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UNIVERSITY OF MINNESOTA

Medical Bulletin

OFFICIAL PUBLICATION OF THE
UNIVERSITY OF MINNESOTA HOSPITALS
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IN THIS ISSUE:

University of Minnesota Medical Bulletin

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Staff Meeting Report

Chlorpromazine and Reserpine in Psychiatry*

Burtrum C. Shiele, M.D.,[1] Richard W. Anderson, M.D.,[2] and Werner Simon, M.D.[3]

Drugs to relieve anxiety and calm disturbed behavior have been sought for many years. Until recently, however, all effective agents were soporific, and only inadequate doses would allow psychotherapy and other useful activities to continue.

Chlorpromazine and reserpine are unique in producing quietude with little or no clouding of consciousness. These drugs are the best now available for acute excitement. Some chronic psychoses are also improved. Therapeutic value is more doubtful in office than in hospital treatment. Some persons are not helped even by large doses, and others become more restless. Annoying and occasional serious untoward reactions may occur, particularly with the more rapid and potent chlorpromazine. Depression is not lightened by either compound. Moreover, no drug can solve life's problems or alter basic personality. Treatment must also include learning, working out difficulties, and maturation, however ably assisted by medical adjuncts.

Pharmacology

Chlorpromazine is a synthetic derivative of phenothiazine and is structurally related to an antihistamine. The drug depresses the central and autonomic nervous systems and, in most people, potentiates the action of anesthetics, sedatives, analgesics, narcotics, and alcohol. Apparently, tranquilization is produced by increased cortical inhibition of the brain stem. Epinephrine is blocked strongly, and histamine, acetylcholine, noradrenalin, and serotonin less so. Oral, parenteral, and rectal doses are readily absorbed. Effects seem to vary with autonomic response, which differs widely from one person to the next.

Reserpine, an alkaloid from the whole root of *Rauwolfia serpentina Benth,* reduces activity of sympathetic regulating centers, prob-

*This is an abstract of a report given at the Staff Meeting of the University of Minnesota Hospitals on January 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, Minnesota.

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ably by interfering with impulses to these centers, without actual ganglionic or adrenergic blockade. Parasympathetic predominance results, as shown by hypotension, hypothermia, miosis, bradycardia, and heightened gastrointestinal activity. Reserpine, however, may influence the central nervous system far more widely by intensifying cortical inhibition of diencephalic structures in the brain stem.

Clinical Uses

The tranquilizing drugs soothe and relax without causing euphoria. Adequate doses quiet the excited individual in a few hours producing a state in which he sleeps readily and long, yet is awakened easily and then is mentally clear and agreeable and has good motor coordination in spite of a rather drowsy mien.

Tension and agitation subside in many psychoses and psychoneuroses of children and adults. Symptoms may be relieved for days, weeks, or longer in these states. In delirium, the turbulent phase of manic-depression, and certain acute schizophrenic and panic states, one course of treatment may terminate the episode.

The peace of mind produced results in more successful life experiences which in turn encourage further improvement. Symptomatic relief, the diminution of suffering, serves as an aid to more fundamental psychotherapy.

The agitated senile group, which scarcely responds to causal methods, may be quieted for long periods in a gratifying way. Many state hospitals with thousands of patients with chronic disorders now employ electroshock and insulin less frequently. Calming medication is safer, pleasanter, and easier to administer. Some patients have been helped who previously failed to improve with shock therapy and/or lobotomy. Expense is considerable but is offset by savings through reduced property destruction. As patients become less disturbed, physicians, nurses, and others can devote more time to basic therapy. More favorable results are expected when marked tension is present and the illness is of relatively short duration. In some cases, maintenance administration may be required indefinitely.

Chlorpromazine may be given before or with insulin or electroshock and may reduce the number of treatments. Reserpine is contraindicated wtih electroconvulsions, owing to risks of apnea and vasomotor collapse.

Reserpine relieves the symptoms of Huntington's chorea. Chlorpromazine relieves nausea, vomiting, and by potentiating analgesics, aids in the relief of refractory pain.

As a general rule, simple schizophrenia, most cases of depression, and obsessive-compulsive psychoneuroses do not respond favorably to either agent.

Dosages

Psychiatric doses of chlorpromazine usually far exceed the amounts given in general medical practice. As yet, no standard treatment procedure has been worked out.

Intensive treatment in a psychiatric hospital may involve doses gradually increasing to a maximum of 4000 mg. per day for 10 to 20 days, followed by a gradual reduction to a maintenance dose of 200 to 400 mg. per day. A more common practice is to use doses of less than 1000 mg. daily for a longer period of time. In every case, the dose of either drug should be adjusted up or down according to symptomatic improvement and side effects.

Both agents are given most freely to hospitalized psychotic patients. Ambulatory patients with neuroses may receive 75 to 150 mg. of chlorpromazine daily by mouth. Oral reserpine, 1 to 8 mg. daily, acts more slowly. Neither drug acts as rapidly as barbiturates, and for prompt relief each may be given intramuscularly. Delirium tremens may be relieved dramatically with a few injections of chlorpromazine.

Reserpine is commonly administered intramuscularly for three or four days, 2.5 to 5 mg. twice daily, then given orally. Most of the disturbed patients need only 8 or 10 mg. per day by either route; up to 130 mg. daily has been tolerated.

Side Reactions

Chlorpromazine is generally tolerated in very high dosage without much discomfort or difficulty. Drowsiness, palpitation, vertigo on arising, nasal stuffiness, constipation, weakness of the legs, miosis, and pain at the site of injection often develop but seldom require interruption of treatment. Less frequent are epigastric distress or vomiting, hypotensive fainting, diarrhea, accommodative and other visual disorders, stomatitis from chewed pills, engorged breasts and lactation. Contact dermatitis sometimes occurs in nurses who handle solutions of chlorpromazine.

Reactions usually vanish in a week or two, even during medication. If stopped, the drug is often resumed without provoking former side effects. When necessary, drowsiness may be reduced by amphetamine or a similar drug Severe hypotension and palpitation may re-

quire bed rest and gradual return to activity. Elderly people must be observed closely for possible syncope, which may develop early in treatment.

More serious complications may warrant withdrawal of medication. A maculopapular rash in the first twenty days usually subsides on reduction or intermission of dosage for a week or two. To prevent solar erythema, sunlight should be avoided until sensitivity is determined.

Obstructive jaundice with stasis in the biliary tree is watched for in the first six weeks of therapy, and urine is tested weekly for bile. When icterus appears the drug is stopped. Most jaundice clears rapidly but some instances are more persistent and severe.

Agranulocytosis develops in less than 1 case per 100,000, usually in women and after five to six weeks on small to moderate dosage. Ambulatory patients should report any fever, sore throat, or other symptoms, and occasional white cell counts are made in the first two months.

Neurologic reactions are Parkinsonism, especially after several weeks of high dosage, dystonia, and rarely great confusion or convulsions. All symptoms clear within a few weeks after discontinuance of therapy. Hyperpyrexia with grippe-like symptoms has been reported, including a fatal instance.

Reserpine also frequently induces sleepiness, weakness and aching of the legs, nasal stuffiness, and hypotension. Common reactions to reserpine but not expected with chlorpromazine are salivation, bradycardia, nausea, vomiting, and diarrhea Infrequently observed are coryza; flushing of the face and sclerae; edema of the face, hands, and feet; polydipsia and polyuria; and syncope. Treatment of these reactions is seldom required, and many may be counteracted or prevented by concurrent use of chlorpromazine.

A more serious complication is Parkinsonism, which often develops coincident with psychiatric improvement. Symptoms may be relieved by lowering the dose and adding methanesulfonate (Cogentin) or a similar compound.

A depressive reaction sometimes occurs in patients with a history of previous depression, tension, or anxiety and often complicates long term administration for relief of hypertension. Amphetamine or electroshock may be required, but most reactions subside if reserpine is halted. Mental confusion after large doses is serious and demands at least temporary withdrawal of the drug.

Staff Meeting Report

Cardiac Lesions in Rabbits: Production by Cross Circulation or Temporary Arteriovenous Shunts*†

Richard L. Davis[1] and Joel G. Brunson, M.D.[2]

Several human diseases with overlapping clinical aspects have diagnostically important lesions that contain fibrinoid. This hyaline substance appears in such ailments as rheumatic fever, lupus erythematosus, polyarteritis, scleroderma, dermatomyositis, and thrombotic thrombocytopenic purpura. Similar fibrinoid changes have been produced in rabbits by bacterial endotoxin and certain acidic polymers of high molecular weight Development is so rapid and widespread, however, that mortality is high, preventing lengthy observation.

The present paper deals with a technic of localizing fibrinoid to a single organ, the heart, for more thorough study. The basic procedure is temporary arteriovenous anastomosis. Methods of this type may permit closer scrutiny of the pathologic sequences which occur in the systemic fibrinoid diseases of man.

Fibrinoid was first described in 1880 but has been examined minutely only in the last few years. Location, form, and staining qualities are distinctive. Microscopically, the material appears homogeneous, refractile, and acidophilic.

When rabbits are given two properly spaced intravenous injections of meningococcal toxin, renal glomerular capillaries are occluded by fibrinoid substance and bilateral cortical necrosis develops, apparently as a result of ischemia. The hyaline compound is seen in capillary loops as early as two hours after the second injection. A single dose of toxin preceded by cortisone has comparable effects on the kidneys.

After infection of rabbits with Group A streptococci or with pneumococci, intravenous endotoxin produces fibrinoid in the heart valves

*This is an abstract of a report given at the Staff Meeting of the University of Minnesota Hospitals on February 3, 1956. A copy of the complete report, including tables and references, may be obtained by writing to the Editor, UNIVERSITY OF MINNESOTA MEDICAL BULLETIN, 1342 Mayo Memorial, Minneapolis 14, Minnesota.

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†These studies were supported by grants from the Minnesota Heart Association and the American Heart Association.

and coronary walls, as well as renal cortical necrosis.

These cardiac changes occasionally ensue after a single injection of endotoxin not preceded by infection, and occur regularly after two injections. As reported by others, vascular alterations following a single administration may favor localization of fibrinoid in arteries and valves.

Morphologic study supports the idea that fibrinoid or its precursors may be formed in and deposited from the blood. Further evidence is the fact that diffuse fibrinoid lesions are produced by acidic polymers administered in conjunction with endotoxin. These same polymers precipitate fibrinogen *in vitro* and *in vivo*, implying that fibrinogen may be concerned in elaboration of fibrinoid. Moreover, a heparin-precipitable protein is noted in rabbit plasma after an intravenous injection of endotoxin. The protein is apparently an altered form of fibrinogen. This material almost completely vanishes after a dose of acidic polymer, and at the same time, blood fibrinogen drops. Both changes have been correlated with diffuse fibrinoid lesions in rabbits.

Finally, when isolated kidneys are perfused with blood of suitably prepared animals, typical fibrinoid material is deposited in the perfused organ, demonstrating that a forerunner of fibrinoid itself is blood-borne.

With each of the experimental procedures mentioned, lesions of many tissues and organs resulted in prompt death of the experimental animal. The possibility of confining damage to the heart was suggested by experiments in cross circulation, when fibrinoid was seen in coronary arteries and heart valves of control animals.

Accordingly, localized acute lesions containing fibrinoid were produced in cardiac vessels and valves of rabbits by carotid-jugular cross circulation between paired animals. In a modified technic, carotid-jugular shunt was done in individual animals. Small amounts of heparin were employed as anticoagulants. Results of the first trials led to use of large amounts, which greatly reduced the incidence of fibrinoid in lesions.

Procedures were also modified by addition of Liquoid, a powerful anticoagulant, of meningococcal endotoxin, or of cortisone, all of which caused fibrinoid involvement of organs other than the heart.

Materials and Methods

Nearly 200 rabbits were employed. Animals died or were killed within ninety-six hours after short periods of vascular anastomosis.

Autopsy was done, tissues were fixed in formalin, and sections were obtained from the heart, lungs, kidneys, adrenal glands, spleen, liver, and skeletal muscle. Specimens were prepared by various methods, in addition to routine hematoxylin and eosin staining.

Meningococcal endotoxin was diluted 1:80 with sterile, pyrogen-free isotonic saline, and 2 cc. was injected into the marginal ear vein. Sodium polyanetholsulfonate (Liquoid-Roche) was dissolved in saline, filtered, and injected into the ear vein in doses of 8 mg. Heparin sodium was injected in a concentration of 10 mg. per cubic centimeter. Cortisone acetate was injected intramuscularly, 25 mg. daily for four days, and the cross circulation procedure was done on the fourth day.

Cross circulation was carried out in 116 animals. The carotid artery of one rabbit was connected by polyethylene tubing to the external jugular vein of a second, and the carotid artery of the second animal to the jugular vein of the first. Cross flow continued for different periods not exceeding 35 minutes.

Arteriovenous shunt was done in 48 subjects. The carotid artery and external jugular vein of each rabbit were joined by tubing for a maximum of thirty minutes.

Of 30 control rabbits, 10 received 10 mg. of heparin, and the carotid artery and jugular vein were cannulated without shunting. Heparin was given to 10 others, and 10 were used as absolute controls.

Results

Cardiac fibrinoid lesions occurred in every group except the controls. Rate and extent varied somewhat, and in some groups other lesions were noted. Heart changes were remarkably like those induced in former experiments by meningococcal endotoxin or by toxin combined with Liquoid. Areas of muscle necrosis, a reaction involving chiefly mononuclear cells, and hemorrhages were observed, as well as discrete perivascular lesions. Larger cells of Anitschkow type and some giant cells also appeared. Valvular lesions were chiefly mitral and aortic. Hemorrhage was frequent and associated with large mononuclears and many Anitschkow-like cells. Fibrinoid was present in the walls of coronary arteries, valves, pericardium, and endocardium.

Some hearts from control animals had significant myocardial or valvular alterations, and the remainder occasionally showed small areas of focal cellular reaction, but no fibrinoid lesions were seen. Other organs were involved only in subjects given Liquoid, endotoxin, or cortisone. Fibrinoid material was observed in the glomerular capillaries, splenic sinusoids, and pulmonary arteries, and focal necrosis was noted in the liver.

Discussion

Experimental results show that cardiac lesions containing fibrinoid can be produced in a high percentage of rabbits subjected to temporary carotid-jugular cross circulation or arteriovenous shunt.

Of the control group undergoing all procedures except actual shunt, 70% had cardiac changes, but none of these lesions contained fibrinoid. The role of mechanical and chemical agents in producing these changes is conjectural. When cross circulation was done with large doses of heparin, the incidence of fibrinoid was materially lowered, but the incidence of nonfibrinoid lesions was not. Thus chemical factors may well be decisive in the production of fibrinoid. Cross circulation may cause mechanical damage, much as the first injection of endotoxin brings diffuse changes before a second provokes development of fibrinoid.

The results of the earliest experiments suggested the use of a potent anticoagulant which causes diffuse fibrinoid lesions when combined with endotoxin. Liquoid, employed with cross flow or shunt, produced a high rate of renal and pulmonary lesions that eclipsed cardiac effects. This, in turn, implied that vascular cross flow or shunt might act like intravenous endotoxin. Therefore toxin was given both before and after anastomosis, using Liquoid or heparin as the anticoagulant. As expected, renal, splenic, and pulmonary fibrinoid developed in each group, supporting our hypothesis.

In a further test, cortisone was combined with cross circulation, to correspond with previous trials of cortisone and endotoxin. Here, too, splenic and pulmonary fibrinoid changes occurred, at a significant though not high rate.

Cross circulation and arteriovenous shunt evidently behave like either preparing or shocking doses of endotoxin; for addition of any compound tested evoked generalized fibrinoid reaction, of the type consistently produced by the same materials combined with bacterial agents.

Acute, localized cardiac fibrinoid lesions brought on by vascular anastomosis are of interest, in view of bacterial endocarditis observed by other investigators, in dogs with permanent arteriovenous fistulas.

Preliminary studies indicate that chronic heart damage and bacterial endocarditis tend to occur in rabbits subjected to cross circulation. It may be that fibrinoid deposits in the coronary arteries and heart valves precede concentration of bacteria in these areas, offering a constant stimulus for evolution of chronic lesions.

Editorials

Bibliographic Tools and Medical Progress

Every student of the medical sciences has become at least vaguely aware of the growing difficulty of "keeping up with the literature." However, the enormity of the problem can only be appreciated when one looks at the statistics of the situation.

It was found by Artelt, Heischkel and Wehmer that in 1952 at least 12,624 medical periodicals were published. K. L. Schmitz, another student of the problem, stated in 1953 that in the German language literature alone the volume of medical publication was 270,000 pages per year. The growth of medical literature seems to be following an exponential rate. According to Rothschuh there were in 1870 only 9 periodicals in the world publishing physiological papers. In 1900 the number was 22, in 1930 it was 75 and in 1950 it was 150. What the number will be in 1960 only time will tell, but if one extrapolates from earlier rates of growth it will approach 200.

In 1940 the average physiological journal published 1700 pages per year. Using the same figure for 1960 one can expect 340,000 pages of physiological literature in that year. These figures do not include journals in experimental medicine, many of which are very largely devoted to applied physiology.

Rothschuh has calculated the time it would take to read the output of one year of publication in physiology. He assumes an eight hour reading day, 365 days per year and reading rate of a page per two minutes. Such reading really represents scanning rather than study, but his figures show that two years and seventy days would be required to go over the physiological papers in 1940. Obviously a much longer time would be required for the current annual output.

I have presented these precise figures to document the fact, which is the common experience of every student of the medical literature, that at the present time it is a physical impossibility for anyone to keep up to date in ones reading of the current original literature in any broad field like physiology. The obvious conclusion is that a scholar must depend for his general knowledge mainly on second-hand reports of one sort or another. Abstracts, reviews and monographs constitute the written communication mechanisms by which we must get most of our information. In the verbal sphere the

"summary lecture," symposia and seminars are the possible media for communication.

Even in the area of specific scholarly research fields the problem of locating and identifying information is acute. No complete numerical data are known to me, but I have some rough figures from my own search of the literature in one small field. Doctors Haddy and Stephens and I recently searched the world literature for papers on pulmonary edema. We did not use time clocks and we did not "read" all of the papers at two minutes per page but we spent in the aggregate at least 3000 hours on more than 2000 titles which we found bearing on the subject. Assuming that our time was as valuable as that of an electrician, a plumber or a plasterer that review has cost $8000. At least half of the time was spent in locating the information, work which could just as well have been done by a central abstracting and indexing agency, if an adequate one existed. Furthermore almost every paper has relevance to several topics, and the reviewers of the other topics have to go through the same wasteful searching processes. Enormous savings in time of scholars in general could be achieved if a really good indexing service existed.

At present we are making only a rudimentary beginning toward solving the bibliographic control problem in medicine. In the United States *Biological Abstracts* covers some 40,000 papers per year, out of the probable 300,000 published per annum in its area of coverage. *Excerpta Medica* and the German *Berichte* publish even less. What is needed is a consolidation of existing imperfect mechanisms and an extension toward complete coverage.

A medical scholar should be able to turn to a workable bibliographic tool to find the location of published knowledge, as a first step in rationalizing the literature problem. Other aids to learning are also necessary, of course. One needs reviews and monographs but these are more important for general knowledge than for the research scholar. Furthermore the reviewer needs the index to carry out his work properly because no one can possibly read regularly all the journals in which work on any particular problem might be published. Authors have disconcerting ways of publishing important papers in most obscure journals. Furthermore libraries in general cannot stock all relevant periodicals. For example, the University of Minnesota subscribes to about 1000 medical periodicals out of the 12,000 plus that are published. Very few medical libraries subscribe to even that large a fraction of the total.

Medical knowledge is increasing at a very respectable rate.

Medical literature is accumulating at such an enormous rate however that we are in danger of burying much new knowledge under the avalanche of paper that threatens to conceal more than it reveals. It is romantic to think that the volume of publication can be reduced so long as the support for medical research is maintained or grows. It is, however, entirely possible to improve mechanisms for locating information by developing better bibliographic tools. If we have our wits about us we will proceed promptly to ameliorate the situation.

MAURICE B. VISSCHER
Professor and Head
Department of Physiology

Education for General Practice

It is well for us to examine, from time to time, just what our graduates do in regard to the type of practice they choose. The recent report of Dr. Frank Dickinson, Director of the Bureau of Economic Research of the American Medical Association provides such an opportunity. His report shows that of all physicians graduating from all United States medical schools between 1930 and 1950, approximately 35 per cent are currently in general practice.

The University of Minnesota Medical School graduated 2,432 physicians during this same 20 year period, and of these 44 per cent are engaged in general practice, 6 per cent are part-time specialists, 23 per cent are full-time specialists, and 27 per cent are not now in private practice. Some of this latter group are in military service and some in residencies. The figure of 44 per cent in general practice compares with 35 per cent in general practice from the University of Iowa; 37 per cent from the University of Kansas; 38 per cent from the University of Nebraska; 30 per cent from the University of Colorado; 32 per cent from the University of Wisconsin; 34 per cent from the Northwestern University; 35 per cent from the University of Illinois; and 26 per cent from the University of Michigan.

It is interesting to note also that the number of Minnesota graduates who entered general practice was 41 per cent for the five-year period, 1930-34; 40 per cent, for 1935-39; 48 per cent, for 1940-44; and 46 per cent for 1945-49.

The above figures indicate that the University of Minnesota is not doing badly in educating general physicians and that among recent graduates of this Medical School, there is no trend away from general practice into specialization.

Medical School Activities

Institute on Mental Deficiency

The University of Minnesota and the National Institute of Mental Health of the U.S. Public Health Service joined forces in the presentation of an Institute on Mental Deficiency which was held at the Center for Continuation Study from February 2 to 4. The Institute was designed to focus the attention of physicians on the problem of mental deficiency, its treatment, and the management of the over-all problem its occurrence presents to the afflicted family.

Attendance at the Institute was by invitation. Those attending included general practitioners, pediatricians, obstetricians, and medical educators from Minnesota and surrounding states. The Institute was presented under the direction of DR. REYNOLD A. JENSEN, *Professor,* Departments of Psychiatry and Pediatrics, University of Minnesota, and the guest faculty included DOCTORS GEORGE TARJAN, *Superintendent and Medical Director,* Department of Mental Hygiene, Pacific State Hospital, Pomona, California; CHARLES BRADLEY, *Associate Professor of Pediatrics and Psychiatry,* University of Oregon Medical School, Portland; and GEORGE S. STEVENSON, *National and International Consultant,* The National Association for Mental Health, Inc., New York City.

Comments of those physicians attending indicated that this initial venture of this type in the upper midwest was most successful.

Faculty News

DR. DAVID GLICK, *Professor,* Department of Physiological Chemistry, participated in a round-table conference on medical electronics which was held January 24 in New York City under the sponsorship of the Rockefeller Institute for Medical Research.

MISS ELIZABETH WHITNEY, *Instructor in Nursing,* has been named one of the first recipients of a $2,000 U. S. Public Health Service fellowship for research in nursing. She will use the scholarship for one year of study toward a master of arts degree in educational psychology. This fellowship is from the first fund for research in nursing voted by Congress to be administered through the U. S. Public Health Service.

MISS RUTH HARRINGTON, *Professor and Assistant Director,* School of Nursing, and MISS RUTH VON BERGEN, *Assistant Professor,* School of Public Health, will attend the Midwestern Regional Conference on Psychiatric Nursing, February 28 to March 4, in Topeka, Kansas.

Postgraduate Education

Eye, Ear, Nose, and Throat for General Physicians

The University of Minnesota announces a continuation course in Eye, Ear, Nose, and Throat for General Physicians which will be presented at the Center for Continuation Study from February 27 to 29, 1956. The most commonly seen problems in this field will be discussed and treatment will be stressed. The course will be presented under the direction of DR. L. R. BOIES, *Clinical Professor and Head,* Department of Otolaryngology, and DR. ERLING W. HANSEN, *Clinical Professor and Head,* Department of Ophthalmology.

Pediatrics for General Physicians

A continuation course in Pediatrics for General Physicians will be presented by the University of Minnesota at the Center for Continuation Study from March 5 to 7, 1956. Guest faculty will include DR. KATHARINE DODD, *Professor and Head,* Department of Pediatrics, University of Arkansas School of Medicine, who will also deliver the annual Phi Delta Epsilon Lecture on Tuesday evening, March 6. The course will be presented under the direction of DR. JOHN A. ANDERSON, *Professor and Head,* Department of Pediatrics.

Notice

All continuation courses presented by the University of Minnesota are approved for formal postgraduate credit by the American Academy of General Practice. Attendance certificates will be furnished on request.

Further information concerning the above programs or others to be presented may be obtained by writing to Dr. Robert B. Howard, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14.

Coming Events

February 16–18 . . Continuation Course in Cancer Detection for General Physicians

February 16 . . . . C. M. JACKSON LECTURE; "The Significance of the Sero-Flocculation Reaction"; Dr. *Harry S. Penn,* Associate Professor, Department of Radiology, University of California at Los Angeles Medical School, Los Angeles; Mayo Memorial Auditorium; 8:00 p.m.

February 16 . . . . SPECIAL LECTURE; "Immunization Against Viral Diseases"; *Dr. Herald R. Cox,* Director of Viral Research, Lederle Laboratories; 125 Mayo Memorial; 8:00 p.m.

February 27–29 . . Continuation Course in Eye, Ear, Nose, and Throat for General Physicians

March 5–7 . . . . Continuation Course in Pediatrics for General Physicians

March 6 . . . . . PHI DELTA EPSILON LECTURE; "Henoch-Schoenlein Purpura in Children"; *Dr. Katharine Dodd,* Professor and Head, Department of Pediatrics, University of Arkansas School of Medicine; Mayo Memorial Auditorium; 8:00 p.m.

March 19–21 . . . Continuation Course in Cardiovascular Diseases for General Physicians

March 20 . . . . . GEORGE FAHR LECTURE; *Professor Otto Krayer;* Mayo Memorial Auditorium; 8:00 p.m.

April 9–11 . . . . Continuation Course in Endocrinology for General Physicians

Faculty Publications

JACOBSON, W. E., SCHULTZ, A. L., and ANDERSON, JACK: Endocrine Studies in 8 Patients with Dystrophia Myotonica. J. Clin. Endocrin. & Metabolism, 15:801, 1955.

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LICHSTEIN, HERMAN C.: The Biotin Requirements of the Genus *Propionibacterium*. Archives of Biochem. & Biophysics, 58:423, 1955.

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NICE, CHARLES M., JR., and HALL, C. WILLIAM: The Relationship of the Left Atrium to the Opacified Esophagus in Upright and Recumbent Positions. Radiol., 65:61, 1955.

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SCHERER, W. F.: Comparative Susceptibility of Cells of the Same Type to Infection by Poliomyelitis Virus. Annals of New York Acad. Sciences, 61:805, 1955.

SKARNES, ROBERT C., and WATSON, D. W.: The Inhibition of Lysozyme by Acidic Polymers from Pathogenic Bacteria. J. Bacteriol. 70:110, 1955.

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WILSON, R. H., HOSETH, WAYNE, SADOFF, CHARLES, and DEMPSEY, MARY E.: Pathologic Physiology and Diagnostic Significance of the Pressure Pulse Tracings in the Heart in Patients with Constrictive Pericarditis and Pericardial Effusion. J. Lab. & Clin. Med., 48:671, 1954.

ZINNEMAN, H. H. and HALL, W. H.: Recurrent Pneumonia in Multiple Myeloma and Some Observations on Immunologic Response. Ann. Int. Med., 41:1152, 1954.

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 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
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.