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ASSOCIATION

IN THIS ISSUE:

Endolymphatic Hydrops

Strabismus in Children

University of Minnesota Medical Bulletin

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Published semi-monthly from October 15 to June 15 at Minneapolis, Minnesota.

Staff Meeting Report

Endolymphatic Hydrops*

Kurt Pollak, M.D.,¹ and Lawrence R. Boies, M.D.²

The rather new term endolymphatic hydrops is employed for Ménière's disease to emphasize the basic pathology. Excessive pressure within the labyrinth apparently results from oversecretion of endolymph or transudation of serum. An important factor is autonomic instability resulting in local vasoconstriction, ischemia, and variable degrees of cochlear and vestibular dysfunction.

Functioning structures of the inner ear are enclosed in a tight, bony capsule and are supplied by an end artery without collateral circulation. These structures are thus vulnerable to autonomic disturbance.

Poor blood flow may be limited only to certain labyrinthine areas. Initial slight involvement may therefore cause only a sense of aural pressure with tinnitus, or vertigo alone, or deafness and tinnitus without vertigo.

Modern tests are usually diagnostic, even in early stages. Most patients respond to vasodilators and other medical therapy. If prolonged treatment fails, *unilateral* vertiginous crises are generally eliminated by safe, relatively simple operation on a semicircular canal. Refractory bilateral attacks may be controlled by cautious administration of streptomycin.

The fullblown syndrome was first described by Ménière in 1861 and properly bears his name, but histopathologic lesions were not described until 1938. Pathologic changes include dilatation of the cochlear duct and, in some cases, of the saccule, utricle, or ductus reuniens.

Diagnosis

Recurrent attacks with symptom-free intervals, rather than a progressively debilitating course, should suggest endolymphatic hydrops.

*This is an abstract of a report given at the Staff Meeting of the University of Minnesota Hospitals on April 27, 1956. A copy of the complete report, including references, may be obtained by writing to the Editor, UNIVERSITY OF MINNESOTA MEDICAL BULLETIN, 1342 Mayo Memorial, Minneapolis 14, Minn.

¹Instructor, Department of Otolaryngology.

²Professor and Head, Department of Otolaryngology.

Vertiginous crises may be accompanied by nausea, vomiting, and a syncope state. Tinnitus may precede all other manifestations by years. A continuous buzzing or rushing noise of changing loudness is heard. Deafness may be associated even when unmentioned or actually unnoticed. Hearing also fluctuates and tends to be lost in low rather than high tonal range. However, the audiometric pattern often differs from this pattern, probably because of other deafening factors.

Both the subject and the examiner must distinguish true whirling vertigo from feelings of dizziness, unsteadiness, and the like. Ménière's sensations are as a rule defined clearly, in contrast to vague descriptions of eighth nerve symptoms from central disorders. Nystagmus is always peripheral with acute vertiginous attacks, and spontaneous nystagmus is absent between episodes. About 90% of patients exhibit the three typical symptoms.

When endolymphatic hydrops is suspected, the following investigations are done:

- 1) Thorough general physical examination.
- 2) Neurologic survey, stressing cranial nerves and cerebellar function. Before vestibular trials, pupils and fundi are observed, a Romberg test is done, and tests for facial anesthesia, corneal reflexes, and spontaneous and positional nystagmus are performed.
- 3) Complete otolaryngologic examination.
- 4) Radiograms of the head, at least in Stewart's position, to show the internal auditory meatuses.
- 5) Specific function tests of the eighth cranial nerve.

A modification of the Kobrak caloric test with ice water is a useful method of examining the labyrinth. The involved side is commonly hypoactive. With early disease, moreover, when deranged equilibrium is hard to describe, vertigo induced by cold water is readily identified with the familiar symptom.

Several refinements of test methods show the typical cochlear deafness that is due to injury of Corti's organ and therefore pathognomonic for Ménière's syndrome. The loudness balance test, for example, measures recruitment of hearing for pure tones.

Denoting the same pathologic background is diplacusis binauralis dysharmonica. A given pure tone is heard as a pleasant musical note in the good ear but is perceived in the diseased organ as a sound of different pitch and of harsh, unpleasant, or even painful quality.

In showing cochlear damage, the intelligibility test for amplified speech is relatively simple and highly valid. Clearness of amplified speech is greatly diminished with even slight increase of intensity above the threshold.

An accurate differential diagnosis is generally provided by the methods described, excluding such conditions as apoplexy, head injury, toxic vertigo, acoustic neuroma, and vertiginous epilepsy.

Medical Treatment

The patient with endolymphatic hydrops is worried, tense, and often fearful of brain tumor. His ailment must be explained in understandable terms. He should be told that most people are greatly helped by medical treatment but that occasional relapses should be expected.

For acute vertiginous crises, drugs that stimulate adrenergic or paralyze cholinergic nerves are suitable. Atropine, 0.8 mg. given subcutaneously, usually ends acute vertigo in thirty minutes and also calms anxiety. Ephedrine is given orally, 100 mg. repeated in fifteen minutes as required. Adrenalin is injected slowly by vein, 0.2 to 0.5 cc. of 1:1,000 solution, until the condition improves. Drugs may be carried for emergency self-treatment.

Long-term therapy includes vasodilating medications, adjustment of body electrolyte and water balance, correction of endocrine dysfunction, physical therapy, and sedation. Tobacco may be forbidden.

Other measures include a low-sodium or neutral ash diet as modified by Schemm, diuresis with ammonium chloride, and some restriction of fluid. Since allergy is considered a potential alkalosis, symptoms may be reduced by greater relative acidity of tissues.

Papaverine is an effective vasodilator in daily oral doses of 0.25 to 1.2 Gm.; less is given if a barbiturate is added. Histamine may be of use. We prescribe oral nicotinic acid, starting with 50 mg. three or four times daily before meals and raising the amount until each dose causes flushing. Bantline blocks impulses in sympathetic and parasympathetic ganglia. Intravenous procaine counteracts arteriolar spasm and atony by blocking impulses in the sympathetic ganglia and at the myoneural junction.

Replacement of deficit in vitamin B complex, P, or C may lessen vasospasm or capillary permeability. Surplus of pituitary antidiuretic factor may be diminished by 1 mg. of diethylstilbestrol and 60 mg. of thyroid extract per day. Dramamine is an effective adjunct, and long-acting barbiturates are recommended.

If bilateral involvement is not alleviated by a strict medical regimen, streptomycin may be given just to the point of toxicity for the more vulnerable nuclei of the vestibular portion of the eighth nerve. Audiometric and caloric tests are performed frequently as guides to therapy. The drug is probably contraindicated in patients with unilateral disease or over 50 years of age.

Surgical Treatment

Surgery is recommended only when the disorder is unilateral and vertiginous crises are not prevented by medical care. Labyrinthotomy damages the membranous labyrinth enough to cause degeneration. The procedure is easier and safer than sectioning the vestibular component of the eighth nerve and causes less morbidity and no deaths. Though hearing on the involved side is not preserved, impairment in most cases is already severe and further loss seems unimportant to the patient.

Through a linear endaural incision, the mastoid cortex and antrum are exposed, and cellular structure is exenterated to show the horizontal semicircular canal. A motor-driven burr is used to fenestrate the canal and expose the perilymphatic space and membranous canal. A portion of the membranous labyrinth may be coagulated by diathermy or lifted out and cut off. If preferred, a dental broach is inserted, twisted, and withdrawn to destroy tissue, much as a nerve is extracted from a tooth.

The wound is left undisturbed, the skin incision is closed, and dressings are applied for a few days. The patient is usually out of bed in two or three days. Temporary discomfort may be felt, but the intact labyrinth usually compensates within several weeks.

Starting in 1944, labyrinthotomy has been done at the University of Minnesota Hospitals in 22 persons 38 to 69 years of age. Results have been excellent and without complications. Postaural incision was used for the first operations, and diathermy coagulation was done in the first 14 cases. Later, part of the membranous labyrinth was excised by Cawthorne's method. The endaural approach is adequate and produces less cosmetic and sensory disturbances.

Other forms of surgery have been advocated, as, for instance, Wright's injection of alcohol into the labyrinth by the round window and Portmann's operation on the saccus endolymphaticus. Lempert extracts the stapes and fenestrates the promontory of the middle ear, after which the endolymphatic system slowly deteriorates.

Staff Meeting Report

Strabismus in Children

Clifford D. Molzahn, M.D.¹

One of the most important eye problems of early life is strabismus, which affects 1.5% of the children in this country. Parents often consult a family physician or pediatrician, and his attitude may deeply influence future therapy. There is, however, frequent misunderstanding, especially of nonoperative methods such as use of corrective glasses and occlusion.

No parent should ever be told to wait and see if a youngster will outgrow squint. The sooner the child can be examined and treated, the better the visual and psychologic results. Delay invites functional loss of an eye. A good cosmetic effect, however, can generally be obtained at any age by means of surgery.

Strabismus and squint are interchangeable terms for manifest deviations of the visual axes; perhaps a better word is heterotropia. Latent deviation is heterophoria. Inward turning of the nonfixating eye is called esotropia, and outward deviation is exotropia. Vertical shift is right or left hypertropia, depending on which eye veers upward.

Classifications of heterotropia are almost as numerous as oculists, with much overlapping and disagreement in existing categories. The etiology of nonparalytic strabismus in childhood is varied and not completely understood.

Among the many factors are abnormal muscles or attachments, innervational disorders, former paralysis followed by persistent contracture of antagonists, and heredity. Fusion, defined as cerebral integration of visual sensation of both eyes, may be impaired either as a cause or result of squint.

Children have two major types of strabismus. The first, accounting for nearly half the cases, occurs at birth or within the first year of life and is nearly always associated with a severe anatomic defect

²This is an abstract of a report given at the Staff Meeting of the University of Minnesota Hospitals on May 4, 1956. A copy of the complete report, including references, may be obtained by writing to the Editor, UNIVERSITY OF MINNESOTA MEDICAL BULLETIN, 1342 Mayo Memorial, Minneapolis 14, Minn.

¹Medical Fellow, Department of Ophthalmology.

that requires early operation. Many instances are familial.

The second form of squint is not evident until about the age of three years, when accommodation begins. Owing to the accommodation-convergence relationship, extreme convergence may produce esotropia, especially if eyes are hyperopic. A faulty ocular muscle may also be involved, as may an overactive cerebral center for convergence.

Since esotropia is much worse during excitement or fatigue, measurements will differ greatly from time to time. Variation may lessen as the child grows older and becomes more stable. Strabismus may develop after measles, mumps, or other acute febrile illness, which may either precipitate a hidden tendency or act as a primary factor by producing meningoencephalitis. Fusion may be destroyed and eyes turned by injuries and ocular diseases that hamper vision on one side.

Mothers are sometimes alarmed by the presence in their babies of prominent epicanthal folds giving the illusion of convergent squint. Infants normally have some degree of epicanthus until slack tissue is drawn up by the enlarging bridge of the nose. Such a pseudo-squint may be recognized, however, by corneal light reflexes placed centrally in relation to the pupils. Persistent folds can be removed at about the age of 12 years by a minor plastic operation.

Treatment of strabismus must be started early in life to avoid such complications as amblyopia, anomalous retinal correspondence, and mental distress. Spontaneous recovery is exceedingly rare, and surgery is often indicated.

Diagnosis should not be missed on routine physical examination if either of two simple tests is included. Choice depends mainly on the subject's age. Where deviation is not obvious, the cover test is most useful. Generally speaking, the patient must be at least two years old and able to fixate with either eye. While he watches a small light held at reading distance, later repeated using one held 20 ft. away, each eye is covered alternately. If the occluded eye deviates and must be moved to take up fixation when the other eye is covered, either heterotropia or heterophoria is present. An eye that continues to veer when not covered is heterotropic. The eye which errs only when covered is heterophoric; that is, fusion keeps the axes in line, and the tendency to squint is latent.

Deviation is often measured by the value of prisms placed before the eye to neutralize movement during the cover test. When the same eye constantly turns while the other fixates, squint is monocular. If

the eyes fixate alternately, strabismus is termed alternating. Intermediate forms are also seen, however.

Should the cover test prove unsatisfactory, the Hirschberg method utilizing the corneal light reflex is quick, easy, and fairly accurate. The child's attention is drawn to a pen-light. If he fixates on the light, the reflection will be approximately centered on at least one pupil; if centered on both, the eyes are straight. Every millimeter of light deflection away from the center indicates about seven degrees of squint.

Vision testing is highly important, since children with strabismus are likely to have amblyopia ex anopsia, meaning blindness from disuse. The term suppression amblyopia is more precise. With monocular heterotropia, the image in the deviating eye is generally suppressed in order to prevent diplopia and confusion.

The earlier the age when inhibition starts, the more profound the visual deficiency. Every child is born bilaterally amblyopic, and only by constant use is critical central visual acuity developed. Thus if one eye is constantly suppressed in early years, critical vision does not emerge. Once a child is past the age of about six years, previously undeveloped vision can never develop.

Amblyopia is just as likely with small as with large deviations and is also found with high refractive errors, unilateral or bilateral. It probably results from cortical or cerebral inhibition of pattern vision without impairment in lower functions of light sense and spatial projection. Visual acuity should be determined as soon as possible. Picture cards can be employed at three years and the illiterate "E" chart by four years. Much can be learned of babies by occluding each eye in turn and watching reactions.

Nonsurgical treatment of strabismus aims to improve vision, establish normal accommodation-convergence relations, and overcome defects in fusion. Treatment consists of (1) refraction and use of corrective lenses, (2) occlusion for suppression amblyopia and to prevent faulty binocular habits, and (3) orthoptic training.

Most esotropics have some accommodation-convergence spasm, and deviation is often partly or completely reduced by glasses that fully correct hyperopia. This requires cycloplegic refraction with atropine or similar drugs, owing to children's highly active accommodation. Needed glasses should be worn as soon as tolerated, often at the age of 12 to 16 months.

Preoperatively, the total effect of correction must be determined and spectacles worn constantly. They are also prescribed for other

defects, such as myopia or astigmatism. Refraction should be repeated at intervals, since errors in children may change.

When amblyopia is present and in cases of monocular squint, the fixing eye must be occluded promptly; treatment after the age of five or six years is often too late.

Parents should be told that occlusion must be complete every waking moment. Otherwise the child will peek out and, with both eyes open, any vision won is again actively suppressed. An effective method is to tape a pad over the eye with a tight elastoplast dressing. Treatment continues as long as sight improves, or until eyes are about equal, at which time strabismus may begin to alternate.

Sight may decline in the covered eye but soon returns when the opposite side is covered. Alternate occlusion may go on until operation. The amblyopic eye can be stimulated by reading, watching television, tracing, or bead work. Motivation is important.

Orthoptic training alone will not straighten eyes but is often a valuable adjunct to other technics, if the trainee is old enough to cooperate. It is employed where some fusion is demonstrated and full restoration seems possible. Work is most effective soon after surgery on extraocular muscles. Visits continue for about six months.

The ideal time for operation is between ages of one and three years. Normal binocular vision with fusion may then develop naturally, before bad habits are well established. Operation is on no account delayed because the candidate is too young or uncooperative to undergo exact tests for binocular vision or because deviation is slight. If eyes are straightened before school age, in addition to other advantages, playmates teasing is escaped. Surgery is frequently undertaken for purely cosmetic reasons even with hopelessly poor vision in one eye, whatever the cause.

Charts were reviewed in 50 cases of strabismus for which operation was done at the University of Minnesota Hospitals. Half the patients were esotropic and the remainder exotropic.

There were nine patients with amblyopia ex anopsia which persisted after treatment; in six of these there was esotropia and in three exotropia. Amblyopia was observed in 24% of the group with esotropia and in only 12% of exotropic subjects, stressing the known tendency with convergent squint.

A total of 38 patients required only one operation on extraocular muscles, though often two muscles were incised; others needed two procedures. Cosmetic results were excellent in 30 instances, good in 18, and fair in two.

Editorials

The Importance of "Unrestricted Funds"

The campaigns of the National Fund for Medical Education and the recent National Medical Education Week have pointed up the need of the nation's medical schools for funds. Although the National Fund has been quite successful and gives every indication that its activities will continue and actually increase in scope, many persons, including a good many physicians, express surprise at the stated financial needs of the medical schools. They point out that the total amount of funds available annually to our medical schools is several times what it was prior to World War II. This much is true, but it is by no means the whole story.

A major share of this increase in total available funds is accounted for by research grants which are available today from public and private sources in amounts which would hardly have been dreamed of 15 years ago. It must be emphasized, however, that *research* grants constitute *restricted* funds, that is, they must be used for very specific purposes in accordance with previously agreed upon terms. Research grants do not provide funds for teaching purposes.

It is, of course, true that research grants make very important and significant, but *indirect*, contributions to teaching. Medical education and medical research are so closely allied that it is impossible to say where one ends and the other begins. Teaching is at its best in a milieu which is conducive to investigation. The research worker may also be an excellent teacher although this is not necessarily so. The fact remains, however, that research funds, which account for the major share of the increase of funds available to medical schools, do not contribute *directly* to teaching.

Funds from standard sources of support, that is, legislative appropriations, tuition fees, and endowment funds in the case of private schools, show considerable variation, from institution to institution. In general they provide for the day-to-day operation of the school. Their utilization, however, is usually spelled out in advance rather precisely, and administrative officers have relatively small amounts at their disposal for meeting unforeseen needs and suddenly arising situations. Large sums for additional facilities or extensive staff increases must, of course, be provided for by special legislative action, gifts, etc.

There is, then, a very real need for *unrestricted* funds, funds which can be used at the discretion of a school's administrative officers to meet needs, relative to teaching of medical students, which arise during a school year. A young instructor, an excellent clinician and teacher, is offered an attractive position elsewhere. Unrestricted funds will enable a dean to offer this capable individual a promotion and salary increase. A newly marketed device for the projection of blood smears would improve greatly the teaching of hematology. Unrestricted funds will permit the purchase of such an instrument. These are but two examples of uses to which unrestricted funds may be put. Here at Minnesota funds from the National Fund for Medical Education have provided support for important teaching positions where the supervision of junior and senior medical students is involved; badly needed audio-visual equipment which has increased instructional effectiveness considerably; special equipment for teaching in both basic science and clinical departments; and photographs, graphs, charts, and exhibits which have been used extensively in teaching. A portion of these funds will be used toward equipment of the new Medical Library, the instructional importance of which requires no further comment.

The availability of unrestricted funds, even though the amount may be modest relative to the total budget of a medical school, may spell the difference between a teaching program which is merely adequate and one which is excellent. They act in the manner of a catalyst, improving the quality of a school's teaching program out of proportion to their absolute amount. Their importance cannot be over-emphasized.

Bequest of the Human Body

A detailed understanding of the structure of the human body has always been one of the cornerstones of medical research and education. Unfortunately, the availability of anatomical material has decreased progressively over the last several decades. Whereas in former years two students were assigned to each body, more recently it has been necessary to assign from four to six students per body. Even with this drastic curtailment there has not always been enough anatomical material to supply the needs of our medical and dental classes.

Until recently most of the anatomical material has come from state institutions in which the inmates had outlived both family and friends. More recently, with the increased burial provisions, fewer and fewer unclaimed bodies have been coming to the medical schools.

Nine of the state legislatures have now taken important steps to remedy this situation by passing specific legislation which permits the bequest of bodies to the medical schools. The Minnesota Statute as amended in 1949 provides:

"525.18, Subdivision I. Every person of sound mind, not a minor, may dispose of his estate, or any part thereof, or any right or interest therein, by his last will in writing, signed by him or by some person in his presence and by his express direction, and attested and subscribed in his presence by two or more competent witnesses.

"Subdivision II. In addition, every such person described in Subdivision I hereof may by will dispose of the whole or any part of his body to a teaching institution, university, college, state board of health, or legally licensed hospital, either for use as such institution, university, college or hospital may see fit, or for use as expressly designated therein."

During 1955, the University of Minnesota received notice of over 20 written bequests. The University of California at Los Angeles has received notice of over 400 bequests during a three-year period, and they have already obtained over 90 bodies by this means. A recent bequest by a British television star, Annette Mills, has brought in over 200 inquiries to the Inspector of Anatomy of the Ministry of Health in Great Britain.

It has been most heartening to read the letters sent in by these individuals who are so willing to do so much to help their fellow man. Some, who are afflicted with specific diseases, have felt that a detailed study of their body would be of great help to humanity. Therefore, during the anatomical study, arrangements have been made to record the various pathological changes that are found. Some individuals have inquired whether their bodies could be used for specific research purposes and this is done whenever possible. However, since a given university does not ordinarily engage in all types of research activity, it is not always possible to follow all of these suggestions. Nevertheless, all of the bodies which are received by the Medical School do aid in medical research either directly or indirectly by providing the basic training and education of the medical research worker.

That a person may bequeath his body in this manner is not generally appreciated. It is important that physicians in particular are well aware of the fact in order that they may answer appropriately questions which their patients may raise. Further information concerning bequest procedures may be obtained from the Chairman of the State Anatomical Committee, Department of Anatomy, University of Minnesota, Minneapolis 14.

Medical School Activities

Dr. Visscher Honored

DR. MAURICE VISSCHER, *Professor and Head*, Department of Physiology, was recently elected to membership in the National Academy of Sciences, recognizing the many outstanding, scholarly contributions he has made to research in physiology and allied medical sciences. The Academy, which is comprised of the nation's leading representatives of the various scientific fields, was founded during the administration of President Lincoln for the purpose of advising the President concerning scientific matters. Today, in addition to this function, it sponsors the National Research Council. Election to the Academy is a signal honor, indeed, and the entire Faculty of the Medical School joins in offering congratulations to Dr. Visscher.

General Practice Preceptorship

From time to time students and practitioners in the state have inquired about the possibility of establishing a preceptorship program as a part of the training of our undergraduate students. This proposal has received considerable study and discussion by a good many members of the Faculty.

In response to a recent inquiry, DEAN DIEHL stated, "Consideration is being given to a revision of the Junior-Senior Medical School curriculum to permit students to devote one quarter of a year to electives and one of the electives under consideration is a preceptorship in general practice. Details of the curriculum change and of the preceptorship remain to be worked out, but these will be top items on the agenda of the Curriculum Committee when its Chairman, DR. WILLIAM F. MALONEY, returns next summer from his three-months' assignment as the representative of our Medical School in its affiliated program with the Medical School of the National University of Seoul in Korea."

We are sure that this information will be of real interest to students and to physicians in private practice.

Faculty News

DR. WESLEY W. SPINK, *Professor*, Department of Medicine, was recently re-elected to a three-year term on the Board of Governors of the American College of Physicians at its national convention in Los Angeles. Dr. Spink, who has been the organization's Governor for

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Minnesota for the last three years, will be General Chairman of the Midwest Regional Meeting of the College which will be held at the University of Minnesota next October. His busy spring schedule of activities includes a trip to Chicago on May 16 where he will deliver the Annual Alpha Omega Alpha Lecture at the University of Chicago Medical School. The subject of his address will be "The Nature of Brucellosis."

DR. REYNOLD A. JENSEN, *Professor*, Departments of Pediatrics and Psychiatry, addressed an open meeting of the International Council for Exceptional Children at the Hotel Nicollet on "Measuring Parental Acceptance of the Handicapped Child." On May 1, he was a guest of the Academy of Medicine in Cincinnati and presented a paper on "Emotional Disturbances in Children." On May 4, along with DR. DENTON P. ENGSTROM, *Instructor*, Department of Pediatrics, he presented a paper at the annual meeting of the American Psychiatric Association on "The In-Patient Psychiatric Service for Children and the Teaching Hospital."

A former member of our Faculty, DR. WILLIAM B. TUCKER, who was Chief of the Tuberculosis Service at the Minneapolis Veterans Administration Hospital until September, 1954, has been appointed Director of the V.A. Tuberculosis Service in Medicine and Surgery effective September 1 of this year. He has been Chief of the Medical Service at the Durham, North Carolina, V.A. Hospital and Professor of Medicine at Duke University Medical School for the past two years.

DR. S. G. BRADLEY, Department of Genetics, University of Wisconsin, was a guest of the Department of Bacteriology and Immunology during the week of March 5 to 9. His lecture, "Heterokaryosis in *Streptomyces*," was given March 6.

Coming Events

- May 22 MINNESOTA MEDICAL FOUNDATION LECTURE; "The Patient Who *Won't* Get Well"; *Dr. Donald W. Hastings*, Professor and Director, Division of Psychiatry, University of Minnesota Medical School; 4:30 P.M. (During 103rd Annual Meeting, Minnesota State Medical Association, Rochester, Minnesota)
- May 24 E. STARR JUDD LECTURE; "Clinical and Experimental Observations on the Pancreas"; *Dr. Robert M. Zollinger*, Professor and Chairman, Department of Surgery, Ohio State University College of Medicine; Mayo Memorial Auditorium; 8:15 P.M.
- May 24 Student-Faculty Coffee Hour; Foyer, Mayo Auditorium; 3:30 to 5:30 P.M.
- May 31 Luncheon for the Senior Class in Medicine (Sponsored by the Minnesota Medical Alumni Association); Junior Ballroom, Coffman Memorial Union; 12:30 P.M.

Continuation Course in Surgery

The University of Minnesota, in cooperation with the American College of Surgeons, is offering a continuation course in Surgery for General Surgeons from May 24 to 26, 1956. Half-day sessions will be devoted to preoperative and postoperative care, cardiovascular surgery, and abdominal surgery including ulcer and gallbladder surgery. One session will be devoted to informal case presentations and a surgical pathological conference. Registrants will also have an opportunity to attend operative clinics or, alternatively, to attend a session devoted to advances in surgical research. This year's guest speaker will be DR. ROBERT M. ZOLLINGER, *Professor and Chairman*, Department of Surgery, Ohio State University College of Medicine, who in addition to participating in the course will also deliver the Annual E. Starr Judd Lecture on Thursday evening, May 24, to which all course registrants will be invited. The course will be presented under the direction of DR. OWEN H. WANGENSTEEN, *Professor and Chairman*, Department of Surgery.

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WEEKLY CONFERENCES OF GENERAL INTEREST

Physicians Welcome

- Monday, 9:00 to 10:50 A.M. OBSTETRICS AND GYNECOLOGY
Old Nursery, Station 57
University Hospitals
- 12:30 to 1:30 P.M. PHYSIOLOGY-
PHYSIOLOGICAL CHEMISTRY
214 Millard Hall
- 4:00 to 6:00 P.M. ANESTHESIOLOGY
Todd Amphitheater,
University Hospitals
- Tuesday, 12:30 to 1:20 P.M. PATHOLOGY
104 Jackson Hall
- Wednesday, 7:45 to 9:00 A.M. PEDIATRICS
McQuarrie Pediatric Library,
1450 Mayo Memorial
- Friday, 8:00 to 10:00 A.M. NEUROLOGY
Station 50, University Hospitals
- 9:00 to 10:00 A.M. MEDICINE
Todd Amphitheater,
University Hospitals
- 1:30 to 2:30 P.M. DERMATOLOGY
Eustis Amphitheater,
University Hospitals
- Saturday, 7:45 to 9:00 A.M. ORTHOPEDICS
Powell Hall Amphitheater
- 9:15 to 11:30 A.M. SURGERY
Todd Amphitheater,
University Hospitals

For detailed information concerning all conferences, seminars and ward rounds at University Hospitals, Ancker Hospital, Minneapolis General Hospital and the Minneapolis Veterans Administration Hospital, write to the Editor of the BULLETIN, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14.