one of the natural constants, such as α^2, only further experiment can decide.

The comparison of the experimental ratio to the calculated ratio is particularly important, since most of the natural constants cancel out. The agreement is much better than for the absolute value but still not exact. The experimental value is about 0.06 percent greater than the calculated value. The error of the calculated ratio arises chiefly from the measured ratio of μ_P/μ_D which is claimed to be accurate to about 0.03 percent. Clearly this interesting deviation is worthy of further study.

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Phase of Scattering of Thermal Neutrons by Aluminum and Strontium*

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In a previous paper[1] we have described a method for determining whether neutrons scattered by an atom have the same phase as the primary neutron wave or opposite phase. The method has now been applied to two more elements, Al and Sr. The crystals investigated were Al_2O_3 (corundum) and $SrSO_4$ (celestite). The measured intensities of various orders of Bragg reflections of monochromatic neutrons are given in the following table, which is arranged like Table I of reference 1.

Table I. Intensities of reflection of thermal neutrons by Al_2O_3 and $SrSO_4$.

Crystal	Plane	Order	Form factor	Intensity
Al_2O_3	$1\bar{1}0$	1	2A1 − 1.44 O	480
		2	2A1 − 1.34 O	700
		3	2A1 + 2.09 O	5940
$SrSO_4$	001	1	0.44 Sr + 0.77 S + 0.12 O	4351
		2	0.62 Sr − 0.19 S + 0.67 O	3576
		3	0.98 Sr + 0.48 S + 1.01 O	2182
		4	0.24 Sr + 0.93 S − 1.81 O	1682
	210	1	0.78 Sr + 0.66 S − 0.01 O	6021
		2	0.21 Sr − 0.14 S + 0.36 O	413
		3	0.44 Sr + 0.84 S + 1.09 O	1493
	101	1	0.46 Sr − 0.65 S − 0.54 O	702
		2	0.55 Sr − 1.16 S − 2.54 O	3182
		3	1.94 Sr + 0.83 S + 0.50 O	5759

Attempts to fit these data with actual values of the scattering length for aluminum and strontium have not been satisfactory. It seems unambiguous, however, that the sign of the scattering of aluminum is the same as that of oxygen, namely, positive according to our convention. This is proven by the low intensity of first and second order compared with that of the third order.

A similar behavior of the reflection from the (101) plane of celestite indicates that the scattering length of strontium is also positive. From the scattering cross sections of these two elements, 1.4×10^{-24} cm^2 for Al and 9.5×10^{-24} for Sr, one can calculate the scattering lengths 0.35×10^{-12} cm for Al and 0.88×10^{-12} cm for Sr.

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Pressure and Temperature of the Atmosphere to 120 km

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Pressures and temperatures of the atmosphere up to 120 km were determined from data taken on the V-2 rocket fired at White Sands, New Mexico on March 7, 1947. The methods used in obtaining these data were similar to those used in a previous flight.[1] The pressure measurements were made with bellows gauges for pressures between 1000 mm Hg and 10 mm Hg. For pressures between 2 mm Hg and 10^{-2} mm Hg, tungsten and platinum wire Pirani gauges were used. A Philips gauge was used for pressures between 10^{-3} and 10^{-5} mm Hg.

Ambient pressures (Fig. 1) were measured up to about

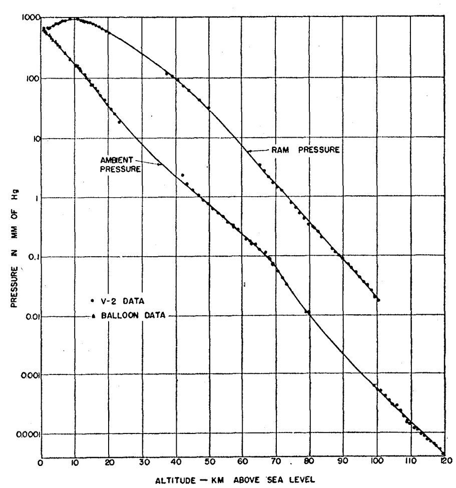

Fig. 1. Ambient and ram pressures as a function of altitude.

80 km with gauges mounted on the side of the V-2, just forward of the tail section. Pirani gauges, mounted in similar positions on opposite sides of the rocket, gave readings which agree within experimental errors, indicating that no appreciable error was introduced by yaw of the missle up to this altitude. A single Philips gauge was mounted on the 15° cone of the warhead. The readings of this gauge were reduced to ambient pressures by use of theories of Taylor and Maccoll.[2] Photographs of the earth made from the missile and gyroscope data indicated a yaw of about 15° at 110 km and a roll period of 40 seconds.