a study of 700 cases, of the Molokai leper settlements of the Sandwich Islands, a fact which is explained by the greatly diminished susceptibility to the disease in persons over 30 years of age, while it
has also been pointed out that owing to male lepers soon losing their sexual powers their wives are then little more exposed to close contact with them than other members of the household. The infections among playmates were mostly European children associated with native lepers, and if another leper had contracted the disease and that contact occurred between 5 and 20 years of age are especially susceptible to the disease.

The house infections include many persons who occupied the same room or even the same bed as a leper. And the numbers occupying the same room must in reality have been far more numerous than the 5 per cent. shown in my table, as so many of the house infections occurred in the poorer tropical races whose houses only contain one room. Further, no less than 50 per cent. of the whole leprososy population have, as having occupied the same bed as a leper, apart from conjugal and cohabiting couples, the addition of whom brings the known bed infections up to no less than 27.42 per cent. - a most striking fact which well brings out the long and extensive period over which leprosy after vaccination from the same source. It is also on record that in rare instances leprosy has been raised in leprous children put to wet nurses. In the absence of any efficient method of the disease, yet there are cases on record which practically amount to positive inoculation experiments, such as the following. Professor Ehlers records the case of a Danish doctor wounding his finger during an obstetrical operation on a leper negro, followed by slow healing, and after a comparatively short time began to lose bits of conjugal mates to a leper colony, as infection is then comparatively rare.

The safeguarding of children and young persons from contact with lepers cannot be too strongly insisted on, and I have elsewhere shown their great susceptibility— that is, children and young people up to 20 or 30 years of age. If by the most infective type of leprosy is the tuberculous form, including mixed cases, with discharge of large numbers of bacilli from the nose and breaking-down nodules; while anaesthetic cases, especially those of lepers, are comparatively innocuous, yet they constitute the greatest menace of all, because, in view of their own weakness and their lack of understanding, such cases as a rule run a quieter course and are therefore more difficult to detect. That leprosy is a most striking fact which well brings out the long and extensive period over which leprosy after vaccination from the same source. It is also on record that in rare instances leprosy has been raised in leprous children put to wet nurses. In the absence of any efficient method of the disease, yet there are cases on record which practically amount to positive inoculation experiments, such as the following. Professor Ehlers records the case of a Danish doctor wounding his finger during an obstetrical operation on a leper negro, followed by slow healing, and after a comparatively short time began to lose bits of skin and integument.

The following considerations make it clear that the first essential in prophylaxis is the removal of all infective cases from frequent and close contact with the healthy, especially the most susceptible—that is, children and young people up to 20 or 30 years of age. If by the most infective type of leprosy is the tuberculous form, including mixed cases, with discharge of large numbers of bacilli from the nose and breaking-down nodules; while anaesthetic cases, especially those chronic and mutilated cases, who have often lost all infectivity, are comparatively innocuous, yet they constitute the greatest menace of all, because, in view of their own weakness and their lack of understanding, such cases as a rule run a quieter course and are therefore more difficult to detect.

The principles of prophylaxis and causes of failures.

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ACUTE INFLAMMATION OF A LARGE DIVERTICULUM OF THE JEJUNUM WITH PERFORATION.

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The following case presents many points of clinical and pathological interest.

On February 3rd, 1922, I was asked to visit a married woman, 48 years of age, who the day previous had been taken ill suddenly with acute abdominal pain and had vomited several times. Her bowels had not moved during the last forty-eight hours. When I saw her she did not look ill; the pulse was 96 and the temperature 99°F. She was of good general condition, excepting that she was somewhat flabby. She complained of acute pain in the left side of the abdomen, below the umbilicus. At the site of the pain there was distinct tenderness on palpation and a suspicion of slight limitation of movement. The symptoms of an acute abdomen were suggestive; indeed, my initial inspiration I could feel a round mass, somewhat larger than a tennis ball, about midway between the umbilicus and the symphysis. The patient was a large stout woman, and the mass was hard and of the consistence of a uterine fibroid, though it was extremely tender. Vaginal examination did not offer any assistance in diagnosis, and per rectum no fullness could be felt through the pouch of Douglas. The swelling was not particularly mobile, though it was circumscribed.

There did not appear to be any urgency to explore the abdomen, so I kept the patient under observation and with fomentations to the abdomen and enemas the condition gradually subsided. The swelling, however, still remained tender, though I noticed that it was becoming smaller from day to day. There was no sickness or vomiting after the first twenty-four hours. When the condition had more or less subsided I advised operation, and this I performed fourteen days after the onset of the acute phase of her illness.

Previous History.

For years she had suffered from flatulence. She had also been subject to recurrent attacks of colicky pain in the abdomen which periodically had necessitated a day in bed. These attacks had been more frequent and more severe than those she had already described. Her bowels had been regular and she had never had attacks of sickness. She had no children. Menstruation had always been scanty and she had never missed a period during her twenty years of married life. Her general health had been good.

Operation.

On February 16th, 1922, I explored the abdomen by a mid-line incision. I found the umbilicus displaced a good distance below the point of a perpendicular dropped from the costal margin. I found a quantity of serous peritoneal fluid escaped. About the centre of the abdomen to the left of the middle line was a mass somewhat larger than a tennis ball and with a hard indurated consistency. When the swelling was slowly demuced of its omentum there was exposed a large spherical swelling, tense and fluctuating, about the size of an orange, situated on the border of a loop of small intestine. While separating the omentum from this point, a large gangrenous patch was disclosed on the fundus of the swelling, with a purulent surface in which very foul-smelling pus and semi-solid contents escaped. It was