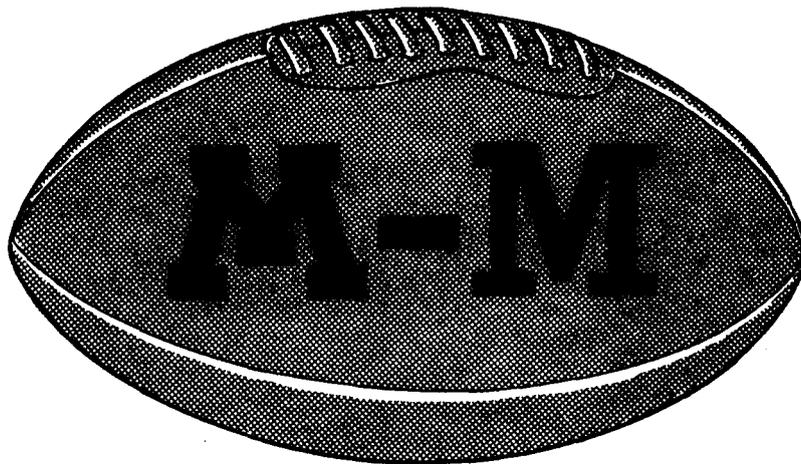


**Staff Meeting Bulletin
Hospitals of the » » »
University of Minnesota**



Gas Anesthesia

October 14, 1938

To the Alumni of the Medical School and Members of the
Anesthesia Travel Club

It is a privilege to extend a most cordial welcome from the faculty of this Medical School to the alumni returning for the 1938 Homecoming, and to the distinguished group of anesthesiologists who are our guests today. The facilities of the School are yours. We trust that you will find much of interest and value.

May we urge the alumni to take the opportunity to visit their former instructors and to make the acquaintance of the new members of the faculty. They look forward to meeting you on this day.

Graduates of some ten or more years past will find many changes in the medical campus, new buildings with enlarged laboratory and clinical facilities. Especially we should like to have you note the new projects under way: the splendid and extensive program in Postgraduate Medical Education, the Serum Center, the Public Health Training Center, and the newly established Psychiatric Clinic for Children.

We share your regret in not finding here some of your former teachers, builders of the Medical School, who have retired from active service. Time removes them from active participation in our program but their continuing interest and support will endure. We are proud of the younger men who carry on in their places. Their ability and loyalty insures steady progress for the future.

Your former instructors appreciate your return to your Alma Mater and we sincerely trust you will find much pleasure in renewing old friendships. We are indeed proud of our alumni and greet you most cordially.

Harold S. Diehl

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

Volume X

Friday, October 14, 1938

Number 3

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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 WEEK

Date: September 30, 1938
Place: Recreation Room
 Powell Hall
Time: 12:15 to 1:20
Program: Movie: "Leader News"

Announcements

Case Reports:

"Pulmonary Hypertension"

Dan Gill
 Lawrence Berman
 Wesley Spink
 Philip Hallock
 C. J. Watson

"Acute Aplastic Anemia"

Mary Schmidt
 Lawrence Berman
 Hal Downey
 Willis Thompson
 K. W. Stenstrom

"Adenocarcinoma of Rectum"

W. H. Hollinshead
 Lawrence Berman
 C. J. Watson

Present: 107

Gertrude Gunn,
 Record Librarian

* * * * *

II. MOVIE

Title: "Fox Hunt"

A Walt Disney "Donald
 Duck" Cartoon

Released by:

R-K-O.

III. WELCOME1. UNIVERSITY OF MINNESOTA
 ALUMNI ASSOCIATION2. ANESTHESIA TRAVEL CLUB

R. Charles Adams, Rochester, Minn.
 David C. Aikenhead, Winnipeg, Man.
 John A. Blezzard, London, Ont.
 W. Easson Brown, Toronto, Ont.
 T. Drysdale Buchanan, New York, N. Y.
 Ansel M. Caine, New Orleans, La.
 Thomas J. Collier, Atlanta, Ga.
 John G. Dunlop, Los Angeles, Calif.
 William W. Hutchinson, Los Angeles, Cal.
 Ralph T. Knight, Minneapolis, Minn.
 Beverly C. Leech, Regina, Sask.
 John S. Lundy, Rochester, Minn.
 Charles F. McCuskey, Los Angeles, Calif.
 Charles H. Robson, Toronto, Ont.
 Henry S. Ruth, Philadelphia, Penn.
 Harry J. Shields, Toronto, Ont.
 Brian C. Sword, New Haven, Conn.
 Ralph M. Tovell, Hartford, Conn.
 Edward B. Tuohy, Rochester, Minn.
 Ralph M. Waters, Madison, Wisc.
 Sydney C. Wiggin, Boston, Mass.
 Paul M. Wood, New York, N. Y.
 Phillip D. Woodbridge, Boston, Mass.

* * * * *

IV. ANNOUNCEMENTS1. TONIGHT

- Friday, October 14,
 1938, 7:00 p.m. Dinner for Dr. J. C.
 Litzenberg, Minikahda Club. Everyone
 Welcome. Tickets at Office of Depart-
 ment of Obstetrics and Gynecology.

2. TOMORROW

- Saturday, October 15,
 1938, 4-6 p.m., Homecoming Tea Dance
 in this room. For students and grad-
 uates in Medicine, Dentistry, Nursing
 and Medical Technology.

(Continued on Page 38)

V. GAS ANESTHESIA

Ralph T. Knight

This is the regular meeting of the General Staff of the University of Minnesota Hospitals. We have two groups of guests. As has been the custom for several years, the Medical Alumni of the University of Minnesota have arranged a special homecoming visit and are attending this meeting as a part of their program. Twenty-two members of the Anesthetists' Travel Club from all sections of Canada and the United States are also our guests. We are highly honored by the presence of both groups. To show the scope of interest of the visiting anesthetists, this small travel group met last year with members in Montreal and Toronto, in 1936 in San Francisco and Los Angeles, in 1935 in New Orleans, in 1934 in New York. This year their week of travel is being spent at the University of Wisconsin, the Mayo Clinic and here. It is because of the presence of this group that the Division of Anesthesia was asked to present the subject for discussion.

A rather commonplace subject has been chosen - Gas Anesthesia. In the last few years a number of new features have been developed in the field of anesthesia, most of them good, with the result that most papers presented by anesthetists to hospital staffs and groups of general medical interest have had for their purpose to make these new ideas generally known. Last fall the Congress of Anesthetists, a large group, rounded out its Chicago meeting by spending the last 2 days with Dr. Ralph Waters of the University of Wisconsin, and, with the rest of his excellent program, what did he have the nerve and wisdom to do but to put on a demonstration of the administration of ether by the drop method! This gave me the courage to select gas anesthesia for today's subject and to go into some of the details of its physiology and management.

Perhaps some of you who have had little or no experience in administering gas have been vexed at the variations and imperfections in gas anesthesia administered to your patients. Perhaps some of you have

thought that this or that anesthetist had some mysterious magic touch which could make most gas anesthesia perfect. Perhaps some of you have thought that the anesthetist was incompetent because some particular anesthesia was unsatisfactory. In gas anesthesia, much depends upon the individual patient, and much also depends upon the skillful management of the patient's physiological factors. This brings up an attitude which is of live concern in anesthesiology.

Rather recently a lawsuit between certain physician anesthetists and certain hospitals and their nurse anesthetists was carried to the California Supreme Court and decided in favor of the hospitals and their nurse anesthetists. The question of who should give anesthetics is not up for discussion on this occasion but the basis of the court's decision deserves comment. The suit was brought on the grounds that the nurses were practicing medicine. The decision stated that recognized surgical authorities had testified at the trial that nurse anesthetists take no responsibility but only administer the anesthetic at the direction of the surgeon. This, of course, is not true. There is no field in medicine in which more immediate and more exact diagnoses are required from moment to moment. There is no other field in medicine in which powerful drugs are routinely given in such exact doses and to their exact physiologic limits. Only in rare instances when the surgeon or obstetrician is forced to accept some drafted or volunteer helper does he actually direct the administration of the simplest anesthesia. In other cases the one at the head of the table whoever he is actually makes the moment to moment diagnoses, good, bad or uncertain, and prescribes and administers the drugs rightly or wrongly. Upon this person's knowledge and skill depend the smoothness of the anesthesia, the avoidance of undue risks and the

welfare of the patient. The surgeon may take over the direction when the anesthesia is rough and unsatisfactory or the patient in danger or even extremis, and who should be better trained to avoid these conditions, or correct them, than the anesthetist?

And so - to the subject of gas anesthesia. Nitrous oxide and ethylene are often chosen because they are nonirritating and nontoxic to tissues and organs. This is an excellent quality. Would that they were more effective anesthetics. Perhaps we can bring out some points regarding their use which will be of interest to the general group here and perhaps we can bring out some differences of opinion among the anesthetists which will enhance the interest in the subject.

Ethylene is more potent than nitrous oxide but both are such weak anesthetics that they must be placed in the blood stream in the highest possible concentration in order to produce even the proximal planes of surgical anesthesia.

The technique of administering either of these two gases is governed by the following principles: Practically no gas is destroyed or metabolized in the body. Very little escapes through the skin. The gas is, therefore, introduced until it is brought as nearly to saturation in the blood and tissues as desired. Every effort is then made to prevent its escape and whatever amount does escape is replaced.

Oxygen is constantly consumed at the patient's current metabolic rate as influenced by pain, toxic condition, fever, emotional stress, premedication, etc., before the anesthesia, and the surgical stimulation and anesthesia itself. This quantity of oxygen must be constantly supplied plus whatever amount is allowed to escape.

Carbon dioxide is formed at the same rate at which oxygen is consumed. In low concentrations it acts as a respiratory, vasomotor and spinal cord stimulant, in somewhat higher concentrations as a depressant and anesthetic. It is removed

from the respired gases completely or in whatever fraction is judged to be desirable.

To initiate the induction of anesthesia the oxygen flow is started at the smallest amount that one thinks will sufficiently supply the patient's needs. The bag is then rapidly filled with nitrous oxide or ethylene and the mask is applied as snugly and comfortably as possible. Two tasks then immediately occupy the attention of the anesthetist: (1) to make the mask gas tight by all the little tricks of adjustment and holding which the anesthetist knows, and (2) to discover as quickly as possible the exact flow of oxygen which the patient requires. As the patient absorbs the gas, that much more is required to keep the bag full, perhaps as much more as 400 to 1,000 cc. per minute until anesthesia is established. More than this, or the continuation of any such amount, is a direct indication of failure to prevent escape. Just enough gas should continue to flow to keep the bag comfortably full but not distended.

About 200 cc. of oxygen per minute is a good amount with which to start. This will supply the metabolic need of a fair number of patients. If the least duski-ness appears the oxygen flow is raised in repeated small adjustments until the color remains at the patient's normal and is readjusted in small variations up or down at the slightest indication and as frequently as changes develop. Larger adjustments at less frequent intervals make for rough anesthesia. It is true that some patients with high hemoglobin and moderate or low metabolic rates can have their hemoglobin less than saturated, therefore show a little duski-ness, and still provide the vital organs with sufficient oxygen for their nourishment and physiologic needs. Very mild degrees of anoxia stimulate the respiratory center to produce more rapid and then deeper respiration. The vaso-motor center is also stimulated. The blood pressure as well as the pulse rate is raised. If the anoxia is prolonged or increased, these centers become fatigued and anesthetized by the need of

oxygen. The respiration is then characteristic in that inspiration becomes shorter and quicker and expiration becomes progressively more prolonged and weaker followed by a progressively longer pause. This change proceeds rapidly to cessation of the act. The earliest signs, when slight anoxia is causing stimulation of pulse, blood pressure and respiration, are practically impossible to interpret correctly because they are also brought about by other factors such as decreasing anesthesia, increasing surgical manipulation, increasing carbon dioxide, etc. The weakening expiration, with the slowing or pause at the end, is the first sign of oxygen want; it is almost unmistakable, and when it appears calls for very prompt action in getting more oxygen into the circulation. When noted within the first 2 or 3 respirations oxygen can be brought back to normal within 2 or 3 more respirations. By keeping very close to this margin one can obtain rather good surgical relaxation with nitrous oxide or ethylene alone. But electrocardiographic changes frequently occur before this and a large number of well studied cases have been reported in which delayed deaths have followed anesthesia carried along this margin in which the brain cells have showed the typical anoxic degeneration, although the respiratory center has either not failed at the time or else has responded easily to measures of resuscitation. Ernst Gallhorn, Professor of Neurophysiology at the University of Illinois, has shown that unanesthetized persons, subjected to a mild anoxia, brought on by an atmosphere of about 8% oxygen, but differing considerably between individuals, suffer with mental confusion and extreme lack of mental and physical coordination, even without the occurrence of cyanosis.

Experience has shown therefore that in anesthesia one cannot safely depend upon respiratory, circulatory or any other signs except "good color" to guard against harmful degrees of anoxia. The cerebrum or the heart muscle may suffer irreparable anoxic damage while the respiratory and vasomotor centers show no adverse effect. Even a standard percentage of oxygen is not reliable as individuals show great variations in tolerance.

We, therefore, have to depend upon the closer margin of good color even at the expense of less efficient anesthesia. The oxygen must then be given barely to the point of good color. If any excess is allowed, it is exhaled unconsumed, progressively diluting the gas in the bag and also in successive inhalations. Gas then diffuses from the blood stream into the external respiratory system to reestablish equilibrium and anesthesia decreases.

When one wishes to increase the anesthesia and approach the maximum obtainable with one of these weaker gases, the basic principle is of course to reduce the flow of oxygen and thus increase the concentration of the gas. This must not be done beyond the margin of good color. There is one other recourse to increase the gas concentration. The bag is emptied and refilled with new gas. This discards the nitrogen which was residual in the lungs at the beginning of the anesthesia and has been diluting the gas. The emptying should be repeated every 20 to 30 minutes for nitrogen continues to diffuse from the blood into the lungs and bag.

There are 2 other available aids for increasing anesthesia. One is to increase the pressure in the bag. This increases the diffusion pressure of the gas against alveolar membrane and forces a little more of it into the blood. However, this increases the expiratory effect and tends to fatigue the patient and it should not be persisted in for more than a short time. The other means available is to increase the carbon dioxide either by allowing it to accumulate or by actually adding some from the machine. By increasing the volume and rate of respiration, gas is brought into contact with greater areas of alveolar membrane and absorption is increased.

This brings us to consideration of the interesting role played by carbon dioxide. It must be remembered that in anesthesia oxygen and carbon dioxide changes are entirely independent of each other. I find that many habitually think of low oxygen and high carbon

dioxide as concomitants, but in anesthesia that is not so. We may wash out all carbon dioxide or exhibit an excess of it while at the same time either administer high oxygen or permit an oxygen deficiency.

Carbon dioxide is the natural respiratory center stimulant. When inhaled in concentrations up to 6 or 7 per cent it incites the respiratory center to greater activity. Yandell Henderson of Yale states that when unanesthetized persons are suffering from the effects of low oxygen atmospheres, as referred to above, the addition of about 3% of carbon dioxide to the low oxygen atmosphere restores their mental and physical activity to approximately normal. He found, however, that if the carbon dioxide was raised to about 7% the good effect of the lower amount is absent; in fact if this same higher amount of carbon dioxide is administered in a normal oxygen atmosphere the deleterious effects are the same as those caused by low oxygen. In experiments upon animals he has found that carbon dioxide in excess distinctly depresses the brain stem.

In anesthesia it, therefore, behooves us to use carbon dioxide only in minimal stimulative doses and to realize that in larger doses it becomes an anesthetic not easily regulated or recognized. We have no way of estimating even approximately the amount of carbon dioxide in the mixture or of knowing what part it has in the effects which we see.

Many of us feel that we have the best control over the situation by routinely keeping the carbon dioxide at the lowest possible concentration saving it for use when especially needed. As soon as unconsciousness appears or even before, the accumulating carbon dioxide is removed. The best method of removal is to pass the exhaled gases through soda lime into the bag. If the machine is not equipped with soda lime it is necessary to allow it to escape through an exhaling valve. By the latter method there is bound to be partial rebreathing and some accumulation of carbon dioxide. If the patient is very resistant to the induction of anesthesia, or

if anesthesia for some reason rapidly diminishes and reflexes cause rigidity, straining and holding of the breath, we are then justified in adding carbon dioxide in an amount that overcomes the spinal reflexes and ushers in effective breathing which in turn increases the absorption of anesthetic gas and effects the advent of satisfactory anesthesia. However, as soon as the respiration becomes effective the carbon dioxide should again be removed, lest it inadvertently advance to become an agent of depression against which there is no satisfactory antidote. If the patient should become over anesthetized or suffer from the collapse of anoxia, then again we should resort to the use of carbon dioxide, but only until an effect upon respiration is noted, lest too much be given. Many of us believe, too, that if no effect is noted within a very few minutes, carbon dioxide should be discontinued for if artificial respiration with increasing carbon dioxide is carried on too long it may easily pass a beneficial concentration and still further anesthetize the respiratory center, thus delaying recovery.

After all, the first indication when respiration ceases is to re-establish exchange of gases through the lungs. That is what maintains life and it can be done by gentle rhythmic pressure on the bag or still better by alternative pressure on the bag and compression of the chest. After getting exchange started with pure oxygen it is time to take account of the carbon dioxide. A good way is to pass only one-half or two-thirds of the expired gas through soda lime. This prevents washing out the patient's carbon dioxide to too low a level and at the same time presents an ever increasing accumulation.

Soda lime absorbers are often carelessly used. They may be used for hours in blissful ignorance of the fact that they are saturated and ineffective, while patients pant and strain in an effort to rid themselves of excessive carbon dioxide. The absorbers should always have 2 chambers so that if the anesthetist suspects that the soda lime

is becoming saturated he may turn to the other chamber and note if he gets better results.

Signs of excessive carbon dioxide are not easy to evaluate because they are simulated by other changes. Increasing respiration and increasing blood pressure are the most helpful but either or both may be lacking. One should routinely test the gas with lime water every 15 or 20 minutes. We find that the efficiency time of a chamberful of soda lime varies from an hour and a half to eleven hours, depending upon the metabolism of the patients who have used it.

With all of these varying factors good anesthesia with these weaker gases, nitrous oxide and ethylene, requires extremely close attention and understanding because it is only within very narrow margins that the anesthesia is both satisfactory and safe even for the lesser surgical procedures. However, when administered with precision, they offer the avoidance of many of the unpleasant reactions, risks, and complications of other anesthetics. They should not be discarded but used whenever the surgery contemplated is within the realm of their particular usefulness.

Someone returning from a convention recently remarked that most of the papers were just on fundamentals, things that we do all the time. And I thought, "Here am I bringing up the routine subject of Gas Anesthesia and a few ordinary fundamental facts of physiology." The knowledge and application of them, however, is absolutely essential to the satisfactory and safe administration of anesthetics, especially the weaker gases.

I have intentionally omitted any consideration of cyclopropane as its principles and technique are quite different. If there are any who would like some information about it, and if there is time, I am sure there are some of us who would be glad to answer questions.

References

1. Gellhorn, E.
The influence of hyperventilation and of variations of oxygen and carbon dioxide tension in the inspired air upon galvanic nystagmus.
Acta Oto-Laryngologica, Stockholm, XXVI, 4, 1938.
2. Gellhorn, E.
Am. J. Physiol., 115, 679, 1936 and 117, 75, 1936.
3. Guedel, Arthur E.
Inhalation Anesthesia, a fundamental guide.
The Macmillan Co., New York, 1937.
4. Henderson, Yandell
Adventures in respiration.
The Williams and Wilkins Co., Baltimore, Md., 1938.

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IV. ANNOUNCEMENTS -(Continued)

3. LECTURE

- Monday, October 17, 1938, 7 p.m., Todd Amphitheatre.
"Nature and Care of Syringes, Needles and Clinical Thermometers"
M. B. Meriam.

4. TUESDAY, October 18, 1938,
8:00 p.m., The Minnesota Pathological Society, Institute of Anatomy, Symposium on Sulfanilamide.
"Action of Sulfanilamide" - R. N. Bieter
"Sulfanilamide Therapy" - W. W. Spink.

5. OPEN -

Special exhibit of roentgenologic studies of cross and longitudinal sections of body: first floor, Anatomy Building. L. G. Rigler.

6. WEEKLY CLINIC

Peripheral Vascular Disease, Outpatient Department Medicine, Fridays, 1:00 p.m. George Levitt and John Paine. Please refer all patients with above complaint for study.

* * * * *

VI. GOSSIP

Head Record Librarian, Gertrude Gunn, is in New York City attending the annual meeting of the Association of Record Librarians of North America. Incidentally, she will do a little advance publicity work for the Institute for Medical Librarians to be held at the Center for Continuation Study, Jan. 30 to Feb. 1, 1939.....Former intern, Pat Nagle, '29, announces the opening of a Surgical Facility at 1021 North Lee, Oklahoma City for the practice of general surgery, plastic surgery, and industrial surgery. Attention will also be given to the management of Major Burns and Controllable Artificial Fever Therapy. Pat, long a bachelor, took unto himself a bride, who spent the last year in the German Department of the University of Wisconsin in a Teaching Graduate Study position. His many friends are pleased to hear of his continued success.....The one and only Edward Sarsfield Murphy, oculist of Missoula, Montana, spent last weekend at the University visiting old friends and making new ones. Murph travels with difficulty as he is forever running into someone he has known in the various places he has been. Bright and early last Monday morning, he met two of his old classmates at the Center for Continuation Study, who came here to take the course in General Medicine. In spite of his very evident Celtic origin, he was the official interpreter for the French while serving his Fellowship under Head Ophthalmologist, Frank E. Burch... ..There may be more enthusiastic fathers, but certainly none are more vocal than Desk man Charles Hayden. His son and heir, born last September, is a constant source of wonder to him. Shortly after his birth, Charlie was found roaming through the downtown stores looking for a miniature sweatshirt for the athlete. Perhaps his best effort in describing the wonder child is when he intimates that he fingers his chest looking for suspenders.....November 5, in addition to being Dad's Day, and the day of the Iowa-Minnesota Football Game, will also be the official day for all the eligible feminine members of the hospital family to go into official mourning, unless something happens to interfere with the wedding of Surgeon Charles Ethan Rae and Black Irish Mary Laughlin, of the Surgery Office. As there is still "hope" Charlie receives a great deal of attention as his wife-to-be remains at her home preparing for the great event. The cool, calm, and collected one is no longer that way. Believe it or not, he went out to start his car the other evening only to recall with great effort that he had dropped his keys down the elevator shaft at 8:00 o'clock that morning. The wedding at high noon, will be another one of those events which no one should miss. The place will be the Church of the Incarnation, and high noon is 12:00 o'clock. They expect presents.....Head Neuropsychiatrist, J. Charnley McKinley, was elected President of the Central Neuropsychiatric Association at their meeting at the Center for Continuation Study last week. Chairman of the Nominating Committee, Hans Heinrich Reese, of the University of Wisconsin, drew a laugh from the crowd when he gave Dr. McKinley's address as Minneapolis, Wisconsin. According to Dr. Reese, one of his friends assured him that he was carrying on in typical Germanic fashion by annexing territory... ..The following letter concerns so many staff men that it is being published: "Dear Sirs: Uneveristy. asking a few questions could you experment on making a new womb out of Flesh or the outer Skin of a new Born child or out of a leg & put it in a incubator The Whole out-fit uturs and all How much is a glass eye, & What do they take for Blood transfusions, can you change a real eye from a nother person into mine it Would Be worth the price answer right away S.E.S."..... ..Head Neuropsychiatrist, William Washington Graves, of St. Louis University, spoke at Pediatrics Seminar last

Monday. Dr. Graves has been visiting our organization since the Neuropsychiatric meeting. For 32 years, this 73 year old investigator has been delving into anthropologic investigations on the human constitution in relation to longevity. At different times he has studied the dimensions of the head, hairiness, length of nose, width of jaw, blood groups, and the scapulae. In his travels he has examined scapulae in all the great collections. His impressions have been gained from thousands of examinations. Every one of his students (I happen to be one) remembers the day when he lined up to have his scapulae examined. He is very politic about assuring all physicians that they have convex (favorable) types. The Department of Medicine lined up for him the other day. Internist Henry Ulrich, who was first, came out smiling as he was told of his convex scapulae. Everyone has enjoyed Dr. Graves' visit, and wondered at his enthusiasm, energy, and ability to remember names.....We had two summer weddings: Baxter Smith and Elaine Bennett, and Fred Hoffbauer and Vivian Vanstrom. The staff sends belated best wishes for a long and happy life.....When internist Richard Bardon, was a youngster, he had orthostatic albuminuria. Discovered in high school, he was taken to various physicians in the United States to have something done. He was forbidden to play football and at one time his father was solemnly assured that he was endangering his boy's life to take him by train from New Orleans to San Antonio. When ophthalmologist Schneider of Milwaukee examined his eye grounds he recalls distinctly bushy whiskers pushed in his face in the dark room. Most vivid recollection is the large number of doctors who laughed. Today laughing doctors always make him think of these perplexed gentlemen. It remained for Internist Ed Tuohy, of Duluth to break the news that his journeys were over and that he could forget that he had albumin in his urine. At 6 feet 4, these many years later he still enjoys the good health predicted by Dr. Tuohy, whose son, Edward, is our guest today as a member of the Anesthesia Travel Club.....Dean Harold S. Diehl was in Ann Arbor this week to deliver the principal address at the 25th anni-

versary of the Founding of the Health Service at Michigan.....Head line-coach George Hauser, of our staff, now recovered from his recent illness, in commenting on our pleasant weather for the football games recalls the time when former Minnesotan, now Head coach, Clark Shaughnessy of Chicago, brought a team of southern boys to play Butler on a cold blustery afternoon late in the fall. When Clark ordered his young hopefuls out on the field for a preliminary warmup, the captain came forward to tell him it was a consensus of opinion of the team that they had better skip practice and go out in the cold when the whistle blew, which would be soon enough.

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VII. STAFF LIST (Continued)

FELLOWS - 1938-39

Arnetta Becker, Lincoln, Nebr.

B.S. '35, M.B. '37, M.D. '38,
University of Minnesota.
Intern Children's Hospital,
San Francisco, 1937-38. Intern
in Pediatrics, University of
Minnesota Hospitals, 1938----

Northrop Beach, Minneapolis, Minnesota.

A.B. '34, M.D. '38, Harvard.
Intern in Medicine, University of
Minnesota Hospitals, 1938---

Lyle Hay, Worthington, Minnesota

B.S. '35, M.B. '37, M.D. '38,
University of Minnesota,
Rotating Intern - Minneapolis
General Hospital, 1937-38.
Intern in Surgery, University of
Minnesota Hospitals, 1938---

J. W. Hanson, Northwood, Iowa.

B.A. '30, M.B. '33, M.D. '34 -
University of Minnesota.
Intern in Bethesda Hospital,
St. Paul, '33-34. Resident in
Pediatrics Abbott Hospital, Minnea-
polis, '34-35. Private Practice,
'35-38. Assistant Resident in
Pediatrics, University of Minnesota
Hospitals, 1938---

Theodore Wellner, Minneapolis, Minnesota.
 A.B. '28 - Luther College, M.B. '38,
 University of Minnesota. Intern in
 Medicine, University of Minnesota
 Hospitals, 1938---.

OBSTETRICS AND GYNECOLOGY

Charles E. McLennan - Fellow to
 Instructor

Theodore Wittels, Minneapolis, Minnesota.
 B.S. '36, M.B. '36, M.D. '38.
 Rotating Intern University of Minne-
 sota Hospitals 1936-38. Intern in
 Medicine, University of Minnesota
 Hospitals, 1938---.

CORRECTION

Leonard A. Titrud - B.S. '35, M.B. '37.
 Stanley Lindley, - Intern in Medicine.
 Wm. B. Stromme - Senior Clerk
 (Acting Intern)

PEDIATRICS

Eric Kent Clarke (Also Neuropsychiatry)
 Reynold A. Jensen (Also Neuropsychiatry)
 Charlotte Fisk - Instructor
 Evelyn Johnson - Instructor