In our case we built up an isothermal and isobaric differential volumeter, giving a direct indication of the variation of volume of the gaseous solution during solution of the liquid in it.

The two vessels A and B, joined by a capillary filled with mercury, are immersed in a thermostat 3 (Fig.1).

Fig.1. I -- trap; II -- coil; III -- float; IV -- mercury level.

If both vessels are simultaneously full of gas at a definite pressure, the mercury in the capillary does not alter its position.

We disconnect the vessels, and add a measured amount of liquid to one of them (B) from the vessel L at constant temperature. Upon solution of the liquid in the compressed gas, the pressure in vessel B changes, and the mercury in the capillary is displaced. By gradual alteration of the volume of the volumeter V connected to vessel B, we may cancel out the fall in pressure which occurred in the system upon solution of the liquid in the gas.

Thus, in the above theoretical approach to solution of the problem, the matter has been reduced to accurate observation of displacement of a mercury level in a capillary, and to accurate measurement of the volumes of liquid in the volumeter.

The equipment consists of three basic parts: the gas compressors with purifying system, the actual equipment for study of volume and phase relationships in gaseous solutions at high pressures, and the control console.

Compression of the gas to 1000 atm was performed by an ordinary GIVD compressor. To give higher pressures, the compressed gas at 1000 atm passed through a further compressor to 5000 atm. Following compression the gas was purefied from oil in an oil separator and filter.