1894. Just previously to his return to consciousness the patient vomited bile.

The following are the time observations made during the administration, which commenced in one-drachm doses at 9.25 A.M.:—

H. M. S. *One-drachm doses.*

- 9 25 15 Resisting and shouting, regular breathing.
 9 26 15 Quiet. Chloroform added to the cap, one breath of air. Respiration 32, pulse 72 a minute, both regular.
 9 27 15 Chloroform added to the cap, one breath of air. Respiration 24, pulse 68 a minute, both regular.
 9 27 28 Snoring.
 9 27 55 Noisy expiration.

Half-drachm doses.

- 9 28 15 Chloroform added to the cap, one breath of air. Respiration 28, somewhat irregular, but without any irregular intake; pulse 76 a minute, regular.
 9 28 30 Holding breath (apnoea).
 9 28 50 Breathing regularly; snoring deeply.
 9 29 0 Chloroform added to the cap, one breath of air; then held breath till 9.29.30.
 9 29 30 Breathing regularly.
 9 29 45 Chloroform added to the cap, no air inhaled; holding breath till 9.30.30.
 9 30 30 Quiet breathing; snoring; chloroform added to the cap, one breath of air. Pulse 42 a minute, regular.
 9 30 30 to 9 31 45 alternate irregular breathing and holding breath; snoring deeply. No irregular intake.
 9 31 45 Chloroform added to the cap, one breath of air; breathing more regularly.
 9 32 0 Regular breathing; still snoring.
 9 32 30 Over cornea insensitive, cap removed. Respiration 32, pulse 52 a minute, both regular.
 9 35 10 Vomiting bile.
 9 36 25 Consciousness returning.
 9 36 45 Operation and dressing finished, patient removed to bed.

The pulse and respiration from the commencement of administration until complete anæsthesia was reached showed the following qualities:—

H. M. S.	Pulse.	Respiration.
9 25 0	80 regular	 28 regular.
9 26 15	72 "	 32 "
9 27 15	68 "	 24 "
9 28 15	76 "	 28 irregular.
9 30 30	42 "	 holding breath.
9 32 30	52 "	 32 regular. { (Anæsthesia complete.)

The promotion of anæsthesia in this case was slow on account of the persistent irregularity of the breathing after the patient became unconscious. When the inhalation was begun at 9.25.15 the patient resisted violently and shouted until 9.26.15. The breathing was then regular until 9.27.28, when snoring set in, and was accompanied shortly afterwards by noisy forced expiration. The respiration continued irregular, but without any gasping or irregular intake, till 9.28.30, when apnoea occurred for 20 seconds. At 9.29.0 the patient held his breath for 30 seconds, and again, at 9.29.45, for 45 seconds. The assistant who was taking observations on the pulse called out, "The pulse is only 42," and for a fraction of a moment I felt an almost irresistible inclination to stop the inhalation. But the pulse was not being taken as a guide in any way, and the irregularity of the breathing was sufficient to account for its slowness; moreover, the facts—(1) that though the breathing was irregular there was no irregular intake, and (2) that there was a small measured dose of chloroform on the cap—prevented any misgiving, after the momentary shock, as regards the possibility of over-dosing having taken place. The inhalation was therefore continued for two minutes longer until anæsthesia was complete. As the anæsthesia deepened the breathing became regular, and on its completion the pulse was 52. Since we commenced five months ago to take systematic clinical observations on the circulation under chloroform I have come to understand how thoroughly it must demoralise the administrator to take the pulse as a guide, and this point is illustrated by the present case. If the chloroformist had relied in any way upon the pulse he would have been obliged to stop the inhalation when

it slowed down to 42, and erroneous conclusions might have been drawn from the case. I had great difficulty in persuading myself originally to allow clinical observations to be taken on the pulse, on account of the bad effect it might produce on the students. We have now, however, accurate observations on the pulse in over 700 cases of chloroformisation, and they prove, like the experiments of the Hyderabad Commission, that no chloroformist who takes the pulse as a guide can by any possibility give chloroform properly. In other words, uniform safety under chloroform can only be attained by complete disregard of the pulse as a factor in the administration. The record makes it clear that this was one of those cases which illustrates the principle that the chloroformist should be guided entirely by the respiration. The slightest distraction of his attention from the all-important process of inhalation would have resulted either in danger or in inability to fully anæsthetise the patient.

Hyderabad.

AN ACUTE EPIZOOTIC AND EPIDEMIC OUTBREAK OF HYDROPHOBIA AT MADEIRA.

By DR. JULIUS GOLDSCHMIDT.

THE successive occurrence, both epizootic and epidemic, of hydrophobia in a country where it had been hitherto unknown causes the history of recent occurrences in Madeira to be of great interest to the epidemiologist.

The number of dogs in Madeira has always been large. There is no official statement on the point, but I may be entitled, having been a resident physician on the island for over twenty-seven years, and having therefore become extremely familiar with the place and its inhabitants, to make an estimate. In doing so, I am sure that I remain below the truth in putting the figure at one dog to two households (*fogos*) each of six individuals—i.e., practically 11,000 dogs to 130,000 persons. The figures are less surprising if it is remembered that similar statistics for Europe indicate on an average one dog to sixteen inhabitants. There is only one town in Madeira—viz., the capital, Funchal, with 30,000 inhabitants; the rest of the population lives either in small hamlets, which rarely deserve the name of villages; or in isolated huts, built on the small plots of ground belonging to them. Thus it happens that the solitary peasant remains, notwithstanding his poverty, in continual fear of thieves and always keeps a dog for his protection. These dogs find their miserable food as well as they can; few of them are regularly and abundantly fed. Their race can only be described as constituting an unjustifiable type of mongrel; but in spite of all these adverse conditions, in spite of utter neglect, racial degeneration, and overcrowding, hydrophobia remained unknown in Madeira until less than two years ago.

At the beginning of June, 1892, rumours were rife in Funchal relating to "a new dog's disease." The animals died in a few days under symptoms which suggested at once the idea of hydrophobia. At the outset the competent authorities did not admit this diagnosis, and the condition was only many weeks later recognised as rabies, a diagnosis which was then confirmed by inoculations. The symptoms were briefly as follows. Animals known as quiet began to snap at all around—even at their own masters. After a short period (two to four days) of excitement paralysis set in, which terminated in the death of the dog. At the end of June reports came in from all parts of the island telling the same story and describing the disease as spreading not alone amongst dogs but also amongst goats and cats. This rapidity of spread is noticeable, for in Madeira communication between the different parishes is precarious on account of difficult roads and numerous deep ravines; but, notwithstanding these topographical difficulties, the epizootic outbreak traversed the island in a marvellously rapid manner, showing itself at almost the same time in the town and in the most distant parts. The dogs underwent an incubation period of from twenty-five to thirty days; the illness lasted for from four to five days. During the first and most acute period of the outbreak 300 dogs perished

on the southern half of the island, and over 1000 were killed on the appearance of suspicious symptoms. One case of undoubted hydrophobia recovered gradually, and the great rarity of this fortunate issue entitles the case to more particular mention. The animal, a bitch three years old and sterile, began to be sad and refuse food on Aug. 15th, 1892. Paralysis of the nether paw set in on the following day. From the 17th she kept up a continual hoarse barking. Five days later she displayed complete general paralysis, with the exception of the tail, which she would wag at the sight of her master. She had considerable difficulty in masticating and swallowed only with great efforts the broth which her master, wearing gloves of thick leather, poured down her throat. The paralysis of the jaw lasted for one month, and during the whole of this time the dog was fed with chicken broth and minced meat. The paralysis then disappeared, and with the remission of symptoms came an amelioration in the state of the tongue. The general paralysis came to a practical end in four months, but even six months after the beginning of the disease there still remained a stiffness in the movements of the neck and the right shoulder.

By December, 1892, the outbreak came to an end. Thus the epizootic lasted for about six months, the last two months having yielded, however, only a small number of cases. Other animals suffered comparatively little. In Funchal and its environs I only met with 6 cases amongst cats, 4 amongst hogs, and 6 amongst goats. Amongst cattle two cases were said to have appeared, but I cannot guarantee this rumour. With regard to the outbreak of a human epidemic it is regrettable that the population of the island suffered in a very marked degree. Nine fatal cases were reported amongst the 60,000 inhabitants of the southern parishes of Funchal, Santa Cruz and Machico—a formidable death-rate, which, applied to the population of the United Kingdom, would have resulted in 5000 victims. The last death from hydrophobia occurred in November, 1892. The local papers, it is true, announced another case on Sept. 14th, 1893, in one of the southern parishes, but I could not ascertain whether the patient, a child nine years old, which was bitten nine months before his death, had really died from hydrophobia.

With regard to the origin of the calamity, it appears to be certain that the epizootic was not autochthonous, but was imported into the island by some continental animal which had escaped the usually over-strict supervision of the Funchal Custom-house officials. Subsequent researches revealed the landing of a Lisbon dog on May 1st, 1892. It died on July 23rd from hydrophobia after nine days of illness, a duration of disease considerably longer than was afterwards the average among the dogs attacked in Madeira. I hesitate therefore to accuse this animal of having introduced the epizootic into the island at the beginning of June; for if, on the one hand, an incubation of over sixty-seven days, though longer than that observed in the other cases, is not impossible, yet, on the other hand, the saliva of this dog must have acquired infectious properties at a very early day of the incubation. But it is known that among dogs in countries where the disease has been long established there is a much longer incubation period than among dogs inhabiting a hitherto uninfected territory, and the predisposition of the (if I may so call them) uninoculated Madeira dogs may have determined their sensibility to the saliva of the Lisbon dog.

At Madeira the epidemic disappeared as suddenly and completely as it broke out, for since the first week of December, 1892, up to this very moment no new cases have been registered. Whether this was due to the action of the police in severely imposing the use of the muzzle or because the infected dogs had been all destroyed it is not possible to say; it is to be hoped, however, that the island will again enjoy perfect freedom from this terrible disease. The acuteness of the outbreak among the human population was quite in proportion with that among the dogs. The first victims were two children, who died at two days' interval from each other during August. The incubation periods were thirty-eight and forty days respectively, and the duration of their illness was three and four days. The average of the incubation among the human sufferers was forty to sixty days. The two children above mentioned died nearly three months after the appearance of the disease among the dogs, and many persons had been bitten before them; yet there had been no deaths reported anterior to theirs. This gives practical support to the view that the virus had to migrate through many dogs before it acquired a concentrated power of infection, sufficient to destroy the human vitality, which is much more resistant to its action than is the vitality of dogs and other

animals, and this is a dogma now very generally accepted by bacteriologists. The post-mortem examinations of the dogs, which were published by the veterinary officer to the district, Senhor Tierno, show that in almost all cases acute gastro-enteritis, peritonitis, and general inflammation of the abdominal organs were present. The inoculations of the medulla on guinea-pigs and rabbits gave positive results. The treatment of the human victims was directed towards the symptoms. One lady bitten was treated at the Institut Pasteur and has enjoyed good health up till now.

In conclusion, I may be allowed to append the following short summary of my own conclusions drawn from the history of this epidemic: (1) Hydrophobia is never spontaneous in origin. (2) An outbreak of hydrophobia spreads with much greater severity and with a much shorter incubation period in a country where it has been freshly introduced. (3) The epizootic can be got rid of by the extermination of all animals infected and suspected. (4) Dogs may recover spontaneously from hydrophobia.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

NOTE ON A CASE OF ADENOMA OF THE BREAST WHICH AFTER NINE YEARS DEVELOPED CARCINOMA.

BY WARRINGTON HAWARD, F.R.C.S. ENG.,
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THERE still seems to be a doubt in the minds of some surgeons as to the necessity of removing adenomata of the breast so long as they are stationary and painless, although of late years there has been a growing conviction of the wisdom of doing so. It may be useful, therefore, to record briefly a case in which an adenoma was under observation for nine years, during which time it remained stationary, and then rapidly developed an unquestionable carcinomatous growth, the patient in the mean time appearing to be in perfectly good health.

In March, 1884, I was consulted by a lady on account of a tumour in the right breast, which she had noticed eight or nine months previously (1883). It had given no pain, but during the first six months had steadily increased in size; for the last two or three months it had not materially altered. The patient, who was thirty-nine years of age, was in excellent health. In the upper part of the right breast there was a firm, lobulated, painless tumour the size of a bantam's egg. It was movable under the skin, and with the adjacent part of the breast moved easily over the tissues beneath. The rest of the breast, and the neighbouring lymphatic glands, appeared quite natural. The patient was travelling, and anxious to avoid an operation, and I told her that there was no immediate necessity for the removal of the tumour. She was advised to cover the breast with a soft pad, to abstain from examining the tumour, to take iodide of potassium, and to present herself for examination if any material change occurred. The tumour at first diminished slightly and then remained unaltered till 1888. I saw the patient at intervals; she continued in excellent health, and the tumour gave no trouble, excepting that it sometimes became rather sensitive during menstruation. In 1888 it seemed to me rather smaller and firmer, as if it had undergone some little contraction, and at one spot the skin dimpled slightly when made tense over the swelling. During the next three years I saw it occasionally and observed no change. In November, 1892, however, the patient, whom I had not seen for a year, exhibited a distinct hard nodule of carcinomatous growth in the skin and that part of the tumour to which the skin had become adherent; she had noticed this change slowly taking place during about six months, but, being away from England, had consulted no one. She had gained flesh and felt well. I immediately removed the breast, and, as a careful examination revealed no glandular infection, I did not open the axilla. The patient made a good recovery. In the upper part of the breast was the firm fibro-adenoma in the deeper part of which were some small cysts. In the skin, where adherent to the tumour,