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Bulletin of the
University of Minnesota Hospitals
and
Minnesota Medical Foundation



Causes, Correlates
and Chance

BULLETIN OF THE
UNIVERSITY OF MINNESOTA HOSPITALS
and
MINNESOTA MEDICAL FOUNDATION

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I. CAUSES, CORRELATES AND CHANCE

A resume of some concepts.

Alan E. Treloar, Ph.D.

The notion that everything that happens is caused by something else seems so completely rational that any challenge of it must savor of useless quibbling. Scientists and laymen alike are apt to accept without question the idea that for every "effect" there is a "cause". All too frequently thoughtful persons seem unaware that there are pitfalls in this pattern of thinking. Does not scientific realism rest on some such premise?

In challenging the concept I am not laying claim to discernment beyond what lies within easy reach of simple analysis. But when an over-simplified notion like the older one of causation becomes so entrenched, it takes courage to believe that any pebble from my slingshot will ripple the still waters of complacency toward which it is directed. It is seriously recorded that a Goliath was slain by a youth with a pebble, so I shall try my aim. Certainly I have an advantage--the pool I would disturb is vast enough!

It should be a challenging experience to fill out the cause of death section on the official death certificate. I am not thinking of the triumph that transmutes the body again to vitality as a statistic. I am seriously concerned with the fundamental problem of setting down a cause for something that has happened. Certifying that a death was caused by something else is a very acceptable illustration of a broader point at issue.

The physician's task in certifying as to the cause of death must in many instances be onerous. Any temptation to circumvent unwelcome decisions between alternatives by dismissing the whole issue as an irrelevant nuisance should be recognized as a temptation to shirk obligations which go far beyond the immediate situation. The American Medical Association has ever led the fight for good mortality statistics as a first re-

quirement in keeping account of this country's vital capital and health needs. Through the cause of death entry on the death certificate the decedent continues to serve the nation as a unit in a frame of reference, as a guide to the medical profession in measuring gains made or yet to be made, in defining problems waiting to be unravelled. The physician has a duty here to the future as well as to the patient he has been striving to serve. But that duty cannot be well executed without clear understanding of

- a) what a cause is, and
- b) what purpose is to be served by the cause of death certification

If, from any experience whatever, you have come to wonder what is the appropriate cause to be entered on the death certificate, you have come to the point where I am waiting to meet you. First, I shall attempt to define the broader issue, of which cause of death certification is but one illustration. There is only one position I feel able to defend with respect to cause assignment in general. Settlement of any particular issue in cause of death certification would, for my part, merely express my attempt to conform to the principles so established.

First, a definition: Causes of an event are simply antecedents to that event in a chain which runs back endlessly into past time. There is no such thing as a cause of an event in the sense that there is one and only one cause. Every death, for instance, has so many antecedents contributing to it that the designation of just one of them as the cause of death is a declaration of faith in the importance of that one event. Surely it is apparent that that faith must be founded on conviction of a purpose to be served, but we will return to this later. The immediate concern is the realistic concept of causes which I have attempted to define.

When a child is observed to throw a stone through a window the known sequence of events leaves no doubt as to the cause of the broken window from the point of

view of where the claim for damage should be lodged. If the child were consulted as to motives, the appropriateness of the first and more obvious cause assignment might be reconsidered. Indeed, the previous confidence in a cause assignment might be shattered as thoroughly as the pane of glass.

A physical chemist in laboratory experiment makes a measured volume of gas contract by applying pressure to it. The amount of contraction observed is not a response only to the pressure applied unless all other influential factors are held constant. But this is physically impossible, since the observer cannot perfectly control himself, even if he succeeds in mastering all else. Contraction of the gas is not caused by the pressure alone, but by a complex in which the dominant factor is pressure. We may make observations on the two selected variables, pressure and volume, varying the former over a range of values while striving to hold temperature constant. The relationship between the two variables will be observed to be approximately reciprocal. We observe a correlation, and may define it with great care, but we certainly do not demonstrate that the changes in pressure cause the responses in volume.

These illustrations point to a generalization with which I have not found any experience inconsistent, and so that all-encompassing concept is nurtured. We observe correlations, and are at all times entitled to give those observations the full confidence they merit. We never observe causation. A correlate becomes a cause only when we have demonstrated that it alone will produce a certain result. This, in reality, is unattainable because there are always other contributors to observed results, even if they be no more than what we may perhaps be too ready to discuss as controllable errors. Causation is a matter of abstraction, a concept, which when stated with precision will acknowledge that recognized factors (such as pressure in our previous illustration) are logically to be regarded as members of a causative system (such as that determining the gas volume observations).

Let us return to medical affairs and reflect for a moment or two on the train of events preceding the death of a person whom we shall call J. As a child J had an illness which today should be diagnosed as rheumatic fever, but in his infancy there was only indecision as to what it was. Some signs of possible heart trouble appear later in life, but J gets along nicely until he is involved in an automobile collision. His injuries include laceration and considerable loss of blood. Tourniquets stop the latter, but he dies in the ambulance on the way to hospital. The cause of death entered by the coroner on the death certificate refers only to accidental death in an automobile collision. But an autopsy at the hospital revealed considerable heart damage. Indeed the autopsy findings in the pathologist's view would have been amply sufficient, along with the tensions immediately prelude to the collision, to provide a more logical reason for the death than external trauma and loss of blood. And the heart damage is certainly traceable to the unrecognized rheumatic fever. Is the death certificate wrong in its medical certification of the cause of death?

A categorical "No!" as answer to this question would come at once from many quarters, especially where there is keen interest in accident statistics. Others would be equally emphatic with a contrary view, and not without equally valid supporting argument. The point that concerns us here especially is not the correctness of either answer, but rather that specification of a cause of death is an empirical selection among a host of possibilities. In its totality, the path of antecedent factors, ever widening as it is traced through past time, can only add more fuel to the fire of controversy, more claimants to consideration. There is no one cause for any death. To suggest an incident such as birth as the ultimate cause of every death may lighten the discussion with facetiousness, but no more.

I am not ready to assert that no one can cook up an illustration wherein an end result X is determined by A alone, no other factors such as B, C, D, et

cetera, playing a part. Argument not infrequently plagues rationality with such ghosts. But I will propose that in factual life situations, such illustrations will be so hard to find that the pursuit of them seems utterly pedantic. Opposed to the unique cause idea is the alternative of multiple causation, a concept so rich in realism that its acceptance is not questioned. The unique cause situation is a limit in simplification which is, in fact, never reached.

This brings us to consideration of the question: "Is it appropriate to consider each factor in a causative system as a partial cause." I am tempted to reconcile my approach to these matters with what is going on, by answering in the affirmative. But I am not happy about that response because of the danger of slipping back into the earlier notion of causes. This has engulfed so many, it seems, that the solution should be shunned. It would be helpful to choose the word "contributor" instead of cause. The idea that any one factor only partially specifies causation must ever be before us.

I must not leave the emphasis on cause in today's subject without commenting on an issue raised in connection with causes of death. It was contended earlier that clarification of the purpose to be served by cause of death certification seemed essential to having the job well done. That the job is not well done at present is known by more than the physician taking short cuts to avoid difficulties. Before an audience such as this, which certainly should be free of culprits of that kind, it would be safe to admonish the absent for reprehensible conduct. But I cannot avoid following a path which leads in a somewhat opposed direction. This does not mean in any way that I condone what goes on to make cause of death certifications less valuable than they might be. But in all frankness, let it be admitted that selecting a cause from a wide battery of possibilities will savor of guessing in the dark unless there is light shed on the issue by clearly defining the purpose which is to be served by the selection.

The point of view has been advanced that any cause of death assignment is an

empirical selection, and the choice must be expected to be influenced if not determined by what the physician wishes to accomplish in making it. Was the A.M.A. striving for a picture of what the health problems of the nation were when it championed medical certification of causes for death? If so, and if the rallying of other forces under that banner was because the A.M.A. objective seemed worthy of support, we are partly oriented to our problem.

We recognize of course that this approach will not define all health problems, but lacking other sources of full coverage for health records this must seem an attack to be made. Presumably then an inventory of deaths is sought that will point up the problems about which something needs to be done. There is reason to infer that this has been the basic philosophy, since the onus has always been given to the certifying physician to indicate the cause to which he believes the death should be assigned. The point that there is a choice to be made among alternatives has been clearly indicated by the sequence of events idea, expressed perhaps as "immediate cause due to due to" This effort to get away from giving just the last straw (such as terminal pneumonia) as the sole cause of death had to be accompanied by another move to have the physician indicate what has been called the "underlying cause." The request that he mark that one by underlining it proved of no avail--the physician nearly always ignored the underlining instruction. So, a joint cause manual had to be drawn up to give the coders a sensible set of rules to follow in making a selection. That device at least had the advantage of establishing uniformity in a procedure otherwise marked by too much of everybody's whimsy.

The last revision of the death certification strives to reestablish the physician's choice by requiring him to put the underlying cause last in the sequence. I am not in a position to judge what degree of success has accompanied this effort. So far, rumblings about upsetting factors involved in revisions of forms override gentler and more pleasing

sounds if there be such in the air. But it seems to be clear that devices like underlining, or position in a sequence, can be of little avail to achieve an objective without clear statement of the purpose to be served in cause of death certification, and thorough education of the medical profession with respect to those purposes.

Now to return to the principle theme. With replacement of the notion of simple causation by that of multiple contributors, we must rely on correlation analysis to reveal the nature and define the extent of association between contributor variables and results. These techniques of correlation study we are perhaps well aware of. Outcomes of applying them are sometimes disappointing, sometimes impressive. But whether those correlations be good or poor we must remember that all we observe is correlation. Slipping over into the inference of causation is a real peril against which we should defend ourselves with every precaution. For while we must logically expect correlation to link partial causes with their effects, all correlations do not by any means imply such relationships. Even the physicist has learned that such goals are attained in abstraction only, that reality is always attended by residual variations belonging to an unresolved complex which he usually designates as "error". The biologist, and especially the medical scientist, has been puzzled if not confounded by the relative magnitude of such unresolved complexes. They obscured his attempted demonstrations rather than accompanied them as dismissable errors. In struggling with them he (the biologist) came to realize far in advance of the physicist that such complexes were but part of a causative system, an unresolved intricacy of forces for which he uses the term "chance." We understand, of course, that "chance" is more than just errors in the sense of measurement difficulties experienced by an exact scientist. Chance almost certainly includes errors running at a much higher level than the laboratory worker is accustomed to admitting. But it includes much more--forces, uncontrollable if not also unknown, which are operating to produce considerable effect on the results observed--forces which are part,

of course, of the causative system leading to those results.

It must be a hopeless pursuit, in the very nature of things, to attempt to define completely any causative system. We are forever engaged in tracing associations between variables with hope running on a more or less high level that the exploration will be profitable. There is an almost infinite complexity of physical and chemical action and reaction involved in the functioning of a human being in any situation. We should not expect to do more than detect principle contributors, to single out the more important factors in terms of which we can perhaps influence results. What is observed, the facts that are recorded, these things serve to define correlations only. Causation is more than ever an abstract concept developed from a basis of experimentation establishing the fact that the contributor is a necessary antecedent of the result. The scientific journals are not without blemish in transgressing this simple principle.

Correlation has been observed between the frequency with which cancer arises in certain sites and the type and amount of smoking indulged by the host. This is naturally a matter of concern because thoughts turn immediately on the possibilities of causation. Doubts concerning reliability or adequacy of the evidence seem to be founded in hope of turning up something to the contrary rather than in deficiency in the evidence itself. But I am not here to debate that. The point I am concerned with is that the extra evidence being sought so avidly on a national scale by other related lines of observation can only confirm or refute the correlation. The new evidence will not, cannot, establish anything more than more information on correlation. It is folly to jump to conclusions of the causation kind until it is demonstrated that removal of the smoking habit decreases incidence of the disease at the specified sites. The smoking habit and the specified cancers may perhaps be responses to causative systems having factors in common. Because of this a correlation may well arise between these two variables without either one being in any

sense a cause of the other. With such points so obvious it is hard to understand why people so commonly move almost precipitously from observation of correlation to inference about causation.

The recorded incidence of poliomyelitis has risen remarkably since World War I, along with cigarette production. The correlation exists, but who wishes to infer causation? If instead of cigarette production we shift to consumption of soft drinks, would the argument of causation be any more valid? One propagandist at least has thought so and has widely disseminated literature seeking to curb the evil influence of consuming carbonated beverages. Alcoholic drinks do not escape from the fury of the onslaught, but interestingly enough the campaign stops there. Milk is free from attack, but most assuredly not from the same cor-

relation which is supposed to prove the argument against beverages of different origin.

There is much serious interest in the causes of heart disease. The explorations on this frontier are implemented with all sorts of resources, from the humble drive of a professor with no more than himself to give, up to munificent grants from centers of aggregated wealth. Claims are made that causes have been indicated if not fully exposed when there is basis for doubt that even a correlation has been found. Chance plays devilish tricks with correlation when small numbers are involved. No appearance of correlation is worthy of serious regard if it could readily arise from chance effects alone. No correlation passing such a test ever, in itself, established causation.

II. MEDICAL SCHOOL NEWS

Coming Events

June 8-13 Continuation Course in Electrocardiography for General Physicians
June 8 Special Lecture; "The Auricular Arrhythmias;" Dr. Myron Prinzmetal, Los Angeles; Owre Amphitheater; 8:00 p.m.

* * *

Continuation Course

Electrocardiography will be the subject of a continuation course for general physicians which will be presented by the University of Minnesota from June 8 to 12 at the Center for Continuation Study. Emphasis will be placed on practical experience in the interpretation of electrocardiograms. Each registrant will have an opportunity to read approximately 200 tracings under the supervision of the teaching staff. Two well-known authorities in the field of electrocardiography will participate in the course as members of the guest faculty: Dr. Myron Prinzmetal, Associate Clinical Professor, Department of Medicine, University of California, Los Angeles, and Dr. Harry E. Ungerleider, Director of Medical Research, The Equitable Life Assurance Society, New York City. The remainder of the faculty will include members of the staff of the University of Minnesota Medical School and the Mayo Foundation.

* * *

Faculty News

The Department of Medicine was well represented at the recent meetings of the American Society for Clinical Investigation and of the Association of American Physicians which were held in Atlantic City May 4 through 6. Those attending included Doctors C. J. Watson, Wesley W. Spink, Carleton B. Chapman, Paul Frick, Rudi Schmid, B. J. Kennedy, Carl S. Alexander, James Dahl, Paul Winchell, Robert I. Wise, Robert Fraser, and Edmund B. Flink. Dr. Wise and Doris Serstock were co-authors of a paper entitled "Experimental and Clinical Studies on Small-Colony (G) Variants of Micrococcus Pyogenes Obtained with Antibiotics" which was presented by Dr. Wise during the A.S.C.I. meeting. Dr. Watson presented a paper entitled "Some Studies of the Nature and Clinical Significance of Porphobilinogen" - with Dr. Samuel Schwartz and Mrs. Violet Swenson as co-authors - at the A.A.P. meeting. Dr. Robert Fraser spoke on "The Work of the Right Ventricle in Interatrial Septal Defects" at the American Federation Meeting on May 3.

Pediatricians were similarly plentiful in Atlantic City from May 4 to 8. The Society for Pediatric Research met there on May 4 to 6 and the American Pediatric Society on May 6 to 8. Members of our Department of Pediatrics attending these meetings included: Doctors Irvine McQuarrie, Richard B. Raile, Paul Adams, Lewis W. Wannamaker, Rosalind Novick, Richard T. Smith, Robert A. Ulstrom, Robert A. Good, Floyd W. Denny, Howard Worthen, Wilmer Pew, Robert Disenhouse, Stanley Crawford, Eleanor Colle, and Elizabeth Drake.

Dr. Stewart C. Thomson, Assistant Director, School of Public Health, and Dr. Robert B. Howard, Director, Department of Continuation Medical Education, participated in the recent continuation course for Pharmacists which was held at the Center for Continuation Study.

Dr. Harold O. Peterson, Clinical Associate Professor of Radiology, conducted a refresher course on Neuroroentgenology for the American Academy of Neurology in

Chicago in the early part of April. On April 11 he spoke to the Detroit Roentgen Society at Grand Rapids, Michigan, on "Myelography." On April 29 he addressed the New Haven Medical Society, New Haven, Connecticut, on "Gastric Ulcers." The following day he spoke at the meeting of the Connecticut Valley Radiological Society on "The Skull" and "Myelography."

Dr. H. E. Michelson, Professor and Director of the Division of Dermatology, spoke at a meeting of the Barron-Washburn-Sawyer-Burnett County Medical Society in Rice Lake, Wisconsin, on May 12, where he presented a "Kodachrome Dermatology Clinic."

Dr. Ruth E. Boynton, Professor, School of Public Health, and Director, Students' Health Service, attended the annual meeting of the American College Health Association which was held in Columbus, Ohio, April 29 to May 2. She acted as moderator in a panel discussion on "Health Insurance Plans for Colleges."

Dr. Owen H. Wangenstein, Professor and Chairman, Department of Surgery, acted as Professor, pro tem, of the Department of Surgery at Ohio State University, Columbus, on April 20 and May 1. Dr. Wangenstein was also a guest of the Ogden Surgical Society in Ogden, Utah, from May 20 to 23.

* * *

Publications of the Medical School Faculty

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Borg, J. F.: Anticoagulants in Cardiovascular Disease. Minn. Med., 35: 1047, 1952.

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III.

UNIVERSITY OF MINNESOTA MEDICAL SCHOOL
WEEKLY CALENDAR OF EVENTS

Physicians Welcome

June 1 - 6, 1953

Monday, June 1

Medical School and University Hospitals

- 9:00 - 9:50 Roentgenology-Medicine Conference; L. G. Rigler, C. J. Watson and Staff; Todd Amphitheater, U. H.
- 9:00 - 10:50 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; W-612, U. H.
- 10:00 - 12:00 Neurology Rounds; A. B. Baker and Staff; Station 50, U. H.
- 11:30 - Tumor Conference; Doctors Kremen, Moore, and Stenstrom; Todd Amphitheater, U. H.
- 11:30 - 12:30 Physical Medicine Seminar; Clinical Use of the Electromyograph; R. S. Blanchard; Heart Hospital Auditorium.
- 12:15 - Obstetrics and Gynecology Journal Club; Staff Dining Room, U. H.
- 12:30 - Physiology and Physiological Chemistry Seminar; Studies on Absorption of Water from the Intestine; J. S. Lee; 214 Millard Hall.
- 1:30 - 2:30 Pediatric-Neurological Rounds; R. Jensen, A. B. Baker and Staff; U. H.
- 4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room; Heart Hospital.
- 4:30 - Public Health Seminar; 15 Owre Hall.
- 4:30 - 6:00 Physiology 114A and Cancer Biology 140 -- Research Conference on Cancer, Nutrition, and Endocrinology; Drs. Visscher, Bittner, and King; 129 Millard Hall.
- 5:00 - 6:00 Urology-Roentgenology Conference; C. D. Creevy, O. J. Baggenstoss, and Staff; Eustis Amphitheater.

Ancker Hospital

- 8:30 - 10:00 Tuberculosis and Chest Conference; Auditorium.
- 2:00 - 3:00 Surgery Journal Club; Classroom.

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Eldon Berglund; Newborn Nursery, Station C.
- 10:30 - 12:00 Tuberculosis and Contagion Rounds; Thomas Lowry; Station M.
- 11:00 - Pediatric Rounds; Erling Platou; Station K.
- 12:30 - Surgery Grand Rounds; Dr. Zierold; Sta. A.
- 1:00 - X-ray Conference; Classroom, 4th Floor.
- 2:00 - Pediatric Rounds; Robert A. Ulstrom; Stations I and J.

Monday, June 1 (Cont.)

Veterans Administration Hospital

- 1:30 - Cardiac Rounds; Drs. Ebert and Berman, and Richards.
- 4:00 - ECG Conference; Drs. Ebert, Berman, and Simonson.

Tuesday, June 2

Medical School and University Hospitals

- 9:00 - 9:50 Roentgenology-Pediatric Conference; L. G. Rigler, I. McQuarrie and Staff; Eustis Amphitheater, U. H.
- 9:00 - 12:00 Cardiovascular Rounds; Station 30, U. H.
- 12:30 - 1:20 Pathology Conference; Autopsies; J. R. Dawson and Staff; 102 I. A.
- 12:30 - 1:30 Physiology 114D -- Current Literature Seminar; 129 Millard Hall.
- 4:00 - 5:00 Pediatric Rounds on Wards; I. McQuarrie and Staff; U. H.
- 4:30 - 5:30 Clinical-Medical-Pathological Conference; Todd Amphitheater, U. H.
- 4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.
- 5:00 - 6:00 X-ray Conference; Presentation of Cases from General Hospital; Drs. Lipschultz and Blank; Eustis Amphitheater, U. H.

Ancker Hospital

- 9:00 - 10:00 Medical X-ray Conference; Auditorium.

Minneapolis General Hospital

- 10:00 - Pediatric Rounds; Spencer F. Brown; Stations I and J.
- 10:30 - 12:00 Medicine Rounds; Thomas Lowry and Staff; Station F.
- 12:30 - Grand Rounds; Fractures; Willard White, et al; Sta. A.
- 12:30 - Neuroroentgenology Conference; O. Lipschultz, J. C. Michael and Staff.
- 12:30 - EKG Conference; Boyd Thomes and Staff; 302 Harrington Hall.
- 1:00 - Tumor Clinic; Drs. Eder, Cal, and Lipschultz.
- 1:00 - Neurology Grand Rounds; J. C. Michael and Staff.

Veterans Administration Hospital

- 7:30 - Anesthesiology Conference; Conference Room, Bldg. I.
- 8:45 - Surgery Journal Club; Conference Room, Bldg. I.
- 9:30 - Infectious Disease Rounds; Drs. Hall and Zinneman.
- 9:30 - Surgery-Pathology Conference; Conference Room, Bldg. I.
- 10:30 - Surgery-Tumor Conference; L. J. Hay, J. Jorgens; Conference Room, Bldg. I.
- 1:00 - Review of Pathology, Pulmonary Tuberculosis; Conference Room, Bldg. I.

Tuesday, June 2 (Cont.)

Veterans Administration Hospital (Cont.)

- 1:30 - Combined Medical-Surgical Chest Conference; Conference Room, Bldg. I.
2:00 - 2:50 Dermatology and Syphilology Conference; H. E. Michelson and Staff;
Bldg. III.

Wednesday, June 3

Medical School and University Hospitals

- 8:00 - 9:00 Roentgenology-Surgical-Pathological Conference; Paul Lober and L. G. Rigler; Todd Amphitheater, U. H.
11:00 - 12:00 Pathology-Medicine-Surgery Conference; Surgery Case; O. H. Wangensteen, C. J. Watson and Staffs; Todd Amphitheater, U. H.
12:30 - 1:30 Physiology 114C -- Permeability and Metabolism Seminar; Nathan Lifson; 129 Millard Hall.
1:30 - 3:00 Physiology 114B -- Circulatory and Renal System Problems Seminar; Dr. M. B. Visscher, et al; 214 Millard Hall.
4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.
5:00 - 5:50 Urology-Pathological Conference; C. D. Creevy and Staff; Eustis Amphitheater.
8:00 - 10:00 Dermatological-Pathology Conference; Review of Histopathology Section; R. Goltz; Todd Amphitheater, U. H.

Ancker Hospital

- 8:30 - 9:30 Clinico-Pathological Conference; Auditorium.
12:30 - 1:30 Medical Journal Club; Library.

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Max Seham; Stations I and J.
10:30 - 12:00 Medicine Rounds; Thomas Lowry and Staff; Station D.
11:00 - Pediatric Seminar; Arnold Anderson; Classroom, Station I.
11:00 - Pediatric Rounds; Erling S. Platou; Station K.
12:00 - Surgery Seminar; Dr. Zierold; Classroom.
12:15 - Pediatric Staff Meeting; Classroom, Station I.
1:30 - Visiting Pediatric Staff Case Presentation; Station I, Classroom.

Veterans Administration Hospital

- 8:30 - 10:00 Orthopedic X-ray Conference; E. T. Evans and Staff; Conference Room; Bldg. I.
8:30 - 12:00 Neurology Rehabilitation and Case Conference; A. B. Baker
9:00 - Gastro-Intestinal Rounds; Drs. Wilson, Nesbitt, Zieve, Hay and Goodnow.

Wednesday, June 3 (Cont.)

Veterans Administration Hospital (Cont.)

- 12:30 - X-ray Conference; J. Jorgens; Conference Room, Bldg. I.
2:30 - 4:00 Psychosomatic Rounds; C. K. Aldrich; Conference Room, Bldg. I.
4:00 - Combined Medical Surgical Conference; Drs. Flink and Hay; Conference Room, Bldg. I.
7:00 p.m. Lectures in Basic Science of Orthopedics, Conference Room, Bldg. I.

Thursday, June 4

Medical School and University Hospitals

- 8:00 - 9:00 Vascular Rounds; Davitt Felder and Staff Members from the Departments of Medicine, Surgery, Physical Medicine, and Dermatology; Heart Hospital Amphitheater.
9:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.
11:00 - 12:00 Cancer Clinic; K. Stenstrom and A. Kremen; Todd Amphitheater, U. H.
12:30 - Physiological Chemistry Seminar; Introduction to Scientific Research-- Search of Literature; M. Goldfine; 214 Millard Hall.
1:30 - 4:00 Cardiology X-ray Conference; Heart Hospital Theatre.
4:00 - 5:00 Physiology-Surgery Conference; Todd Amphitheater, U. H.
4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.
5:00 - 6:00 Radiology Seminar; Rib Changes Noted After Ineffective Blalock-Taussig Operation; Bertram Levin; Eustis Amphitheater, U. H.
7:30 - 9:30 Pediatric Cardiology Conference and Journal Club; Review of Current Literature 1st hour and Review of Patients 2nd hour; 206 Temporary West Hospital.

Ancker Hospital

- 8:00 - 10:00 Medical Grand Rounds; Auditorium.

Minneapolis General Hospital

- 9:30 - Neurology Rounds; Heinz Bruhl; Station I.
10:00 - Pediatric Rounds; Spencer F. Brown; Station K.
10:00 - Psychiatry Grand Rounds; J. C. Michael and Staff; Sta. H.
11:30 - 12:30 Clinical Pathological Conference; John I. Coe; Classroom.
1:00 - Fracture - X-ray Conference; Dr. Zierold; Classroom.
1:00 - House Staff Conference; Station I.
2:00 - 4:00 Infectious Disease Rounds; Classroom.
4:00 - 5:00 Infectious Disease Conference; Wesley W. Spink; Classroom.

Thursday, June 4 (Cont.)

Veterans Administration Hospital

- 8:00 - Surgery Grand Rounds; Conference Room, Bldg. I.
8:00 - Surgery Ward Rounds; Lyle Hay and Staff; Ward 11.
11:00 - Surgery-Roentgen Conference; J. Jorgens; Conference Room, Bldg. I.
1:00 - 3:00 Metabolic Disease Conference; Drs. Flink, Heller, and Jacobson, and Bolin.

Friday, June 5

Medical School and University Hospitals

- 8:00 - 10:00 Neurology Grand Rounds; A. B. Baker and Staff; Station 50, U. H.
9:00 - 9:50 Medicine Grand Rounds; C. J. Watson and Staff; Todd Amphitheater, U. H.
10:00 - 11:00 Pediatric Grand Rounds; Irvine McQuarrie and Staff; Eustis Amphitheater, U. H.
10:30 - 11:50 Medicine Rounds; C. J. Watson and Staff; Todd Amphitheater, U. H.
10:30 - 1:50 Otolaryngology Case Studies; L. R. Boies and Staff; Out-Patient Department, U. H.
11:45 - 12:50 University of Minnesota Hospitals Staff Meeting; How the University of Minnesota School of Nursing Meets Nursing Needs; Katharine J. Densford; Powell Hall Amphitheater.
1:00 - 2:50 Neurosurgery-Roentgenology Conference; W. T. Peyton, Harold O. Peterson and Staff; Todd Amphitheater, U. H.
3:00 - 4:00 Neuropathological Conference; F. Tichy; Todd Amphitheater, U. H.
4:00 - 5:00 Physiology 124 -- Seminar in Neurophysiology; Ernst Gelhorn; 113 Owre Hall.
4:30 - 5:20 Ophthalmology Ward Rounds; Erling W. Hansen and Staff; E-534, U. H.
4:30 - ECG Reading Conference; James C. Dahl, et al; Staff Room, Heart Hospital.
5:00 - Urology Seminar and X-ray Conference; Eustis Amphitheater, U. H.

Ancker Hospital

- 1:00 - 3:00 Pathology-Surgery Conference; Auditorium.

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Wallace Lueck; Station J.
10:30 - Pediatric Surgery Conference; Oswald Wyatt; Tague Chisholm; Station I, Classroom.
12:00 - Surgery-Pathology Conference; Dr. Zierold, Dr. Coe; Classroom.
1:00 - 3:00 Clinical Medical Conference; Thomas Lowry; Classroom, Station M.
1:15 - X-ray Conference; Oscar Lipschultz; Classroom, Main Bldg.
2:00 - Pediatric Rounds; Robert Ulstrom; Stations I and J.

Friday, June 5 (Cont.)

Veterans Administration Hospital

- 10:30 - 11:20 Medicine Grand Rounds; Conference Room, Bldg. I.
1:00 - Pathology Slide Conference; E. T. Bell; Conference Room, Bldg. I.
2:00 - Autopsy Conference; E. T. Bell and Donald Gleason; Conference Room, Bldg. I.

Saturday, June 6

Medical School and University Hospitals

- 7:45 - 8:50 Orthopedic X-ray Conference; W. H. Cole and Staff; M-109, U. H.
9:00 - 10:00 Infertility Conference; Louis L. Friedman, David I. Seibel, and Obstetrics Staff; Eustis Amphitheater, U. H.
9:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; Heart Hospital Amphitheater.
9:15 - 10:00 Surgery-Roentgenology Conference; L. G. Rigler, J. Friedman, Owen H. Wangenstein and Staff; Todd Amphitheater, U. H.
10:00 - 11:30 Surgery Conference; Todd Amphitheater, U. H.
10:00 - 12:50 Obstetrics and Gynecology Grand Rounds; J. L. McKelvey and Staff; Station 44, U. H.
11:30 - Anatomy Seminar; The Hippocampus of Sorex Cinereus; Jennifer Buchwald; 226 Institute of Anatomy.

Ancker Hospital

- 8:30 - 9:30 Surgery Conference; Auditorium.

Minneapolis General Hospital

- 8:00 - Urology Staff Conference; T. H. Sweetser; Main Classroom.
11:00 - 12:00 Medical - X-ray Conference; O. Lipschultz, Thomas Lowry, and Staff; Main Classroom.

Veterans Administration Hospital

- 8:00 - Proctology Rounds; W. C. Bernstein and Staff; Bldg. III.
8:30 - 11:15 Hematology Rounds; Drs. Goldish and Bolin, and Howard.
11:15 - 12:00 Morphology Dr. Aufderheide, Conference Room.