This increase with overripening of either dry sperm or sperm in suspension is therefore held to be due not to a substance liberated by sperm but to a physiologic change in ageing sperm (as in the case of eggs). The physiologic changes include a change in metabolism, in permeability of the sperm wall, in viscosity of the protoplasm, and in a changed reactivity to a given dose of agglutinin. This cyclical change in reactivity is paralleled in the eggs by a cyclical liberation of agglutinin.

It is this cyclical physiologic change in eggs and in sperm which is held responsible for the initial vitalizing phase, the later devitalizing and senescent phases.

The results and interpretation with ageing sperm are in harmony with those obtained in agglutination of bacteria.

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Effects of Oxygen Therapy on Patients with Congestive Heart Failure.

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The effects of living for 2 to 5 weeks in an atmosphere containing 40 to 50% oxygen were studied in 5 patients with cardiac insufficiency. The Barach oxygen chamber, with constant temperature and humidity regulation, was used. Studies were made (a) with the patients in the ward, both before and after residence in the oxygen chamber; (b) with the patients in the oxygen chamber with normal (21%) atmospheric oxygen content; and (c) with the patients in the oxygen chamber with 40 to 50% of oxygen in the atmosphere. All other procedures, such as diet, fluid intake and the dosage of drugs, were kept sufficiently constant so that they did not modify the results. The usual clinical observations were recorded and in addition, measurements were made of the basal metabolic rate, pulmonary ventilation, vital capacity, arterial oxygen content, arterial CO_2 content, and the CO_2 dissociation curves of the arterial blood. From the latter were calculated the arterial oxygen saturation, arterial CO_2 tension and the arterial serum pH.

In one patient with mitral stenosis of long standing, great cardiac enlargement and marked chronic passive congestion but no per-

ipheral edema, very little change occurred after a week in 45% oxygen. There was only a slight rise in the level of the CO_2 curve while he was in the chamber. No clinical improvement was noted.

Two patients with chronic valvular heart disease, marked decompensation and edema, together with fever and other evidences of active rheumatic infection, showed moderate subjective improvement. In these individuals, residence for 2 weeks in 45% oxygen was associated with a considerable rise in both the arterial CO_2 content and the level of the CO_2 curve. In one case, there was a rise in arterial oxygen saturation from 84 to 93%. (No measurement was made in the other case.)

During the first period in the chamber, when the inspired oxygen percentage was high, there was no marked change in the water balance. Later, the patient who was more seriously ill was removed from the oxygen room to the ward and there occurred rapid and extreme decompensation. The pulse became thready, the blood pressure fell from 156/80 to 90/?, and cyanosis was marked. Coincidently, the oxygen saturation fell from 93 to 84%, the arterial CO_2 from 41.7 to 26.4 volumes %, and the arterial pH changed from 7.38 to 7.32. There was complete suppression of urine throughout the 20 hours that she remained in the ward, during which time 2 catheterizations were done, without result. She was then transferred back to the chamber into an atmosphere containing 45% oxygen. There was prompt relief of symptoms. The blood pressure rose to 120/75, and 2 hours later she began to void. After 2 days, analysis of the arterial blood showed the oxygen saturation to be 98%, the CO_2 content 49.5 volumes %, and the serum pH 7.45.

Of particular interest were 2 cases of non-rheumatic heart disease with advanced myocardial failure. One of these had arteriosclerosis and extensive fibrosis of the myocardium; the other showed a large aortic aneurysm, partly intrapericardial, with aortic insufficiency, probably of luetic origin. Both had dyspnea, orthopnea and marked edema. Each patient, after a preliminary period of study in the ward, was put into the oxygen chamber, with 45% oxygen, for 18 days. At the end of this time, the oxygen in the chamber was reduced to 20% and maintained at this level for 6 days. The oxygen was then again increased to 45% and was kept at this concentration for several days more. The percentage was finally gradually reduced and the patient was transferred back to the ward. There was striking relief of dyspnea, orthopnea and cyanosis, as well as a tendency toward a lower temperature, during the periods when the patients were inspiring a high percentage of oxygen.

The blood changes were similar to those observed in the preceding group, namely, a rise in the arterial CO_2 and in the CO_2 curve level, a rise in arterial oxygen saturation, decrease in pulmonary ventilation and in basal metabolic rate and, in one case, an increase in the vital capacity. The arterial serum pH was not altered.

The striking features of these 2 cases were the occurrence of diuresis and the consequent disappearance of edema while in an atmosphere rich in oxygen. In both cases, a return to ordinary room air was followed by diminution in urinary output and return of edema. A second period of residence in 45% oxygen again resulted in diuresis and disappearance of edema. The direct relationship between the oxygen percentage in the atmosphere and the water balance, as measured by fluid intake and output, seemed clearly established. No such constant and parallel relation was apparent between diuresis and the changes in other measurements, such as vital capacity, metabolic rate, pulmonary ventilation, CO_2 level and hydrogen ion concentration. Probably there was a fairly close association between the amount of urinary output and the degree of arterial oxygen unsaturation, but the data were not sufficiently complete to determine this point. The temperature and humidity of the atmosphere were not deciding factors, because the same sequence of events occurred whether the patient was transferred from the oxygen chamber to the ward, or was kept in the oxygen chamber while the oxygen in its atmosphere was changed from 45 to 21%.

Electrocardiograms were taken at frequent intervals on all 5 patients. No changes were observed in the form of the complexes or in conduction which could be ascribed to variations in the oxygen content of the inspired air.

Citations to literature will be given in the complete report.

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A New Type of Microelectrode.

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Several types of microelectrodes have already been devised by different investigators.[1] In all these electrodes the conducting me-

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[1] Bose, J. C., *Trans. Bose Institute*, 1919, ii; Taylor, C. V., PROC. SOC. EXP.