STAFF CONFERENCE

University Hospital - Thursday, October 30, 1930.

Case I.

Subacute Bacterial Endocarditis

The case is that of a white male 24 years of age admitted to the University Hospital on 2-12-30 and died on 10-17-30. At the time of admission the patient complained of; 1. fever 99 - 101°, 2. weakness, 3. lack of strength, 4. cardiac palpitation. The patient stated that on the night of January 5th, 1930 before which time he has been perfectly well, he went to bed feeling somewhat ill. He rose in the morning feeling stiff in all his joints and neck. There was no joint swelling, heat or redness. There was no upper respiratory G.I. or G.U. disturbance. Stiffness in the joints persisted one day. 3 days later he felt feverish and saw a M. D. when he was advised to stay in bed for 24 hours, after the fever had left. He was also given medications. He remained in bed 3 days following which he left his bed with a temperature of 97°. He went back to work at the University and on the same day began to feel weak and perspired freely and noticed that his strength was very much decreased. He also noticed that he had again developed fever, the temperature at this time being 101°. The patient returned to bed for another 3 day period. He again returned to his work at the University. Had no fever but had little desire to take care of his work because of his marked loss of strength. During the latter part of January the patient noticed on clearing his throat that he could raise a slight amount of bright red blood along with the mucous. This condition persisted for approximately 2 weeks. 17 days after the patient returned to his usual work, he again saw a physician and was hospitalized at Minneapolis on February 1, 1930 for observation. He remained in the hospital for 3 days and a basal metabolism test was taken which was found normal. Doctor informed him that his pulse was normal but that his temperature was abnormal. Following his stay in the hospital, patient stayed in bed at home, February 4th and remained in bed until the time of admission to the University Hospital on 2-13-30. For 10-12 days before admission the patient seemed to feel that he was feverish in the afternoons. Also developed night sweats during the preceding one week before admission to the hospital. Patient's past history was essentially negative. He had the usual childhood diseases consisting of mumps, tonsillitis, followed by pneumonia and diptheria 2 months following the attack of mumps and tonsillitis. Patient underwent tonsillectomy at 13 years of age. There was no history of accidents, and venereal diseases denied. History by systems was also essentially negative. There was no evidence of any ear, chronic nose, throat, or sinus infection. There was a history of frequent epistaxis 4 - 5 times a year for the preceding 1½ years, the epistaxis being brought on by blowing the nose. It is to be noted that the tonsillitis at the age of 12 was very severe. There is no history of chorea or rheumatic fever. In 1918 during an insurance examination, the patient was told that he had heart trouble. There was no pulmonary history other than the pneumonia following tonsillitis at the age of 12. Gastro-intestinal and urinary history essentially negative.

Physical examination revealed a male of dark complexion presenting on external examination, a visible pulsation in the suprasternal notch and a sthenic type of structure. There was also a funnel chest. Examination of the throat revealed some injection of the tonsillar pillars and with tonsillar tags present. The heart revealed no thrill. There was heavy pulsation in the 5th interspace, and the heart was considerably enlarged to the left by percussion. There was also a to and fro murmur over the entire precordium, systolic rather than the diastolic murmur. This to and fro murmur was best heard over the aortic area and was transmitted to the vessels of the neck. Pulse was 84, Corrigan in type, there was a pistol shot femoral and brachial. Durochiez sign was negative. Blood pressure was 150/30. Examination of the aolomen was entirely negative. Diagnostic impres-

sion was aortic regurgitation and stenosis, probably on a basis of subacute bacterial endo-carditis. It is to be noted that in regard to the physical examination by the staff examination of the heart showed it to be enlarged, especially to the left and of the aortic type. There was a systolic and diastolic murmur heard throughout, diastolic was louder over the aortic area. There was a water-hammer pulse, pistol shot femoral and a positive Durochiez phenomena was recorded. Capillary pulsations were also recorded. No petechiae were noted.

Laboratory: A report from the Department of Health on February 14th, 1930 in regard to agglutination test on blood concluded that agglutination was absent for bacillus melitensis and bacteria tularense antigen. There was also negative Widal and a negative agglutination for para typhoid A. and B. Examination of the blood on 2-13-30 showed a Hb. 80%, WBc 8,950, differential of P 67, L 31, Eo 1, M 1. Stool examination was essentially negative. Blood culture 2-17-30 was negative. Blood Wasserman was negative. Blood chemistry 2-18-30 U. N. 19.6, sugar .091. The following month the WBc showed 16,000; blood cultures still normal. However, 3-12-30 a blood culture showed short chains of streptococci, many occurring singly and in pairs. This blood culture was reported in the same fashion 4-19-30. Hb. 5-29-30 was 65%, and Rbcs 2,850,000. Spinal puncture was essentially normal. P.S.P. test on 6-23-30 showed an excretion of 10% in first hour and 20% in 2nd hour, total of 30%. Urinalysis on 2-13-30 showed spec. gravity 1022, acid reaction, without sugar or albumen and with a negative sediment. These urinary findings remained the same until 3-14-30 when it was noticed that the specific gravity was lower, having dropped to 1012 and from this time until exitus spec. gravity remained low, varying from 1012 to 1006. Albumen was occasionally noticed being present in a trace. Sedimental findings were completely negative until 4-26-30 when 3 - 4 RBcs per H.P.F. were noticed and an occasional WBc. These findings were repeated only intermittently and not constantly. 5-13-30 an occasional granular cast was noticed. 6-26-30 it was noted that there were occasional RBcs and WBcs, casts and epithelial cells. This condition remained the same from day to day until 7-7-30 when except for a trace of albumen being present, the sedimental findings were otherwise negative. The sediment on this date and until the time of exitus continued to be negative, and there were no unusual findings in the remaining urinary tests.

Electrocardiogram 3-7-30 concluded that there was myocardial disease present. T 2 and T 3 waves were negative consistently. X-ray examination of the sinuses and 6' chest 2-13-30 concluded that the sinuses were negative, and that there was cardiac enlargement which was moderate, aortic or hypertension in type and in the 2nd stage. 5-8-30 chest examination concluded that there was cardiac enlargement of the left ventricular type and a possible slight pleural effusion. 3-4-30 examination of chest concluded that the lungs were negative but that the heart was enlarged and of the aortic or hypertension type.

At the time of admission the patient's temperature was 101°. From this time on the patient ran an up and down temperature varying from 101° as an average, with 97 as an extreme low and 103 as an extreme high.

Medications and procedures: mercurachrome 2%, dichloramine T and boric ointment bed sores and abrasions. Petrol agar repeatedly and luminal gr. 3 repeatedly. Morphine sulphate gr. $\frac{1}{4}$ repeatedly. Cod liver oil repeatedly, cascara occasionally. Blaud's pills, gr. 5 t.i.d. p.c. Amytol tablets 3.

Nurses notes: Patient received usual daily care. Most of the time he was fairly comfortable and drowsy, excepting for some pain associated with bed sores. It was noted that occasionally the patient developed a chill. Patient's appetitie was consistently poor. It was noted that the patient slept most of the time. 9-23-30 noted that patient was complaining of pain in the cardiac region

and that he had repeated emesis. 10-16-30 it was noted that the patient seemed to have considerable mucous in the throat and was unable to cough it up. 10-17-30 without unusual preceding occurrences it was noted that the patient's pulse was very weak and that he did not respond. It was also noted that the patient's color was very poor. Exitus occurred at 8:45 A.M. on 10-17-30.

On 2-18-30 it was noted that the patient was continuing with a septic fever. No petechiae were found. The spleen was not palpable. Urinary sediment and blood culture were negative. Note by staff on 2-24-30 concluded that the condition was probably a rheumatic heart disease of aortic insufficiency. 4-20-30 noted that there was a pain that was complained of under the left costal margin which was concluded to be a probable splenic infarct with associated peri-splenitis. 2-18-30 Cuff test applied for 12 minutes and negative except for ½ dozen small petechiae. 3-16-30 2 small petechiae were noted in the palm of the right hand, pin head in size and tender. 6-6-30 it was noticed that the patient's left arm and leg were paralyzed. Physical examination also showed paralysis of the left side of the face, with deviation of the tongue to the left, and deviation of the uvula to the right. Biceps and patellar reflexes were increased on the left. Ankle clonus and patellar clonus were present on the left and absent on the right. Babinsky reflex not present on the right side. Abdominal reflexes absent on the left, normal on the right. 6-7-30 hemiplegia on the left side of embolic origin involving the motor area of the right side of the brain. This remained essentially the same until 9-5-30 when it was noted the patient was having considerable precordial pain. This pain was finally controlled by administration of morphine. 10-16-30 noted that the patient was apparently running a down hill course.

1. Subacute bacterial endocarditis.
2. Decubitus ulcers.
3. Bilateral pleural effusions.
4. Pericardial effusions.
5. Cardiac hypertrophy.
6. Myocardial insufficiency.
7. Vegetative endocarditis of the left auricle, bicuspid and aortic valves.
8. Bilateral pulmonary congestion.
9. Multiple splenic infarcts.

Carcinoma of Testicle With Metastases

The case is that of a white male 38 years of age admitted to the University Hospital on 10-8-30 and died on 10-11-30. At the time of admission the patient complained of 1. pain in the chest, especially on breathing 2. pain in the right hip, 3. generalized weakness, particularly in the right leg and arm. In March 1930 the patient noticed pain in his chest and a swollen left testicle. He saw a physician at this time and was taken to a hospital and the testicle removed. After 2 - 3 weeks he was discharged. He worked one month and all during this time he was troubled with pain in the right chest. His case at this time was diagnosed as a tuberculosis and the patient was sent to a sanatorium. Here he was discharged after 10 day staf of "no tuberculosis found". He was then hospitalized at Benidji and stayed there until admission to the University Hospital. For the past 4 - 5 weeks the patient has developed pain in the right hip and weakness in the right leg and arm. His family state that he has lost considerable weight, the exact amount not being known. For the past 2 months the patient has had considerable cough, raising some sputum. For 2 weeks before admission to the hospital, the patient has been raising blood in his sputum. Before the onset of the present condition the patient was perfectly well. He had the usual childhood diseases consisting of measles, chicken-pox, mumps and whooping cough. He also had diptheria and smallpox. The patient was operated on in March 1930 for herniotomy and removal of left testicle. Most of this history was obtained from the family as the patient was unable to give it. Family history is essentially negative, except that 2 aunts of the patient died of cancer; one of cancer of the breast, the other of unknown location. Patient's occupation was that of a farmer and then a laborer. The past history generally and by systems is essentially negative except for the developement of pain and weakness in the right hip and leg and arm. Neurological history states that for the past 2 -3 weeks his memory has been failing.

Physical examination revealed a white male, pale and very emaciated and somewhat dyspneic. It was also noted that he had considerable difficulty in moving his right arm and leg. There were no eye findings. There was considerable lack of cooperation on the part of the patient. Examination of the chest revealed dullness over the whole right side with decreased breath sounds and increased voice sounds. There was increased tactile fremitus in that side. Blood pressure was 140/105 and the pulse was 122 and regular. The heart was considered negative. Examination of the abdomen revealed some rigidity over the entire abdomen, pain and tenderness over the upper abdomen. There was a scar in the left lower quadrant due to a herniotomy. No masses were palpable. The liver was not palpated. Genital examination revealed absence of the left testicle. Rectal examination negative. Examination of the extremities was entirely negative except the right leg and arm where the muscles were considered to be flabby and there was a bedsore on the right hip. Nervous and mental examination concluded that patient had a poor memory and was completely disoriented. Babinsky was considered positive on the right and negative on the left.

Laboratory data: Urinalysis 10-9-30 showed spec. grav. 1026-, acid reaction without sugar or albumen and with numerous Wbcs in the sediment. Blood on 10-8-30 showed Hb. 74%, Wbc 27,500 and Rbc 3,720,00. Differential of L 13, P 87.

X-ray examination of the chest and pelvis concluded there were multiple metastases of both lungs and a negative pelvis.

Medications and procedures; Zinc oxidedressings were applied to the decubitus ulcer on the right hip. Morphine sulphate gr. 1/6 given repeatedly. S.S. enemas were given. 1 cc was given. Oxygen tent was applied. Digalen was given repeatedly.

Nurses notes: at the time of admission on 10-8-30 the patient complained of severe pain in the chest and right arm. Seemed partially paralysed, also right hip. Complained of pain in both legs. 10-9-30 patient's breathing was quite labored. Complaining of considerable pain and discomfort. 10-10-30 severe dyspnea was noted. Patient was unable to lie on his back or left side. He was irrational at times. 10-11-30 the patient was very restless, perspiring freely, became incontinent, pulse irregular and exitus occurred at 4 P.M. 10-11-30.

Progress notes: 10-10-30 X-ray showed metastatic malignancy of both lungs, probably a teratoma of the left testicle.

DIAGNOSIS:

1. Carcinoma of the right testicle.
2. Subcutaneous hemorrhage on the lateral aspect of both arms.
3. Left herniotomy scar.
4. Carious teeth.
5. Old amputation of the last 2 phalanges of the left 5th finger.
6. 75 cc free old hemorrhage in the peritoneal cavity.
7. Bilateral generalized pleural adhesions.
8. Generalized pleural carcinomatous metastases.
9. Right pericardial carcinomatous metastases.
10. Bilateral pulmonary metastases.
11. " " broncho-pneumonia.
12. Carcinomatous metastases to the spleen.
13. Carcinomatous metastases to the liver.
14. Absence of the left testicle.
15. Carcinomatous metastases to the mediastinal lymph nodes.
16. " " " " right cerebrum.

CASE III.

INTESTINAL OBSTRUCTION

The case is that of a white female 28 years of age admitted to the University Hospital 10-17-30 and died on 10-20-30. At the time of admission the patient complained of: Chart does not contain a complete history and physical examination by a clerk. The admission notes state that the patient was admitted complaining of pain over the lower abdomen, nausea, dizziness, ringing in the ears and stiffness of the fingers and toes with associated general weakness. Stated that the onset of her condition occurred at 6 A.M. on the day of admission. There were sudden sharpabdominal pains so severe that they caused the patient to double up. There was associated nausea and vomiting and finally the development of tinnitus and carpopedal spasm. There was also a history of back pain, late menstrual period of 3 weeks followed by an abnormal irregular flow with associated clots and pain lasting 2 days instead of 4. Since the occurrence of this menstruation there has been some discharge and pain in the back. It was stated that the patient had no pain in the back for some time before admission. Patient had been wearing a pessary which had been changed on 10-16-30 and patient had discomfort since that time. Patient had 2 children, the youngest 6 years of age. Past history - the general health was good, the appetite excellent, and the patient was able to work hard. Bowels and urinary tract were negative. There was no edema of the ankles, no dyspnea, no cough and no easy fatigue.

Physical examination at that time revealed a well nourished female 28 years of age, curled up in bed, very restless, the fingers of the hands in accoucheur position. There was definite abdominal tenderness, especially in the right lower quadrant. There was slight rigidity over this area without rebound tenderness. The liver and the spleen were not palpable. There was no palpable mass in either lower quadrant. Impression by admitting officer was possible ectopic pregnancy, twisted ovarian cyst and adnexal disease. Examination on 10-18-30 by the staff showed the observation of a midline scar, tenderness over the entire lower abdomen with rigidity most marked in the right lower quadrant. At that examination posterior to the cervix a mass was found extending from one adnexal region to the other,

soft and cystic in consistency, extremely tender and tenderness increased by motion of the cervix. Mass was considered to be 2 - 3 cm. in diameter and 6 - 7 cm. long. Considered to be definitely separated from the uterus. Diagnosis was made by this staff member of pelvic inflammatory disease, ectopic pregnancy or twisted ovarian cyst (?). It was considered that operation was necessary. A note by another member of the staff on 10-17-30 stated that the patient was seized with severe abdominal pain which was sharp, piercing in character and caused her to double up at 6:30 A.M. on 10-16-30. History obtained by this staff member stated that the patient was nauseated all morning and early in the evening. She began vomiting in the afternoon and was unable to retain any food or liquid substance. Patient continued all day with intermissions in intensity in the pain. Pain was localized to the lower abdomen in the midline and on both sides, and that pressure in the right lower quadrant caused pain in the left lower quadrant. The last menstrual period was date of September 27. Period was one day late and was of 2 days duration, normal period being of 4 days. Menstruation was irregular in that she passed occasional clots and at intervals flowed more freely. Examination of the abdomen showed a midline lower abdominal scar which was apparently due to uterine suspension. No rigidity, there was tenderness in both lower quadrants, marked over the left lower quadrant. Pressure over the right lower quadrant caused moderate severe pain over the left lower quadrant. No masses were made out. There was no distention present. Vaginal and rectal examination - cervix was considered to point almost in the axis of the vagina. Consistency of the cervix wasapproximately normal. There was bilateral laceration and moderate patulousness of the cervix. Examination of the corpus showed it to be anterior in position and apparently held up anteriorly by a mass posterior to it. The corpus was considered to be of normal size and shape, a little soft, freely movable laterally. Pain was elicited on motion. Examination of the adnexa showed no masses palpable on either side, but pressure on the right adnexal region cuased pain in the left adnexal region. There is a mass regular in outline, flattened somewhat anteriorly and posteriorly with the longest axis directed laterally. The mass is estimated at about 8 cm length, and 3 - 4 cm in width. It appears faucet shaped, forming a half circle about the posterior aspect of the uterus and occupying a larger share of the culdesac. Consistency of the mass is cystic but not fluctuant and is uniform. Digital pressure and on this mass cause moderate pain more noted over the left adnexal region. Diagnostic impression of this staff member was extopic pregnancy first, 2. ovarian cyst with twisted pedicle, 3, pedunculated myoma with cystic pedicles, 4, pelvic inflammatory disease with abscess occupying the cul de sac. An examination by a constulting staff member on 10-17-30 showed that the abdomen presented no rigidity and no rebound tenderness. Vaginal and rectal examination showed a large soft mass situated posteriorly to the uterus, having the feel of encapsulated fluid. One area posterior to the cervix permitting a finger to be hooked into it. The uterus was apparently free of the mass which extends to the left beyond the margin of the uterus and is at least 8 cm broad. The impression was, 1, Bleeding into a cyst, 2, twisted ovarian cyst, 3, Possible ectopic pregnancy. A discussion of the diagnosis stated that the sudden onset ruled out probably any abscess formation in the pelvis or tubal abscess of chronic inflammation. Lack of abdominal tenderness and fever also tend to preclude the diavnosis of pelvic abscess or tubal infection. Recommendations by this Staff member were rest and morphine, followed by operation.

Laboratory data: Urinalysis 10-18-30 showed Spec. gravity 1022, acid reaction, without sugar, cloud of albumen and with sedimental findings of many WBcs, few clumps of pus cells and numerous Rbcs. Blood examination on 10-18-30 showed hb. 93%, Wbc of 17,450. Differential of P 94, L 6, group IV.

X-ray examination on 10-20-30 of abdomen concluded that there was intestinal obstruction of the small bowel.

Medications and procedures: Nose and throat cultures were taken. Ice bags were applied to the abdomen. Vaginal and pelvic examinations were performed. Head of the bed was elevated. Morphine sulphate gr. ¼ and atropine sulphate gr. 1/150 given repeatedly. Fluid report. Lysol douches were given, enemas were given with good results. 5% glucose and saline was given intravenously. Proctoclysis was commenced. Hyperventilation was performed. Caffeine sodium benzoate gr. 7½ was given.

On October 18, 1930 operation was performed with the preceding diagnosis. A midline incision was made below the umbilicus and the operation findings were in the right lower quadrant; a very dark loop of bowel which was strangulated 6 - 8" in length. It was believed that this loop of intestine had herniated in an opening in the right broad ligament. Patient was being operated upon when the surgical staff was called in operative consultation. When the constricting band about the bowel was found, it was divided and found that the hernia had occurred through a hole in the terminal ileum about 18" from the cecum. Operative procedure consisted of excision of this gangrenous section of the bowel, inversion of the ends in purse string suture and inversion of the stump and a lateral anastomosis was then made using 2 rows of sutures anteriorly and posteriorly. The bowel was aspirated before an anastomosis was made. Bloody fluid was obtained from both segments. Both bowel walls were dilated and fragile. Anastomosis was performed with facility and seemed satisfactory. Hemorrhagic fluid in the peritoneal cavity was mopped out. Broad ligaments on both sides were intact.

Nurses notes: At the time of admission the patient was seen by 5 hospital residents. Patient seemed to be in acute pain and was nauseated. Patient continued to complain on 10-18-30 of nausea and abdominal pain. Had emesis of brown fluid. The temperature was around 100° 100.4. Sent to the operating room on 10-18-30 and returned in an unconscious and fair condition. 10-20-30 patient was complaining of nausea and abdominal distress and being very uncomfortable. Later in the day the patient was noisy and irrational. Later in the day her condition became gradually weaker, pulse became imperceptible and exitus occurred at 10:35 P.M. on 10-20-30.

Progress notes: 10-19-30 intravenous saline and glucose was given. 10-20-30 the temperature was 104.4 and blood pressure 160/110. There was no abdominal distention nor rigidity of the abdominal muscles. The wound was clean and there was no fresh drainage. The chest was considered negative. There was some pain in the midabdomen in the upper portion of the incision. It was considered on this day that there were no signs of peritonitis or lung involvement. There was no infection of the urinary tract. The hyperpyrexia was unexplained. Still later on this date it was considered that there might be leakage from the anastomosis and a portable abdominal plate was made. The plate showed marked distention of the small bowel with thickening of the bowel wall shadows suggesting fluid in the peritoneal cavity. It was considered advisable to give intravenous saline and follow this by an ileostomy. Patient became irrational and restless following intravenous administration of fluid and went into a stupor and exitus occurred.

DIAGNOSIS:

1. Intestinal obstruction, due to herniation of the ileum through an orifice of the mesentery of the terminal ileum.
2. Gangrene with segments of ileum.
3. Unhealed 18 cm right rectus midline incision.
4. Old right anterior tibial scar.
5. Bilateral cubital hemorrhage.
6. Generalized peritonitis.
7. Recently incised left broad ligament.
8. Severed left Fallopian tube.
9. Possible early broncho-pneumonia in the right base.
10. Fatty metamorphosis of the liver.
11. Side to side bowel anastomosis 18 cm proximal to the cecum.

Top

Paul H. Fesler, Superintendent of University Hospitals, President of Minnesota State Hospital Association, third Vice-president of the American Hospital Association, is elected to Presidency of American Hospital Association at annual meeting in New Orleans.

Former court reporter college man entered hospital field under guidance of Dean LeRoy Long, University of Oklahoma. Under stern taskmaster learned to build organization, make outside contacts and construct buildings. When superintendent L. B. Baldwin, University of Minnesota, died, noted hospital authorities had only one name to suggest, Paul Fesler. He came to Minnesota and repeated success of elsewhere. Has splendid quality of developing departments under individuals rather than under central control. Honor well deserved, large number of friends throughout the country have supported candidacy. Now making triumphant tour through old stamping grounds. Will probably be back on the job this week. Congratulations from the entire staff.

Leads

Roentgenologist Leo G. Rigler elected Secretary - Treasurer of Minnesota Radiological Society after successful two-year term as President. President-elect Kirkland, Mayo Clinic is now in charge. Dr. Rigler, through perseverence and effective leadership has combined the radiologists of the state into compact unit. He stimulated them to make contributions to programs and to get together for mutual benefits. The society grew from a small beginning to the present efficient size. Again our splendid roentgenologist demonstrates capacity for leadership. We are proud of energetic, efficient, affable Roentgenologist Rigler.

Heat

Turn off the heat in the Eustis amphitheater, say we all. Item #1 for consideration of President-elect Paul Fesler when he returns from trip.

Conference

Very interesting case of woman who had signs of toxemia during repeated pregnancies who finally died of a combination of cardiac failure and renal insufficiency. Case to be considered Friday at regular staff conference 11 A. M. in Todd amphitheater. Everyone requested to be present.

Praise

Many visitors during recent convention visited University of Minnesota Hospitals for first time. Favorable comment received, especially concerning Health Service, Out-Patient Department and cooperation of men. Mr. Dunnevan stopped here first on advice from friends at home to visit Surgeon Wangensteen.

Psychopathic

Old Psychopathic Hospital committee reorganized, rejuvenated and reactivated under able direction of executive secretary R. O. Beard. Purpose to organize lay activities, medical organizations and others interested in getting appropriation for psychopathic unit.

Drinker

Respirator now at University Hospitals through activity of Minnesota State Department of Health by a special appropriation of Governor Christianson. Possible aeroplane service already developed.

Apparatus consists of sheet metal tank equipped with comfortable bed and The patient's head protrudes through a flat soft rubber diaphragm or

collar attached to the body of the respirator, the rubber collar making an air-tight seal about the patient's neck. The diameter of the collar is adjustable, and thus excessive tension on the neck of the patient is avoided.

By means of electrically dirven blowers and an appropriate valve arrangement, the air pressure within the tank is changed alternately from a few centimeters negative pressure to normal atmospheric pressure. The negative pressure induces inspiration - the chest and diaphragm of the patient expand and air is inhaled. The return to atmospheric pressure allows the normal tone of the respiratory muscles to cause expiration. Both the size and the rate of the breaths taken are under control of the attendant and can be measured (or recorded) by means of a suitable U-tube manometer, filled with colored water and connected by rubber tubing to the body of the respirator.

In general, negative pressure of about 12 to 18 cm. of water suffices to maintain adequate ventilation in an adult or child with complete respiratory paralysis. In the case of newborn babies in which respiration does not being within a few minutes after birth, lower negative pressures (from 8 to 10 cm.) have been found adequate. Our experience indicates that the negative pressure used should be sufficient merely to prevent cyanosis or obvious respiratory distress - nothing is gained by using excessive negative pressures for long periods, while we have reason to believe that such pressures actually do harm to the lung tissue, particularly in the case of infants whose lungs may be atelectatic.

Without having the pump stopped the patients can eat, drink and sleep while in the respirator. A bed pan can be passed through one of the port-holes, enemas can be given, and rectal drips can be administered in deglutition cases. The noise of the machinery, although not excessive, is sufficient to prevent the use of a stethoscope in chest and heart examinations. We have taken roentgenograms of patients' chests both while the respirator was running and when the bed was pulled out and the pump stopped.

As a result of the simplification of the apparatus, treatment in the respirator has become more or less routine hospital procedure and does not require specialized attention on the part of the authors.

The indications are respiratory paralysis from acute anterior poliomyelitis, carbon monoxide (gas) poisoning, alcoholic coma, drug poisoning (morphine, heroin, barbital), drowning, postoperative respiratory failure and asphyxiation of the newborn.

The contraindications are simply those of observing the patient's reaction to the respirator. If the patient is not suffering from respiratory difficulty or is not cyanosed, there is generally no point in using the respirator. If the patient does not respond to the treatment and does not spontaneously breathe in synchronism with the machine, the artificial respiration may actually interfere with voluntary breathing and certainly does no good. Even in the case of conscious patients who are frightened and apprehensive but badly cyanosed, we have experienced no great difficulty in putting them into the respirator. A patient can be transferred from a bed or stretcher to the respirator very easily in less than one minute by inexperienced persons.

In many instances morphine has been given to patients who are already in respiratory difficulty but are apprehansive of the machine and are restless. This treatment has proved effective, especially in poliomyelitis, but obviously it is to be used only when the respirator is immediately available or when the patient has already been placed in it.

The respirator should be near at hand for the resuscitation of infants who do not respond to the customary respiratory stimuli at birth. A sufficient number of patients have been treated to indicate that for the newborn the respirator has a very useful field. A special baby size respirator has been developed. Two 40 watt lamps are attached inside to furnish light and heat. The head end is so arranged that the angle of inclination of the baby may be adjusted.

Extracts from Drinker, J.A.M.A. 95: 1249-1253 (October 25) 1930. (Philip, et al)