cause layer x does not thin over the rise and is not faulted.

Application of gravity tectonics to the formation of the Outer Ridge gives the most satisfactory explanation of its development. The presence of horizon A denies any deeper tectonic development, and the internal structure of the ridge precludes simple differential deposition of sediment to form the ridge. On the sea floor, large areas are covered by unconsolidated and semiconsolidated sediments. Slump features on the continental margins and the activity of turbidity currents show that these materials are quite plastic and may become highly mobilized under appropriate circumstances. These conditions should be eminently suited to the development of local and regional topography by gravity tectonics aided by changing patterns of sedimentation through geologic time, which would result in imbalance of vertical stresses in different areas. With gravity tectonics playing a large role in the development of structural land forms on the continents, it would be unusual if similar processes were not important on the sea floor.

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14. Of the University of Miami. The profile was run at low speed (3 to 3.5 knots or 5.5 to 6.5 km/hour) with a 4-second firing interval for high resolution of detail (about 165 shots per kilometer, giving one reflection every 6 m). The source was a 60,000-joule arcer, which was discharged through two sets of electrodes, one on either side of the ship. Signals were received by a passive ten-element hydrophone array towed 150 m behind the ship, and recorded on a Rayflex helical-drum recorder using a 2-second sweep to improve resolution. Maximum penetration was 1.3 seconds of round-trip travel time. The trace of the profile crossing the ridge appears in Fig. 1; part of the profile, in Figs. 2b and 3. All times in the text and in the scales of Fig. 2, a–c, are round-trip travel times based on the velocity of sound in sea water.
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Superconductivity at 20 Degrees Kelvin

We have found a superconductor with a transition temperature at 20°K. The substance is a solid solution between Nb_3Al and Nb_3Ge.

During the past decade no substantial increase in superconducting transition temperature has been achieved. For the last 13 years, ever since the discovery of Nb_3Sn in 1954 (*1*), the limit of all superconducting transition temperatures has remained in the vicinity of 18°K. All attempts, through the formation of mixed phases with Nb_3Sn or other compounds crystallizing in the same β-W structure, to raise the transition temperatures over the values of both of its end points have been unsuccessful. The first attempt to do so was made by Hardy and Hulm (*2*) right after their discovery of the superconductivity of V_3Si at 17°K. Many other efforts have been made since. However, the number of negative results are so great we shall not list them. An excellent compilation can be found in Roberts' article on superconducting compounds (*3*).

The increase of superconducting transition temperature to 20°K was accomplished through the formation of a solid solution between Nb_3Al and Nb_3Ge, crystallizing in the β-W structure.

In the β-W structure, Nb_3Sn and

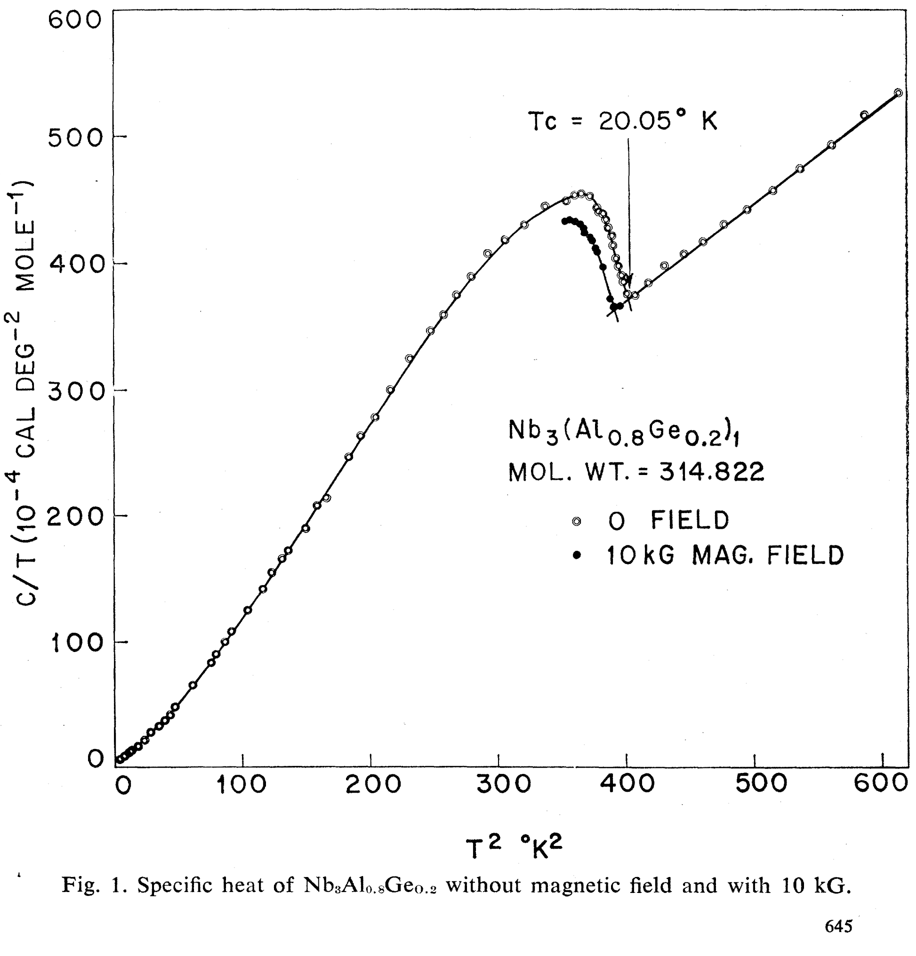

Fig. 1. Specific heat of $Nb_3Al_{0.8}Ge_{0.2}$ without magnetic field and with 10 kG.

Nb_3Al (*4*), and recently Nb_3Ge (*5*), are the only known superconductors with transition temperatures in the vicinity of 18°K. In itself, Nb_3Ge is a rather ambiguous compound. Under normal conditions of formation it crystallizes in the nonstoichiometric ratio of about 3.3 Nb to 1 Ge, thus being very rich in niobium compared to the ideal ratio of 3 to 1. The $Nb_{3.3}Ge$ has a superconducting transition temperature from 6° to 7°K. When more stoichiometric ratios are enforced by extremely rapid cooling methods, the transition temperature can be raised to 18°K. It has not yet been possible to decide with certainty how close these compounds now are to the 3 to 1 ratio. In the Nb-Al system there is a temperature-dependent homogeneity range (*6*) which makes the 3 to 1 ratio difficult to obtain.

We, therefore, decided to investigate the Nb_3Al–Nb_3Ge system. It is interesting to note that recently reported similar efforts have failed to reach even 18°K (*7*). The maximum temperature of 20°K reached at present for more or less ordered crystals is near a composition of 4 Nb_3Al to 1 Nb_3Ge. Alloys prepared by arc melting were annealed over a period of days at temperatures below 1000°C.

The superconducting transition was measured magnetically by observing superconducting shielding currents and subsequently was measured calorically. The latter method verified that the superconductivity of our samples was a bulk effect. The specific heat versus temperature is given in Fig. 1 and shows a transition into the superconducting state at 20.05°K. Superconducting shielding currents were observed with a ballistic galvanometer on a similarly prepared sample when immersed in liquid hydrogen at 20.05°K. The electronic specific heat, γ, obtained from the measured entropy in the superconducting state and assuming the validity of the third law of thermodynamics, shows a large decrease of more than a factor of 2 from the values measured for Nb_3Sn or V_3Si (*8*). This variation of T_c with γ, and consequently with the density of states, is opposite to the prediction given by microscopic theories. This is not too surprising since it has become quite evident during the last few years (*9*) that any correlation between γ and T_c is tenuous at least and usually of the wrong sign. In fact, when the measured transition temperature and γ are used in the microscopic theory to define empirically some attractive electron-electron interaction (which is neither measured nor calculated) it is found that variations in density of states must then be almost completely compensated by variations in the interaction parameter for all the high-temperature superconductors (*10*).

We have at present no real explanation for the high transition temperatures apart from the hypothesis that the stoichiometry of Nb_3Al or perhaps even of the intermediate composition has been improved considerably over that of the normal Nb_3Al or Nb_3Ge. We do not think that the variation of the average number of valence electrons per atom is decisive (*11*).

The only conclusion, by analogy, that can be drawn at present with certainty is that V_3Al, should we ever manage to crystallize it in the β-W structure, would be a very high superconductor. Since there is no theory for the high transition temperatures of a superconductor, it is impossible to say how much this value would be raised above 18°K.

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Hexokinase Isoenzymes in Human Erythrocytes: Association of Type II with Fetal Hemoglobin

Abstract. *Hexokinase activity in human erythrocytes is associated with three electrophoretically distinct bands. Normal adult erythrocytes contain hexokinases Types I and III. Type II hexokinase is present in the erythrocytes of newborn infants and absent from those of normal adults; it is, however, present in erythrocytes of adults with hereditary persistence of fetal hemoglobin. Type II hexokinase and fetal hemoglobin appear to be associated.*

Heparinized samples of venous blood were spun at 600*g* for 10 minutes at 4°C, and the buffy coat and plasma were removed. The red cells were suspended in 0.9 percent saline containing glucose (0.01*M*), and the suspension was centrifuged at 2000*g* for 20 minutes. This process was repeated three times. The washed red cells were resuspended in an amount, equal to their volume, of 0.01*M* phosphate buffer, *p*H 7.0, containing 2-mercaptoethanol (5 mmole/liter), sodium ethylenediaminetetraacetate (EDTA, 5 mmole/liter), glucose (0.01 mole/liter). They were lysed by freezing and thawing three times in a bath of dry ice and acetone. The hemolyzate was spun at 20,000*g* for 20 minutes, the hemoglobin content of the clear supernatant was determined and adjusted to 15 g/100 ml by the addition of phosphate buffer. Thirty-microliter samples were applied to the gel.

Vertical starch-gel electrophoresis (*1*) of hemolyzates was performed with a 0.02*M* sodium barbital gel buffer, *p*H 8.6, which contained Na_2EDTA (1.0 mmole/liter) and 2-mercaptoethanol (5 mmole/liter), at 6 volt/cm for 19 hours at 4°C. The electrode buffer was 0.06*M* sodium barbital, *p*H 8.6, containing Na_2EDTA (1.7 mmole/liter) and 2-mercaptoethanol (5 mmole/liter). Thin slices of the gel were stained for hexokinase activity for 90 minutes at 37°C by immersion in 0.1*M* tris(hydrozymethyl)aminomethane (tris), *p*H 7.4, containing nicotinamide-adenine dinucleotide phosphate (5×10^{-3} mole/liter), $MgCl_2$ (5×10^{-3} mole/liter), adenosine triphosphate (5×10^{-3} mole/liter), KCN (2×10^{-3} mole/liter), glucose-6-phosphate dehydrogenase (0.4 international units/ml), phenazine methosulphate (1.3×10^{-4} mole/liter),