

**Staff Meeting Bulletin**  
**Hospitals of the » » »**  
**University of Minnesota**



**Otogenic Meningitis**

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Published for the General Staff Meeting each week  
during the school year, October to May, inclusive.

Financed by the Citizens Aid Society

William A. O'Brien, M.D.

I. LAST WEEKDate: October 6, 1939Place: Recreation Room  
Powell HallTime: 12:15 to 1:00Program: Movie: "Donald's Golf Game"

## Clinical Pathological Conference

Carroll Bellis  
Lawrence Berman  
William W. Moir  
Thomas J. Kenyon

## Discussion

H. S. Diehl  
Leo G. Rigler  
Charles Rea  
Owen Wangensteen  
James McCartney  
Lawrence Berman  
C. J. Watson  
James McCartneyPresent: 131Gertrude Gunn  
Record Librarian  
- - - -II. MOVIETitle: "Great Heart"Released by: M-G-M.  
- - -III. ANNOUNCEMENTS1. HAROLD F. BUCHSTEIN, M.D.Announces the opening of offices for the  
Practice of Neurological Surgery1837 Medical Arts Bldg., Minneapolis, Minn.  
- - -2. WELCOME ALUMNI

Although this week is the official Homecoming for the alumni, the Medical School program has been curtailed because of the close proximity to the celebration of the Fiftieth Anniversary of the

founding of the Medical School. Alumni clinics and luncheons will not be offered in the Medical School this week. All medics are invited to attend the Homecoming Tea and Dance to be held in the Recreation Room of Powell Hall after the game Saturday. The program has been arranged by the nurses, medical techs, and dental hygienists, for the medics, dents, nurses, techs, and hygienists. Dancing will continue throughout the evening.

3. PROGRAM

Center for Continuation Study

Nursing Education, Oct. 16-21.

Cardiology, Nov. 6-11.

Urology, Nov. 6-11.

Neurologic Roentgenology, Nov. 13-15.

Medical, Hospital, and Institutional

Library Methods, Nov. 27-29.

Note: With the completion of this program for the fall quarter, the first three years of operation of the Center will end with a record of 48 medical and hospital courses. Of those, 38 have been medical and 10 hospital. Of the ten hospital courses, eight have been given this year.  
- - - -4. WEDDINGS

- (1) Margaret Keeler (T.S.O.) and Graham Harroll - August 5.
- (2) Ruth Brodrick and John Skogland - August 16.
- (3) Mona O'Neill and Walter Nickel - September 30.
- (4) Emeline Swenson (Sta. 30) and Erling Hauge.

5. BABIES

- (1) Baby girl - Dr. and Mrs. Burtrum C. Schiele - June 28.

Congratulations!

#### IV. OTOGENIC MENINGITIS

Jerome A. Hilger  
Eric H. Loenholdt  
R. E. Priest  
Emmet N. Milhaupt

Otogenic meningitis is not a disease of concern only to the otolaryngologist. Within the past five years, cases have been admitted to the hospital on other services as well as on otolaryngology-- among these being neurology, medicine and pediatrics. Therefore, since it is a disease liable to confront medical people other than those specializing in otology, it would seem germane to discuss it before the mixed group.

##### Introduction

Until the advances of chemotherapy in recent years, the mortality rate in otogenic meningitis was overwhelming. When bacteria were found in the spinal fluid the outcome was unhappily, but almost invariably, fatal. Workers were indefatigable in their attempts to lessen the mortality but of the many methods of treatment advocated none offered consistent help. During the first thirty-four years of the present century, Gray was only able to find in the literature records of twenty-seven recoveries from otogenic streptococcal meningitis. Since the introduction of prontosil into clinical medicine by Domagk in 1935, Cawthorne collected records of 194 recoveries. It is probable that there are many more unreported recoveries, since the inclination to publicize results varies inversely as the frequency of their occurrence. Indeed, in one report alone, that of E. Applebaum in 1939, there were seventy-seven recoveries from otogenic streptococcal meningitis and three recoveries from otogenic pneumococcal meningitis.

Thus it would seem that the use of chemotherapy has come to constitute the most important single measure in the treatment of otogenic meningitis. It is also probable that alone it could not accomplish the spectacular results that have come through its judicious combination with

surgical and supportive measures.

##### Incidence

When considering meningitis as a cause of death, it is noted that of 15,000 autopsies at a general hospital there were records of 337 cases of septic meningitis, of which 175 were secondary to ear disease<sup>1</sup>. At an Ear, Nose and Throat Hospital, analysis of total deaths over an eight year period showed that of 363, 124 had meningitis, and of these 124 cases ninety were caused by aural diseases<sup>2</sup>. Thus it is noted that bacterial meningitis is the most frequent cause of death in diseases of the ear, nose and throat and that the ear is the commonest source.

Of 2,674 cases of bacterial meningitis of all types reported by Neal, Jackson and Applebaum<sup>3</sup>, 67 per cent occurred under the age of ten years. For purely otogenic meningitis, this age incidence remains about the same. In the early years of life, otogenic meningitis is most liable to follow an acute aural infection, while in later life it is more frequently seen to complicate a long standing middle ear suppuration.

The incidence of otogenic meningitis varies with the virulence of epidemic and sporadic infections. Fraser and Halliday<sup>4</sup> record 43 cases of meningitis in 2,731 cases of acute suppurative otitis media, an incidence of 1.8 per cent while in 8,905 cases of suppurative ear disease<sup>5</sup>, both acute and chronic, meningitis was noted in 64 cases, an incidence of 0.7 per cent. In this hospital, the relation between meningitis cases and surgical mastoid cases is disproportionate since the more grave complications tend to gravitate here. However, over a period of the last 5 years 452 cases of surgical mastoiditis have been seen while in the same period we have treated 25 cases of otogenic meningitis. This would indicate an incidence of 5.86 per cent of meningitis in cases of advanced aural suppuration.

## Etiology and Pathology

An understanding of the sequence of events which takes place in the spread of infection from the ear to the meninges forms the essential background for treatment of the disease.

Bacteriology -- The bacteriology of otogenic meningitis parallels that of otitis media. Neumann<sup>6</sup> analyzed 101 cases and found 45 due to streptococcus, 72 due to pneumococcus type III, 16 due to pneumococci of other types, and 4 to staphylococci. His division did not differentiate between streptococcal groups. Certainly the most frequent offender in otogenic meningitis is the  $\beta$  hemolytic streptococcus, as would be expected since it is, in the vast majority of cases, the causative agent in acute otitis media. In several of our cases of meningitis the organism has been found to be the non-hemolytic streptococcus. The pneumococcus type III is notorious amongst otitic invaders for the frequency with which it invades the intracranial spaces and the blood stream. Routine culture in all cases of acute otitis media is a laudible procedure if for no other reason than to identify these cases and place the finger of suspicion on them early in the disease.

Neumann<sup>6</sup> reports that he has never seen a case of otogenic meningitis with more than one organism demonstrable in the spinal fluid that did not subsequently prove to have a brain abscess also present. This is borne out in our case history number 4.

Methods of Extension -- Extension of infection from the middle ear and mastoid to the subarachnoid space may take place in one of three ways, namely: (1) by retrograde thrombophlebitis in the communicating venous channels; (2) by extension through preformed channels -- the Fallopian canal, the carotid canal, persistent suture lines, ununited fracture lines, etc.; and (3) by actual destruction of the bony plates intervening between the site of infection and the meninges.

That the lymphatic system is not a factor in the extension of these infections is due to the lack of continuity of lymphatics between extracranial and intracranial structures.<sup>7</sup>

### Extension by retrograde thrombophlebitis --

Friesner, in his pathological specimens, has shown thrombosis and sepsis of the veins in the submucosa of the middle ear early in infection, even while the overlying epithelium is intact. This thrombosis is primarily protective, but unfortunately it sometimes has an opposite result and actually conducts the invading microorganism to the subarachnoid space. The hemolytic streptococcus has a predilection for attacking venous structure. The resulting retrograde thrombophlebitic process reaches the subarachnoid space; the thrombi suppurate and rupture into the pia arachnoid; meningitis results.

As has been noted in Friesner's specimens, this process may be coincident with the early stages of the middle ear suppuration and may take place from the acutely involved mucosa anywhere in the middle ear or mastoid space.

To this may be added that it may also extend from similarly involved mucosa in the pneumatized petrous portion of the temporal bone. The latter has the same continuity with the middle ear and is liable to the same degree of acute inflammatory reaction coincident with middle ear infection, as is found in the cells of the mastoid process proper.

This, then, is the means of extension in those cases in which the otitis media has been present a matter of days rather than weeks or months. Occasionally, too, this avenue may be used in those long-standing chronic suppurations without bony plate erosion which become suddenly activated by an acute process coincident with swimming or an acute upper respiratory infection. An example of the latter instance is case history number 3.

### Extension through preformed channels

Preformed channels in the temporal bone leading to the intracranial space are numerous. Among them are canals for the carotid artery, the lateral sinus, and the seventh to the eleventh cranial nerves inclusive. In addition the labyrinth spaces themselves may be regarded embryologically as a backwater of the subarachnoid space. They are separated from the extracranial space of the middle ear by membranes covering the round and oval window. The labyrinth fluids are in immediate connection with the subarachnoid space and cerebrospinal fluid by means of the endolymphatic duct, venous drainage, and the internal auditory meatus. Extension of infection may be by any of these preformed pathways<sup>8</sup>.

The bony vault of the middle ear space is traversed in the embryo by the suture line between the petrous and squamous components of the temporal bone. Immediately overlying this suture line are the meninges of the middle fossa. In the process of normal development, firm bony union obliterates this suture line -- normally in the second year. Anomalous lack of bony union, however, has been repeatedly observed<sup>9</sup>. When it occurs, it leaves between suppuration in the middle ear space and the meninges only a fibrous junction traversed by several small veins--an inviting avenue of extension.

Fractures of the base of the skull frequently involve the petrous and labyrinthine portions of the temporal bone. The fracture may be transverse or longitudinal to the latero-medial axis of the petrous, or, in severe fracture, may be fragmented in both directions. If transverse or combined fracture occurs, the bony capsule of the labyrinth is usually involved. This is endochondral bone and repairs only by fibrous union. Thus the wall abutting the middle ear space offers easy access of infection to the labyrinth and meninges for the remainder of that individual's life. Similar to this type of case are those instances of meningitis, truly otogenic, in which fracture occurs in the presence of an existing otitis media, and those

instances in which injudicious meddling in the middle ear following fracture carries infection to the meninges. Not infrequently otogenic meningitis results from direct extension of the organisms from the middle ear through the membranous windows to the labyrinth and thence to the meninges. An occasional case is due to luxation of the stapes from the oval window during myringotomy<sup>8</sup>.

The fulminant meningitis in newborns and infants is usually consequent on non-union of the suture line. Numerous instances of this type have been observed at this hospital in the five years reviewed. A typical instance is presented as case history number 1.

### Extension by destruction of intervening bone --

Destruction of the bony plates of the middle ear and mastoid with direct extension of infection to the meninges is a process requiring weeks and sometimes years of suppuration. It has been observed by Ballance<sup>7</sup> that the mucoperiosteum of the peripheral mastoid cells is also the internal periosteum of the bony plates delimiting the middle and posterior cranial fossae. When the nutritive vascular connections between periosteum and bone undergo septic thrombosis, bony necrosis results and suppuration is brought into immediate contact with the dura. The resulting external pachymeningitis is oftentimes but a step in the progress to the subarachnoid space. Such a train of events takes place, not in days, but in weeks, and, as has been noted, may occur after years of chronic suppurative otitis media. The latter may over a period of years, in effect, create a new preformed channel and hence leave the patient at the mercy of the next acute exacerbation.

To paraphrase Cawthorne<sup>10</sup>, "acute suppurative otitis media may cause meningitis within hours by spread through certain preformed spaces, within days by spread through veins, and within weeks by direct destruction of intervening bone."

## Cerebrospinal fluid --

The cerebrospinal fluid reflects the progress of invasion as it occurs.

The earliest stages of irritation correspond to a period of serous inflammation. It results in outpouring of cerebrospinal fluid and the concomitant symptoms of increased intracranial pressure.

In the next or cellular stage, irritative symptoms become more pronounced and the cell content of the spinal fluid increases from the normal 0-5 lymphocytes per cubic millimeter to as high as ten or fifteen thousand cells, mostly polymorphonuclears. As the cells increase, the protein content also rises and the chlorides usually decrease. The sugar content is usually not materially reduced unless bacteria are present. This is not infallible, however, since in several of our cases the sugar has been extremely low, yet no bacteria were demonstrable on smear or culture. Quite frequently the patient is first seen in this, the cellular stage. If progress has not been made to the bacterial stage, the prognosis may be much more optimistic.

In the bacterial stage the organism may be demonstrable on smear or on culture, or by both methods. Not until a case has progressed to this point can it be referred to as true bacterial meningitis. With this restriction in mind, extradural inflammatory reactions are properly excluded and many of the reported cures of meningitis must be stricken from the list. The occasional case presents organisms on smear but they cannot be subsequently cultured. It is to be assumed in these instances that the viability of the organism has been attenuated by the protective factors in the spinal fluid. This evidence of vigorous resistance on the part of the host is ample reason for a more favorable prognosis than would otherwise be permissible. When the spinal fluid contains organisms of both Gram positive and Gram negative character it is not safe to assume that the meningococcus is present. More frequently the Gram negative staining bacteria are degenerative phenomena.

The indication for treatment points to the aural source when one exists, and not to the epidemic cause.

## Symptoms

The disease may be divided into three clinical stages: (1) The stage of onset; (2) the stage of the established disease; and finally, (3) the stage of paralysis. In fulminating cases they may follow each other with such disastrous rapidity as to be indistinguishable. In the less vigorous forms the three phases are separable and it is noted that each is preceded in its development by parallel changes in the character of the cerebrospinal fluid.

## Stage of onset --

Headache is the most constant and helpful symptom. It may be a boring pain over the affected ear or the homolateral eye. In some posterior fossa irritations it is principally occipital. It is characteristically more severe at night. As the disease progresses it becomes generalized.

Photophobia, sometimes of moderate degree, often confined to the homolateral eye is frequent.

Vomiting without preceding nausea occurs, particularly in children.

With the first invasion of the meninges there is usually a chill and a sharp rise in temperature. The temperature remains high and does not remit as in septicemia.

There may at first be no cervical rigidity, but pain on flexion of the neck is usually always present.

During the irritative phase, the reflexes are usually increased.

There is a mental anxiety and restlessness accompanying early meningitic involvement that is peculiarly constant and characteristic. It is in sharp

contrast to the feeling of general well-being which is often present in a case of otitic sepsis between periods of rigor.

Objectively a leukocytosis of more than 18,000 cells may be present -- too high for an uncomplicated mastoiditis.

#### Stage of the established disease --

This is the obvious stage of the disease. The preceding symptoms are marked.

Headache is unbearable and generalized.

Cervical rigidity is pronounced, and in children may result in a position of opisthotonos.

Mental anxiety gives way to noisy delirium. Examination rouses resistance and is difficult.

#### Stage of paralysis --

The patient lapses into profound coma; respirations are loud and snoring; temperature rises to intolerable heights; incontinence occurs, and in adults may be regarded as terminal; reflexes disappear; pulse is rapid and wavering; and the patient expires as a result of the combined effects of severe intracranial pressure and toxic damage to vital centers.

#### Diagnosis

Diagnosis is only possible by examination of the spinal fluid. The true bacterial nature of the meningitis must be established by smear or culture<sup>12</sup>. The fluid should be examined and cultured immediately after withdrawal to insure accurate results.

#### Prophylaxis

Many cases of otogenic meningitis need not occur. Some cases develop needlessly because warnings have been ignored.

#### Neglected infections --

Neglected middle ear and mastoid suppurations are, by the authority of most writers, less frequently seen than formerly. However, these cases still appear all too frequently. A middle ear that has discharged pus for more than three weeks should be given competent investigation. So also should any acute otitis media which presents untoward symptoms not characteristic of the usual course of the disease. A chronic suppurative middle ear that does not respond to the usual conservative care and gives evidence of persistent purulent involvement of the bony or membranous environs of the middle ear and mastoid space deserves surgical care. All chronic running ears should be supervised until they no longer discharge pus.

#### Faulty surgery --

Neumann<sup>13</sup> feels that premature surgical intervention in acute mastoid infection is more liable to result in dissemination of the infection to the meninges than is the case if surgery is delayed until the second or third week. As a matter of fact logical surgical indication rarely appears in acute mastoid infection before the third week. An exception to this generalization must be made for those cases referred to by Kopetzky<sup>14</sup> as hemorrhagic mastoiditis. In this severe form of the disease, early hemorrhagic inflammatory reaction replaces the usual suppurative process, and early removal of the membranous linings of the mastoid cells prevents the virulent retrograde thrombophlebitis of the small venules which conducts the infection to the intracranial spaces.

What has been referred to in the past as a simple mastoidectomy should more properly be referred to as a complete mastoidectomy. The inference of thoroughness implies exenteration of all available cell structure in the mastoid. Neglect in this regard may leave a

smoldering focus of infected cells which may extend inward to the meninges. The vital importance of thoroughness in surgical mastoid procedure has been given proper emphasis by Boies.<sup>15</sup> He found, in a study of three hundred consecutive cases of acute surgical mastoiditis occurring over a five year period and with a normal age distribution, that inflammation actually reached the dural covering of the lateral sinus or the middle fossa or along the surface of the petrous pyramid in thirty-five per cent of cases. With the advances in the anatomy and pathology of the temporal bone which have been made in the last 30 years, the victim of incomplete surgery is becoming a rarity. Even more rare are the cases of accidental surgical trauma to the dura in the course of mastoidectomy.

### Treatment

Treatment in otogenic meningitis varies with the pathology in the middle ear and mastoid in each case.

It considers two factors: removal of the focus when one may be truly said to exist, and counteracting of the infection already present in the spinal fluid.

### Surgical considerations --

In regard to the removal of focus competent opinions are at variance. Dwyer<sup>16</sup> has stated, "If our clinical findings point to the ear as the focus, the sooner we operate the better." In the same vein Ersner<sup>17</sup> holds, "The most modern therapeusis is to attack the primary focus, and secondarily to institute an antimeningitic regime." However, it is difficult to believe that immediate surgery will benefit those cases in which extension to the meninges has been through natural preformed channels or through venous connections from the middle ear space. The usual complete mastoid operation does not interrupt these connections. Adequate surgical drainage may be frequently obtained by myringotomy alone. That such cases are not benefited by mastoidectomy; that the primary focus

in these instances is not a "feeding" source to the meninges is demonstrated in case history number 5. Here the otitis media from which the meninges were originally infected resolved itself while the meningitis was still raging.

Hence in cases of otogenic meningitis which have developed within hours or days of the original ear infection, reliance in treatment is placed on a supportive regime.

When the original infection has been present two or three weeks or more bony involvement in the mastoid process is possible, confirmation by x-ray should be sought. Abscess formation within the mastoid, infection of the bony plates contiguous to the dura, and advanced hemorrhagic inflammatory reaction with extensive thrombophlebitis of the small vessels urgently demand surgery-- here there is something to eradicate and beneficial results may be anticipated. Surgical procedure includes complete mastoidectomy with investigation of cellular leads into the petrous, plus removal of the bony plates of the middle and posterior cranial fossa beyond the limits of diseased dura. In cases of chronic suppurative otitis media this is modified to include radical mastoidectomy and investigation of the epitympanic space and tegmen tympani.

### Supportive measures --

Those phases of treatment common to all grave illness--rest, adequate fluid intake, nursing care, and so forth, need no repetition.

Supportive measures particularly applicable to otogenic meningitis include chemotherapy, blood transfusions and spinal drainage.

Chemotherapy in the form of sulfanilamide, sulfapyridine and related compounds has brought hope and even optimism to a disease where previously none existed. Its effect on the course of the disease has been graphically presented in the earlier statistics. It has replaced to a great extent the less effective serum

therapy in otogenous infections.

We have in several cases of pneumococcus type III meningitis combined chemotherapy and serum therapy. Our efforts with this organism have been uniformly unsuccessful. Scattered reports of cure, however, are beginning to appear in the literature. No uniformity in treatment has been established--some cures were by drug alone, others in combination with serum.

Frequent small blood transfusions are used routinely. They counteract the hemolytic effect of the invading organism and of the chemotherapeutic drug. In addition Kopetzky<sup>18</sup> feels this to be the best means of combating chemical changes that the infection has caused in the cerebrospinal fluid.

Spinal drainage by lumbar puncture is performed daily or more often until intrathecal pressure returns to normal. Its principal function is the preservation of pressure below the paralytic limits.

#### Case Reports

Of the 25 cases of true bacterial otogenic meningitis seen at this hospital in the 5 years preceding July, 1939, seven were terminal on admission and died within twelve to twenty-four hours. Of the remaining eighteen, nine were treated before the advent of sulfanilamide and allied compounds and one recovered. In the nine treated since the advent of these drugs four recovered. It is interesting to note that in six of the twenty-five cases, the importance of the existing otitis media as a causative factor in the meningitis was not recognized on admission.

#### Conclusions

Since the introduction of sulfanilamide and allied compounds, otogenic meningitis is approached with new optimism.

Surgery still performs an important role in otogenic meningitis when its use

is governed by consideration of the pathogenesis of each case.

#### CASE HISTORIES

1. An infant with an unrecognized otitis media causing meningitis.

White male, 1 month old. Had not done well since birth, was a feeding problem, and continued to have green stools. Was irritable for 4 days and had convulsions for 2 days before admission to hospital.

Examination revealed a small dehydrated infant. Veins very prominent over scalp, and anterior fontanelle bulging. Both tympanic membranes were dull and appeared thickened.

#### Laboratory Examination

Spinal fluids showed a cell count of 270 with 66 polymorphonuclears and 34 lymphocytes on smear gram + diplococci were found. On typing they were type V pneumococci.

#### Treatment

Consisted of spinal puncture and anti-pneumococcal serum V intravenously and intraspinally. Oxygen was given. The child continued to have convulsions and died the next day. Autopsy was performed and showed purulent exudate over the left hemisphere of brain, especially profuse over left parietal region. The middle ears were opened and the left middle ear was found to contain thick yellow pus.

#### Final Diagnosis

Pneumococcal type V meningitis  
Acute left otitis media.

2. White female, 20 years old, who 3 years previously had an acute upper respiratory infection followed by an acute nephritis which later turned into a chronic glomerular nephritis.

Two weeks before admission she developed left earache and 1 week later it started to drain spontaneously. About the same time she developed double vision, marked hearing loss on left and vertigo. Generalized headache 1 day.

Examination showed a very ill patient, constantly retching, and marked stiffness of neck. Total VI N. paralysis on left. Left ear showed a high perforation with mucopus.

#### Laboratory findings

Urine 3+ alb. many erythrocytes, leucocytes and casts. Blood. Hemoglobin 41%, erythrocytes 1,960,000, leucocytes 24,100, 86 neutrophils, 11 lymphocytes, 3 monocytes. Non-protein nitrogen 128. Urea nitrogen 38, creatinine 6.4. Sed. rate 130 mm. 1 hr. Spinal fluid 4500 cells. 83 neutrophils. 17 lymphocytes. Culture of spinal fluid and blood. Sterile. Spinal fluid smears showed Gram + cocci.

#### X-ray

Diffuse cloudiness of entire left mastoid, and petrous apices showed increased density which extends into petrous tip on left side.

#### Diagnosis

Acute mastoiditis, left. Petrositis, left.  
Otitis meningitis. Gram + cocci.  
Chronic glomerulonephritis.

#### Treatment

Transfusions. Repeated spinal puncture. Left complete mastoidectomy and radical mastoidectomy with extensive exposure of middle fossa dura 2 days later. Sulfanilamide in large doses bringing her level up to 19.1 at one time.

#### Result

Temperature down to normal on 5th postoperative day. There was complete return of function of VI N. paralysis. Ear healed and became dry. She still has her chronic glomerulonephritis.

3. White male, age 7 years, who was admitted to the hospital Oct. 15, 1937. He had scarlet fever 1 year before and since then has had almost continuous discharge from both ears, with a very marked hearing loss. During exacerbations he would complain of pain over right ear and dizziness. Three days before admission he had pain over right side of head and the day before he vomited and had pain over right eye and back of eye.

#### Examination

Showed purulent bilateral otitis media, both tympan membranes destroyed, no mastoid tenderness. 1st degree nystagmus to left. Stiff neck and positive Kernig's.

#### Laboratory Findings

Urine negative. Blood hemoglobin 70%, leucocytes 19,700, 89 neutrophils, 11 lymphocytes; spinal fluid 865 cells with 89 neutrophils and 11 lymphocytes. Spinal fluid culture showed nonhemolytic streptococci, and blood culture also positive for nonhemolytic streptococci.

#### X-ray Findings

Showed a bilateral sclerotic mastoiditis with acute involvement and bone destruction on right side.

#### Diagnosis

Bilateral chronic mastoiditis with acute exacerbation on right.  
Petrositis on right.  
Otitic meningitis.  
Nonhemolytic streptococcus.  
Septicemia.

#### Treatment

Right complete mastoidectomy, spinal drainage, transfusions and prontosil. At operation no direct extension to dura was found but there was a definite lead into the petrous apex.

#### Course

Temperature down to normal on 2nd

postoperative day. Spinal fluid sterile in 10 days. Continued to drain mucus from right ear but symptom free and was discharged Nov. 14, 1937.

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4. White male, age 21 years, who was admitted to hospital March 12, 1939. Had a chronic discharge from right ear for past 5 years. Was seen in dispensary in 1935 but failed to keep future appointments. Five days before admission had severe headache and pain in right ear. Chill 2 days before admission and nausea and vomiting and became irrational on day of admission.

#### Examination

Patient very irrational and violent with stiff neck and positive Kernig. Right ear filled with thin purulent discharge and a large polyp in exterior auditory canal. There was definite evidence of right facial weakness.

#### Laboratory Findings

Urine 2+ albumin. Hemoglobin 99%. Leucocytes 13,000, 89 neutrophils, 11 lymphocytes. Spinal fluid 5,300 with 93 neutrophils, 7 lymphocytes. Pressure 340 mm. Spinal fluid culture showed hemolytic streptococci. Queckenstedt negative.

X-ray showed a bilateral sclerotic mastoiditis with cholesteatoma cavity on right.

#### Diagnosis

Chronic purulent otitis media right.  
Chronic mastoiditis with cholesteatoma right.  
Otitic meningitis, hemolytic streptococcus.  
Subdural abscess.  
Brain abscess, right temporal lobe.

#### Treatment

On day of admission a right mastoidectomy was performed--a large cholesteatoma was found filling the right antrum and this contained pus under pressure. The tegmen of antrum cavity was necrotic. The dura was exposed and a large subdural abscess was found. Dura was slit and much pus exuded. Large doses of sulfanilamide

subcutaneously and repeated spinal taps.

#### Course

Patient continued to be irrational and very toxic and died on third postoperative day. No permission for autopsy was granted but on probing the operative wound a large brain abscess was found extending inward from the subdural abscess. This was about 3 cm. in diameter and well drained out.

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5. White male, aged 4 years, who was admitted to the hospital 3-8-39; 12 days before admission his right ear drained for 2 days. One week before admission became tired and irritable and intermittent headache. Day before admission he developed pain in his legs and a stiff neck. Vomited on day of admission.

#### Examination

Showed him very dehydrated and comatose. Temperature 104, pulse 120, respiration 20. Tympan membranes were dull and slightly injected with posterior perforations. No drainage. Tonsils inflamed. Bilateral cervical adenopathy. Reflexes hyperactive, Kernig positive and bilateral positive Brudzinski; neck showed marked rigidity.

#### Laboratory Findings

Urine negative. Hemoglobin 59%. Erythrocytes 3,300,000, leucocytes 58,900. 97 neutrophils. 7 lymphocytes. Spinal fluid culture showed beta hemolytic streptococci. Sugar 15 mg.

#### X-ray

Mastoids. Mild exudative mastoiditis without bony destruction.

#### Diagnosis

Bilateral otitis media. Bilateral exudative mastoiditis, mild. Hemolytic streptococcus meningitis.

#### Treatment

Sulfanilamide, spinal drainage, blood transfusions and fluids. Meningitic symptoms cleared within a week,

but spinal fluid cell count persisted at 100 cells per cu. mm. In spite of previous conviction against surgery, it was feared an epidural inflammation might be present. On Mar. 22, 1939, right mastoidectomy was done and a fairly normal mastoid was found with just a few granulations about mastoid antrum.

### Result

Temperature came down to normal about the 18th day after admission and child made a good recovery. Neurologically and mentally entirely normal.

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## V. GOSSIP

The Fiftieth Anniversary celebration of the Medical School had many highlights. The guest speakers included two Nobel Prize winners, the Surgeon General of the United States Public Health Service, and the Director of Rockefeller Institute for Medical Research. The medical schools of Harvard, Yale, Columbia, Johns Hopkins, Pennsylvania, Rochester, Toronto, Chicago, and Minnesota were represented on the program. Regular local readers of the New York Times were dumbfounded to find greater mention of the proceedings in the New York paper than in their local newspapers. The New York paper was officially represented by its own reporter with editorial instructions to cover all details. Some of the sessions left the audiences with the idea that they had been "listening in" on a private conversation between the speakers and a selected few in the audience. In the case of one speaker, it was thought that his remarks were exclusively for himself. The round table luncheons were filled to capacity on both days (280). Over three hundred attended the banquet on Friday evening. Attendance cards were obtained on a sufficient number to indicate that the attendance at all the meetings was well over a thousand. The Thursday night session was preserved for posterity with a complete transcript of the remarks of Dean Diehl, President Ford, Governor Stassen, and enough of Professor Carlson's so that forever afterward a pure example of Minnesota's own speech will be on hand. Friday afternoon from 1:00 to 1:45, the University of Minnesota's radio station WLB broadcast the first 45 minutes of the program from the previous evening. And speaking of transcriptions, ediphone recordings were made when speakers failed to provide manuscripts. Two of the round tables were also transcribed and stenographic notes obtained on the balance. This subject material will be of two types -- one relating to the theme of the chemistry program and the other to the history of the Medical School. If there is sufficient interest they will be published as separate volumes. As usual the University convocation address by a medical man drew the

crowd of the year. Surgeon General Parran was very much at home with his subject and found high favor with his audience. Nobel Prize winner, Charles H. Best, packed the heaviest sex appeal. Presiding officer, Clarence M. Jackson of the Thursday afternoon session, brought his program to a timely close in anticipation of the guest dinner which followed. He hurried down without putting on his "soup and fish" to find that he was the first one there. The Honorable Harold E. Stassen scored with his extemporaneous remarks. His speeches must be "out of the moment" through the necessity of giving so many addresses on such a variety of occasions. The content was widely applauded. President Ford rose to new heights in spite of the liberties he took with the durable Dane, A. J. Carlson, in referring to him as a Swede. Dean Lyon would have enjoyed his first memorial lecture. It was filled with ideas which were similar to his own, and I am certain that the inspiration which the speaker received on this occasion must have come from distant shores. At some future date those who were not present on Thursday evening will be privileged to hear the program. The recording device from the psychiatric unit was used for the Bronk-Gasser luncheon. In some of the luncheons, the only places left for late-comers were at the head table. Some of the boys professed to have a thrill at being asked to a place above salt. Many wondered why some of the speakers appeared to be so much at home. Harvard's physiologist, Cannon, was raised in St. Anthony Park, which gives St. Paul two physiologists, as Yale's physiologist, Fulton, is also from St. Paul. If the truth were known, many of the other scientific stars would be found to be small town boys from the Middle West. Moving the meetings from Music to Northrop confused some of the audience, but the prize went to the man who sat in for some time in Eustis on Friday morning. The banquet broke all records in length (and interest). Dr. Diehl's resume' of changes since the famous Robertson-Beard report, Dr. Hagen's oratorical flights on behalf of the alumni, Dr. Wilson's pinch-hitting for Dr.

Balfour - recounting research projects of early days, Dr. Earl's dedicatory contribution, and Dr. Scammon's flight through revolutionary days to the present, comprised the unusual program. It is probable that few interested audiences ever sat for such a long time. On Saturday morning the clinics were moved from Eustis to Medical Science because of the size of the crowd. This part of the program was carried off with unusual dispatch. Starting at nine, as scheduled, they were finished at twelve, as scheduled. Each speaker presented a very carefully prepared contribution for the occasion which was strictly in line with the theme of the program. Closing the Medical School during these days provided the students with an opportunity to attend all sessions and to rub shoulders with the scientifically elite. A limited number of alumni from a distance were present. Santa Monica's Leo J. Madsen was an interested observer. He is known as the man who presided at the birth of Shirley Temple and is now her family physician. The establishment of the Minnesota Medical Foundation was another highlight of the meeting. This new organization is empowered to receive gifts of any sort for the Medical School. It has already had forty from interested alumni (\$100 apiece), one for \$5,000 from another donor, and one of the alumni, feeling extra grateful and wanting to help, sent a check for \$1,000. Many who have felt that they did not care to give to a state institution because of changing politics and policies may now give to this trust fund which the University and the alumni and others will jointly control. Before the meetings were over, many wondered what chemistry really included. It includes practically everything, as it has to do with the relations and affinities of atoms. The alumni luncheon on Saturday was well attended and very interesting. The nurses are busy at their Thirtieth Anniversary this week with a continuation course in Nursing Education at the Center for Continuation Study, capping on Tuesday, Richard Olding Beard lectureship address by Isabel Stewart on Wednesday; dinner, Alumnae of University of Minnesota School of Nursing, Woman's Club, Thursday; exhibits in the University of

Minnesota Library and Powell Hall, Wednesday and Thursday; and Homecoming tea and dance on Saturday afternoon after the game (with the medics, dents, medical technologists, and dental hygienists). There are 50 representatives of nursing schools at the Center for Continuation Study. This is an unusual attendance as there are only 168 nursing schools in our regular interest area which includes the 39 schools in Minnesota. The following faculty members from other centers are teaching this week: Agnes Gelinas, Skidmore College, Saratoga Springs, New York; Isabel M. Stewart, Teachers College, Columbia University; Sister M. Berenice Beck, Marquette University; Sister M. Domitilla, Rochester, Minnesota; and Helen Nahm, University of Missouri. The Medical School is represented by Doctors Carlstrom, Miller, Blount, Skinner, Arnow, Kabat, Wright, Jensen, and O'Brien. Mr. Amberg of the Hospital, Drs. McConnell and Darley from Education, and Mr. Calvin of the Minnesota Hospital Service Association are also on the "male" faculty. Representatives of the nursing staff include Muriel L. Thomas, Bertha Pritchett, Agnes Fleming, Ione Corliss, Jennie O. Schey, Christie Tostenson Hawkins, Celia H. Hauge, Ida McDonald, Irene Beland, Barbara Griffin, Ruth Harrington, Thelma Dodds, Myrtle Kitchell, Katharine J. Densford, Julia Miller, Marie Druckery, Gertrude Carsrud, Frances Hoffert, Ingeborg Nelson, Lillian Hagen, Marguerite Donker, Florence E. Leech, Grotta Lassen, Ruth Gillespie, Elsie Mullen and Lucile Petry. Adelaide Jury, dietetics, and Lucille Daniels, physical therapy round out the list. Groups of students from the University, General, and Miller Hospitals are taking part in the demonstrations, as many are being used in practical class demonstration. The University of Minnesota was the first University in this country to include Nursing in its curriculum. Since then, many universities and colleges have followed suit and nursing education continues to play a more important role in the education of the nurse. And not to be outdone, the Dentists are now in the middle of their Golden Jubilee Celebration. - -

What ho!