

diminished diastolic filling of the heart. This condition I would call acapnial oligæmia, or exsanguinity. It is compensated temporarily by constriction of the arterioles. The blood stream diminishes until finally it is insufficient to supply the oxygen needed by the tissues. Then tissue asphyxia, and acute acidosis quickly result. The colloids of the tissues in asphyxial acidosis imbibe water in the same manner as does fibrin when soaked in dilute acid. The vascular system is thus emptied as if by hemorrhage. Fluid passes from the blood into the tissues almost as fast as it can be supplied by intra-venous infusion of saline.

Thus there are two sequences: (1) pain-hyperpnœa, acapnia, and fatal apnœa vera, *i. e.*, failure of respiration; (2) pain-hyperpnœa, acapnial oligæmia, and cyto-asphyxial oligæmia, *i. e.*, failure of the circulation because of exsanguinity.

A full discussion of this topic and its literature will soon be published in the *American Journal of Physiology*.

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Observations on the nature of the antitrypsin of the serum.

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In a previous communication to this society, it was shown by the authors that the viscosimeter offers a method for determining the anti-tryptic activity of serum which is extremely accurate, delicate and constant in its results. Further study by means of this method has revealed the fact that this so-called anti-tryptic activity is in reality very much more complex than had hitherto been suspected. If a series of intracellular enzymes are prepared from various human organs and from carcinomata, according to the method of Wiechowski, by drying, it becomes possible to test the inhibitory action of any given serum against each of these enzymes by the use of the viscosimeter. This has been done by the authors with a considerable number of sera. The resulting figures, which have been constant in successive experiments, demonstrate that the inhibitory value of each serum is distinct and different for each of the enzymes tested. These differences are extreme, inasmuch

as a given serum may show an inhibition of only five per cent. of the total digestion against one organ enzyme, and as much as 95 per cent. against another. With a second serum, again, these relations are found reversed. It seems impossible to interpret these results otherwise than as indicative of the existence of a variety of ferments, each one more or less characteristic of the organ from which it is derived. This multiplicity of proteoses has recently been suggested by Vernon as the probable explanation of certain differences shown in comparative digestion experiments with the pressed juices obtained from the various organs. At the same time, it seems necessary to assume the existence in the serum of a corresponding variety of anti-ferments.¹ It is, therefore, evident that it is impossible to speak of the "anti-tryptic" activity of serum, inasmuch as this term comprises a heterogeneous set of functions. An observation which will prove to be of interest, if confirmed by a wider series of experiments, is the fact that sera derived from cases of cancer have hitherto shown a characteristic mode of reaction. Their inhibitory activity against commercial trypsin has in general been very high, as previously determined by many German observers, by the casein method of Gross; in some cases it has been normal or average; in others, very low. In no case, however, has the inhibition exercised by any cancer serum against the "tryptic" ferment derived from a cancer notably exceeded its inhibition of trypsin; in almost all cases it has fallen enormously below the latter. In the normal control cases, these relations have hitherto been exactly reversed. An explanation for these facts the authors do not consider possible as yet. At all events, the viscosimeter seems to afford a simpler method than any yet devised to determine these complex relations of the serum.

¹Whether the inhibitory activity of the serum is in reality attributable to true anti-ferments cannot be discussed here, but to the authors this seems the only likely explanation of certain conditions, in spite of the fact that Hedin was able to reproduce some of the phenomena of inhibition by the use of charcoal.