Effects of atmospheric conditions on the circulatory system are best seen when the observed results are viewed in the light of either the Crampton or the Barach indices. The Crampton index is expressed in terms of percentage, which is determined by the increase in the rate of the heart beat and the rise or fall of the systolic blood pressure when the subject passes from a reclining to an erect posture. A high percentage signifies a slight increase in the heart rate and a considerable increase in blood pressure; a low percentage, a marked increase in the heart rate and a considerable decrease in blood pressure. The Crampton percentage rose in an atmosphere of 20° C., 50 per cent. humidity, and fell at 30° C., 80 per cent. humidity, these results signifying respectively an improvement and a deterioration in the circulatory system or its nervous control.

The Barach index of cardio-vascular energy represents the sum of the systolic and diastolic blood pressures multiplied by the heart rate. This fell in air of 20° C., 50 per cent. humidity, while at 30° C., 80 per cent. humidity, it rose above 20,000, the maximum which Barach has assigned to normal, healthy individuals.

The results indicate that as regards bodily temperature and the cardio-vascular mechanism, such a cool and comfortable atmosphere as 20° C., 50 per cent. relative humidity is beneficial, while the heat and humidity of an atmosphere of 30° C., 80 per cent. relative humidity, are deleterious.

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Physical analysis of blood serum in nephropathies and cardiopathies.

By **E. E. BUTTERFIELD** and **W. H. BRADDOCK.**

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The current methods of recognizing renal insufficiency are based on the detection of a diminished rate of elimination of substances normal or foreign to body metabolism. The most reliable data are based on a study of the nitrogen, chloride and

water balance. There are practical and theoretical objections to such studies. Constant diets are impracticable at Bellevue at present and there are too few workers to carry out such investigations on a large scale. On the theoretical side, we know that a diminished rate of elimination of water and chlorides does not necessarily indicate renal insufficiency but may occur in cardiac decompensation with edema.

A diminished rate of elimination must eventually lead to retention and the most accessible place to look for retention is in the blood serum. A complete chemical examination of the serum should reveal the retention of certain substances but in the case of NaCl we know that retention of NaCl and water occur together so that the concentration of NaCl in the serum remains practically constant.

In an attempt to overcome these theoretical and practical difficulties we have worked out a system of physical analysis of the blood serum which has yielded valuable information as to the relative concentration of chemical substances possessing similar physical properties. The freezing point, the refractive index, and the specific gravity of the blood serum are independent variables

TABLE.

	Total Averages.			Extremes.		
	F. P.	$\Delta N_d \times 10^3$.	Sp. g.	F. P.	$\Delta N_d \times 10^3$.	Sp. g.
Normals (5)	0.57	17.4	1.026	0.55–0.59	16.7–18.0	1.025–1.027
Cardiacs with edema (13)	0.56	17.1	1.025	0.53–0.58	15.3–19.2	1.024–1.030
Nephritics with edema (20)	0.56	13.5	1.020	0.53–0.59	11.1–15.7	1.015–1.023
Nephritics with uremia (6)	0.67	18.1	1.029	0.76–0.61	18.9–16.5	1.030–1.027
Nephritics with uremia and edema (3)	0.62	14.3	1.022	0.63–0.61	13.2–15.4	1.020–1.025
Arterio-sclerotics with hypertension (3)	0.57	20.4	1.031	0.59–0.57	20.8–19.7	1.033–1.030

within certain limits. Systematic use of these methods on 50 cases, chiefly nephritics, cardiacs, and arterio-sclerotics, has shown that definite serum pictures exist which are more or less characteristic of different types of nephritic or cardiac disease. Nephritic edema is associated with hydremia while in cardiac edema the blood serum is normal. Uremia may or may not be

associated with hydremia. When hydremia and uremia coëxist subcutaneous edema is also present. The arterio-sclerotic cases with hypertension and with indefinite renal or cardiac symptoms show an extremely concentrated serum without any elevation of the freezing point. The results are easily summarized by giving the numerical values, low and high, and total average for each group.

F.P. denotes the freezing point and Sp.g. the specific gravity of the serum with the usual corrections. $\Delta N_d \times 10^3$ is the difference between the refractive indices of serum and water measured at the same temperature and multiplied by 1,000. The dry residue and the protein content of the serum were also determined. From these determinations it appears that the refractive index depends chiefly on the serum proteins while the specific gravity follows closely the values for the dry residue.

The clinical diagnoses were made by Dr. Van Horne Norrie and Dr. Frank Erdwurm. It is necessary to have thoroughly reliable diagnoses as far as the best contemporary clinical medicine permits. In one case of each of the important groups the clinical diagnoses have been confirmed at autopsy.

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The anaphylactic response of the human fallopian tube.

By RICHARD WEIL.

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The material for this study was obtained in the routine course of gynecological operations, through the courtesy of the surgeons. In the operations for fibroid tumors of the uterus, it is frequently necessary to remove the Fallopian tubes, which furnish a satisfactory basis for the study of smooth muscle reactions. The tubes were studied by the method described by Dale for the uterine horns of the guinea-pig. Some of the material came from women who had previously received horse serum in some form, while in the remainder, regarded as controls, there was no history of the use of diphtheria antitoxin, or other therapeutic serum derived