in the case of both husband and wife was negative, and no obvious cause could be found to account for the obstetric clinical history. In March, 1926, the patient again became pregnant, and she was immediately placed upon a diet rich in vitamin E, together with calcium lactate (60 grains per diem) and a preparation of ovarian hormone. The pregnancy progressed to term in a normal manner, and a child weighing 10½ lb. was delivered by Caesarean section on December 22nd, 1927.

Case 2.—Mrs. S., aged 32, a 2-para. Her first child was premature, and weighed 6½ lb. It was reared with difficulty. The second pregnancy was complicated by hydramnios, and a child showing an extreme degree of spina bifida was born at the thirty-second week of gestation. The patient became pregnant again at the end of November, 1928. She was placed upon a similar regime, with the addition of iodine, and a healthy child weighing 8 lb. was born in September, 1929. The existence of a small elongated dimple over the lower part of the lumbar spine and sacrum showed the tendency to spina bifida which had complicated the preceding gestation.

Contagious Abortion.

I will conclude with a short reference to the question of contagious abortion in relation to the human species. In veterinary medicine infection of the uterus with Bang's bacillus is well known, and it is a frequent cause of abortion among certain infected herds. The Ministry of Agriculture has issued several leaflets upon the subject, and the importance of the infection is emphasized among all farmers and stock-raisers. Recently attention has been

drawn to the possibility of transmission of Bang's bacillus to the human pregnant female, and a few undoubted cases of this infection have occurred both in this country and in Denmark.

As a cause of abortion in the human species, however, infection of this nature is sporadic and rare. I have only met with one undoubted example, and this occurred some years ago in the wife of a farmer who had infected stock upon his land. The case was at first regarded as an ordinary infected abortion, but the continuance of pyrexia and the persistence of a grey muco-purulent discharge led to a bacteriological investigation of the uterine cavity. An unusual bacillus in pure culture was found in the discharge, and this coincided in appearance and cultural characteristics with a control tube of Bang's bacillus, supplied by Messrs. Evans and Co. of Liverpool. Following this case a bacteriological investigation was instituted in other cases of infected abortions. Altogether 50 cases were examined, but no other example of infection with Bang's bacillus was found.

The infection is undoubtedly rare, but the possibility of the disease should be remembered, especially in the case of what appear to be septic abortions in rural areas.

The figures accompanying this paper were obtained for me by Miss King, the sister in charge of my department, and by Mr. Jeafferson, my registrar, to whom I take this opportunity of acknowledging my indebtedness.

MASTOID DISEASE WITHOUT OTORRHOEA.

BY

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ACUTE suppurative middle-ear disease is sometimes classified as "mild" in which resolution occurs without perforation of the drum, or "severe" with perforation and aural discharge. With both forms there is no doubt mastoiditis in some degree—suppuration in the antrum and air cells, and associated reaction in the surrounding bone. But only a small proportion of cases go on to what is clinically recognized as "mastoid disease"; in the majority, and almost invariably in the "mild" type, resolution occurs.

Yet if we adopt this classification it is important to bear in mind that definite and even extensive mastoid disease can on occasion occur where there is not, and has never been, any aural discharge. On examining the records of some 300 mastoid operations performed personally since the beginning of 1925, I find fifteen such cases occurring in fourteen patients.¹ Such a ratio is probably much above the normal, as two recent groups of cases are included in this period. With the possible exception of No. 12, these cases, notes of which are subjoined, may be regarded as primary acute otitis—that is, neither recurrent nor chronic. In each case the occurrence of any previous ear trouble, and especially any discharge, recent or remote, has been the subject of particular inquiry.

Preceding Illness.—Influenza had preceded the ear trouble in both the adults (9, 14) and that or a "cold" in three more cases (8, 10, 13). Scarlet fever had been the precursor in one (1). But no fewer than eight of the fourteen patients had been in apparently perfect health immediately before the onset of otitis (2, 3, 4, 5, 6, 7, 11, 12). No. 12 was a congenital syphilitic, but there had been for years no evidence of the disease. Probably in Case 6 the otitis was a sequel of the incomplete adenoid operation.

Pain was present in every case at some point, but in several it was intermittent (11R, 11L, 14), or insufficient for some days to cause the patient to seek advice (2, 3, 4, 10).

Tenderness over the mastoid antrum or process is, except pain, probably the most constant sign of mastoiditis. But in five cases it was quite inconspicuous (1, 5, 8, 11R, 11L), and was absent in two (4, 14 early).

Fever was absent in one case throughout, and in both the adults at the beginning. Only four of the patients had a temperature above 100° F. when first seen.

The tympanic membrane was examined in every case by means of an illuminated magnifying speculum. It was noted as being quite normal in appearance in eight of the fifteen ears (1, 2, 3, 5, 10, 11L, 12, 13).

Post-aural Oedema.—A word in passing as to this symptom. It is in so many cases the outward and visible sign of mastoiditis, and is so invariably illustrated as such in textbooks, that there appears to be some risk lest it should be regarded as a diagnostic criterion, without which we can exclude this complication.¹ It was, in fact, the occurrence of swelling that in ten of these fifteen cases decided me to operate on the mastoid forthwith. Nevertheless, it is well to emphasize that even in acute primary otitis, disease of the mastoid, perhaps quite extensive, may occur where post-aural swelling is inconspicuous (7), or entirely absent (4, 8, 9, 11R, 11L, 14 early).

Pathology.

The ages of the patients in years were 1, 2, 3, 5, 6, 7, 8, 8, 10, 11, 13, 16, 26, 34. These ages are what one would expect in a group of primary acute otitis. A striking feature of the records (which are usually very brief) is the frequency with which mention is made of the cellular nature of the bone. This conspicuous development of the cells may be an etiological factor—that is, it was because the bone was unusually cellular that mastoid swelling appeared early and before perforation. But since this feature was specially noted in four of the five cases where no oedema had occurred, that cannot be the only explanation.

In four cases a perisinus abscess was discovered at operation (4, 7, 8, 14), and in two of these the sinus contained old clot breaking down (4, 8). It is to be noted that in both these cases the drum had appeared normal when first examined, mastoid oedema was absent, and tenderness absent in one and quite slight in the other.

The pus was examined in eight cases, in two of which no growth of organisms was obtained. During 1929 special attention was directed to the possibility of a *Streptococcus mucosus* infection. Both then and before the report was uniformly "streptococcus," that particular type not being found. Furthermore, the clinical course was not that

characteristic of a *Streptococcus mucosus* infection. A curious feature is the tendency of the cases here recorded to occur in little groups, thus:

1925. June 23rd, 24th.
1928. March 2nd, 18th, 19th, 28th.
1929. March 1st, 2nd,
May 18th, 23rd, 23rd, 25th.

"Signifies that there had been no preceding illness.

This may be mere coincidence, but it does at least suggest that at certain periods or during certain epidemics there may have been a specially (perhaps attenuated) "mastoidotropic" virus in circulation.

We have, then, a group of cases in which

- (1) There is often no preceding illness;
- (2) There neither is on examination nor has ever been any otorrhoea;
- (3) Pain may be slight or have ceased;
- (4) There may be little or no tenderness;
- (5) Fever may be mild or absent;
- (6) No oedema may be discoverable;
- (7) The tympanic membrane may appear quite normal;

and yet all the time there is serious mischief in the mastoid requiring operation.

For example, Case 4. When I first saw this little "pink and white" girl she seemed well in herself; constipation might account for the overnight feverishness and some "fractiousness." The pain was not more than a tight lump of wax could produce. On removing the wax the drum looked quite normal (and even next day the pinkness was not more than what often follows removal of cerumen). There was not the least trace of oedema, or tenderness on pressing or percussing the mastoid or pulling the ear. Within twenty-four hours she had a rigor.

In Case 8 the clinical picture was at first that of simple otitis media. Myringotomy was followed by a free discharge, and relieved pain and tenderness. The temperature did not fall as "cleanly" as one expected, but by the fifth day it was down to 99°. The boy looked and said he felt perfectly well; even later, when the temperature went up, he was sleeping soundly, and his appetite in an adult would have been called voracious. There was no pain in the ear, and only the slightest returning tenderness. Yet the clot in the lateral sinus was beginning to break up.

In Case 14 there had been no pain, tenderness, or oedema. The right ear was not even deaf, though it had been. The drum was grey and retracted; there was nothing to suggest fever or any sign of toxæmia. But it seems hardly credible that the extensive destruction of bone, found three days later to have exposed the sinus in a pool of pus, had not already made considerable progress.

The treatment in all the cases was a Schwartz mastoid operation. Eradication of cells was as complete as possible, and in most cases the whole mastoid process was removed. The lateral sinus was exposed in all cases, a point that I believe to be of great importance. Except in the three older patients and where specially mentioned, adenoids were removed at the time of the mastoid operation. The eventual result has been uniformly good, and all the patients have normal hearing.

BRIEF NOTES OF CASES.

Case 1.

A. C., aged 7, had had a tonsil and adenoid operation in 1924. On June 23rd, 1925, he complained of pain in the right ear, localized at the tragus, for one day, following scarlet fever. There was definite mastoid oedema and slight tenderness; the tympanic membrane was normal; temperature 99.4°. A Schwartz mastoid operation was performed, revealing pus throughout the mastoid process. Convalescence was normal.

Case 2.

R. A., aged 16, came on June 24th, 1925, complaining of pain behind the right ear for one week, and a tender swelling for one day. There had been no preceding illness; never aural discharge or previous ear trouble; the tympanic membrane appeared normal. Temperature 101.2°. A Schwartz mastoid operation showed great destruction of bone in a mastoid of cellular type; very little pus. Complete recovery.

Case 3.

E. F., aged 3, came on February 14th, 1926, complaining of a tender swelling behind the right ear for one day. There had been earache for one week, but no discharge or previous trouble

with the ears; no recent illness. The tympanic membrane was normal; no fever. A Schwartz mastoid operation showed that the antrum contained pus. Convalescence was normal.

Case 4.

J. W., aged 8. Seen on December 17th, 1927, complaining of pain in the right ear for three weeks; there had been no discharge; no preceding illness. Tonsil and adenoid operation in 1924. She was feverish the previous night; temperature when seen was 99°. She had facial impetigo, and was very constipated. No post-aural tenderness, pain, or oedema. The tympanic membrane, after removing a plug of wax, was quite normal.

At 6 a.m. on December 18th she had a rigor (104°, see chart). That morning she again complained of pain in the right ear, not severe; there was still no trace of mastoid tenderness or oedema, but the tympanic membrane was pink, not bulging.

Immediate operation. Myringotomy produced a single bead of pus, much blood. A Schwartz mastoid operation was performed; the bone was normal, but the antrum contained pus; the lateral sinus and its groove appeared healthy.

Next day her midday temperature was 98°, and she seemed well. On December 20th (third day) she had a slight rigor, with

return of fever, but seemed well; no pain. The day after that the fever had disappeared, and she seemed very comfortable that day and the two following (21st to 23rd), though the temperature rose on the evening of the 22nd. A skiagraphic examination was made of the chest, and reported "early military tubercle of right lung." The mother then said that she had been getting "shiverings" for three weeks. At 10 p.m. on December 23rd a third rigor occurred. I tied off the jugular vein, and exposed the sinus. The part that had been exposed before seemed quite normal, but the bulb lay in an old stinking abscess, and was full of clot breaking down.

Four days after this operation the temperature came down, and although the neck wound suppurated later, and there was subsequently a perichondritis of the opposite ear, convalescence was otherwise uneventful. I was led to seek suppuration in the bulb by the similarity of this case to one I had had previously²; in that, although there was bilateral otorrhoea, the complete absence of mastoid tenderness and oedema, and almost complete absence of pain, caused a delay of several days before the thrombosed jugular bulb was exposed.

Case 5.

P. T., aged 11, on March 2nd, 1928, complained of pain in the left ear and swelling behind it for four days; no preceding illness; never any ear discharge. The tympanic membrane appeared normal. Temperature 100°. Immediate Schwartz mastoid operation. A periosteal abscess was found; the bone was engorged, but did not contain macroscopic pus. No adenoids were present. Convalescence was normal.

Case 6.

W. A., aged 5, had had a tonsil and adenoid operation (elsewhere) a month previously. On March 19th, 1928, he came complaining of pain in the left ear for five days. Before that he had been quite well; the attack started with vomiting for one day, and there had been epistaxis and vertigo two days before he came up. Never any aural discharge. A tender swelling was present rather below than behind the left ear; there was no deafness, but the membrana flaccida was bulging. Temperature 102°. A Schwartz mastoid operation showed extensive damage to the bone in an exceptionally cellular process; the lateral sinus was healthy. A strip of adenoids was removed from the left lateral recess of the pharynx. Convalescence was normal.

Case 7.

W. W., aged 10, on March 18th, 1928, complained of pain and a swelling behind the right ear; it had been present for two days. Patient had had no aural discharge, but a little earache three weeks previously, quite inconspicuous. On examination there was found a slight post-aural oedema, tender; oedema of postero-superior meatal wall hid the tympanic membrane, but there was no discharge. Temperature 99.8°. Immediate Schwartz mastoid operation. Very cellular process, with considerable destruction of bone. The lateral sinus came unusually far forward, and lay in a large abscess; it was red but not thrombosed. Convalescence was normal.

Case 8.

P. C., aged 13, came on March 28th, 1928, complaining of pain in the left ear for four days following a cold, and deafness. Had never had any previous ear trouble. There was slight tenderness of the mastoid process, but no trace of swelling. The tympanic

membrane was pink and bulging. Temperature 102°. Myringotomy produced blood only. Next day the ear was discharging pus freely, but there was still some tenderness.

By the seventh day he was feeling quite well, and free from pain, though the ear was still discharging, and the temperature was not quite down to 98° (see chart). That evening his temperature rose, and was 104° at noon on April 5th. At this point

it remained for three days. The boy was sleeping and eating well; there was no vomiting, no rigor; the only pain was a slight frontal headache; there was no trace of mastoid oedema, but on firm pressure the process was just tender.

A Schwartz mastoid operation showed a cellular bone much engorged, but free from pus except in one or two cells deep below the antrum, and a little purulent fluid in the apical cells. On opening the sinus groove a large offensive abscess was exposed, with the sinus lying in it thrombosed, perforated, and the thrombus beginning to break up. The jugular vein was not tied. Convalescence was normal.

Case 9.

S. B., aged 34, on March 1st, 1929, came complaining of pain in the left ear for one week following influenza. There was no trace of mastoid oedema, but definite tenderness; the tympanic membrane was bulging and a dusky pink. Temperature 98.4°. Myringotomy produced blood only, no pus. During the following days the aural discharge was purulent; definite mastoid tenderness persisted, but without any swelling; there was slight fever. Pain and fever tending to increase, a Schwartz mastoid operation was performed; the bone was very cellular; the cells contained a serous fluid and two small beads of pus only. Complete recovery.

Case 10.

G. R., aged 2, came on March 2nd, 1929, complaining of a swelling above the right ear for one day, but behind that ear for four days. Influenza fourteen days before, but never any aural discharge. Temperature 99.2°. The swelling was tender, but the tympanic membrane appeared absolutely normal. Immediate Schwartz operation revealed a large subperiosteal abscess, chiefly above the ear, and a mastoid process full of thick granulations, all bony trabeculae having disappeared; the lateral sinus was normal; large adenoids were present. Convalescence was uneventful.

Case 11.

J. R., aged 8, came on May 18th, 1929, complaining of intermittent earache on alternate sides during the last week; now absent. Never any aural discharge. The pain came on of itself, when he was quite well. Temperature 100°. Small flat tonsils; large adenoids; nose normal. The left tympanic membrane appeared quite normal, the right was depressed.

The complaint of earache on one side or the other persisted, but no further evidence appeared; there was no trace of mastoid swelling, but slight and variable tenderness over the mastoid antrum; this had possibly been present before he came, as he was sent to me as a case of mastoid disease. On May 22nd I removed tonsils and adenoids, and opened both maxillary antra, which were full of thick muco-pus, later reported streptococcal.

The temperature had never quite settled (see chart), and on the fifth day after operation (May 27th) went to 101.2° in the evening. For the next five days it swung up to this point every evening, and was down every morning. The boy seemed very well; the hearing was normal; there was the same variable, transient,

and quite slight earache and tenderness over the mastoids. On May 31st he was slightly deaf, and complained of bubbling in the ears. There was no oedema, but slight tenderness on the right mastoid; the membrana flaccida of that side appeared red, but the whole drum was retracted. Earache was present only on the left side, where the drum and mastoid seemed normal. I diagnosed a very quiescent mastoiditis, but thought it well to try a paracentesis. On the right side this produced blood, which on culture grew streptococci; on the left there was definite pus, from which

Staphylococcus albus grew. The next day the temperature tended to be lower, and for three days there was no pain. By June 5th, however, the earache had recurred, though it was not severe; there was profuse aural discharge; the evening temperature was 103.2°, and both mastoid processes were slightly tender on firm pressure.

The Schwartz mastoid operation was therefore performed on both sides, with identical findings—a bone cellular, congested, infiltrated with muco-pus; the sinus normal. Convalescence was marked by a bout of fever and thirst—possibly iodoform poisoning—but was otherwise normal; the nose and both ears are now quite dry, and hearing normal. The mastoid infections were streptococcal on both sides. I have no doubt that there was definite mastoid disease at least as early as the day of the paracentesis.

Case 12.

M. B., aged 6, a congenital syphilitic, had had occasional earache, but never discharge; tonsil and adenoid operation in 1927. On May 23rd, 1929, she came complaining of pain in the left ear for four days without preceding illness, and a recent tender post-aural swelling. The tympanic membrane was normal; temperature 99°.

An immediate Schwartz operation showed the mastoid bone congested, but without actual pus. Large adenoids were removed. Two days later she was crying with earache, and a paracentesis was done. A third attack of pain occurred on the tenth day, with a rise of temperature to 103.4°, but this cleared up the next day. On that day haematuria was observed. It is curious that the same sequential haematuria had occurred after the tonsil operation, and in both cases it was suggested that scarlet fever had been "missed." Convalescence was uneventful.

Case 13.

S. N., aged 1, came, on May 25th, 1929, complaining of two days' pain in the left ear, following a cold, and recent post-aural swelling. The swelling was tender and red, but there had never been any aural discharge, and the drum appeared normal. Temperature 102°. An immediate Schwartz mastoid operation showed the whole mastoid and adjacent bone to be congested, dripping blood, but no pus was found. Large adenoids were removed. Convalescence was normal.

Case 14.

C. F., aged 26, came, on May 23rd, 1929, complaining of tinnitus in both ears for two weeks following influenza, without pain. Never any aural discharge or previous ear trouble. At first both ears had been deaf, later only the left. The right tympanic membrane was grey, the left pink, and both indrawn. On inflation air entered both ears with a distinct labial sound, relieving deafness and tinnitus. Three days later he returned with a tender swelling extending from the level of the right mastoid antrum for four inches down the neck, and earache. The drum was neither swollen nor red, but yellow pus could be seen through it. Temperature 101.2°.

A Schwartz mastoid operation showed a typical von Bezold abscess beneath the sterno-mastoid muscle, communicating with the mastoid through a hole in the anterior part of the process; through the latter pus pulsed out. The cortex was somewhat thick, but proved to be a mere shell enclosing a large cavity in which lay the lateral sinus, apparently healthy. Convalescence was normal. The absence of all pain on the first visit caused me to make a diagnosis of catarrhal otitis. I do not believe it possible that in examining the ear either tenderness or oedema was overlooked, but the operation showed that extensive disease of the mastoid must have been already present.

REFERENCES.

¹ Cf. Prognosis in Mastoid Disease, E. Watson-Williams, *Practitioner*, January, 1929. ² Acute Otitis Media with Jugular Bulb Thrombosis, *British Medical Journal*, 1923, i, p. 1014.

TWO CASES OF PARAFFINOMA.*

BY

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THIS communication consists of a report of two cases of tumour formation resulting from injection of paraffin or paraffin oil. In both instances the tumours consisted of hyperplasia of connective tissue of dense cicatrizing character, the bulk being further added to by the contained paraffin.

Clinical observation and experimental work with monkeys have demonstrated that mineral oils, when injected into the tissues, may cause foreign body reaction with formation of tumour masses. It is apparent that some individuals are susceptible, and the reaction may be severe, with very extensive mass formation. In other individuals there is no tissue reaction. In some instances the injected paraffin oil has been observed to spread along the lymph channels and

* A paper read in the Section of Surgery at the Annual Meeting of the British Medical Association, Manchester, 1929.