As can be seen from the figure, hydrostatic compression results in an increase of the temperature of antiferromagnetic transformation of manganese telluride. The magnitude of this effect is equal to $dT_N/dP = (2.0 \pm 0.4) \times 10^{-3}$ deg/kg/cm^2. This result was confirmed by direct measurements at a pressure of 4400 kg/cm^2. The Néel temperature determined from a break in the R(T) curve is in this case equal to +46°C.

[1]K. Kelly, J. Am. Chem. Soc. **61**, 203 (1939).
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CONCERNING THE STABILITY OF SHOCK WAVES

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THE stability of normal discontinuities in an arbitrary medium with respect to perturbations of a wave type was studied by D'iakov.[1] He found a region of absolute instability when the perturbation from the shock grew with time, a region of stability when this perturbation is damped and, finally, a peculiar region of "spontaneous sound emission by the discontinuity," in which the perturbation has the form of an undamped travelling wave. However, the last region was not completely determined by D'iakov. In order to separate off the wave emitted by the discontinuity from the incident one, it was required in Ref. 1 that the wave vector $\mathbf{q}(q \sin\vartheta, q\cos\vartheta, 0)$ of the wave be directed away from the discontinuity.* Together with the requirement of the reality of $\mathbf{q}$ and ω this gives the condition

$$0 < \cos\theta < 1, \tag{1}$$

according to which the region of spontaneous emission was defined. But here the "transport" of the perturbation of the moving fluid was not taken into account.

We write the conditions of spontaneous emission

$$\operatorname{Im}\omega = 0, \quad \operatorname{Im} q_y = 0, \quad V_y > 0, \tag{2}$$

where $\mathbf{V}$ is the velocity of the perturbation in the system in which the discontinuity is at rest. Since, in this system, the fluid behind the shock moves with a velocity $\mathbf{v}(0, v, 0)$ and the velocity of the perturbation in the moving medium is[2]

$$\mathbf{V} = \mathbf{v} + \mathbf{q}\, c/q, \tag{3}$$

the Eqs. (2) lead to the inequality

$$-M < \cos\theta < 1, \tag{4}$$

where $M = v/c$ is the Mach number.

Thus, to region (1) (in which the emitted wave moves relative to the stationary fluid in a direction opposite to the moving shock wave) is joined the region

$$-M < \cos\theta < 0, \tag{5}$$

in which the emitted sound waves move in the same direction as the shock wave, gradually falling behind it.

Application of Sturm's theorem to the equation for $\cos\vartheta$ (see Ref. 1) gives us for the region (5)

$$\frac{1-M^2-v_0M^2/v}{1-M^2+v_0M^2/v}<\left(\frac{\partial V}{\partial p}\right)_H j^2<\frac{1+2M^2-v_0M/v}{1+v_0M/v}. \tag{6}$$

The whole region of emission is completely determined by the inequalities

$$\frac{1-M^2-v_0M^2/v}{1-M^2+v_0M^2/v}<\left(\frac{\partial V}{\partial p}\right)_H j^2<1+2M. \tag{7}$$

It is of interest that the inequality (5) extends the region of emission in that direction which is most convenient for experiments, because it corresponds to the least exotic form of the Hugoniot adiabatic.

The condition that the left-hand side of the inequality (7) be negative and, consequently, that the region sought can, in principle, exist on ordinary adiabatics (where $(\partial V/\partial p)_H < 0$), is

$$1<M^2(1+v_0/v). \tag{8}$$

This inequality is realized even for the case of an ideal gas. The region of sound emission is not however, present because the requirement that $(\partial V/\partial p)_H j^2 \equiv -M_0^{-2}$ (for an ideal gas) satisfy (7) leads to $M_0 < 1$, i.e., (7) coincides with the region of instability.

*In the notation of Ref. 1 the components of the wave vector are $q(k, \ell_2, 0)$. The remaining notation is unchanged here.

[1] S. P. D'iakov, J. Exptl. Theoret. Phys. (U.S.S.R.) 27, 288 (1954).
[2] L. D. Landau and E. M. Lifshitz, Механика сплошных сред (Mechanics of Continous Media), GITTL, M. 1953.

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REFLECTION AND REFRACTION OF SOUND BY A SHOCK WAVE

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FOR an ideal gas the normal incidence of sound on a shock wave has been treated by Blokhintsev[1] and by Burgers,[2] while Brillouin[3] has considered oblique incidence. However, in the last reference the author obtains erroneous results for the reflection and transmission coefficients as he does not take into account the perturbation of the surface of the shock wave.

The reflection and refraction of sound by a shock wave in an arbitrary medium is considered in this note.

As is well known, the shock wave moves with a supersonic speed with respect to the rarefied medium and with a subsonic speed with respect to the compressed medium. Therefore if a sound wave is incident on the surface of discontinuity from the side of the compressed medium, no transmitted wave is formed, and a reflected wave and an entropy-rotational perturbation carried by the liquid flux appear. Similarly, when sound is incident on the shock wave from the side of the rarefied medium no reflected wave is formed while an entropy-rotational wave appears in addition to the transmitted wave. A perturbation wave of amplitude η moves along the surface of discontinuity with a propagation vector k equal to the projection of the propagation vector of the incident wave $k_i(k, \ell, 0)$ on the surface of discontinuity and with a frequency ω equal to the frequency of the incident sound wave in the system of coordinates in which the surface of discontinuity is at rest.