III. "How can intermittence of springs be explained". Proc. Royal Academy of Sciences in Amsterdam, Vol. **32**, pp. 88—93, 1929.

IV. "Some principles governing the choice of length and diameter of tubing in oil wells". A. I. M. E. Technical Publication N°. 344, New-York 1930, see also A. I. M. E. Transactions, Petroleum Development and Technology 1931, pp. 279—292 and "The Oil and Gas Journal", October 2, 1930, p. 377.

V. "The cause of periodicity generally occurring with rising mixtures of gas and liquid". Proc. Royal Academy of Sciences, Vol. **33**, pp. 450—456, Amsterdam 1930.

VI. "De oorzaak der fluctuatie bij heete en gasvoerende bronnen". De Ingenieur 1931, N°. 8, Mijnbouw 2, The Hague.

VII. "The cause of fluctuations in rising mixtures of gas and liquid", Journal of Rheology, III, pp. 3 – 15, 1932.

Physics. — *The Supraconductivity of Hg—Cd Alloys.* By W. J. DE HAAS and J. DE BOER. (Communication N°. 220a from the Physical Laboratory Leyden).

(Communicated at the meeting of February 27, 1932.)

§ 1. The purpose of this research was to investigate in which way the transitionpoint of mercury is changed by the addition of cadmium.

From the constitutional diagram (Fig. 1) of the system Hg—Cd [1]) we see that Hg and Cd can form a series of mixed crystals, interrupted by one "Mischungslücke" only.

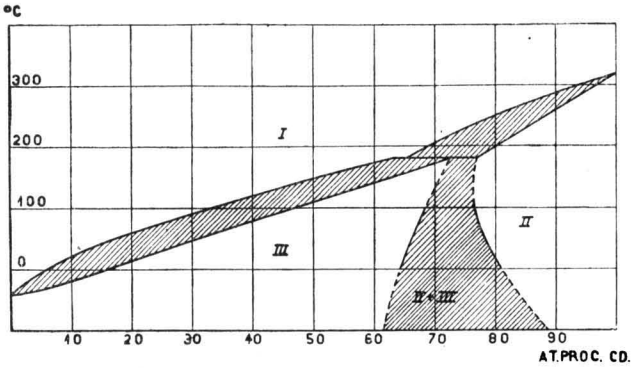

Fig. 1.

Röntgenographic investigations have shown that we have here to do with two different lattices. The mixed crystals, consisting principally of Hg are found to crystallize in the rhomboëdric crystal lattice of Hg. In this lattice the relative few Cd-atoms have replaced an equal number of Hg-atoms,

[1]) M. C. NEUBURGER. Röntgenographie der Metalle und ihrer Legierungen. CL. V. SIMSON. Zeitschrift für Phys. Chem. 109—183, 1924.

§ 2. We measured the change of the resistance at the temperatures of liquid helium for mixed crystals, containing a percentage 30, 40 and 50 atoms of Cd and crystallized therefore in the Hg lattice.

The rod shaped resistances were made from the purest Cd-Kahlbaum and twice distilled Hg. By long tempering they were made as homogeneous as possible. Experience has taught us, that we have a good criterion of homogeneity in the fall of the resistance. The steeper the fall, the greater the homogeneity of the solid solution. From Fig. 2 it is evident that the fall covers a range of a few hundredths of a degree only. This proves the high homogeneity of the solution.

The resistance measurements were made in the usual way with a thermo-force free resistance-box of Diesselhorst. The measuring current was 10 mA. In tables I, II, III and Fig. 2 the results of the measurements

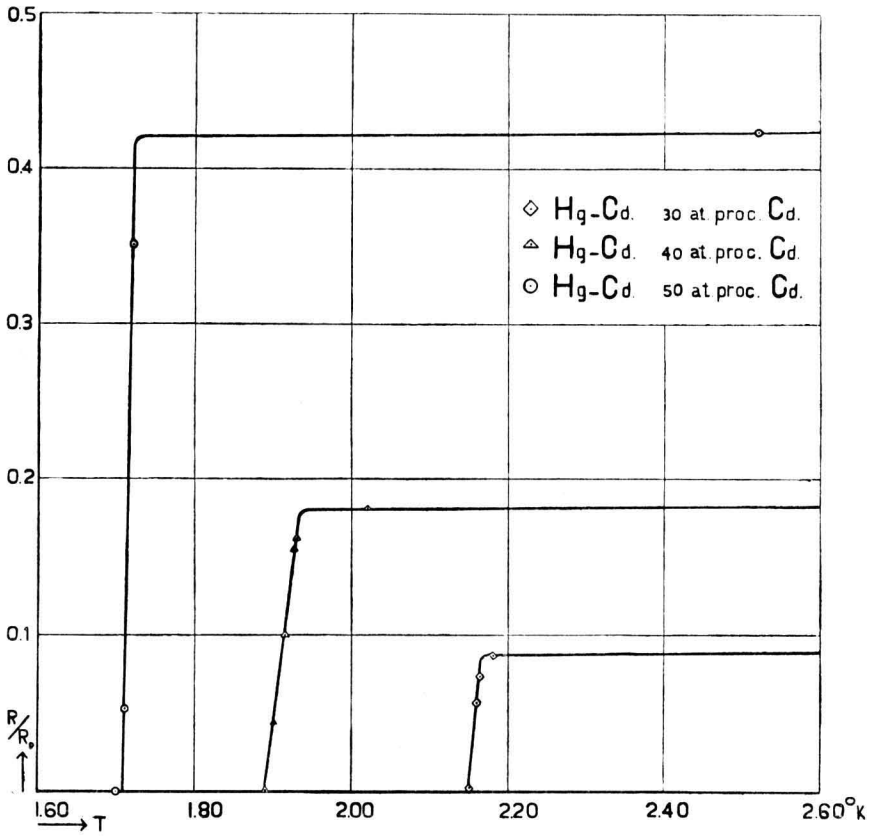

Fig. 2.

have been given. In the first two columns the pressure and the temperature of the helium bath are to be found. The third column gives the measured resistance divided by the resistance at 0° C.

TABLE I

Hg-Cd, 30 atompercentage Cd.		
P-helium	T, in K.	R/R_0
781	4.24	0.0922
384	2.18	0.0862
363	2.16	0.0743
362	2.16	0.0569
356	2.15	0.0011
Transition point: 2.16°		

TABLE II

Hg-Cd, 40 atompercentage Cd.		
P-helium	T, in °K.	R/R_0
123	2.74	0.184
25.7	2.02	0.181
19.5	1.93	0.162
19.0	1.92[5]	0.155
18.1	1.91	0.100
17.6	1.90	0.044
17.1	1.89	0.000
Transition point: 1.91 °K.		

TABLE III

Hg-Cd, 50 atompercentage Cd.		
P-helium	T, in °K	R/R_0
775	4.24	0.434
80.1	2.52	0.425
10.3	1.72	0.352
10.0	1.71	0.053
9.5	1.70	0.000
Transition point: 1.71 °K.		

§ 3. Fig. 3 shows the transition point of the alloy as a function of the percentage of the added Cd. The data for the pure Hg have been taken from the measurements of W. J. DE HAAS, G. J. SIZOO and H. KAMERLINGH ONNES [1]).

From this figure we may conclude, that pure Cd, if it could crystallize into the rhomboëdric Hg lattice, would have a transition point surely

[1]) Leiden Comm. N°. 180*d*.
These Proc. XXXIV, 1162, 1925.

above 1° K. Measurements with the ordinary Cd have shown that this has a transition point below 1° K.

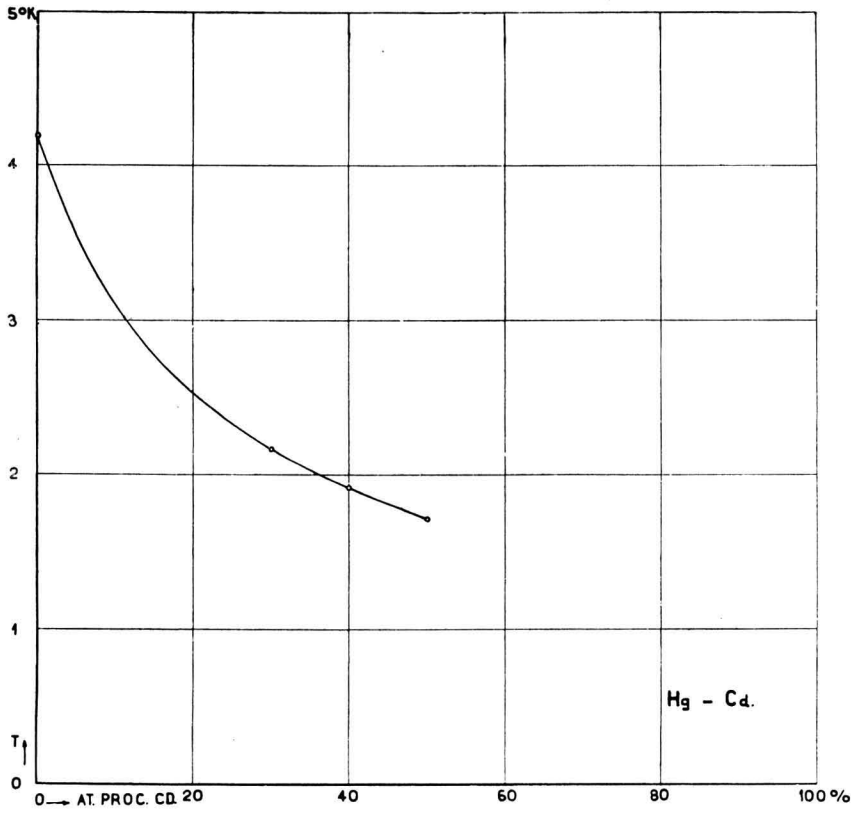

Fig. 3.

This shows again the great influence of the crystal lattice on the phenomena of supraconductivity.

Physics. — *Thermal conductivity of Indium at low temperatures.* By W. J. DE HAAS and H. BREMMER. (Communication N°. 220*b* from the Physical Laboratory at Leyden.)

(Communicated at the meeting of February 27, 1932.)

1. We used the apparatus, with which we measured already the thermal conductivity of lead and tin [1]). Also the measuring method was entirely the same but for our aiming at a higher accuracy this time.

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[1]) W. J. DE HAAS and H. BREMMER. Leiden Comm. N°. 214*d*. These Proc. XXXIV, 3, 325, 1931.