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Practical Nursing: The Student and, the Graduate

Eugenia R. Taylor, M.A.¹ and Ruth V. Johnston, Ph.D.²

This is a report concerning one of our curricula, practical nursing. The selection of this subject seems appropriate since 1957 marks the tenth anniversary of the establishment on a trial basis of our first program in practical nursing, the first to be established within any university.

Currently, a four-quarter program in practical nursing and a six-quarter program in practical nursing home management are offered in the University. In the former, students enroll in general education courses offered in the General College concurrently with their practical nursing classes and supervised experience in the care of patients. The latter program was designed to prepare young women for positions primarily in rural areas. It is offered jointly by the School of Agriculture and the School of Nursing and was established in the fall of 1949. Both programs are fully accredited by the Minnesota Board of Nursing. The graduates are eligible to take the state board examination for licensure on completion of either of these programs. This report consists of a review of the background of events leading to the development of the two programs in practical nursing and a summary of findings of two studies of the graduates of these programs.

The Practical Nursing Program

Within the past few years the constantly increasing need for additional nursing personnel has become more widely recognized by the public as well as by medical and nursing groups. This need has been the result of a number of factors. Among them are the many significant medical advances with consequent delegation of a greater number of functions to nursing, the extension of health care plans, and the construction of new hospitals and related facilities. Various efforts have

¹This is an abstract of a report given at the Staff Meeting of the University of Minnesota Hospitals on March 15, 1957. A copy of the complete report, including a table and references may be obtained by writing to the Editor, UNIVERSITY OF MINNESOTA MEDICAL BULLETIN, 1342 Mayo Memorial, Minneapolis 14.

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been made to increase the numbers of young persons entering the health fields and to extend the services of those in the field to meet better the needs of patients in hospitals and related health agencies. In view of the changing functions being delegated to and developed by professional nurses, it is unrealistic to rely entirely upon that group for total care of all patients. Studies and experimental programs have therefore been directed toward developing sound educational programs aimed at the preparation of personnel to supplement the professional nurse group. Since World War II there has been increasing recognition of the contribution that can be made by the practical nurse prepared in a formal program to share in the care of the ill. Though a few formal programs in practical nursing education have been in existence since 1918, a tremendous growth has occurred since 1945. Now there are over four hundred accredited programs in the United States of which 13 are in Minnesota.

The title "practical nurse", one which some still mistakenly use to indicate the helpful though untrained neighbor who traditionally aids in family emergencies, has now been accepted to designate an individual trained in a formal program to share in the care of the ill with supervision of a registered nurse or a doctor. While this title still carries a connotation of this older role, all but two states now have a law providing for licensure of practical nurses (LPN). The American Nurses Association has approved the following definition of the practice of practical nursing as a suggested inclusion in licensure laws: "The practice of practical nursing means the performance for compensation of selected acts in the care of the ill, injured, or infirm under the direction of a registered professional nurse or a licensed physician or a licensed dentist; and not requiring the substantial specialized skill, judgment, knowledge required in professional nursing".

In continuing its role in preparation of nurses to function at various levels—administrative, supervisory, teaching, and professional practice—the University of Minnesota School of Nursing believed it desirable to establish a purely educational program in practical nursing in order to develop and try out a new pattern of practical nursing education and to provide a controlled practice field for preparation of teachers in practical nursing. Thus the four-quarter program, established on a trial basis in 1947, was developed as an educational program with students paying for the usual total costs as do other university students. This was a distinct change from the traditional pattern in which maintenance is provided for the student by the hospital in exchange for service.
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rendered while learning. Thus for these students, classes and clinical experiences are planned within the regular school day and week, and selection of hospital practice is in terms of student needs for learning. The four-quarter program is so planned that students may take advantage of the many opportunities available to all students on campus. Guided by the philosophy that there should be general education as well as vocation preparation, the program includes General College courses in communication, nutrition, biology, psychology, and social science.

The six-quarter program combines preparation in practical nursing and home management. To accomplish this dual purpose, this curriculum includes School of Agriculture courses in general education, home economics, and sciences. In addition to the practical nursing classes and clinical experience in the University Hospitals, these students spend one quarter in a small general hospital in a rural Minnesota community. This special phase of the program is designed to acquaint the practical nursing student with the needs and opportunities in health fields outside the urban centers and to stimulate her to seek employment as a graduate in rural hospitals and related agencies.

Survey Results

As was mentioned earlier, these two programs were established on a trial basis; therefore, there has been special and constant evaluation and joint planning with the faculties of the General College and the School of Agriculture to determine effectiveness and to select the most appropriate learning opportunities to accomplish the desired objectives. Additional evaluation of each program as reflected through the eyes of the graduates was secured by use of questionnaire. A follow-up study of the first 42 graduates of the six-quarter program in practical nursing and home management was completed in 1954. The second study included the 140 graduates of the four-quarter program through 1955.

Some general findings of these studies which have implications for further curriculum development have been summarized.

Employment. Most of the four-quarter graduates accept first positions in either University Hospitals or in private Twin City hospitals. The majority of them changed positions within the first year of employment on their first job. Reasons for leaving these positions were to go back to school (13 per cent took additional courses in a specialized area of nursing such as operating room nursing, in general education, or Bible study), to leave the state, or to accept a more desirable position. Seventy per cent of the six-quarter graduates accepted first posi-
tions in rural areas. Second positions for the latter group were also predominantly in rural communities.

Evening and night experience is not provided within the student program. It is interesting to note that most of the respondents had at least a month of evening experience and almost half had night duty assignment. Most of the graduates had the majority of their experience with medical, surgical, and pediatric patients and with those with long term illnesses.

Graduates now employed in fields other than nursing are doing office work and sales work primarily. They indicated that they sought employment of these types in order to improve hours and salary. In the period 1948-1955 salary in first positions ranged from $130 to $240 per month. One graduate reported that in her third position she received $300 in an office nurse position in California. The modal salary was between $210 and $220.

Job Satisfaction. Most frequently mentioned factors in job satisfaction were those of good working relationships among the staff and a feeling of personal contribution to the health team. One of the frustrating factors in employment was the feeling of inability to practice good quality nursing care. Some of the reasons given for this were poor equipment, inadequate supplies, inadequate personnel, and most important, the apparent lack of an appreciation by some of the staff for high standards of patient care. The graduates felt they were well accepted by the patients and by the nursing aides and similar personnel and that they were fairly well accepted by professional nurses and doctors.

Health Status. Emphasis has been placed throughout the program on the importance of good health practices, both from a personal point of view and as a phase of patient teaching. An inquiry into the health status of these graduates indicated that 90 per cent had had complete physical examinations within the previous 2 years, most of them being within the immediately preceding year. Reasons given by the few who had not had a physical examination included lack of finances, procrastination, and lack of conviction that it was necessary. A third of the group had not been ill within the last year.

Community Activities. Participation in community activities was confined primarily to religious group and Practical Nurses’ Association functions. A few were scout leaders or members of women’s clubs, American Red Cross, and Parent-Teachers Associations.
Appraisal of effectiveness of programs. Most of the graduates felt that they had received a good preparation in practical nursing, in comparison with other practical nurses with whom they worked. A majority indicated, however, several areas and specific examples of practical nursing skills which they felt should receive greater emphasis in the student program. Over half of the graduates asked for more theory and practice in giving medicines. Several graduates expressed this idea, "Even if LPN's are not allowed to give many medications they still must have an understanding of medicines to give good care to their patients receiving this therapy." Some of the graduates urged additional experience during the evening and night periods of the day. At present only limited hospital experience is scheduled for evenings and none for nights because of the policy of providing continuous supervision by members of the instructional staff.

A major measure of ability to function depends on the amount and quality of supervision and guidance of the professional nurse. About half of the respondents indicated that they had been asked to perform duties for which they were not prepared; about one-sixth received assistance in order to carry out a particular activity. Those functions for which most of the graduates indicated a need for additional preparation included administration of medications, catheterizations, oxygen therapy, and techniques needed for assisting in the labor and delivery rooms and in surgery.

Students in the four-quarter program felt that most courses had had personal usefulness as well as vocational value. In the six-quarter program faculty goals in including certain courses were not maximally realized in that some students apparently did not see the relationship of these courses to themselves as students, workers, or citizens. In addition to formal classes, graduates expressed a feeling of real value in opportunities available to them in the varied contacts and activities with other students in the University situation.

The Head Nurse's Role in the Preparation of the Student

The student in practical nursing fits into the nursing team by doing for the patient the methods of nursing care she has been taught in the classroom. The instructor informs the head nurse when the student is ready to do additional nursing procedures, and then the assignment is so planned to give the student opportunity to gain this experience whenever possible. The nursing team has the responsibility for making the student's experience as meaningful as possible. This includes careful planning of assignment, suggestions to the student on special needs
of patients, help with problems that arise in special situations, answering the student’s questions, and giving her opportunity to observe different treatments being done on the ward.

The licensed practical nurse makes her greatest contribution to the team by giving good bedside nursing care. In this hospital, the LPN does not give medications, but she is usually assigned to do many of the other treatments, thus leaving the professional nurse free to give medications and to perform the other functions for which her training has fitted her. Because of her more prolonged contact with the patients while doing treatments and other care, the LPN has the opportunity and responsibility to make important observations about the patient’s condition and in turn to report them to the nurse in charge. Since the LPN has a more limited background, she needs and seeks the guidance of the professional nurse or doctor in fulfilling her important role on the nursing team.

Summary

The success of the programs in practical nursing and of the graduates of these programs depends on the optimum utilization of the LPN in the role for which she is prepared. The medical staff can contribute to this success by understanding the preparation of the LPN, by interpreting practical nursing to patients and the public, and by utilizing the skills of the practical nurse appropriately. Since the prepared practical nurse can and does make a major contribution to patient care, there should be recognition of and appreciation for this contribution. Recognizing the importance of this vocation field, the doctor may be able to encourage appropriately qualified young persons to consider practical nursing as a career.
Further Use of an Artificial Kidney at the University of Minnesota Hospitals*

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In previous papers from this hospital, Lewis, Reiser, Egdahl, Chung, Rafucci, and Flink 1,2 reported on the use of the artificial kidney in the treatment of 21 patients seen between 1950 and 1952. We present the results of treatment of an additional 26 patients during the period from July 1952 to July 1956. The apparatus 3 used was the same, the Brigham modification of the Kolff artificial kidney manufactured by E. A. Olson of Ashland, Massachusetts. In 1952 we modified the apparatus slightly by adding a water pump to facilitate emptying the tank of dialyzing solution. For a history of the artificial kidney and techniques, the reader is referred to previous articles 1,2,3.

A review of recent literature indicates that earlier optimistic predictions about the results of extracorporeal hemodialysis were premature. Although Alwall and his associates 4 reported a series of 26 cases with only 35 per cent mortality, most investigators have reported mortality rates approximately 60 per cent in patients with acute renal failure requiring dialysis. Morales and his co-workers 5 in this country and Battezati and Taddei 6 in Italy treated a total of 33 patients, 11 of whom recovered, a combined mortality rate of 67 per cent. The artificial kidney team 7 in Korea reported a mortality rate of 68 per cent. Keitzer, Ford, and Miller 8 salvaged four of 14 patients for a mortality of 65 per cent. Anthonisen and his associates 9 in Denmark reported 19 patients recovered of 34 treated, a mortality rate of 56 per cent. In the first group of 21 cases treated at this hospital between 1950 and 1952 2, only one patient survived. Of our present series of 26 patients, eight survived, a mortality rate of 62 per cent. No discussion in terms of survival percentages really does justice to the problem. A brief presentation of case histories with comments follows.

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Dialysis was carried out in every instance as an adjunct to conservative therapy. Only when all other available means of treatment had been exhausted and the patient's condition continued to deteriorate did we resort to extracorporeal dialysis. In a few cases peritoneal lavage was tried first. To use Alwall's phase I, patients were treated with the artificial kidney only "on vital indication."

Case Reports

The first group of cases includes nine patients with acute renal failure complicating surgical procedures.

CASE 1. A 77-year old male, was subjected to operation for strangulated inguinal hernia. Two-thirds of the small bowel was necrotic and was resected. The patient was referred here because of anuria. He was treated by dialysis on March 10, 1953. He expired on March 13 after 8 days of anuria. Autopsy findings were multiple cysts of both kidneys, benign nephrosclerosis, severe bronchitis, and myocardial fibrosis.

CASE 2. After an elective herniorrhaphy, a 42-year old male, suffered ileus for which he was operated upon. Adhesions were tyed and a cecostomy made. This was followed by cellulitis of the abdominal wall and jaundice, requiring re-exploration of the abdomen, replacement of cecostomy, and ileostomy. The patient was transferred to this hospital and subjected to dialysis twice. He died after 11 days of anuria. The postmortem findings were retrocecal abscess, peritonitis, infarction of the lower lobe of the left lung, and tubular nephrosis.

CASE 3. A 48-year old male, was treated conservatively for perforation of a duodenal ulcer. He did well for 6 days, then went into shock from which he failed to rally. He became oliguric 12 days after perforation. An abdominal exploration was made with closure of the ulcer and drainage of an abscess of the lesser bursa. He was referred here on the ninth day of oliguria, and dialysis was carried out with the artificial kidney. He came out of coma following dialysis for the first time in 8 days. A second dialysis was not carried out because a severe hemorrhagic tendency developed. He died on January 4, 1955, after 14 days of anuria, of generalized peritonitis, abscess of the lesser bursa, duodenal ulcer, pulmonary edema, jaundice, and hemoglobinuric nephropathy.

CASE 4. had a resection of a ruptured aortic aneurysm and replacement of the resected aorta by Ivalon graft. Following surgery, the patient was anuric. On the sixth day of anuria the artificial kidney was used. Blood urea nitrogen (BUN) and potassium were lowered from 238 to 91 mg per 100 ml and 7.6 to 3.2 mEq per liter respectively. He died 24 hours later of multiple renal infarcts, pulmonary edema, confluent bronchopneumonia, duodenal ulcer, and gangrene of the right leg.

CASE 5. A 57-year old hypertensive male, sustained rupture of an abdominal aneurysm. Treatment was resection and replacement by homograft. During the first 2 postoperative days, in addition to anuria, he suffered a cerebrovascular accident and an electrocardiogram was interpreted as suggestive of an acute myocardial infarct. He was treated by extracorporeal dialysis on the fifth post-operative day and died 2 days later after 7 days of anuria. Autopsy findings included "shock kidney", bilateral pulmonary edema, bronchopneumonia, acute myocardial infarct, retroperitoneal hematoma, and pancreatitis.

CASE 6. A 41-year old female, had a radical mastectomy during which she received 2 pints of mis-matched blood. She was transferred to this hospital for dialysis after 7 days of anuria. Cardiac rate rose during the day in spite of Cedilanid® therapy. BUN was 284 mg per 100 ml. After 3 hours of dialysis cardiac arrest occurred. Attempts at resuscitation failed. Significant postmortem findings included "transfusion kidneys" and tuberculosis of hilar and cervical lymph nodes, spleen, liver, and adrenals.

CASE 7. A 73-year old male with severe angina, had a transurethral prostatectomy elsewhere. Irrigation fluid was distilled water. Plasma hemoglobin after operation was 610 mg per 100 ml. The blood pressure was maintained with Levophed® for the first two post-operative days. The patient became oliguric and was transferred to this hospital where dialysis was undertaken on the eleventh post-operative day. After 55 minutes on the artificial kidney, the patient complained of severe angina not relieved by nitroglycerin, had a convolution and died. Postmortem findings included complete occlusion of the left anterior descending and right coronary arteries, myocardial fibrosis, and hemoglobin nephrosis.

CASE 8. A 49-year old male, was treated by abdomino-perineal resection for carcinoma of the rectum. Post-operatively, marked swelling of the calves and anuria developed. Bilateral fasciitis was carried out on the fifth postoperative day. A muscle biopsy was reported to show Zenker's degeneration. Anuria was treated by use of the artificial kidney only "on vital indication."
kidney on three occasions. After the first two treatments, there was good immediate clinical response. BUN dropped from 211 to 119, 217 to 135, and 190 to 116 mg. per 100 ml. following the respective dialyses. Postassium was lowered from 6.3 to 4.8, 7.6 to 4.3, and 7.8 to 4.2 mEq. per liter, respectively. The patient died 24 hours after the last dialysis, 13 days after the onset of anuria. Autopsy was not permitted.

CASE 9. A 57-year old male, was treated with abdomino-perineal resection for a carcinoma of the rectum. Anuria developed after operation. On the eighth day of anuria, the patient was treated with the artificial kidney. He died 2 days later in irreversible shock. A second dialysis was deferred because a severe hemorrhagic diathesis had developed. At autopsy, he was found to have aspiration atelectasis, bronchopneumonia, chronic peritonitis, and hemoglobin casts in the kidney tubules.

Our efforts in this group of patients proved to be only temporarily beneficial. In case 6, earlier dialysis might have been life-saving. Had regional heparinization been available, the patients in cases 3 and 9 might have benefited by a second dialysis which was contraindicated at that time by severe hemorrhagic diathesis.

CASE 10 was the only instance of anuria complicating abortion. A 23-year old female, took 3 grains of quinine and was probably instrumented as well. On admission to another hospital 24 hours later, she was jaundiced and a fetus was found in the vagina. She was transferred to this hospital where blood taken for crossmatch failed to clot in 36 hours. Petechiae were noted in the conjunctivae and palate. She was in shock. On the eighth day of anuria, dialysis with the artificial kidney was carried out. She died 24 hours later. Coroners autopsy revealed necrosis of the uterus and adnexa with retained necrotic placenta, pelvic peritonitis, partial necrosis of the pituitary gland, pulmonary hemorrhage and edema, and hemoglobinuric kidneys.

The next group of cases includes three patients with subacute glomerulonephritis and one with diffuse fibrinoid disease.

CASE 11. A 63-year old male, was admitted elsewhere because of epigastric pain, nausea, vomiting and black stools. Following a cholecystographic examination, which revealed a non-functioning gall bladder, the patient went into shock. A generalized petechial eruption developed, and the patient became oliguric. He was transferred to this hospital, and dialysis was carried out twice, 8 days apart. He died 5 days after the last dialysis, after 22 days of anuria and oliguria. On the day of death, he passed 535 ml. of urine. Significant postmortem findings were yeast cholangiolitis and chronic glomerulonephritis.

CASE 12. A 47-year old male, was admitted to another hospital with complaints of chronic sinusitis, episcleritis, arthralgia, and spots on the legs. He had had a coronary occlusion one year earlier. He received various antibiotics and subsequently became oliguric and uremic. Admission urine contained albumin and red cells. He was admitted to University of Minnesota Hospitals because of progression of uremia. Peritoneal lavage was carried out but proved inadequate, and we resorted to treatment with the artificial kidney. The patient died 2 days later. The principal postmortem findings were bronchopneumonia and subacute glomerulonephritis.

CASE 13. A 14-year old girl, complained of anorexia, nausea, and fatigue followed by abdominal swelling and severe oliguria. She had been treated with penicillin for a sore throat 2 months earlier. On admission to University of Minnesota Hospital, antistreptolysin titer was 1000 units. She was treated with extracorporeal dialysis on the sixth day of anuria with marked relief of symptoms. The artificial kidney was again utilized on the twenty-second day of anuria, but treatment had to be stopped after 2½ hours because of a blood pressure rise followed by a convulsion. Patient died after 26 days of anuria. Postmortem findings described were systemic fibrinoid disease with severe renal involvement, hemorrhagic pneumonia, and acute encephalomalacia.

CASE 14. A 13-year old girl, was referred to this hospital because of anuria thought to be due to acute glomerulonephritis. Dialysis on the artificial kidney was carried out, but the treatment was marred by poor blood flow and clotting. However, the serum potassium was lowered from 8.1 to 7.2 mEq. per liter. The patient's condition continued to deteriorate, and at the suggestion of one of us (C.D.C.), intermittent peritoneal lavage was started and maintained over a period of 12 days with remarkably good control of her uremic state. At the suggestion of the staff of the Pediatrics Department, a needle biopsy of the right kidney was made. Subacute glomerulonephritis was evident with involvement of all 14 glomeruli in the specimen. Dr. Robert Vernier then started treatment with adrenocortical hormones on the twenty-fourth day of anuria. Four days later a diuresis began, and the patient is now doing well.
The next three cases fall in the category of acute renal insufficiency secondary to trauma.

CASE 15. and 18-year old male, sustained fractures of his left mandible and right clavicle in an auto accident. He was unconscious and in shock when first treated with two units of plasma. He was anuric after the accident. Because of progression of uremia (BUN 302 mg. per 100 ml.) he was subjected to dialysis on March 7, 1953 and again 4 days later because the serum potassium rose to 8.6 mEq. per liter. He responded nicely to treatment both times, the BUN decreasing to 146 mg. and potassium to 4.3 mEq. Diuresis began after 15 days of oliguria and anuria. The patient is alive and well 4 years later.

CASE 16. a 36-year old male, suffered lacerations of the face and left arm, and fractures of the pelvis, acetabulum, and eight ribs in an auto collision. He remained in shock the first 24 hours after the accident. He was treated with Levophed® for about 48 hours. The patient's condition grew worse, and he was transferred to University of Minnesota Hospitals where he was treated with the artificial kidney. There was no real change in the clinical picture. The patient died 8 hours after dialysis. Postmortem findings were fat embolism with renal involvement, perforation of the splenic flexure of the colon, ruptured mesentery, and multiple fractures and contusions.

CASE 17. a 39-year old farmer, was pinned under a tractor for 4 hours. He sustained fractures of his right radius, three ribs, and a severe crush injury of the left thigh. An abdominal exploration was carried out because of continued shock, but no ruptured viscera were found. Shock lasted 48 hours. The patient was in the emergency room at University of Minnesota Hospital at 6 P.M. on June 4, 1956 and appeared moribund. An electrocardiogram was suggestive of severe potassium intoxication. Dialysis was under way by 7 P.M. The serum potassium was reduced from 10.2 to 4.9 mEq. per liter and shock abated, but the patient remained comatose. Dialysis was again carried out 3 days later because of recurrent potassium toxicity, and the serum potassium fell from 9.1 to 4.3 mEq. per liter. The patient responded for the first time and talked with his family after the second dialysis. The next day, he was seen at the University of Minnesota Hospital at 6 P.M. on June 15, 1956 after 15 days of anuria. Postmortem findings were coagulase-positive staphylococcal bacteremia, micro-abscesses and hemorrhages in the brain, bronchopneumonia, obstructive tubular disease of the kidneys, and fractures. This patient might have recovered if the crushed leg had been removed and the last dialysis planned a little sooner.

In the three cases of trauma, one patient survived, the second died of underlying disease, and the third might have been saved by more aggressive therapy.

Two instances of carbon tetrachloride toxicity and one case of ethylene glycol poisoning have been observed. Their case reports follow.

CASE 18. a 30-year old diabetic, was exposed to carbon tetrachloride fumes while at work. He denied alcohol intake prior to exposure. He drank much orange juice after exposure because of his diabetes. On admission to University of Minnesota Hospitals, the patient appeared moribund. He was comatose and cyanotic, had distended neck veins, peripheral edema, and percussible and palpable cardiomegaly as well as pulmonary edema. At the end of 5 hours of dialysis the patient was alert, and the pulmonary edema, cardiomegaly and distended neck veins had disappeared. During dialysis, serum potassium fell from 9.3 to 4.0 mEq. per liter, weight fell from 154.5 to 147 lbs., and BUN was lowered from 184 to 60 mg. per 100 ml. The patient is now alive and well to the best of our knowledge.

CASE 19. a 26-year old male, inhaled carbon tetrachloride on March 3, 1953, the morning after an evening of social drinking. He became oliguric. He was transferred to University of Minnesota Hospitals on March 14 after two convulsive seizures. Tracheotomy was done. In spite of a urine output of 650 ml. after 15 days of oliguria, the patient had six generalized convulsions within 5 hours, so a dialysis was carried out. The BUN at the start was 280 mg. per 100 ml., and at the end 85 mg. per 100 ml. No further convulsions occurred. The patient is now doing well.

CASE 20. a 30-year old male, accidentally drank 60 ml. of ethylene glycol on January 1, 1950. Oliguria and anuria ensued. Dialysis with the artificial kidney was carried out three times. He responded well to each treatment. He died 4 days after the last dialysis on the twenty-seventh day of oliguria in respiratory distress. The patient lost 24 lbs. in 27 days, but was found to have pulmonary edema in addition to confluent bronchopneumonia at autopsy. Edema and pulmonary infection are two of the commonest fatal complications of this disease.
Of the three cases of poisoning, two patients recovered with the aid of dialysis. The third might have recovered if pulmonary complications had been avoided by more stringent fluid restriction.

In the next four cases, incompatible blood transfusions complicated cesarean delivery.

CASE 21. a 27-year old woman was referred to this hospital on November 12, 1952, 7 days after cesarean section. Dialysis was performed on the twelfth day of oliguria when the BUN reached 268 mg. per 100 ml. The BUN was 154 mg. after dialysis. The creatinine came down from 21 to 4.2 mg. per 100 ml following the procedure. Diuresis and recovery ensued.

CASE 22. age 24 years, bled from central placenta previa during the third trimester and received one pint of incompatible blood during cesarean section on April 5, 1953. She received artificial kidney therapy after 8 days of anuria on April 13. During treatment BUN fell from 178 to 90 mg. per 100 ml, potassium from 8.9 to 4.4 mEq. per liter. On April 17 after 12 days of oliguria and anuria, the patient passed 1350 ml. of urine. The BUN that day was 230 mg., potassium was 8.3 mEq. A second dialysis was not done. The patient died during a convulsion on April 19. Postmortem findings were massive necrosis of the pituitary gland due to infarction and obstructive tubular disease of the kidneys due to hemolytic transfusion reaction. This patient might have been saved by a second dialysis and hormone substitution therapy.

CASE 23. aged 29, had a cesarean section on December 23, 1954, for central placenta previa. The child was stillborn. Two pints of O+ blood were administered. The patient was O-. The patient became anuric and required nasal suction for protracted ileus in the postoperative period. She was transferred here with a severe electrolyte imbalance. Dialysis was carried out on January 1, 1954. Attempts to correct the imbalance prior to dialysis with hypertonic saline failed. Pulmonary edema developed after dialysis which was treated with tracheotomy, positive pressure oxygenation, and phlebotomy. The patient is now doing well.

CASE 24. a 30-year old nurse, had a cesarean delivery because of placenta previa and hemorrhage on June 9, 1954. She was transfused with one pint of A+ blood. Her true type was A-. Following the transfusion reaction the patient received 13,140 ml. of fluid intravenously and excreted 900 ml. in a 7 day period. In the 24 hours before removal to this hospital she suffered eight generalized convulsions. A tracheotomy was done. On admission here, the patient was comatose, cyanotic, breathing in Cheyne-Stokes fashion, and had pitting edema of all extremities. At the end of 2 hours of dialysis the patient sustained a weight loss of 8 lbs. and was able to talk to her husband. She went on to diuresis and recovery after 11 days of oliguria and anuria.

In four cases of transfusion reaction accompanying cesarean section, three patients were aided to recovery by dialysis for uremia, electrolyte imbalance, and overhydration respectively. One patient might have been saved by a second dialysis and hormone replacement.

CASE 25. is an instance of barbiturate poisoning with shock previously reported. A 27-year old female ingested approximately 2500 mg. Nembutal® and 1000 mg. phenobarbital with suicidal intent. Dialysis was carried out on August 7, 1953, after therapy with 1.6 gm. Metrazol® failed to improve the patient's precarious condition. Barbiturate removed with artificial kidney dialysis amounted to 260 mg. The blood level of barbiturate fell from 2.7 to 1.6 mg. per 100 ml. The patient was awake 12 hours later. She is well now and has received electro-shock and psychotherapy for her psychiatric condition. This patient's recovery was assured by removal of barbiturate by extracorporeal dialysis.

CASE 26. a 67-year old male, became oliguric and anuric without known cause. He had previously passed urinary calculi. Attempts to pass ureteral catheters on the right side failed. No urine was obtained from a catheter passed to the left kidney pelvis. In spite of peritoneal dialysis, the patient's condition deteriorated rapidly, and we resorted to extracorporeal dialysis on October 30, 1955. Before right nephrostomy could be performed, the patient died on October 31. Autopsy was not permitted. The etiology of oliguria remains obscure in this instance.

Discussion

We have grouped the cases roughly according to cause in the table. Our record is poorest in that group of patients who had had extensive...
surgery with complications. Unfortunately, this is the group most likely to enlarge in the future. Perhaps in these cases a fresh preventive approach is indicated.

Such measures might include hydration of the patient by intravenous means preceding surgery to maintain diuresis during the operative period. Diuresis induced prior to insult seems to offer some protection to the kidneys in experimental animals. Whenever, in the course of surgery, prolonged shock or a suspected transfusion reaction occurs, it might be well to denervate the kidneys temporarily by injecting Pontocaine® around the renal pedicle if such can be done conveniently. It is our gloomy conclusion that treatment after the insult in these cases offers only the bleak comfort to the family and surgeon that everything that can be done to help the patient has been done. On the whole, patients with renal failure following surgical complications and trauma require dialysis earlier and more frequently than patients in other groups. This is probably due to the greater catabolism in these individuals than in the others described.

In patients with glomerulonephritis and renal failure due to connective tissue disease, the outcome obviously depends on resolution of the underlying disease process.

Our experience with renal failure secondary to abortion is too limited for comment. More aggressive treatment of victims of trauma is probably indicated. Here, immediate replacement of large amounts of plasma soaked up by injured tissues is an important preventive measure. To quote a phrase of Dr. Wangensteen’s "The patient isn’t losing Levophed®, he’s losing blood." Our results with dialysis in toxic nephrosis have been gratifying. Let us remind those who believe that patients with this disease treated conservatively invariably recover that three patients with carbon tetrachloride toxicity died here in the period under discussion in spite of careful conservative management.

Our results in those unfortunate mothers who suffered transfusion reactions during cesarean section are gratifying to say the least, as is the outcome in the case of barbiturate poisoning.

It is noteworthy that four of the patients who succumbed had lesions of the endocrine glands. Pituitary necrosis was found in cases 10 and 21. Tuberculosis of the adrenal glands and adrenal hemorrhage and infarction were found in cases 6 and 16, respectively.

Finally, we owe much to the splendid help generously given by members of many departments in handling these difficult problems. We
must specially mention Doctors F. John Lewis, E. B. Flink, Robert Abernathy, N. L. Gault, Frederick Goetz, Dennis Kane, Victor Gilbertsen, Richard Eggdahl, Harris Hyman, Arnold Kolodny, Kurt Pollak, and Donald Bravik.

### Table

#### Patients Treated by Use of the Artificial Kidney, 1952-1956

<table>
<thead>
<tr>
<th>Patient</th>
<th>Sex</th>
<th>Age</th>
<th>Diagnosis and Complications</th>
<th>Duration of Oliguria and Anuria, Days</th>
<th>Number of Dialyses</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>M</td>
<td>77</td>
<td>Strangulated hernia, 70 per cent small bowel resected</td>
<td>9</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>42</td>
<td>Herniorrhaphy, cecostomy, peritonitis, abscess</td>
<td>11</td>
<td>2</td>
<td>Died</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>48</td>
<td>Perforated duodenal ulcer, peritonitis, abscess</td>
<td>15</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td></td>
<td>Ruptured aneurism, synthetic graft</td>
<td>8</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>57</td>
<td>Ruptured aneurism, homograft</td>
<td>7</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>41</td>
<td>Radical mastectomy, transfusion reaction</td>
<td>8</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>73</td>
<td>TUR with hemolytic reaction</td>
<td>12</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>49</td>
<td>Combined abdomino-perineal resection, rectum</td>
<td>13</td>
<td>3</td>
<td>Died</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>57</td>
<td>Combined abdomino-perineal resection, rectum</td>
<td>10</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>GROUP II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>F</td>
<td>23</td>
<td>Abortion</td>
<td>9</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>15</td>
<td>M</td>
<td>18</td>
<td>Auto accident, fractures</td>
<td>15</td>
<td>2</td>
<td>Alive</td>
</tr>
<tr>
<td>16</td>
<td>M</td>
<td>36</td>
<td>Fractures, ruptured spleen, colon, adrenal infarction</td>
<td>7</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>17</td>
<td>M</td>
<td>39</td>
<td>Crush injury, left leg</td>
<td>15</td>
<td>3</td>
<td>Died</td>
</tr>
<tr>
<td>GROUP III</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>M</td>
<td>63</td>
<td>Chronic glomerulonephritis and cholangitis</td>
<td>23</td>
<td>2</td>
<td>Died</td>
</tr>
<tr>
<td>12</td>
<td>M</td>
<td>47</td>
<td>Subacute glomerulonephritis</td>
<td>?</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>13</td>
<td>F</td>
<td>14</td>
<td>Systemic fibrinoid disease</td>
<td>26</td>
<td>2</td>
<td>Died</td>
</tr>
<tr>
<td>14</td>
<td>F</td>
<td>13</td>
<td>Subacute glomerulonephritis</td>
<td>28</td>
<td>1</td>
<td>Alive</td>
</tr>
<tr>
<td>GROUP IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>M</td>
<td>30</td>
<td>Inhaled CC14</td>
<td>14</td>
<td>1</td>
<td>Alive</td>
</tr>
<tr>
<td>19</td>
<td>M</td>
<td>26</td>
<td>Inhaled CC14</td>
<td>15</td>
<td>1</td>
<td>Alive</td>
</tr>
<tr>
<td>20</td>
<td>M</td>
<td>36</td>
<td>Drank ethylene glycol</td>
<td>27</td>
<td>3</td>
<td>Died</td>
</tr>
<tr>
<td>25</td>
<td>F</td>
<td>27</td>
<td>Barbiturate poisoning</td>
<td>0</td>
<td>1</td>
<td>Alive</td>
</tr>
<tr>
<td>GROUP V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>F</td>
<td>27</td>
<td>Cesarean with transfusion reaction</td>
<td>11</td>
<td>1</td>
<td>Alive</td>
</tr>
<tr>
<td>22</td>
<td>F</td>
<td>24</td>
<td>Cesarean with transfusion reaction and pituitary infarction</td>
<td>12</td>
<td>1</td>
<td>Died</td>
</tr>
<tr>
<td>23</td>
<td>F</td>
<td>29</td>
<td>Cesarean with transfusion reaction</td>
<td>11</td>
<td>1</td>
<td>Alive</td>
</tr>
<tr>
<td>24</td>
<td>F</td>
<td>30</td>
<td>Cesarean with transfusion reaction</td>
<td>9</td>
<td>1</td>
<td>Alive</td>
</tr>
<tr>
<td>GROUP VI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>M</td>
<td>67</td>
<td>Cause unknown</td>
<td>?14</td>
<td>1</td>
<td>Died</td>
</tr>
</tbody>
</table>
REFERENCES


The changing pattern of American society has, especially since World War II, effected changes in the characteristics of students pursuing higher education, including medical students. Organizations and individuals with an interest in potentiating the effect of our medical educational process have felt a need to understand more clearly these changes. Selection of students, curriculum content, and teaching methods, as well as efforts to deal with student financial needs, are features of this process which might benefit from such a clarification.

In March, 1956, a questionnaire was circulated to all undergraduate students in the Medical School of the University of Minnesota with the primary objective of gaining information concerning their financial status. Responses from more than 95 per cent of these students provide the basis for the following report.

Each of the medical classes has from 114 to 122 students including either three or four women. The single and married students of each class were considered separately, and an attempt was made to determine for each group the place of residence, employment obligations, living expenses, and the major sources of funds. Married students also provided information on the employment of their wives and on size of their families. Students in both groups were asked to indicate their interest in borrowing money from a hypothetical loan fund with annual interest of 2½ per cent and principal due 5 years after completion of medical training. These data appear in Table 1.

Perusal of the tabulated data reveals the high incidence of married medical students and a related increase in monthly living expenses which seems not to support the legend that two can live as cheaply as one. Further study reveals, however, that, children notwithstanding, most wives are employed outside the home where they earn approximately $200 per month (data not in table). In addition, married students themselves hold more part-time employment than do their single colleagues. While some 40 per cent of all single students live with parents, only one married student in the entire group lists his or his wife's

* Acknowledgement is made to Joseph Mlinar and Alan Anderson for their assistance in obtaining data on which this report is based. The office of the Dean of the University of Minnesota Medical School, the Medical Student Council, and the Minnesota Medical Foundation were likewise generous in aiding this project.
THE MEDICAL BULLETIN

TABLE 1
SOCIAL AND ECONOMIC DATA CONCERNING MEDICAL STUDENTS* ACCORDING TO CLASS AND MARITAL STATUS

<table>
<thead>
<tr>
<th>SINGLE STUDENTS:</th>
<th>Freshmen</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of class single</td>
<td>75%</td>
<td>65%</td>
<td>50%</td>
<td>45%</td>
</tr>
<tr>
<td>Average monthly living expenses (excluding tuition and books)</td>
<td>$90</td>
<td>$85</td>
<td>$95</td>
<td>$110</td>
</tr>
<tr>
<td>Proportion of single group:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>living with parents</td>
<td>40%</td>
<td>45%</td>
<td>35%</td>
<td>40%</td>
</tr>
<tr>
<td>employed part-time</td>
<td>30%</td>
<td>40%</td>
<td>65%</td>
<td>80%</td>
</tr>
<tr>
<td>wanting to borrow funds</td>
<td>50%</td>
<td>20%</td>
<td>25%</td>
<td>35%</td>
</tr>
<tr>
<td>listing each of the following as a major source of funds:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>savings</td>
<td>45%</td>
<td>35%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>scholarships</td>
<td>12%</td>
<td>8%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>parents</td>
<td>75%</td>
<td>75%</td>
<td>65%</td>
<td>65%</td>
</tr>
<tr>
<td>own employment</td>
<td>45%</td>
<td>40%</td>
<td>55%</td>
<td>70%</td>
</tr>
<tr>
<td>government assistance</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>MARRIED STUDENTS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of class married</td>
<td>25%</td>
<td>35%</td>
<td>50%</td>
<td>55%</td>
</tr>
<tr>
<td>Average monthly living expenses (excluding tuition and books)</td>
<td>$240</td>
<td>$250</td>
<td>$220</td>
<td>$225</td>
</tr>
<tr>
<td>Proportion of married group:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>living with parents</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>employed part-time</td>
<td>25%</td>
<td>50%</td>
<td>70%</td>
<td>90%</td>
</tr>
<tr>
<td>with wives employed</td>
<td>80%</td>
<td>75%</td>
<td>70%</td>
<td>65%</td>
</tr>
<tr>
<td>with children</td>
<td>35%</td>
<td>45%</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td>with more than one child</td>
<td>5%</td>
<td>30%</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>wanting to borrow funds</td>
<td>60%</td>
<td>45%</td>
<td>35%</td>
<td>40%</td>
</tr>
<tr>
<td>listing each of the following as a major source of funds:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>savings</td>
<td>35%</td>
<td>10%</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>scholarships</td>
<td>3%</td>
<td>15%</td>
<td>16%</td>
<td>10%</td>
</tr>
<tr>
<td>parents</td>
<td>20%</td>
<td>30%</td>
<td>25%</td>
<td>35%</td>
</tr>
<tr>
<td>own employment</td>
<td>25%</td>
<td>55%</td>
<td>60%</td>
<td>75%</td>
</tr>
<tr>
<td>government assistance</td>
<td>25%</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>wife's employment</td>
<td>75%</td>
<td>70%</td>
<td>60%</td>
<td>65%</td>
</tr>
</tbody>
</table>

*Data in most categories approximated to nearest 5%.

parental home as place of residence. Likewise, parents are listed as a major source of funds by twice as many single students as married students. Marriage thus appears to mark both physical and financial emancipation from the parental home. Government assistance is more often a factor in the income of married students than in that of single students as are scholarships in the upper three classes, but savings assume greater prominence among the single students. Both married and single students express a desire to borrow funds under the terms set forth in the questionnaire (and mentioned above), but this response is more frequent among the married students and most prevalent among the Freshmen.

Comparison of the students by class groups without regard for marital status provides data summarized in Table 2.

The figures in Table 2 indicate a substantial receipt of scholarship funds by medical students compared with their total of formal debts.
The Minnesota Medical Foundation has vigorously broadened this source of student funds in recent years, though these figures also reflect private scholarship arrangements. A large proportion of the students hold part-time employment requiring an average of 10-15 hours of time each week (data not in table), with hospital externships constituting the bulk of this employment in the upper two classes. The level of total debts per class reveals a limited increase between the Sophomore and Junior groups, which may be related to the marked increase seen in employment as hospital externes in the latter group. The data indicate a sizable demand for loan funds on the 2½% interest, long-term basis. The peak demand is seen in the Freshman group, but more than a third of the Seniors wish to borrow such funds.

Consideration of the medical students as a single group reveals that 90 per cent of them are employed during the summer months, and most of these students earn from $200 to $300 above their summer expenses. In this connection, it must be borne in mind that the University of Minnesota Medical School has a 10-month school year for the three lower classes. About 25 per cent of the students entered medical school with formal debts chiefly to parents or other family members. The prevalence of part-time employment, which has been noted for various class groups, is 57 per cent of the entire student body. Married students constitute 45 per cent of the total group. Of these, 44 per cent have children and 71 per cent of the wives are employed outside the home. Students signifying an interest in borrowing funds under terms suggested comprise 38 per cent of the entire group. Of these students 62 per cent are employed while of those not wanting to borrow funds 49 per cent are employed. The average amount desired was about $1000.

### TABLE 2

<table>
<thead>
<tr>
<th>Social and Economic Data Concerning Medical Students*</th>
<th>According to Class Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost of year's tuition, books, and equipment</td>
<td>Freshmen $750</td>
</tr>
<tr>
<td>Proportion of group:</td>
<td></td>
</tr>
<tr>
<td>with prior military service</td>
<td>16%</td>
</tr>
<tr>
<td>having received scholarship aid in medical school</td>
<td>15%</td>
</tr>
<tr>
<td>(average total per recipient)</td>
<td>$590</td>
</tr>
<tr>
<td>employed part-time</td>
<td>25%</td>
</tr>
<tr>
<td>employed as hospital externes**</td>
<td>0%</td>
</tr>
<tr>
<td>holding formal debts***</td>
<td>35%</td>
</tr>
<tr>
<td>(average total of such debts)</td>
<td>$600</td>
</tr>
<tr>
<td>wanting to borrow funds</td>
<td>55%</td>
</tr>
<tr>
<td>(average amount desired)</td>
<td>$1000</td>
</tr>
</tbody>
</table>

* Data for most categories approximated to nearest 5%  
** Employment as junior interns in private Twin City hospitals.  
*** Funds which the student is obligated to repay at a future date.
No ready assessment can be made of the effects which the summarized financial factors exert on medical educational objectives. It is difficult, however, to escape the prejudice that employment obligations are detrimental to the efforts which a student can exert toward acquiring the scientific knowledge and medical acumen which this educational process is designed to develop. It is possible that the hospital externship type of employment has a less deleterious effect than does employment bearing no relationship to medicine, though the former has been suspected of eroding the student's dependence upon academic standards. Data presented in this report indicate that many students would want to borrow funds on a low interest, long-term basis. Such funds have not been available to them in the past. Insofar as economic necessity motivates part-time employment, the availability of such funds might be expected to permit medical students to apply a greater proportion of their energies to the task of assimilating a thorough knowledge of the basic disciplines of the medical profession.

OTTO RAVENHOLT

Junior Medical Student
Dr. MacLean Receives Markle Award

DR. LLOYD MACLEAN, Instructor, Department of Surgery, has been named a Markle Scholar for 1957 it was recently announced by JOHN M. RUSSELL, Executive Director of the John and Mary R. Markle Foundation of New York. Dr. MacLean is one of 25 physicians in the United States and Canada receiving this prized scholarship this year. For each Scholar appointed, the Markle Foundation allocates $30,000, which is granted at a rate of $6,000 annually over a 5-year period. The purpose of the Markle program is to encourage young scientists to remain in academic medicine, thereby strengthening medical school faculties. Many of the nation's outstanding investigators are or have been Markle Scholars.

In the past several other members of our Faculty have received Markle awards. They include DOCTORS GEORGE E. MOORE, ROBERT A. GOOD, LEONARD F. PELTIER, WILLIAM F. SCHERER, GILBERT S. CAMPBELL, MITCHELL W. SPELLMAN, and ROBERT A. ULSTROM.

Faculty News

DR. F. H. VAN BERGEN, Associate Professor and Head, Department of Anesthesiology, presented a talk entitled "Physiology of Respiration" at the Second Mid-Winter Refresher Course Program of the American Society of Anesthesiologists, held March 10 at the Drake Hotel, Chicago, Illinois.

DR. J. T. SYVERTON, Professor and Head, Department of Bacteriology and Immunology, has been appointed to a 4-year term on the National Advisory Allergy and Infectious Disease Council, National Institutes of Health. Announcement of Dr. Syverton's appointment was recently made by DR. L. E. BURNLEY, Surgeon General of the U. S. Public Health Service, Department of Health, Education, and Welfare. Dr. Syverton also served as co-chairman and presented a paper entitled "Stable and Pure Line Cell Strains: Derivation and Comparative Viral Susceptibility" before the 11th annual Symposium on Fundamental Cancer Research, Virus and Tumor Growth in Houston, Texas, on March 7, 8, and 9.

DR. J. J. BUCKLEY, Instructor, Department of Anesthesiology, took
part in the meeting of the Canadian Anaesthetists Society, Western Division, on March 7 and 8 in Winnipeg, where he spoke on "Physiological Contraindications in Anesthesia for Intracardiac Surgery" and participated in a panel discussion on "Pulmonary Physiology."

DR. DONALD M. MCLEAN, Senior Medical officer (Virus Research) at Commonwealth Serum Laboratories, Melbourne N2, Australia, will be with the Department of Bacteriology and Immunology for three months as a Visiting Instructor, to participate in the research program concerned with the identification of new viruses related to aseptic meningitis. Dr. McLean attended the Conference on Cancer Biology at the M. D. Anderson Hospital, Houston, Texas, March 7, 8, and 9.
Electrocardiography for General Physicians

The University of Minnesota announces a continuation course, an Introduction to Electrocardiography for General Physicians, which will be held at the Center for Continuation Study on the University Campus from May 6 to 10, 1957. This course is intended primarily for physicians with little or no previous experience in electrocardiographic interpretation. Basic principles, variations in normal patterns, and frequently observed abnormalities will be stressed. Registrants will have an opportunity to interpret more than 200 electrocardiograms under supervision of qualified instructors. Guest lecturer will be DR. MAURICE SOKOLOW, Associate Professor, Department of Medicine, University of California Medical School, San Francisco. The remainder of the faculty will include members of the faculties of the University of Minnesota Medical School and the Mayo Foundation.

Symposium on Alcoholism

"The Treatment of the Alcoholic" will be the theme of a Symposium on Alcoholism for Physicians to be held at the Center for Continuation Study on May 23 and 24, 1957. The symposium will be sponsored cooperatively by the University and the Minnesota Department of Health. Featured speakers will include DR. LORANT FORIZS, Medical Director of the Florida Alcoholic Rehabilitation Program, who will speak on motivating the alcoholic patient and the treatment of alcoholics in groups. DR. R. GORDON BELL, Director of the Bell Clinic, Willowdale, Ontario, will talk on the nature of alcoholism and the use of drugs in the follow-up treatment of the alcoholic. Speaking on the use of the ataractic drugs in the treatment of alcoholism will be DR. VERNELLE FOX, Medical Director of the Georgian Clinic, Atlanta, Georgia. Also on the program will be DR. NELSON J. BRADLEY, Superintendent, and DR. LLOYD SMITH of the Willmar State Hospital, Willmar, Minnesota, and DR. K. W. DOUGLAS, Superintendent of the Sandstone State Hospital, Sandstone, Minnesota. The conference is open to all physicians, but attendance will be limited to provide ample opportunity for group discussion. Registration fee for the course is $5.00. Applications may be secured from the Center for Continuation Study, University of Minnesota, Minneapolis 14, Minnesota.
Coming Events

April 8-10. Continuation Course in Radiology for General Physicians

April 11-13. Continuation Course in Allergy and Chest Diseases for General Physicians

April 11. JOURNAL-LANCET LECTURE; "Drugs Affecting Human Behavior;" Dr. Chauncey D. Leake, Associate Dean, Ohio State University College of Medicine, Columbus, Ohio; Mayo Memorial Auditorium; 8:00 p.m.

April 16. Minnesota Pathological Society Lecture

April 23. S.A.M.A. LECTURE; "Tristram Shandy;" Dr. John L. McKelvey, Professor and Head, Department of Obstetrics and Gynecology, University of Minnesota Medical School; Room 125 Mayo Memorial; 8:00 p.m.

May 6-10. Continuation Course: Introduction to Electrocardiography for General Physicians

May 7. DULUTH CLINIC LECTURE; "Studies in Insulin Antagonism;" Dr. Dewitt Stetten, Jr., Associate Director in Charge of Research, NIAMD, Department of Health, Education, and Welfare, U. S. Public Health Service; Mayo Memorial Auditorium; 8:00 p.m.

May 13-17. Continuation Course in Proctology for General Physicians

May 23-25. Continuation Course in Surgery for General Surgeons

May 23. Meeting of the Society for Experimental Biology and Medicine

May 24. SPECIAL LECTURE; "Hemophilia;" Dr. K. M. Brinkhous, Department of Pathology, University of North Carolina, Chapel Hill; Mayo Memorial Auditorium; 8:00 p.m.
WEEKLY CONFERENCES OF GENERAL INTEREST

Physicians Welcome

Monday, 9:00 to 10:50 A.M. OBSTETRICS AND GYNECOLOGY
Old Nursery, Station 57
University Hospitals

12:30 to 1:30 P.M. PHYSIOLOGY-
PHYSIOLOGICAL CHEMISTRY
214 Millard Hall

4:00 to 6:00 P.M. ANESTHESIOLOGY
Classroom 100
Mayo Memorial

Tuesday, 12:30 to 1:20 P.M. PATHOLOGY
104 Jackson Hall

Friday, 7:45 to 9:00 A.M. PEDIATRICS
McQuarrie Pediatric Library,
1450 Mayo Memorial

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

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