while allergy may be an associated phenomenon of resistance, a high degree of resistance against a tuberculous infection may be developed without a measurable amount of allergy.

7043 P

Minute Volume Determinations in Mitral Stenosis During Auricular Fibrillation and when Restored to Normal Rhythm.

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Lewis,[1] using dogs and cats, was able to demonstrate that the minute output of the heart was decreased about 20% when the auricles were caused to fibrillate by faradic stimulation. He made the observation also that the more rapid the ventricular rate, the greater the decrease in minute volume.

Eyster and Swarthout,[2] in similar experiments on dogs, were able to produce a decrease in minute volume of from 15-79% when the auricles were caused to fibrillate. The ventricular rate in their experiments was increased after fibrillation was induced so that the actual decrease in minute volume cannot be entirely attributed to the fibrillation of the auricles.

Smith, Walker and Alt[3] found that the minute volume increased approximately 30% when normal rhythm was restored by quinidine in cases of auricular fibrillation which had been previously compensated by digitalis. Realizing that in mitral stenosis auricular contraction plays an appreciable rôle in the filling of the left ventricle, we used only mitral stenosis cases in our series. The experiments were carried out as follows: Four cases of mitral stenosis with auricular fibrillation, some of which were decompensated, were treated with digitalis until well compensated and until the ventricular rate was between 60 and 70 per minute. These cases were kept on digitalis and this rate was maintained for some period of time before the actual measurements of minute volume were begun. These were done by the acetylene method as advocated by

[1] Lewis, *J. Exp. Med.*, 1912, **16**, 395.

[2] Eyster and Swarthout, *Arch. Int. Med.*, 1920, **25**, 317.

[3] Smith, Walker and Alt, *Arch. Int. Med.*, 1930, **45**, 706.

Grollman.[4] Decompensated cases became well compensated under the regime and in these cases, minute volume determinations were not begun until the vital capacity had reached its highest level. Then the minute volume was determined in each case and repeated until the volumes checked. Continuing the digitalis at its maintenance level, quinidinization was then begun. After regular rhythm had been established and the amount of quinidine had been reduced to a maintenance dose, several days were allowed to elapse. Minute volumes were again determined and repeated until satisfactory checks were obtained.

Using this method in 4 cases, we found that the increase in minute volume when regular rhythm was restored was from 22% to 40% with an average of 30.8%.

The following cases will serve as examples:

Case 1. Admitted to the Medizinische Klinik, Freiburg, in Breisgau, Germany, in a state of marked cardiac decompensation. A diagnosis of mitral stenosis with auricular fibrillation was made. She was treated with digitalis and given the usual cardiac regime. After several weeks of this regime, she became compensated and her ventricular rate was held around 60-70 per minute. A few weeks after she became compensated, her minute volume was determined and a value of 2.03 liters per minute was obtained. She was quinidinized and a normal rhythm was established. After a pause of a few days, her minute volume was determined and value of 2.75 liters per minute was obtained. This represented an increase of 35.8%.

Case 2. Admitted to the Minneapolis General Hospital with a diagnosis of mitral stenosis and auricular fibrillation. Her ventricular rate was rapid but there was very little decompensation present. Increased doses of digitalis reduced her ventricular rate to 60-70 per minute and as she was now completely compensated, her minute volume was determined and a value of 2.55 liters per minute was obtained. After the normal rhythm had been established through the use of quinidine and a sufficient period of time had been allowed to elapse, her minute volume was 3.2 liters per minute, or an increase of 25.5%.

Case 3. Admitted to the Minneapolis General Hospital with a diagnosis of mitral stenosis, mild aortic insufficiency, and auricular fibrillation. He had been digitalized before admission but was kept on digitalis alone for a few days. His rate remained around 60-65

[4] Grollman, The Cardiac Output of Man in Health and Disease. Charles C. Thomas, 1932.

per minute. Minute volume determinations were then done, giving a value of 2.41 liters per minute. After regular rhythm was restored with quinidine, his minute volume rose to 3.37 liters per minute, a gain of 40%.

Case 4. Admitted to the Minneapolis General Hospital with mitral stenosis and auricular fibrillation. This patient had already been digitalized and the ventricular rate had already been reduced to around 60-70 per minute. After a few days in the hospital, the minute volume was determined as 2.38 liters per minute. She was quinidinized and the regular rhythm restored. Her minute volume rose to 2.90 liters per minute—a rise of 22%.

7044 C

A Rapid Method for Quantitative Estimation of Arsenic in Arsphenamine.*

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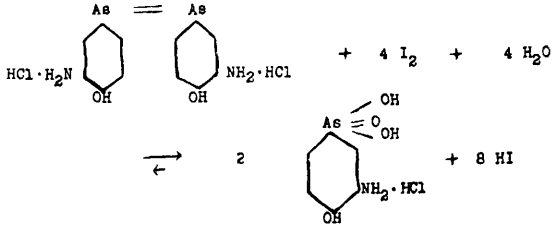
The direct titration of the arsenic in arsphenamine with a standard iodine solution was first used by Gaebel,[1] who also found that the reaction was a reversible one, namely



The titration of inorganic arsenious compounds with iodine is also a reversible reaction, but may be carried to completion, as shown by Washburn and Strachan,[2] by maintaining the pH of the reaction mixture between 9 and 4. Gaebel found, however, that this was not the case with the reaction between arsphenamine and iodine.

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[1] Gaebel, G. O., *Arch. Pharm.*, 1911, **249**, 241.

[2] Washburn, E. W., and Strachan, E. K., *J. Am. Chem. Soc.*, 1913, **35**, 681.