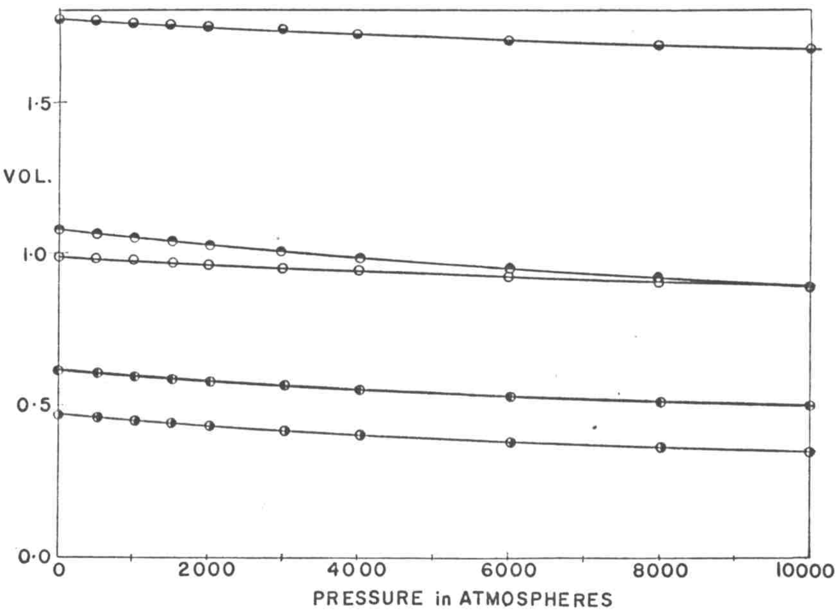

FIG. 12. Plot of specific volume vs. pressure in atm for the five sets of Swenson data at 4·2°K. ◒ Swenson's experimental specific volumes for lithium, ○ Swenson's experimental specific volumes for sodium, ◓ Swenson's experimental specific volume for potassium, ◐ Swenson's experimental specific volumes for rubidium and ◑ Swenson's experimental specific volumes for cesium. The solid line represents the theoretical specific volumes as calculated using equation (10) with the proper J and L values for the metal and the proper H value as indicated in Table 2.

4. DISCUSSION

Considering the evidence presented here it would seem that a plot of P versus $(\partial P/\partial v)_T$ is truly a straight line for the alkali metals; that is, that Tait's Law is applicable. The question of whether Tait's Law is obeyed by all solids cannot be decided unambiguously without examining more materials. Particularly interesting will be an examination of the rare gas solids, data for which is presented by STEWART.[23] These values will be analyzed shortly.

The precision of Br II and Br III data is about equal, with the Br II values being slightly lower, except in the case of potassium, where some curious deviations occur. These probably are of experimental origin but perhaps have deeper meaning.

Since Tait's Law appears to be the actual law obeyed by the alkali metals and perhaps many other substances, it can be used to smooth experimental data on compressibility. The volume versus pressure graph indicates the soundness of the values of J and L chosen, a poor fit indicating that a redetermination of the values is in order.

In this discussion the comparison has been between liquids and polycrystalline solids. How is this fact to be reconciled with the fact that the compressibilities of single crystals are identical to those of polycrystals? The resolution of this apparent dichotomy is linked with a deeper investigation of the consequences of the fact that at least certain solids obey Tait's Law. Tait's Law can be derived free of assumption from the general equation of state. An examination of this equation shows that the average particle size (degree of association) is strongly dependent on the pressure. A fuller discussion of this subject and the various conclusions that must be drawn from the application of the general equation will be presented in a subsequent paper.

REFERENCES

1. TAIT P. G., *Scientific Papers*, Vol. 2, Cambridge University Press, London, New York (1898).
2. CARL A., *Z. physik. Chem.* **101,** 238 (1922).

3. WOHL A., *Z. p*
4. GIBSON R. E. *Acad. Sci.* 5
5. GINELL R., *J.*
6. GINELL R., *J.* 1135 (1961).
7. GINELL R., *J.*
8. BERNAL J. D.,
9. GINELL R., *J.*
10. BRIDGMAN P. **76,** 55–70 (1
11. See for instanc 227 (1952).
12. LEVITT L. S., *J*
13. COOK M. A., New York (1
14. BRIDGMAN P. **76,** 71–87 (1