

dent for its own existence on the manner in which its operations are carried out. Hence the importance of recognising the conditions of blood which precede all pathological changes. In cases of apoplectic clots in the brain, Dr. Sieveking has shown that if a patient survive a fortnight or three weeks that blood crystals are formed. It would appear that these blood crystals do not form from clotted blood until the blood corpuscles have become ruptured by endosmosis. May not the same pathological process be carried on in the heart? If so, what an important factor the blood salts play in this fibrinous change.

In cases of splenæmia the blood was found by Scherer to have the following abnormal constituents: lactic, acetic and formic acids and a peculiar substance (hypoxanthin) to the extent of 6 per cent. This hypoxanthin is normal in the spleen but not in the blood. Conditions of the blood expressed by the terms anæmia, splenæmia, léucocythemia, are those in which will be found grey yellow coagula in the heart and large veins. These coagula, says Vogel, are made up almost entirely of colourless corpuscles. The conditions of the blood in different diseases would be exceedingly interesting. Dr. Dulcher, of Ohio, has arrived at the following conclusions with respect to the blood in phthisis.

1. That there is a decrease of the red corpuscles and a slight excess of the white.
2. That there is an increase of fibrin and a deficiency of its vitality.
3. That the albumen is in excess as to amount, but depraved in quality and unfit for the elaboration of healthy fibrin.
4. That there is an increase of dissolved animal matter and a diminution of saline matter.
5. That there is a reduction of its specific gravity and an increase of its watery particles.

The above conditions I have known to be associated with fibrinous concretions in the hearts of phthisical patients. The old proverb, a stitch in time saves nine is as true in disease as in economics. A knowledge of the initiatory blood changes if recognised could be more easily modified or prevented than when those changes have fully expressed themselves in organic structural changes.

Progress of Medical Science.

CLINICAL LECTURE ON THE USE OF DIGITALIS IN DISEASES OF THE HEART.

Delivered at the Philadelphia Hospital by H. C. WOOD, JR., M.D.

There are, gentlemen, primary physiological facts concerning the action of digitalis which I shall to-day lay down somewhat dogmatically as the premises for the discussion of the subject. I do this because time is wanting in which to give you the proofs of these premises, even if they were not out of place in a clinical lecture-room; and I do it the more willingly because those of you who may be inclined to be skeptical can find these proofs in detail in my treatise upon therapeutics.

By experiments on the lower animals two things have been definitely ascertained: 1, that in the lower animals digitalis is a very powerful stimulant to the inhibitory apparatus of the heart; and 2, that it is also a powerful stimulant to the muscular substance or its contained ganglia.

We know the first because after the administration of the drug, when the heart has already been affected by it and is beating slowly, if the inhibitory nerves be cut, the organ springs, as it were, into an intense rapidity of action. The drug stimulates the cardiac muscle, because the amount of work performed by the heart is vastly increased under its influence, even when the viscus is disconnected from the body. We also know as a probable fact that digitalis causes a general vasomotor spasm, a contraction of the muscular walls of the vessels. Thus much for the observations made on the lower animals.

When digitalis is administered to man, the first thing we observe is a diminution in the number of heart-beats and an alteration of the character of the pulse, which becomes full, and hard, and strong. You can recognize by the feel of the blood-wave that both the force of the contraction of the heart and the amount of blood thrown out during the systole are increased. If the drug is given in poisonous doses the pulse may, it is true, become rapid, and smaller than normal. The meaning of this can be explained by referring again to the animal. We find that here the same phenomena are observed, and that if a very large dose is given, the heart may be suddenly arrested in systole from irritation of the cardiac muscle; before this happens, for a time, the tendency to contract is so great that the systole will occur before the complete filling up of the cavities. Two short imperfect waves are thus produced instead of one long one: this is the double beat,—forming a dicrotic pulse. In man the "dicrotic pulse" of digitalis is classical, and its mechanism is evidently the same as that of the double arterial wave in the lower animals: instead of a long pause and a full dilatation, the first attempt at diastole is interrupted by an abortive systolic contraction. As in animals, probably in these