mastoid necrosis the mastoid antrum was reached through fairly firm bone at a depth of $\frac{3}{4}$ of an inch, and a collection of creamy pus tapped. Several drachms of this pus issued, its white appearance and apparent freedom from odour contrasting strongly with the contents of the more superficial

The shading indicates the extent of the extracranial abscess cavity.

abscess. In enlarging the opening into the antrum downwards, the non-thrombosed lateral sinus was opened, blood welling up suddenly and flooding the wound; the hæmorrhage was very easily stopped by plugging with gauze.

A small loose sequestrum removed from a position above and behind the antral opening disclosed a larger opening, into which a probe passed by its own weight to a vertical depth of $1\frac{1}{4}$ inch. On bending the probe and sweeping it round in a posterior direction, a cavity could be made out between the dura mater and the bone. It was not thought advisable to proceed further by enlarging the opening into the cranial cavity owing to the very septic state of the parts generally, and the condition of the patient. A rubber drainage tube was inserted just within the opening into the cranium.

COURSE SUBSEQUENT TO OPERATION.

The temperature and pulse rapidly came down to and remained at normal, the wound remained sweet, and the condition of the patient appeared for a time satisfactory. The gauze packing was removed from the lateral sinus on the fourth day without hæmorrhage. Marked pulsation was observed in the blood clot occupying the opening into the cranial cavity on removal of the drainage tube.

On November 3rd, 1895, the patient complained that she "saw double." Examination showed complete paralysis of the left external rectus muscle, the pupils were semi-dilated, equal, and reacted sluggishly to light. Intense neuro-retinitis with the usual signs of choked disk were present in both eyes, but rather more intense in the left. Vision tested in a superficial manner appeared normal. Slight left facial paresis was present. The power of grip in the left hand was almost gone, that of the right hand being strong. No paresis of the left leg or *tache cérébrale* could be made out. The patellar reflexes were obtainable with difficulty.

On November 4th, 1895, Professor Oliver kindly discussed with me the advisability of exploring the cerebellum and temporo-sphenoidal lobe. It was decided to wait, as a basal inflammation might account for all the symptoms. The general health of the patient continued to improve, and during the following six weeks the paralyses and neuro-retinitis

gradually became less marked. At this time the vision in the right eye was normal, with the left eye $\frac{1}{2}$ distant vision and Jaeger 4 near type were read. On March 25th, 1896, the wounds were entirely healed and the paralyses gone.

On November 3rd, 1897, the patient presented herself in robust health. The left eye showed deterioration of distant vision to $\frac{1}{2}$, the fundus oculi showing partial atrophy of the nerve with a few white patches in the neighbourhood of the papilla. These with a slight otorrhœa being the only adverse signs to be detected.

REMARKS.

The difference in character and complete separation of the two collections of pus is worthy of notice. The extradural abscess in all probability was continuous with one in the cerebellum, with which it communicated through an erosion in the dura mater. The abscess burrowing down in the sheath of the sterno-mastoid followed the course sometimes taken in disease of the tip and inner surface of the mastoid process as described by Bezold. Erosion into the mastoid vein would afford an explanation of the presence of the altered blood clot found in this abscess. The explanation of the paralyses on the same side of the body as the lesion is explained as an involvement of the motor fibres in the inflammatory process after their decussation. The possibility of this is a fact worth remembering in cases presenting one-sided symptoms in which cerebral abscess of the opposite side is suspected, especially should middle-ear mischief be present on both sides. The absence of diminution of vision during severe neuro-retinitis in this class of case, with greater intensity on the same side as the lesion, is in accordance with the signs noticed by other observers.

A CASE OF CHRONIC SUPPURATIVE MIDDLE EAR DISEASE WITH INTRACRANIAL COMPLICATIONS.

By ROBERT H. WOODS, M.B., F.R.C.S.I.,
Throat and Ear Surgeon to the Richmond Hospital, Dublin.

THE time is within the recollection of the youngest of us when intracranial abscess meant certain death. To-day it is not too much to say that with proper treatment the chances of recovery are distinctly in the patient's favour. This change is partly the result of the spirit of investigation which in the recent past has dominated the work of our profession and partly to the genius of one man whose achievements have been something for the rest of us to wonder at.

Professor Macewen was the first to co-ordinate and elevate the treatment of brain abscess, and to him must be ascribed the credit of having shown the laws to which the condition is subject and the evidences by which its presence, from being a matter of conjecture, becomes one of high probability. For my own part I must express my indebtedness to him for any knowledge I may possess on the subject or any success that may have attended my efforts in this direction.

I hope the following case will have sufficient interest to warrant my bringing it under notice:—

M. C., aged 28, railway guard, was admitted to the Hardwicke Hospital under the care of Dr. O'Carroll on September 21st, 1895, having been sent in by Dr. O'Connell Redmond, who suspected intracranial mischief as the cause of his malady.

Previous History.—Fifteen years previously he had scarlatina. For the past seven years his left ear has been intermittently discharging fetid pus. He suffered from chronic constipation.

History of the Attack.—The discharge from the ear stopped on September 15th (that is, seven days before admission) and he was attacked by violent throbbing headache, principally affecting the left side and occipital region. He lost appetite, became thirsty, shivered repeatedly, and was inclined to be sick but did not actually vomit.

Condition on Admission.—The patient looked dazed. His pupils, especially the right, were dilated, but reacted slowly to accommodation and to light. The eyes were prominent, the lids not touching the corneæ. The tongue was covered with fur, brown in the middle and white towards the tip and edges. He was perspiring freely and the body was covered with a sudaminous rash. He complained of great pain in the abdomen, especially in the right iliac region. A loud systolic murmur was to be heard in the mitral area and could be followed into the axilla. The upper angle of the left posterior triangle of the neck just at the base of the skull was very tender, especially on firm pressure. His stools were yellowish and fluid. He had no paralysis motor or sensory.

The case was one of some obscurity, and although the likelihood of the brain being affected was not lost sight of, the first idea was that it was a case of severe typhoid fever;

and this presumption was favoured by the evidence afforded by the character of the stools, the tenderness and gurgling in the right iliac fossa, and the absence of symptoms that could reasonably be taken as pointing to any other cause for the malady. No typhoid rash, however, could be seen. At Dr. O'Carroll's request I examined him on September 30th.

The body was almost constantly bathed in sweat. His breath had a very disagreeable odour, and the teeth were covered with sordes. He frequently lost consciousness, was unable to recognise his relatives, and became very restless, getting out of bed and tossing the clothes about. Cerebration was slow; even in his more lucid moments it was difficult to get him to answer questions coherently. When asked his address he gave a former one, and he was unable to name familiar objects, though he understood and could tell their function. Thus, when shown a bunch of keys he could not by any effort think of their name, though when asked what they were for he had no hesitation in replying that they were for opening locks and doors. Similarly, when shown a pocket knife, without being able to say what it was, he could tell that it was useful for cutting tobacco, and if in the same moment he was shown a plug of tobacco he had the same difficulty in naming it as if he had not used the term at all. Or if one persisted in the question he might call it an overcoat or a walking stick, or something equally absurd, though he was quite aware it was used for smoking or chewing. His pulse was feeble, but not frequent. He was emaciating rapidly in spite of the fact that he took fluid nourishment fairly well. He complained of thirst, a bad taste in the mouth, and of frontal and occipital headache. He was on one occasion observed to have a slight degree of opisthotonos during a rigor. Ophthalmoscopic examination showed that he had double optic neuritis. The urine (sp. gr. 1037) was acid, and there was a precipitate of urates and a trace of albumen, but no sugar.

His temperature was now taken every four hours, and the difference between the curve on the ordinary clinical chart and that of the four-hourly chart was most marked and most instructive. The ordinary chart, which for curiosity's sake was marked at the same time, showed a curve varying two or three degrees from day to day without any regularity, and so devoid of character that absolutely nothing could be learnt from its inspection, or, worse still, whatever was learnt was wrong. Some idea of its deception may be formed from the fact that on October 3rd, when the patient was at his worst, when, as shown by the four-hourly chart, his maximum and minimum temperatures for the day differed by 8.5° F., the ordinary chart told nothing more than that at a certain hour in the morning his temperature had been 98° F., and in the evening 99° F., a not very serious condition if the chart was the only guide to one's opinion. This is as good an illustration as one can have of the danger of using ordinary temperature charts where intracranial pyogenic trouble is suspected.

On examining the four-hourly chart it will be seen that on the days immediately preceding the first operation there is the most marked similarity between the sequence of events. On each day the morning temperature was subnormal by a degree or even two, in the middle of the day a rise coincident with rigor occurred, the temperature passing 104° F., followed by a fall to subnormal again as night approached.

After we had thus observed him a few days there seemed to be no doubt that whether he had typhoid fever or not he was suffering from intracranial mischief, the result of the suppurative ear disease, and from the character of the temperature chart the tenderness in the posterior triangle of the neck, and other symptoms, a diagnosis was made of sigmoid sinus thrombosis.

First Operation, October 5th, 1895.—The patient being too ill for removal to the Surgical Hospital was chloroformed in bed. A vertical incision was made immediately behind the left ear, and the bone removed from Birmingham's triangle with mallet and gouge until the mastoid antrum was exposed. From this cavity a quantity of very fetid cholesteatomatous debris and granulation tissue were removed, and exit given to a few drops of greenish pus. The antral walls were inspected, but no matter could be seen escaping. The bony opening was then enlarged backwards until the groove for the sigmoid sinus was opened up. The sinus was of a dark greenish colour, the walls softened, and the lumen plugged with a septic thrombus. The sinus was slit open and the clot scraped away with a Volkmann's spoon. The dura mater was then lifted gently away from the bone in various directions. An abscess was found on the cerebellar aspect of the petrous bone, and about two drachms of fetid pus evacuated. This was probably extradural. The cavity was syringed out with carbolic lotion, a drainage tube inserted, and the outer portion dressed with iodoform gauze.

The patient was much benefited by the operation, but not so much as we expected. The temperature was lower, the pain and perspiration less, but his mental condition remained blurred and he had the same form of amnesia and to quite the same degree as before operation. Professor Macewen points out that the symptoms of extradural abscess or sigmoid sinus thrombosis always dominate and mask those of brain abscess when they occur together, and that it is not until

the dural condition is relieved that reliable evidence of the brain abscess can be obtained. This was clearly a case in point, and it was concluded that there was yet another lesion, probably brain abscess, unrelieved. The symptoms pointed rather towards the cerebrum than the cerebellum as the seat of the trouble; but the fact that I had already found pus in the cerebellar fossa warped my judgment to the extent of making me believe the cerebellum to be the more likely place. I, however, decided to place the exploratory wound so as to have access to both cerebrum and cerebellum.

Second Operation, October 7th.—The patient being still too ill for removal, this was also performed as he lay in bed. A trephine hole was made behind and above the mastoid process, opening directly over the lateral sinus so that access could be had both above and below the tentorium. Great care was taken to prevent contamination from the mastoid wound, which was now discharging fetid pus. A hollow needle was passed into the cerebellum three times with negative result, so it was decided to try above the tentorium. The punctures in the dura mater were therefore sealed by being liberally sponged with compound tincture of benzoin to ensure against contamination from the neighbouring pus. In order to get quite clear of the lateral sinus, it was found necessary to enlarge the trephine hole slightly upwards by taking a half moon out of its upper edge; this having been done the temporo-sphenoidal lobe was tried, and at the third insertion of the needle we were rewarded by the appearance of pus. A crucial incision was made in the dura mater, and a pair of catch forceps entered along the track of the needle and withdrawn with the blades open. Exit was thus given to over 4 drachms of horribly fetid pus together with numerous brain sloughs. The cavity was washed out with weak carbolic lotion and a drainage tube inserted. Notwithstanding the fact that he had a mitral murmur, we felt bound at both operations to give him chloroform rather than ether on account of the unsuitability of the latter in such cases, and it is worth noting that he took the anæsthetic perfectly.

After-History.—The pulse-rate, which before operation was 72, rose after evacuation of the abscess to 96. The patient made steady, if somewhat slow, progress to complete recovery. He complained a few times of pain in various points of the chest; he had slight cough, but there were no physical signs. Ten days after the first operation there was no albumen in the urine; the temperature was normal, and so remained during his stay in hospital, except for three temporary rises, due on two occasions to blocking of the cerebellar drainage tube by sloughs, and on the third to a bud of granulation tissue, which grew into the lumen of the tube through a hole in its side. From the beginning of the attack until about October 15th—that is, for about a calendar month—his mind was a complete blank. He remembered nothing of the operations, nor the fact that he had consented to their performance. He slowly recovered from his amnesia by first being able to name more familiar objects and afterwards others. Though when in health one of the most placid of men, during convalescence he was emotional and excitable; more than once the idea possessed him that individual nurses had treated him unkindly, whereupon he denounced them with a degree of fervour and sincerity born only of the deepest conviction, but for which he was truly penitent when the enormity of his offence was later on brought home to him. The temporo-sphenoidal drainage tube was removed before many days, the tube to the cerebellar fossa was kept in for several weeks, and withdrawn very gradually. The wounds were quite dry, and there was no appearance of discharge from the ear. On November 14th he was allowed up. The rapidity with which he lost flesh during his illness was only exceeded by the rate at which he fattened during convalescence.

Vision.—On December 2nd his field of vision was examined by Mr. Swanzy, who found that he suffered from incomplete right homonymous hemianopsia, due probably to implication of some of the optic radiations in the temporo-sphenoidal lobe. Six weeks later this had so far improved as not to interfere with the performance of his duty as a railway man.

Epileptiform Seizures.—On December 14th, 1896, he was discharged from hospital, and a couple of weeks afterwards returned to his work, where he is still employed, though not as guard. On two occasions subsequent to

his leaving hospital he was attacked by epileptiform convulsions. On February 11th, 1896, while at work his head swam and ached; on getting home he became faint, and the head and eyes were involuntarily turned towards the right as if trying to look over the shoulder, the arms and legs got stiff, his skin greatly congested, and he lost consciousness for fifteen minutes, after which interval he recovered. The second attack happened about six weeks later, and was of a similar type. It would seem as if these two seizures were in some way dependent on the state of his bowels. On both occasions he was badly constipated, and was completely relieved by purging. Since he has paid more attention to his habits he has not for over twelve months been similarly troubled.

Mental Condition.—He is at the present time in full possession of all his faculties. The ear is perfectly dry, and he is able to discharge with efficiency his duty as keeper of a railway crossing.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

ON THE USE OF NITROUS OXIDE GAS FOR PROLONGED OPERATIONS.

IN his interesting communication to the British Medical Association, recently reported,¹ Dr. Kemp remarks that "As the result of his experiments (on animals) it is strongly suggested that nitrous oxide gas combined with oxygen would be an appropriate anæsthetic for prolonged operations. A deep and smooth anæsthesia can be maintained for a sufficient length of time to warrant a wider trial in major surgery for long and severe operations. The gas is many times safer than either chloroform or ether, and after-vomiting is practically never present if the ordinary precautions of feeding be observed."

I have anticipated this suggestion, and as the result of clinical experience have arrived at very similar conclusions. During the past two years I have frequently given both nitrous oxide gas and air, and also gas mixed with oxygen, in preference to ether for long operations, with in most cases satisfactory results. The long prevalent idea that it is dangerous or injurious to prolong nitrous oxide anæsthesia is not, I think, supported by facts. I have given pure gas, with occasional breaths of air, for periods of over ten minutes in nearly 200 cases, the longest administration in the series lasting fifty minutes, without the occurrence of any disquieting symptoms, nor have I seen anything to suggest that an undue strain is thrown upon the right side of the heart. The patients, too, recover quickly, and no bad after-effects ensue either on the same or on the following day. But the anæsthesia thus produced is far inferior to that obtainable by nitrous oxide mixed with oxygen.

Mr. Gardner² has recently called attention to the value of this mixture for some of the operations of *minor* surgery, the longest administration he records lasting fourteen minutes. There are, however, many operations in *major* surgery for which this mixture is suitable, sometimes even preferable to chloroform or ether. I have given the mixture for periods varying from fifteen to sixty-five minutes in nearly 150 cases for such operations as radical cure of hernia and hydrocele, Syme's amputation, amputation of leg, removal of polypi and exostoses from the external ear, trephining long bones, removal of lipomata, adenomata of the breast, etc. In one case, a girl aged 14, anæsthesia was maintained for fifty-five minutes while the mastoid antrum was trephined. The longest case is that of a man aged 20, in whom varicose veins of the thigh and leg were excised, the operation lasting one hour and five minutes. Except for three or four slight movements of the leg, absolutely quiet and smooth anæsthesia was obtained, and no reflex movements occurred while the skin was being sutured. The patient vomited once, but was quite ready for his tea on his return to the ward.

All persons are not equally good subjects for gas. Heavy smokers occasionally, but more especially heavy drinkers, often struggle violently under gas, but even when this is so at first, these patients often settle down after four or five minutes, and take the anæsthetic fairly well.

Gas and oxygen is, I think, a highly valuable anæsthetic in cases of extensive cellulitic inflammation occurring in broken-down alcoholic subjects, for in these patients the risks of

either chloroform or ether are often so much increased that although, as pointed out above, such persons are especially prone to struggle, it is, I venture to think, worth while to put up with this inconvenience for the sake of the greater safety of the patient's life. Children as a rule take the mixture well; the youngest patient I have notes of was aged 1½ year, in whom smooth anæsthesia was maintained for fifteen minutes while a tuberculous abscess was scraped, injected with iodoform emulsion and sewn up; the oldest a man aged 74. As far as my experience goes, patients with pyæmia, bronchitis, and even acute pneumonia take the mixture well. As regards after-effects, my experience is that the patients often vomit slightly at the close of a long operation, but this is seldom repeated, and the patient is quite himself at the end of five or ten minutes. The only disadvantage is the difficulty of invariably maintaining absolutely quiet anæsthesia during the whole period of a long operation, but this, I believe, is a difficulty due rather to want of experience than to any defect in the method itself. In conclusion, gas and oxygen may with advantage be substituted for ether in a large number of the cases in which that anæsthetic is usually given; sometimes it may be preferable even to chloroform, and, being undoubtedly the safest anæsthetic we possess, it merits a wider trial in major surgery.

HERBERT J. PATERSON,
Senior Assistant Anæsthetist, St. Bartholomew's Hospital.

TWO CASES OF POISONING WITH CARLINE THISTLE.

I THINK these cases are worth recording. They occurred at Bahria, Citta Vecchia, in the third week of November. The carline thistle (local name, Xeuikit-il-Miskta) is the *carlina gummifera* (Dec.), *atractylis gummifera* (Lin.), a plant common in Malta and in other countries on the shores of the Mediterranean. It is notable for its root, which can grow to enormous proportions, and for its purple composite flower surrounded by radical spinous leaves.

Three children ate the root of one of these plants, which they cut with a knife; two of them, a girl aged 8 years and a boy aged 9 eating it rather freely. They ate it on a Wednesday afternoon, and did not complain at all before the catastrophe came on. On Thursday evening the girl was taken ill, and the parents were soon alarmed at the stertorous breathing and at the drowsiness of the child. There was some retching, but no actual vomiting. Early in the morning the child became collapsed and died before any medical aid could be got. In the evening of Friday the boy returned home and refused to eat. He was told that the girl had died, and he confessed that they had been eating some roots the day before. He went to bed, and soon after the family were startled at his difficult breathing. The father of the girl (the children were cousins) was sent for, and he declared that his daughter had suffered in the same way. The district medical officer was hastily called, but it was too late, as the boy died a few hours after comatose and with marked signs of asphyxia.

At the *post-mortem* examination the two bodies had the same appearance. The tongue protruded slightly between the lips, the pupils were greatly dilated. The appearance consisted in a general congestion in the venous system. In the girl all the organs were highly congested, the lungs and the brains especially so. The stomach showed capillary injection in limited areas. It contained a brown liquid in which fibres of the ingested root were identified. The intestines were congested and contained abundant solid fæces. The heart in both cases was flaccid, and contained a little dark fluid blood.

In the boy the congestion was not so well marked in the organs, with the exception of the brain, of which the veins were injected to the extreme. No trace of the root could be found in the stomach, but the fibres were found abundantly in the intestines, which contained a very great quantity of solid fæces. No attempt was made to examine chemically the organs, as the poisonous principle of the plant is not known to me. I have searched all the books of botany and medical jurisprudence which I could find here, but no cases of poisoning by this plant are fully described, nor is the active principle of the plant mentioned anywhere. The only literature on the subject I am aware of is an article in the *Barth*, September, 1875, an extinct local medical paper,

¹ BRITISH MEDICAL JOURNAL, November 20th, 1897.
Lancet, June 12th, 1897.