compression of the heart and great vessels, and at the same time allows free movement of the forward limbs in running. This the deep or high-indexed chest gives. When, however, the forward limbs are not used for locomotion, but for climbing, swinging, defense and other lateral movements, the deep chest restricts the freedom of such motions, and the animal is better served by one which is more nearly round.[5] The anthropoid apes are examples of this class; they assume the semierect position and in them "the thorax is rather broad than laterally compressed."[6] In man, as has been shown, the thorax is normally flattened anteroposteriorly. Thus we see that in general as the mammalia ascend in the scale of development their chests become more flattened. The apparent explanation for the nearly round chests of whales and bats is that, as their anterior limbs are no longer used in ground locomotion, forward and backward movements, but laterally in swimming and flying, respectively, such a chest is best suited to their needs.

An examination of the human chest from fetal to adult life is of interest in this connection. At the fourth month of fetal life the chest is considerably deeper than it is broad—the lower mammalian type. During the later months the anteroposterior diameter relatively decreases until at birth the chest is practically round[7]—the anthropomorphal type; and after birth it gradually flattens out until the normal index of 70 is reached at about the eighteenth year. The period of most rapid change is during the first six years of life; and at puberty the index is about 80. It is evident, then, that each human chest in its development has gone through the same stages with respect to its diameters as has the human type in its ancestral development.

Having in mind the above, and that the type of chest in which tubercle infection most frequently develops is the same as the normal human chest at puberty, it is a fair conclusion that the typical tuberculous chest is one which has been arrested in its development at or about puberty. Bessesen[4] believes that the lack of development is principally in the transverse diameter, the anteroposterior becoming about normal. High-indexed chests have been shown to be common among paupers and the insane,[3] and a study of the literature and photographs leads me to believe that such chests may also be found associated with idiocy, cretinism and chondrodystrophy. High-indexed chests, then, are frequently associated with various forms of so-called degeneracy, which are really conditions of maldevelopment.

It has been suggested that the degree of abnormality in the diameters may have some influence on the prognosis of pulmonary tuberculosis, and Hutchinson[8] states that in 31 successive cases, of 16 patients who did badly the average index was 80.2, while 15 that did well averaged 74.6. My observations regarding this have not been sufficiently extensive to warrant a conclusion, though a few cases have shown results which lead me to believe that it may be true.

If high-indexed chests predispose to pulmonary tuberculosis, it is possible to lessen this predisposition by exercises which tend to produce an increase in the transverse diameter; such as climbing, swinging by the arms and movements laterally from the body. It also creates the presumption that it may not be best to prescribe for patients with pulmonary tuberculosis exercises which tend to develop deep chests.[9]

5. Hutchinson: Studies in Human and Comparative Pathology, 1901, Chapter v.
6. Huxley: Anatomy of Vertebrate Animals, p. 402.
7. Holt: Diseases of Infancy and Childhood, 1908, p. 24.
8. Hutchinson, Woods: Discussion on Dr. Bessesen's paper, THE JOURNAL A. M. A., 1905, xlv, 2007.

CONCLUSIONS

1. The typical tuberculous chest is more nearly round than the normal chest.
2. The increased index precedes development of tubercle infection in the lungs. It is due to an arrest of development at or about puberty and predisposes to pulmonary tuberculosis.
3. Abnormally high-indexed chests in children should be corrected by proper exercises.

55 East Seventy-sixth Street.

CHLOROFORM—THE IDEAL HEMOSTATIC IN PULMONARY HEMORRHAGE

JOSEPH B. FISH, M.D.
Superintendent Sanatorium of the Jewish Consumptives' Relief Society
EDGEWATER, COLO.

In spite of the great advance made in medicine during the last half-century, the treatment of pulmonary hemorrhage remains practically the same as at the time of Galen, with the addition only of a number of the newer drugs which do not seem to materially improve the solution of this vexed question. The therapeutics of this frequent complication in pulmonary tuberculosis is still based entirely on clinical experience, which in the main is unsystematic and haphazard. Morphin, atropin, ergot, hydrastis, lead acetate, stypticin, adrenalin, calcium chlorid, gelatin, nitrites, magnesium sulphate, and a host of other drugs used either singly, in combination, or in rotation, are doled out to the patient with more or less disappointment until Dame Nature, in spite of the drugs and the deranged digestion resulting from their employment, comes to the sufferer's rescue and by her *vis medicatrix* brings about the formation of a blood clot at the bleeding point.

The lot of a patient afflicted with pulmonary hemorrhage is, indeed, pitiful and his aspect at once evokes compassion. Compelled to lie flat on his back without even a pillow under his head, enjoined from changing his position, or at times even his clothes, no matter how irksome or oppressive, forbidden to turn his head or utter a word, subjected to the inevitable ice-bag, which occasionally leaks and chills him to the bone, stuffed with cracked ice in lieu of food, given frequent hypodermic injections, the patient must needs look very forlorn and think of naught but his impending doom. Nor is the position of the attending physician an enviable one, harassed as he is by anxious relatives and uncertain as he must be as to the results of his treatment.

In a previous paper[1] I made cursory mention of the successful use of chloroform in the treatment of pulmonary hemorrhage. Since that time I have continued my experiments with the drug and have given up one by one almost all the above-mentioned medical agents, limiting my treatment even in very severe hemorrhages to chloroform only. I am happy to report most excellent results from the use of chloroform in nineteen

9. Med. Rec., 1905, lxvii, 645.
1. Clinical Observations on Pulmonary Hemorrhage, THE JOURNAL A. M. A., March 13, lii, 883.

cases of pulmonary hemorrhage, two of which ordinarily would have been regarded as probably fatal.

The routine treatment has always been uncertain and empirical because of the fact that the bleeding point is not accessible and therefore can not be reached directly by hemostatics. Our aim, therefore, must be to bring about a blood clot in an indirect manner. This may be achieved in one of the following ways: (1) by reducing the force and rate of the heart beat; (2) by reducing the blood pressure; (3) by reducing the respiratory movement.

Now the effect of chloroform on the circulation is chiefly to depress the vasomotor system, causing an extraordinary fall of blood pressure. Complete vascular relaxation ensues, facilitating the passage of the blood from the arteries into the capillary network and veins. The patient is, so to speak, bled into his own vessels. There is also some cardiac enfeeblement and dilatation, which likewise contributes to the fall of blood pressure. Chloroform has also a depressant effect on the respiration, because of the lessened supply of blood to the respiratory center.

As chloroform produces coagulation of the blood *in vitro*, it is possible that in some cases its action in the body is aided by direct contact of the vapor with the bleeding point.

In chloroform, therefore, we have all the requirements for an ideal hemostatic. It lessens the heart action, reduces the blood pressure and diminishes the respiratory movement. It acts promptly and efficiently and, what is more, it leaves the digestive tract intact.

The patient being placed in a semirecumbent position, from 2 to 4 c.c. of chloroform are dropped on the usual inhaler, or wad of cotton, and held near the nostrils of the patient. The hemorrhage will cease within five or ten minutes. During the following twenty-four or forty-eight hours the patient will be bringing up blood clots. The inhalation of 15 to 20 drops every hour is continued for a few days. Ammonium chlorid with small doses of codein is given internally every four hours. The ammonium salts favor expulsion of retained secretions, whereby we hope to avoid an aspiration pneumonia and the codein will prevent excessive coughing. It is also a good plan to administer a teaspoonful of magnesium sulphate three times daily to remove excrementitious matter which, when retained in the blood, will stimulate the vasomotor center and raise the blood pressure.

In the limited number of cases in which I had the opportunity of using chloroform the results have been all that could be desired. Being fully aware of the paucity of material on which this study is based, I hope that a more extensive trial by the profession at large will bring out more fully the value of chloroform in pulmonary hemorrhage.

Antituberculous Substance in Tuberculous Glands.—Dr. A. Fontes (*Brazil-med.*, 1908, xxii, No. 40) offers the following conclusions derived from his studies *in vitro* of the tuberculous glands of guinea-pigs: 1. There exists in the tuberculous glands of guinea-pigs a substance capable of reducing the number of tubercle bacilli in a given emulsion. 2. This substance does not exist in normal glands. 3. The maximum effect of this substance is exercised after 120 hours' contact; when it has reached this it ceases. 4. The addition of a larger amount of extract of tuberculous gland extract, after the appearance of the action, does not cause a new diminution of the number of bacilli. 5. This substance is not reactivated by the addition of fresh serum from a new guinea-pig.

ISOHEMOLYSINS AND ISOAGGLUTININS OF HUMAN SERUMS, WITH SPECIAL REFERENCE TO CANCER

WILLIAM J. BUTLER, M.D.
Attending Physician Cook County Hospital
AND
W. T. MEFFORD, M.D.
CHICAGO

In 1892 Maragliano[1] directed attention to the fact that the blood serums of patients afflicted with various diseases exerted a destructive influence on the blood corpuscles of healthy individuals, and also on the corpuscles of pathologic cases and set free hematoidin. He expressed the opinion that the reduction in sodium chlorid in the blood in different conditions of disease was a factor in the solution of red cells. This appears to be the first observation on isolysins of human serums.

Ehrlich and Morgenroth[2] demonstrated that the blood serums of goats that had been immunized by homologous blood corpuscles contained isolysins, the serums of the immunized goats being hemolytic for the corpuscles of other goats.

Von Dungern,[3] on the other hand, found that the serums of guinea-pigs that had been immunized with the tracheal epithelia of cattle was not only destructive to the tracheal epithelia of the latter, but also exhibited an hemolytic influence on the blood corpuscles of cattle.

Landsteiner,[4] in 1890, showed that human serums often agglutinated human corpuscles. He found this phenomenon of agglutination especially marked in the blood of diseased individuals.

The first extensive clinical application of the phenomena observed by Maragliano and Landsteiner was made by Ascoli,[5] who examined seventeen normal persons and ninety-seven patients for isohemolysins and isoagglutinins. He employed in his technic a mixture of equal parts of serum and of blood corpuscle suspension. He used a 2½ per cent. suspension of blood corpuscles for the hemolytic reaction and one-half of this for the agglutination reaction, the serums for the latter being employed in different dilutions. His controls consisted of suspensions of the blood corpuscles in salt solution.

He found the agglutinating power of the serums of healthy individuals hardly observed in a higher than a 1 to 20 dilution of their serums, while in pathologic conditions it was often found in much higher dilution. In the examination of normal bloods, hemolysis was in most cases *nil*. In a very few he had observed a trace of solution and in rare cases a slight solution of red cells had occurred, as indicated by the rose color of the fluid after sinking of the cells.

In the examination of the serums of pathologic cases with relation to hemolysins, he found negative results with 5 cases of chlorosis, 2 of infection with *Anchylostoma duodenale*, 1 of abscess, 3 of acute rheumatism, 3 of exudative pleurisy, several of bronchitis, several of acute and chronic gastritis, 2 of lead-poisoning, 1 of acute and 2 of chronic nephritis.

On the other hand, he found strong isoagglutinating and isohemolytic properties in the serums of two patients with carcinoma of the stomach, a probable Addi-

1. Maragliano: Verhandl. d. xi Cong. f. inn. Med., Leipzig. 1892; Deutsch. med. Wchnschr., 1892, xviii, 411.
2. Ehrlich and Morgenroth: Berl. klin. Wchnschr., 1900, p. 37.
3. Von Dungern: München. med. Wchnschr., 1899, xlvi, 1128.
4. Landsteiner: Centralbl. f. Bakteriol., 1900, xxvii, 356.
5. Ascoli: München. med. Wchnschr., 1901, xlviii, 1239.