of the Van Slyke apparatus and the total Co_2 content determined by the method devised by Van Slyke.[1] The method adopted was considered to be more advantageous for my purpose than the widely used method of first exposing plasma to 5.5 per cent. of CO_2 and ascertaining the CO_2 combining power.

Results: The results presented in the accompanying table indicate that the total CO_2 content of the arterial plasma is a fairly constant figure, averaging fifty-six volumes per cent. The venous plasma is always a little higher than the arterial in individual cases, the discrepancy being from three to eight volumes per cent. This discrepancy has been found to increase if the individual is allowed to take some light exercise, such as walking, just before the blood samples are taken. Under these conditions the arterial figures remain about normal while the venous are from twelve to fifteen volumes higher.

THE TOTAL CARBONATE CONTENT OF THE ARTERIAL AND VENOUS PLASMA OF NORMAL INDIVIDUALS AT REST.

CO_2 reduced to 0°–760 mm. in 100 c.c. plasma.

Arterial	Venous	Arterial	Venous
c.c.	c.c.	c.c.	c.c.
62.0	66.0	55.0	61.0
57.8	64.4	58.0	61.4
54.0	61.0	57.5	62.8
59.1	67.2	62.8	65.4
54.9	62.2	53.4	60.0
58.1	64.2	59.0	65.7
2.7	59.9	60.3	67.4
57.5	61.5	54.9	62.2
55.7	61.0	60.5	68.9
51.5	59.9		

9 (1469)

The total carbonate content of the arterial and venous plasma in patients with chronic heart disease.

By **R. W. SCOTT** (by invitation).

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Twenty-eight determinations of the total carbon dioxide content of the arterial and venous plasma have been made on ten

[1] Van Slyke, D. D., *J. Biol. Chem.*, 1917, XXX, 347.

individuals with chronic heart disease. All patients in this group have been carefully selected because they were suffering primarily from a failure of the heart to maintain an adequate circulation. They have been free as far as could be determined from any vascular or renal disease. For the most part they were young patients with chronic rheumatic myocarditis and valvulitis.

In some a normal cardiac mechanism was present, as determined by the electrocardiograph. In others auricular fibrillation usually associated with mitral stenosis was found. Moribund patients and patients with a marked degree of venous stasis and edema have not been included.

Samples of the arterial and venous blood were obtained at the same operation; immediately centrifuged, and the total CO_2 content of the separated plasma determined directly. In all cases the blood was obtained while the patient was at rest in bed. The results are presented in the accompanying table.

THE TOTAL CARBONATE CONTENT OF THE ARTERIAL AND VENOUS PLASMA IN PATIENTS WITH CHRONIC HEART DISEASE.

CO_2 reduced to 0°–760 mm. in 100 c.c. plasma.

Arterial	Venous	Arterial	Venous
c.c.	c.c.	c.c.	c.c.
42.8	50.6	32.0	44.5
33.7	37.3	41.6	48.4
38.2	50.3	48.5	54.2
47.6	52.5	39.7	44.6
46.9	50.6	51.0	63.0

It is seen that both the arterial and venous plasma have a total CO_2 lower than that found in normal individuals. The arterial values for CO_2 show wider variation and the discrepancy between the CO_2 of the arterial and venous plasma is more marked in heart cases than in normal individuals. These differences are attributed to the varying degrees of cardiac efficiency in the heart patients.

In the type of cases studied there has been a certain relation between the integrity of the circulation and the level of CO_2 in the plasma. The more dyspneic the patient the lower has been the CO_2 in the arterial plasma. The following case will serve as an example: A patient walked into the hospital complaining of

shortness of breath. On examination a moderate cardiac enlargement with mitral stenosis and auricular fibrillation was found. The CO_2 of the arterial plasma was thirty-eight volumes per cent. Five days later when he was much improved the CO_2 of the arterial plasma had increased to forty-nine volumes per cent.

The results of this study seem to indicate that when the minute volume of air respired at rest is definitely above normal (10 to 12 liters) the plasma CO_2 is low. With improvement in the circulation and the accompanying fall in the minute volume the CO_2 of the arterial plasma shows a definite increase toward the normal.

10 (1470)

The total carbonate content of the arterial and venous plasma in patients with chronic pulmonary emphysema.

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This study represents six determinations of the total carbon dioxide content of the arterial and venous plasma over a period of six months on three patients with chronic pulmonary emphysema of the so-called "large lunged" type. The patients were males between forty-five and fifty years of age with definite enlargements in all diameters of the thorax, particularly the anterior-posterior diameter; thus presenting the typical "barrel shaped" chest. They were singularly free from cardio-renal disease so that all their symptoms and signs were attributed to the disturbance in the respiration resulting from the degenerative process in the lung. From observations to be reported in detail elsewhere, it has been found that this type of patient will tolerate an unusually high percentage of CO_2 in the inspired air with little increase in the minute volume over that at room air and without any subjective symptoms of distress. As a rule such patients breath eight to ten per cent. CO_2 for from ten to fifteen minutes with no apparent discomfort. That is, one man who has been under observation for the past nine months had a