and to heat until the fumes of the nitrogen oxids arise faintly, in this way furnishing the mixture of nitric and nitrous acids. The acid is then poured into another clean, dry test tube and, after superimposing the urine on the slightly yellow nitric acid, the usual play of colors is looked for.

An error in interpretation, not of the presence of bile, but of the presence of albumin, in the urine is remotely possible after this manipulation. In practically every test made in this way a distinct white ring can be seen between the urine and the acid in nonalbuminous urines after the lapse of less than a minute, often at once. This ring, which is practically always just below or associated with the normal brown ring, is sometimes so dense and sharp that under some conditions, remembering the usual Heller's test for albumin, a faulty conclusion respecting the albumin content of a urine may be made. Heating the acid alone to boiling will never give the same result, and the white ring in question is probably precipitated resin dissolved from the wood by the nitric acid. This resin can not be removed by ordinary means. Benzin will not remove it completely, or will give a cloud at the juncture of the urine and the acid after its removal from the benzin. Alcohol is impracticable, for it mixes with the acid. Consequently, the ring will be present after making nitrous acid in this way and it becomes necessary to heed the warning.

The same care in diagnosis in this test, relative to the presence of albumin, must be taken as in the interpretation of the presence of albumin in urines containing resins, from copaiba, etc., when making the Heller's test for albumin. In the latter instance the white ring is usually high, that is, above the junction line of the nitric acid and the urine, for it comes from the urine. The position of the ring in the test for bile by yellow nitric acid made as described above is low, the resin being precipitated from the acid, and this location of the ring is of importance in putting one on one's guard.

When one remembers how hastily some clinical tests of urine are made, this precaution, I believe, is of practical importance. One always hesitates to announce such a simple error as this, but in none of the usual text-books on clinical diagnosis has any mention of it been found. Other methods of producing the nitrous and nitric acid mixture may be used, as, for instance, by heating nitric acid with starch, by adding a nitrite to the acid, or by exposing the acid for a long time to the air, but none of these is so easy of application or so rapid of execution as the one by the use of the wood of matches.

CASE OF ACUTE MASTOIDITIS WITH SOME UNUSUAL FEATURES.*

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The interesting and uncommon features present in this case I believe warrant its recital.

Patient.—Mrs. S., 65 years of age; a widow; domestic by occupation; was admitted to the hospital Nov. 30, 1907.

History.—Patient's family history is negative. Three years ago she suffered from an attack of pneumonia, followed by an acute purulent otitis media in the right ear, from which she eventually completely recovered. Nov. 3, 1907, she was confined to bed with an attack of influenza, and almost immediately an acute otitis media made itself apparent in the left

ear. The tympanic membrane ruptured of its own accord, and soon a purulent discharge was noticed. At first there was little pain, but gradually the pain became more severe in character and extended over the region of the mastoid process. This condition was allowed to go on for two weeks, when the pain, temperature and deafness made the patient so miserable that she finally sought relief, and was at once admitted to the hospital.

Examination.—Patient appeared well nourished and rather corpulent. She seemed to be a very sick woman. The lungs showed a mild degree of emphysema. The heart was hypertrophic and the second sound was very much accentuated. The urine showed granular casts and the presence of albumin. The specific gravity was 1.018. Abdomen, extremities and reflexes were normal. The cranial nerves were perfect. The eyes responded to light and accommodation. There was no nystagmus. The fundus of both eyes showed nothing abnormal.

Ears: The tympanic membrane of the right ear was slightly retracted. The hearing function was normal for ordinary purposes. In the left ear only loud conversation was heard close to the ear. Whisper could not be heard at all. Weber was lateralized toward the left ear. Rinne was negative. Bone conduction was good. High-note tuning forks were appreciated somewhat better than the lower notes. There was a mild degree of edema over the mastoid process. The whole region was extremely sensitive to pressure, especially at the tip and posterior border. The canal was very much narrowed by the sagging of the upper wall. There was some secretion in the canal. The perforation in the tympanic membrane could not be seen. The drum was reddened and bulging and its anatomic landmarks were no longer recognizable. The patient complained bitterly of pain both in the ear and back of the ear, and of some headache. The temperature on admission was 101 F. There was no history of a chill, sweating, nausea, vomiting or vertigo.

Examination of the secretion showed pneumococci. Examination of the blood showed 18,000 leucocytes and 80 per cent. of these were polymuclears. Operation was advised at once and accepted.

Operation.—Division of the soft parts showed nothing unusual. On chiseling the mastoid, immediate entrance was made into a cavity filled with pus, broken down cells and granulation tissue. Although the opening was made close to the suprameatal region, I came down directly on the lateral sinus, which in this patient unfortunately was lying far forward, within three-eighths of an inch from the posterior wall of the external meatus. By working slowly and carefully I was able to preserve the posterior wall and enter the antrum. The whole mastoid process was cleaned out and the tip resected. As the sinus appeared healthy and distinct pulsation was noticed, it was not interfered with. The wound was packed, a dressing and bandage applied, and the patient was put to bed. For the next forty-eight hours the result of the operation appeared to be entirely satisfactory.

On the evening of the third day after the operation the patient passed a restless night and complained of headache and pain over the left side of the head. The temperature rose to 102.2 F. and the pulse rate was 70. Physical examination proved negative. An examination of the fundus in both eyes showed a slight blurring of the discs. The patient was given calomel. For the next forty-eight hours she appeared to be improving, her temperature not going above 100 degrees. Suddenly, on the morning of the sixth day, the patient began to complain of severe headache, the temperature gradually rose to 105 F. and the pulse dropped to 60. There was neither chill nor vomiting. A blood count showed 15,000 leucocytes, with 76 per cent. of polymuclears. Physical examination proved negative. The fundus in both eyes showed a marked choked disc. The mentality of the patient was good, and there was not the slightest sign of delirium. She complained bitterly of her headache. A serous meningitis was at once suspected, the reasons for this suspicion being the intense headache without other cranial symptoms, the choked discs, the rather slow pulse, with a temperature of 105 F. It was

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decided to make a lumbar puncture, and also to remove the dressings and seek for the cause of the meningitis.

The lumbar puncture at once substantiated the diagnosis of serous meningitis. The fluid was drawn under high pressure, was perfectly clear, and proved negative on microscopic examination. No lymphocytes; coagulability was good, and there was an absence of all formed elements or bacteria.

The question now arose as to what was producing the serous meningitis. Examination of the wound revealed the sinus covered with a layer of lymph, but soft and pulsating. In the region of the antrum there was a large pocket of pus, in regard to the origin of which there was some doubt. This pocket was cleaned and a fistula sought for in the roof of the antrum, but none could be detected. With the exception of an otitis pyemia pure and simple, due to an absorption of toxic matter, as the cause for a high temperature, an extradural abscess or a probable lateral sinus thrombosis of the parietal type, had to be borne in mind. As there was no positive evidence of the latter two suspicions, the wound was packed lightly to afford good drainage from the region of the antrum. It was decided to wait twenty-four hours and watch the effect of the lumbar puncture and the thorough cleansing of the wound. On the following day the temperature dropped to 99 F. and the patient appeared to be very comfortable. For the following three days the temperature remained below 101 F. and the pulse between 68 and 78. The slight pressure symptoms, such as the headache, which appeared to recur toward evening, were relieved by lumbar puncture. Thirty c.c. were withdrawn each time and proved negative to microscopic examination.

On the evening of the third day the patient began to feel very uncomfortable. Her headache again became excruciating. It was located over the occipital region on the left side, and the entire frontal region on both sides. The temperature rose to 105 F. and the pulse dropped to 60. The fundus examination showed discs measuring nearly $1\frac{1}{2}$ mm. in depth. There was neither chill nor vomiting. A blood count showed 22,000 leucocytes and 84 per cent. of polynuclears. Blood culture proved negative. The extreme pain over the occiput, the high temperature with the slow pulse, the absence of all cranial symptoms, with the exception of the headache and choked discs, together with the previous history and observations, led me to conclude that serious complications were present. The pain and pyemic temperature might be explained as being due to a sinus thrombosis, while the marked pressure symptoms pointed to a brain abscess.

The patient was again anesthetized, and the roof of the antrum and tympanic cavity were made more accessible. As I removed the roof of the antrum I at once came on an extradural abscess. The greater part of the roof was removed until I was able to evacuate this abscess thoroughly. The dura was explored, but no fistula was apparent. The sinus was the next point for observation. The walls were found to be discolored and of a greenish hue, and easily remained indented after pressure made by the finger. There was, therefore, no doubt about the presence of a thrombus within the sinus. I first exposed the sinus toward the torcular for about $1\frac{3}{4}$ inches until the wall appeared normal. It was then slit open, and a broken-down thrombus removed, and free bleeding obtained. Before attacking the central end I proceeded to tie the jugular. At first the jugular could not be found, but finally it was found entirely collapsed, and about the size of a very small quill. It was tied off and resected for about an inch, and the upper portion brought out at the upper edge of the wound. This was done for the purpose of further observation.

I now went back to the mastoid wound, and found it necessary to lay bare the entire sinus and the bulb. The whole anterior wall was resected, and the thrombus was cleaned out, inclusive of that within the bulb. No free bleeding was obtained. Although the thrombus in the bulb looked healthy, I was unwilling to leave such a mass in a location where infection is not rare and also treacherous. If the remainder of the thrombus should break down, it could easily be dealt with, as explained above. The patient had now been under the anes-

thetic for one and three-quarter hours, and was beginning to show signs of exhaustion, and it was not deemed wise to proceed any further. No attempt was made to explore the brain, as no involvement was suspected. Sufficient had been found to account for all the symptoms. The patient was put to bed, treated for the slight shock which had resulted from the operation, and awoke on the following morning with a temperature of 102 F. and a pulse of 88. Her subjective symptoms had been very much improved, and her physical condition was excellent. There was a slight rise to 102.3 F. in the evening, and on the following day the temperature dropped to 100 F., with a pulse varying from 80 to 100. The patient now appeared to be cheerful and feeling the good effects of our operative efforts. During the following ten days she was constantly improving, when suddenly she developed a temperature of 103 F. with slight headache. She also began to cough and to complain of pain in the left side of her chest and in the region of the left kidney. Respiration 24, pulse rate 115. The sputum was of a rusty tinge.

Examination of the mastoid wound and of the wound in the neck showed both progressing favorably. A blood count showed 18,000 leucocytes, with 81 per cent. of polynuclears. Widal was negative. Examination of the chest showed consolidation over the lower lobes on the left side. The twenty-four-hour quantity of urine was diminished to 600 c.c. Microscopic examination showed pus cells, red blood cells, granular, hyaline and epithelial casts. An examination of the fundus of both eyes was extremely interesting. Both discs were markedly swollen. In addition, there was an exudation near the macula region of both eyes, and on the outer side of the right papilla there was an exudation with a small flame-like hemorrhage—a picture very familiar to us in albuminuric retinitis. This attack proved to be a migratory pneumonia with an acute exacerbation of an old chronic nephritis. As the temperature still ranged between 103 and 100 F. after ten days, and there was still some consolidation present in the lower lobe on the left side, with increasing cough and dyspnea, it was thought best to pass a needle into this area for the purpose of determining whether there might not be present an empyema or abscess of the lung. There was a possibility that this pneumonic process might be a metastatic condition resulting from the original infection. The exploration proved negative.

After three days the temperature began to drop of its own accord, and from this time on the patient showed improvement from day to day. The wound closed after three months from the date of her admission into the hospital, and at the present time she is perfectly well and able to resume her duties as a domestic.

Especial attention is called to the fact of the presence of a serous meningitis with its characteristic symptoms of high temperature with a slow pulse, choked disc and severe headache. The high temperature was probably due to the sinus thrombosis, but its association with a slow pulse and choked disc led me to suspect a serous meningitis, which was verified by the lumbar puncture. The sinus thrombosis was probably present at the very first rise of temperature, and although suspected could not be verified. Either it was located at the bulb or, what is more probable, it was of the parietal type and, therefore, could not be diagnosed from general appearances or puncture of the sinus. The reason for not attacking the sinus and bulb at this stage of the condition was, that there was a probability that the pocket of pus in the antrum or an extradural abscess in this location might have been the cause for the serous meningitis.

Another interesting feature in this case is the occurrence of a distinct neuro-retinitis of the albuminuric type, making itself evident in the latter part of the illness. This was at once recognized by its exudative character at the fundus. It was especially prominent in the neighborhood of the macula.