## ACKNOWLEDGMENTS

This work was assisted by grants from the Office of Naval Research, U. S. Department of the Navy (Project grants N6onr-27511 project NR081-101 and Nonr 233(28) ). For highly skilled technical assistance we are indebted to Mr. Donald Lyons, who conducted many of the experiments incorporated in figure 8; and to Mr. William Hoffman and Lester Emarine who built the apparatus. Our indebtedness to Professor Bridgman, who pioneered work with this type of apparatus, is obvious. William S. Fyfe and Gordon J. F. MacDonald did some of the experiments on which this account is based and provided much stimulating discussion of the problems and results encountered. Apparatus on loan from the U. S. Geological Survey was used in

## REFERENCES

- Bridgman, P. W., 1935, Effects of high shearing stress combined with high hydrostatic
- -, 1937, Shearing phenomena at high pressures, particularly in inorganic compounds: Am. Acad. Arts Sci. Proc., v. 71, p. 387-460.
- -, 1952, The resistance of 72 elements, alloys, and compounds to 100,000 kg/cm<sup>2</sup>: Am. Acad. Arts Sci. Proc., v. 81, p. 165-251.
- Griggs, D. T., 1941, An experimental approach to dynamic metamorphism: Am. Geophys.
- Griggs, D. T., Fyfe, W. S., and Kennedy, G. C., 1955, Jadeite, analcite, and nephelinealbite equilibrium (abs.): Geol. Soc. America Bull., v. 66, p. 1569.
- Jamieson, J. C., 1953, Phase equilibrium in the system calcite—aragonite: Jour. Chem.
- Kennedy, G. C., 1955, Pyrophyllite-sillimanite-mullite equilibrium relations to 20,000 bars and 800°C (abs.): Geol. Soc. America Bull., v. 66, p. 1584.
- Larsen, E. S., and Bridgman, P. W., 1938, Shearing experiments on some selected minerals and mineral combinations: Am. Jour. Sci., 5th ser., v. 36, p. 81-94.
- MacDonald, G. J. F., in press, Experimental determination of calcite-aragonite equilibrium relations at elevated temperatures and pressures: Am. Mineralogist.
- , 1956, Quartz-coesite stability relations at high temperatures and pressures: Am. Jour. Sci., v. 254, p. 713, 721.
- Robertson, E. C., Birch, Francis, and MacDonald, G. J. F., 1955, Fields of stability of jadeite, kyanite, and pyrope (abs.): Geol. Soc. America Bull., v. 66, p. 1608.

INSTITUTE OF GEOPHYSICS

University of California

Los Angeles, California