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

Acute Surgical Mastoiditis

Volume XII | Friday, October 18, 1940 | Number 3

STAFF MEETING BULLETIN
HOSPITALS OF THE . . .
UNIVERSITY OF MINNESOTA

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William A. O'Brien, M.D.

I. LAST WEEK

Date: October 11, 1940

Place: Recreation Room
Powell Hall

Time: 12:15 to 1:10 p.m.

Program: Movie: "The Riveter"

Bone Marrow Biopsy
Robert Hebbel

Discussion
E. T. Bell
E. M. Schleicher
C. J. Watson
Lawrence Berman
Wesley Spink

Present: 162

Gertrude Gunn
Record Librarian

II. MOVIE

Title:
"Alaskan Views"

III. ANNOUNCEMENTS

1. MARRIAGE

Donald Arnold, teaching assistant in psychiatry and Capitola Oney, R.N., both of Station 60.
Congratulations!

2. DR. IRVINE McQUARRIE

will give an address entitled, "The effect of war upon civilian health in China," on Wednesday, October 23, at one o'clock in the auditorium of the Hennepin County Medical Society. Members of the University Hospital Staff are cordially invited to attend.

3. ALUMNI MEET

The Minnesota Medical Alumni Association, in keeping with its annual custom, will sponsor a clinical program of lectures and demonstrations on Friday, October 25, 1940, the day preceding the University Homecoming celebration. Beginning at 9:00 a.m. the following program will be presented in the Eustis Amphitheatre of the University Hospitals:

Dr. H. E. Michelson:
Dermatologic Clinic

Dr. T. J. Kinsella:
Bronchiogenic Carcinoma

Dr. A. L. Dippel:
Studies on Pelvic Morphology

Dr. L. G. Rigler:
Radiologic Clinic

Dr. George Fahr:
Newer Knowledge of the Action of Digitalis

Dr. S. F. Herrmann: (Tacoma, Wash.)
Meckel's Diverticulitis

Dr. E. T. Bell:
Clinical Pathological Conference

Dr. Swan Ericson (LeSeuer, Minn.):
The Doctor in a Democracy

Drs. Kinsella, Rigler, Herrmann and Ericson are members of the Class of 1920 which is holding its Twenty-Year celebration on the same day.

The annual meeting of the Association will be held immediately following the clinical program, under the chairmanship of Dr. Harold G. Benjamin, president. A luncheon in the new Coffman Memorial Union will conclude the program.

All interested physicians, as well as all Alumni of the University of Minnesota Medical School, are invited to attend the clinical program.

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IV. ACUTE SURGICAL MASTOIDITIS: A REVIEW OF 257 CASES

R. E. Priest
E. N. Milhaupt
G. M. Tangen

Introduction

The purpose of this study is to analyze the cases of acute surgical mastoiditis treated during the past four years at the University of Minnesota Hospitals with reference to several factors including especially: postoperative hearing ability, and the effect of sulfanilamide and related compounds on therapy.

A report by Dr. L. R. Boies in 1936[2] covered the 240 cases immediately preceding this group. The present study includes 257 cases. We realize that this is a small series of cases. The percentile figures, therefore, might not hold with strict accuracy if compared to a larger group of cases. We believe that they do indicate trends. Hence they are included.

Incidence

The incidence of acute surgical mastoiditis at this hospital for a ten year period is seen in Table I.

Table I

Year	Number
1929	48
1930	53
1931	27
1932	35
1933	49
1934	48
1935	85
1936	100
1937	70
1938	64
1939	69

The table shows a fairly constant annual number of cases until 1935-36 when a measles epidemic caused a sharp increase. The incidence decreased in 1937 and remained fairly steady thereafter.

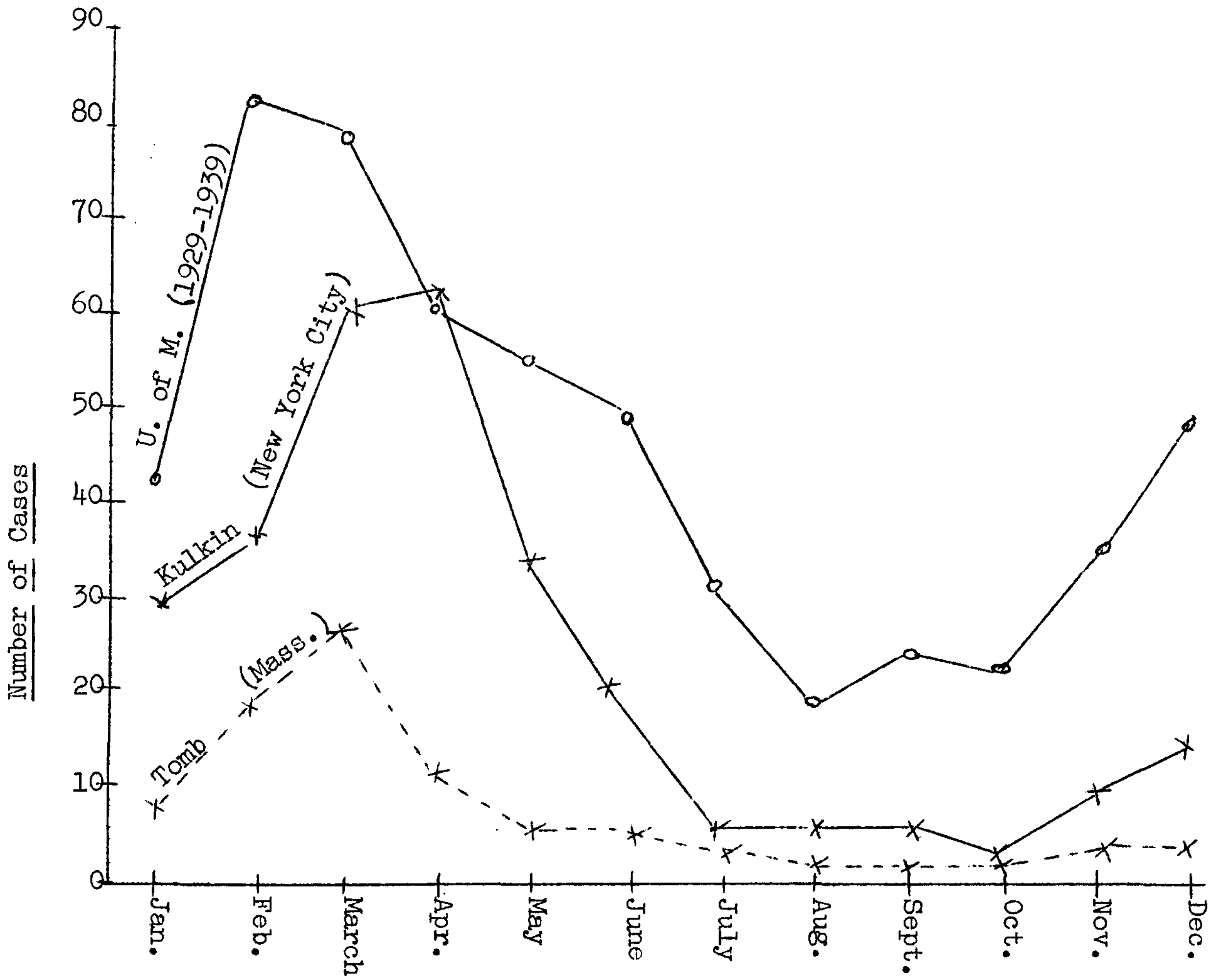
Dr. Wesley Spink believes that sulfanilamide began to be widely used about the middle of 1937 at the University of Minnesota Hospitals.[15] No appreciable effect by this drug on the incidence of acute surgical mastoiditis at this hospital is now apparent. We do not know how widely the drug was used outside the larger centers in 1938 and 1939. Most of our cases come from small communities. The future may show a decrease in the number of cases due to more widespread use of sulfonamide compounds in cases of acute otitis media.

The seasonal incidence of acute surgical mastoiditis follows a rather definite pattern. The accompanying graph (Figure I) shows the ten year incidence curve (1929-1939) at the University of Minnesota Hospitals together with curves from other localities.[8,16] The remarkable similarity in the shapes of the graphs is apparent. The number of cases is low during August, September and October. It rises during November, December and January to reach its peak during February, March and April. Through the early summer it gradually declines to the August low point.

This general pattern of seasonal incidence agrees with the experience of other authors whose graphs are not shown on the chart.[9] A noteworthy exception is the chart given by Rawlins and Reich[13] of San Francisco. Their seasonal incidence graph has not only the usual single cold weather peak, but also a second equally high rise in July. The influence of the climatic factor on mastoiditis has been discussed by Fabricant.[6] Work to show that the characteristics of organisms may vary with their climatic environments has recently been reported by Lynch.[12]

Figure I

Seasonal Incidence of Mastoiditis



The age incidence appears in Table II:

Table II

Less than 1 year	8
1-3	33
4-5	26
6-10	63
11-20	60
21-30	27
31-40	15
41-50	14
51-60	8
61-70	2
Over 70	2

The greatest number of cases occur before twenty years of age. This agrees with other reports.[13,16,2,5]

Type of Operation

Operations for acute surgical mastoiditis are done to relieve the immediate toxic symptoms, to eliminate the danger of intra-cranial and vascular extension, and to permit the ear to heal completely with as nearly normal hearing as possible. These purposes are best accomplished by complete removal of cells down to the inner cortex of the temporal bone. When mastoidectomies are completely done, dural exposure is common. In this series the incidence of dural exposure was as shown in Table III.

Table III

Surgical Exposure		
Middle cranial fossa	94	36.5%
Sigmoid portion of lateral sinus	69	26.8%
By Necrosis of Bone		
Middle cranial fossa	14	5.4%
Sigmoid portion of lateral sinus	67	26.0%
Total middle cranial fossa exposure	108	41.9%
Total lateral sinus exposure	136	52.8%

The figures just given agree closely with those published elsewhere.[2,16] They are important because they prove, in conjunction with low mortality figures in the present series, that dural exposure can occur safely despite the contiguous mastoid infection.

One justification for doing complete mastoid operations, rather than simple drainage is found in the records of patients having recurrent mastoiditis. In our series there were seventeen cases (6.6%) in which previous simple mastoidectomy had been performed. The first operation has been incompletely done in every instance. Three had been operated at the University Hospitals and fourteen elsewhere. Obviously, every patient incompletely operated does not necessarily have recurrence of mastoiditis. It is significant, however, that no recurrences were encountered in patients operated completely. There were post-auricular abscesses accompanying otitis media in some such cases. These recovered after simple incision and drainage. In no case requiring a second mastoidectomy did we fail to find large cell groups which should have been removed at the first operation.

Mortality

There were seven deaths in 257 patients (2.7%) operated upon for acute mastoiditis. All deaths were caused by meningitis or sepsis or both. The term "sepsis" as used here connotes a well defined clinical picture of septicemia, though in all cases micro-organisms were not grown in blood cultures. Some patients might have had positive blood cultures but died before repeated cultures could be made. Of the entire group who had meningitis or sepsis 16.6% died. It is of interest to compare the mortality in the present series with published reports shown in Table IV.

Table IV

Rawlins & Reich[13] (403 cases)	4.8%
Coates, Ersner & Persky[5] (644 cases)	4.5%
Boyd[3]	4.2%
Boies (1936)[2] (240 cases)	4.0%
Kafka[7] (1385 collected cases)	5.8%
Tomb[16] (100 private cases)	1.0%
Present series	2.7%

With the exception of the report by Tomb, the mortality rate in our series is lowest. All the reports cited covered periods when the sulfonamide compounds were not used. Examination of the data pertaining to the complicated cases indicates a possible reason for the lower mortality in our series.

Complications

In computing the mortality figures in this study such complications as facia paralysis, postauricular fistula and others not threatening to life were not considered. Sepsis and meningitis were the two potentially fatal complications encountered. The incidence of sepsis is seen in Table V.

Table V

Cases with positive blood cultures (all beta hemolytic streptococci)	10
Cases without positive blood cultures but with well established clinical pictures of sepsis	3
Deaths within this group (patient never had positive blood culture)	1 (7.5%)

Clinical indications of sepsis were present on admission to the hospital in eleven of the thirteen cases of sepsis. They followed mastoidectomy in two of the cases. The lesion causing the sepsis was lateral sinus thrombosis in eleven cases, with perisinus abscess and acute mastoiditis each accounting for one more case. The mortality from sepsis in this and other series is indicated in Table VI.

Table VI

Boies[1] (1936, University of Minnesota)	19%
Meltzer[12] (Mass. Eye & Ear Infirmary)	28.5%
Present Series	7.5%

The general and surgical management of cases has been very similar in these three series except that chemotherapy was added to the therapeutic measures in the present series. The decrease in the death rate is truly remarkable and naturally very gratifying.

The potential danger of otogenic meningitis has also been reduced. Data relative to it are shown in Table VII.

Table VII

Meningitis

1. With positive cerebrospinal fluid cultures		7
B hemolytic strep.	3	
Non hemolytic strep.	3	
Pneumococcus III	1	
2. Without positive cerebrospinal fluid cultures		4
Deaths within these groups	3 (27.2%)	
Deaths in group with positive cultures	2 (28.5%)	
3. Meningitis and sepsis occurring together: Three patients had organisms in both blood and spinal fluid; all died.		

Comparison of results of other series of otogenic meningitis with our group shows that a distinct gain has been made in the therapy of this disease. In Table VIII these comparisons are listed.

Table VIII

Meningitis	% Mortality
Rawlins & Reich[13] (Stanford Service, San Francisco City & County Hospital)	75
Coates, Ersner & Persky[5] (Medico-Chirurgical and Graduate Hospitals, Philadelphia)	58
Boies[1] (1932, Massachusetts Eye and Ear Infirmary)	100
Loenholdt[10] (University of Minnesota, untreated with sulf. compounds)	100
Present series (series as a whole)	27.2%
Present series (only cases with positive spinal fluid cultures)	28.5%

It is apparent from a consideration of the material just cited that the gain in mortality rate in the present series is due to a reduction in the number of deaths due to complications. This reduction must result from the use of sulfanilamide and its related compounds because no other material change in the mode of treatment has been made since the report of an exactly comparable series.[2]

A brief comment on the way we are using the sulfonamide compounds may be of interest. We seldom see patients in early stages of otitis media. Therefore, our discussion of sulfonamide therapy necessarily applies only to post-operative patients. In our series there were only two cases in which we had control of the therapy early in the disease. Both patients were hospitalized less than one week after onset of earache. Both ears yielded beta hemolytic streptococci on culture. Both developed surgical mastoiditis despite adequate sulfanilamide therapy. As was stated earlier, widespread use of sulfonamide compounds in acute otitis media may reduce the incidence of acute surgical mastoiditis. Sulfanilamide was the drug used in most of our cases. Occasionally sulfapyridine or sulfathiazale were used. In forty-eight patients (14.7%) one of these three compounds was used. Twenty-one cases were uncomplicated and twenty-seven were complicated. The usual indication for administration of sulfanilamide or a related compound in an uncomplicated case was a postoperative fever. The average number of days of therapy in the complicated cases was eight, and in the uncomplicated ones nine and one tenth. Blood levels were not taken on the earlier cases. In the later ones, comprising 23 cases, the average level of 11.5 mgm. per cent was above the accepted therapeutic range of five to ten milligrams per cent. Not enough cases were treated with sulfapyridine and sulfathiazale to make any generalizations possible.

It is now clearly established that in pneumococcus mastoiditis with meningitis sulfathiazale should not be used. Sulfathiazale does not enter the spinal fluid in sufficient concentration to be effective. Sulfapyridine and specific anti-pneumococcus serum are indicated.[14, 15]

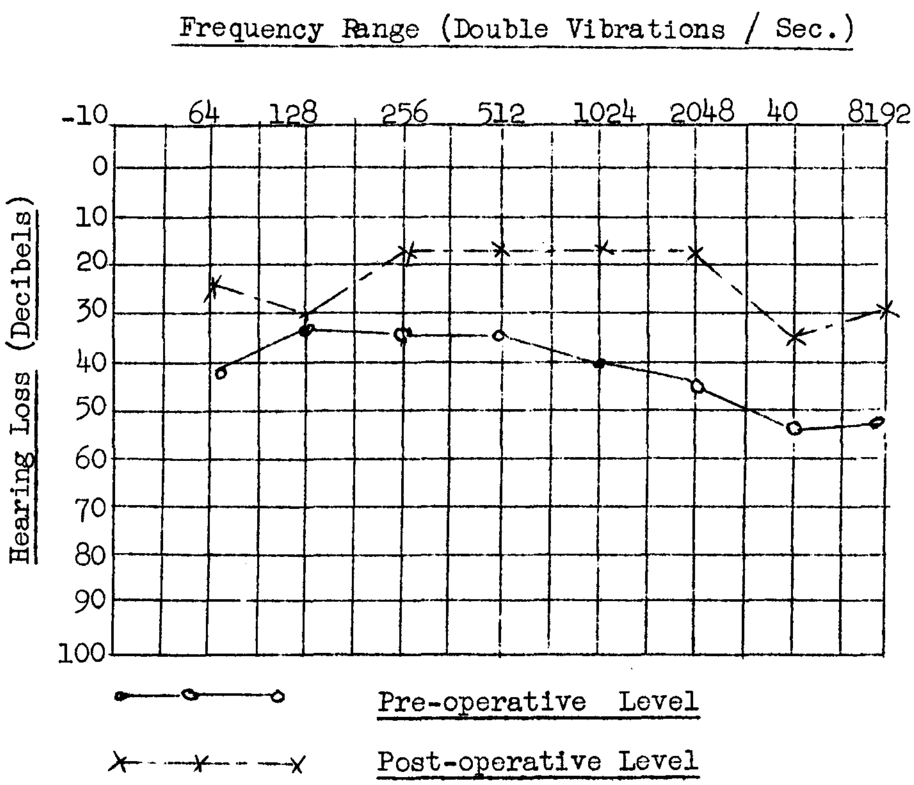
Postoperative Hearing Ability

Figure II shows the pre- and post-operative threshold hearing levels of forty-nine patients on whom complete mastoidectomies were performed. These patients had no history of chronic otitis media or chronic mastoiditis. These audiograms should be strictly comparable. They were made under as nearly identical conditions as possible. Only patients who had both pre- and postoperative audiograms were used in the calculation. Their audiograms were made at varying postoperative intervals. In all cases, however, the preoperative level was measured within a few days of the operation. It is probable, therefore, that the postoperative curve is lower than it would have been if all audiograms had been made at a long postoperative interval. In a clinic such as ours this is a difficult factor to control unless one disregards the patient's expense and time.

Figure II

Acute Surgical Mastoiditis Without Previous Otitis Media or Mastoiditis

(Average of 49 Cases)



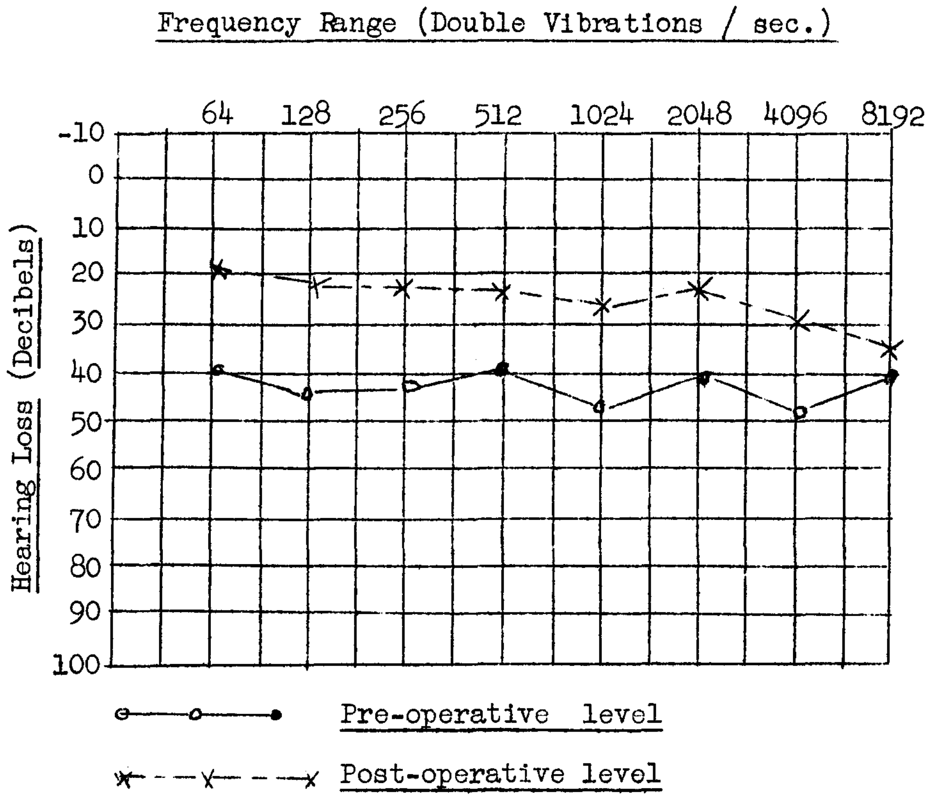
The preoperative level is seen to be much lower than the post-operative one. In many cases the postoperative level closely approximated the normal. The average, however, was as shown. It is pertinent here to consider the statement of C. C. Bunch[4] who cautions one to remember "-----that clinical tests with modern audiometers can be reproduced in repeated tests with an accuracy of from five to seven and a half decibels----."

In Figure III are shown the hearing levels of those patients on whom incomplete mastoidectomies had been performed prior to the present operation. The group is small, comprising seven patients

Their postoperative hearing was almost as good as that of patients whose ears had not been previously operated.

Figure III

Acute Surgical Mastoiditis with Previously Incomplete Mastoidectomy

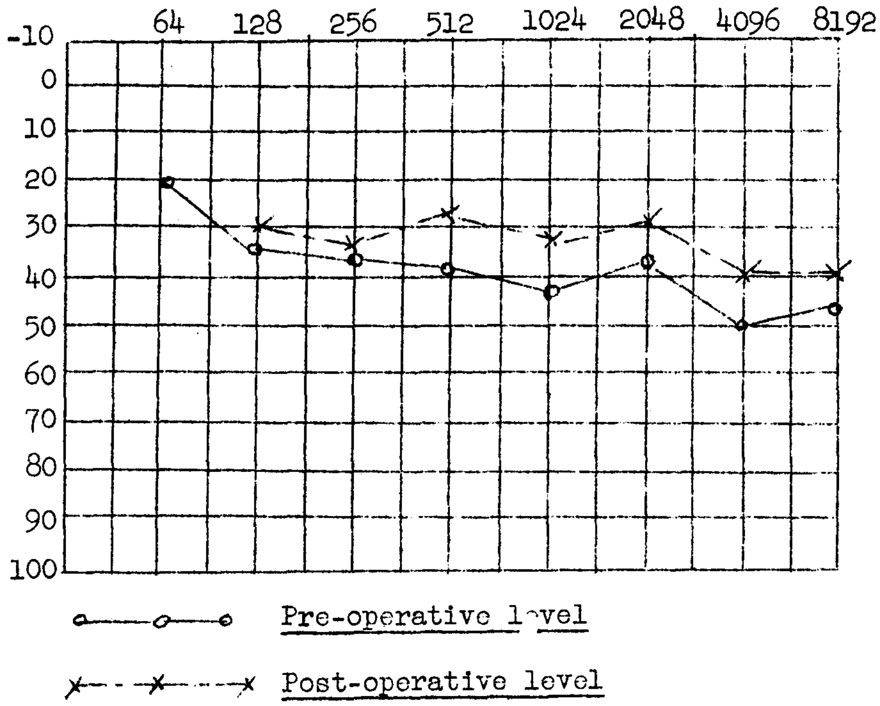


In Figure IV are seen the hearing levels of the patients having chronic mastoiditis and complete or simple mastoidectomy rather than radical mastoidectomy. While these patients have poorer hearing than either of the first two groups, their postoperative hearing is much better than the preoperative level.

Figure IV

Acute Exacerbations of Chronic Mastoiditis - Complete Mastoidectomies

Frequency Range (Double Vibrations / sec.)



Summary

257 cases of acute surgical mastoiditis are reviewed in detail. The annual incidence calculated on a ten year period has shown no decrease since the advent of sulfanilamide and related compounds. Dural exposure occurred frequently and without untoward results. The mortality in 257 cases was two and seven tenths per cent. All deaths were caused by meningitis, sepsis or both. The death rate in the group having these complications was lower than previously published figures. This reduction was due to the use of sulfanilamide and related compounds. Postoperative hearing was found to be improved over preoperative hearing in all types of cases. The greatest improvement was seen in the ears operated during their first attack of otitis media with mastoiditis. Postoperative hearing in both the recurrent and chronic groups was surprisingly good.

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V. GOSSIP

New York City - M. H. Manson, one-time member of the Department of Surgery, formerly connected with the Commonwealth Fund, has been appointed medical director of Bell Telephone Laboratories, 463 West Street, New York. He will take his new position November 1. Huron, South Dakota - The Local Arrangements Committee in charge of Fire Prevention Week had the most effective series of displays I have ever seen. In the middle of the sidewalk on the main street they had even dragged an old wrecked car which was supposed to have been driven by someone who failed to stop when the siren on the fire apparatus sounded. Probably at no other place in the Union would the fire apparatus find so much space to pass as in South Dakota. At the meeting of the South Dakota State Nurses Association I was followed on the Public Health Section Program by a field nurse who imitated bird sounds by whistling. The Committee assured me there was no connection with my offering. Life Magazine, October 4, 1940 -- Air Stewardess Lillian Christensen, formerly of our Out-patient Department Staff has her charms prominently displayed in the section devoted to the Wilkie Caravan for votes. Boston, Massachusetts - medical travelers from any part of the United States will quickly sense the genuine hospitality here. Boston seems to do everything so well and to have so many opportunities for good medical service and investigation. The medical profession has a liberal representation of physicians from every part of our country. One of our very good friends is on the staff of the Joseph H. Pratt Diagnostic Hospital, 30 Bennet Street, just across the street from the Boston Dispensary (Next door to the Boston Floating Hospital). These three teaching units are part of the teaching program of Bingham Associates, the postgraduate medical service of Tufts Medical College. Through this agency Maine physicians and their hospital service associates from 24 community hospitals are brought to Boston at Fund expense to take special courses. In the hospital service field, a substitute is sent for a month to relieve the person coming to Boston. Patients sent for diagnostic study to the Hospital in Boston are returned to their own physician with not only the diagnosis but also a suggested line of treatment, plus an abstract covering the disease in question. In addition they publish a bi-monthly digest of the clinics, conferences, and lectures given by the staff. This connection with the outlying community hospitals and their staffs is to be envied. Many of our staff names are familiar in Boston clinics. Minnesotans should work for closer undergraduate and graduate relations with Boston medicine....Eureka, South Dakota--Obstetrician and Gynecologist Maude Marguerite Gerdes, Minnesota '30, Fielder for Children's Bureau, United States Department of Labor, is now director of Bureau of Child Hygiene, Mississippi Department of Health, Jackson, Mississippi. Maude stopped off in Minneapolis with her usual good stock of travel stories from the South, and also one from South Dakota about her farm tenant who took the barn when he moved off the place...Minnesota Pathological Society, October 15, 1940, 8:00 p.m. Bacteriologically minded internist Wesley W. Spink of our staff discussed Pathogenesis and Treatment of Staphylococcal infections...Cleveland, Ohio, October 14 -- Dr. Maurice B. Visscher, professor of physiology and head of the Department, University of Minnesota Medical School discussed Intestinal Absorption as a Clinical Physiological Problem at the annual meeting of the International Assembly which opened on this date. Last year's representative from our group was Urologist C. D. Creevy who spoke on The Diagnosis and Treatment of Infections of the Upper Urinary Tract. The next meeting will be held in Minneapolis in 1941. Petersburg, Alaska -- Joseph Oscar Rude, Minnesota '29, who has been practicing there since graduation is in Minneapolis today to show his colored movies on Alaska to the regular weekly staff meeting of the University of Minnesota Hospitals. Dr. Rude, who hails from Gary, Minnesota, has the same birth date as Minnesota's youthful Governor, Harold Stassen, who had to register for conscription last Wednesday. Dr. Rude brought a prize salmon from Alaska for the Governor as a gift from ardent Republicans in his area.....

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