ly over the nose and mouth, any expired air can be easily detected. Massage, heat and stimulation of reflexes should be applied. If an assistant operator is available he should call the doctor and apply supplemental treatment.

Schafer method

A brief description of the Schafer method of resuscitation is given as follows:

1. The subject is placed in the prone position with the head turned to one side and placed over the back of the hand or over a handkerchief or other garments. The mouth should be cleaned and the tongue pulled forward.

2. The operator kneels astride one or both legs so that his knees are about even with the subject's knees. The hands are placed on the body about 4 inches apart with the fingers together and following the line of conformation of the lower ribs.

3. The pressure is forward and downward with straight arms for about 3 seconds, followed by a quick removal of the hands and relaxation on the part of the operator for 2 seconds. This alternation of pressure and relaxation is continued at 12 respirations per minute.

4. Supplemental treatment should be applied by an assistant operator, who telephones the doctor, secures warm clothing and a blanket, cuts off the wet clothing, assists with massage and stands by to change position with the operator performing the resuscitation.

Mechanical methods

Doctor C. K. Drinker and Doctor Lewis A Shaw of Harvard University constructed a heavy resuscitator (1929) about six feet in length and two and one-half feet in width and a depth which accommodates the body with the exception of the head, which is exposed and insulated from within by a collar. It was considered the first satisfactory appliance for administering artificial respiration over long periods.

A regular rhythmic respiration is produced at about 15 to 25 breaths per minute by air pressure which is alternately fed in and forced out in imitation of the act of breathing. The incoming air current bears down on the chest and abdomen of the patient and causes him to exhale, and the diminished pressure causes his lungs to inflate. Mechanical resuscitators of a much improved form for portable use have been introduced by the E & J Manufacturing Company and the McKesson Appliance Company. These are widely used in American hospitals and are absolutely approved.

An excellent technical report has been prepared by Dr. Coryllos* who maintains that the apparatus is easily effective in the hands of non-medical rescue squads. These new combination inhalators and resuscitators have been subjected to exacting experimental investigation with favorable results. It is maintained that in the presence of apnea and beginning relaxation of the muscular system that only the mechanical methods of forcible insufflation of oxygen into the lungs can produce successful resuscitation. The modern methods permit forceful mechanical insufflation-suction until respiratory movements begin. Then the device is changed by a valve to a steady stream as an inhalator.

Supplemental treatment

Steinhaus has pointed out that the circulatory system has a great deal to do with the chances of recovery. When the heart is beating feebly the pressure in the capillaries is less than 10 per cent of the original pressure imparted to the blood by the heart (5 to 10 m.m. Hg.). It is highly important to do anything possible to aid the return flow of blood to the heart. The two principal methods are (1) the contracting and relaxing of skeletal muscles and the (2) forceful respiratory movements.

Steinhaus recommends exercising the arms and the legs and exerting pressure on the abdomen during the inspiratory phase of respiration. The arm exercise involved in the Silvester method is possibly helpful and in addition, the legs may be exercised by pushing the knees up toward the chest a number of times while holding the feet. This circulatory viewpoint of resuscitation indicates that it is highly important to have the subject placed so that the head is downhill and gravity assists the return flow of blood to the heart.

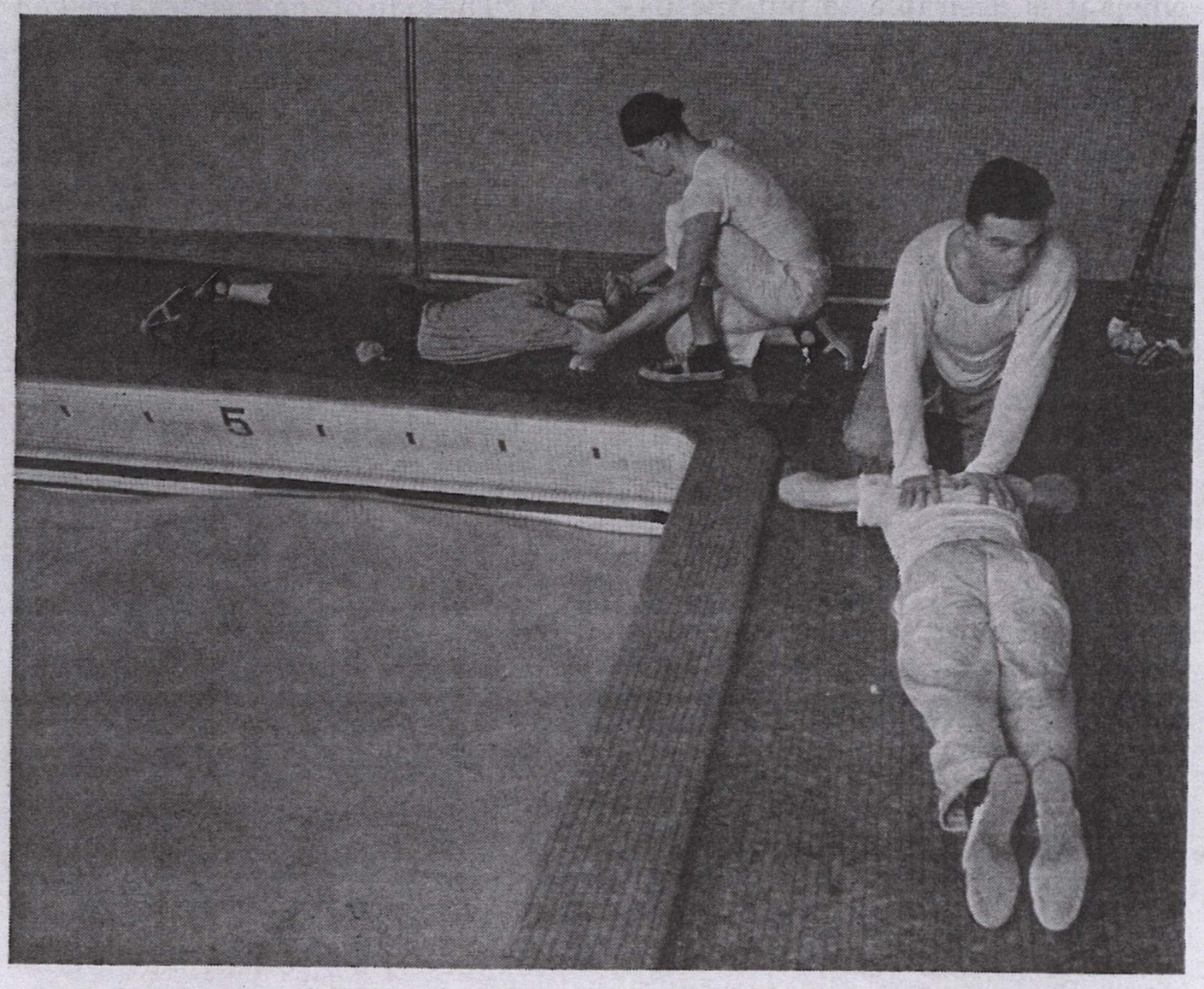
Another point is that pressure should be gradually applied to minimize the effect of increasing the intra-thoracic pressure and checking the return flow of blood to the heart. With the patient on the back the legs may be lifted or exercised as suggested. This is the strong reason for methods which use the supine position.

Circulation may be assisted by massage toward the heart. The rubbing should be over the big veins by stroking movements continuously applied in the direction of the heart. A strong slap should be given on the back before starting pressure in the prone position. It may also be helpful to slap the bottoms of the feet and the face, pull the hair and apply rectal dilation. Colonel Nielsen emphasizes that it is better to rough up the body and it should never be allowed to lie quietly.

Vibratory tapping (100 times per minute) over the heart area may provide stimulation to the heart. Re-

(Continued on page 24)

*P. N. Coryllos, "Mechanical Resuscitation in Advanced Forms of Asphyxia," *Surgery, Gynecology & Obstetrics*, 66: 698-722 (April, 1938).



Nielsen Resuscitation Method, arms bent at elbows, hands crossed under face.