contribution from the $(1s)^2$ shell does not exceed 6% of the contribution from the $(1p)^4$ shell in all cases.

Shown below for comparison are the integral cross sections computed with the Shklyarevskiĭ formulae and those obtained experimentally:

Interval of proton energy, Mev	18.6 – 24.2	24.2 – 29.9
Integration interval of experimental data, Mev	34 – 63	42 – 70
Integral cross section obtained experimentally, 10^{-30} cm² Mev/sr	135.2 ± 20.6	120.6 ± 18.9
Computed integral cross section, 10^{-30} cm² Mev/sr	10.5	8.8

The difference by a factor of ten should be considered too large, even making allowances for the approximate nature of the theoretical computations, as well as for the fact that a quasi-deuteron interaction mechanism may also introduce a certain contribution to the experimental integral cross section. The 5 — 7 Mev shift toward high γ energies of the experimental maximum that can be seen in all the graphs relative to the computed contribution from the $(1p)^4$ shell can be explained by the fact that all of Shklyarevskiĭ's calculations are based on the assumption that the final nucleus remains in the ground state, which, of course, is hardly probable.

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MAGNETIC ANISOTROPY OF THE DISORDERED ALLOY Ni_3Mn *AT HELIUM TEMPERATURES*

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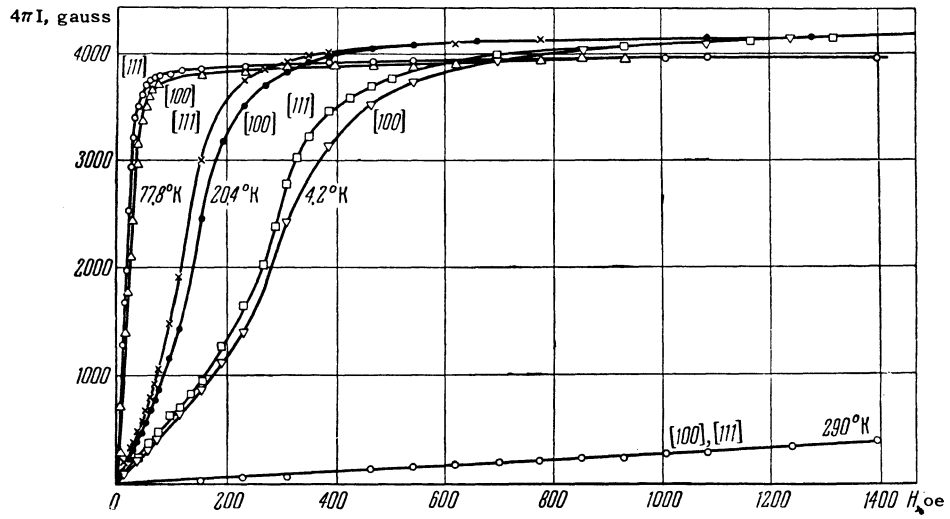
FOR polycrystalline specimens of the alloy Ni_3Mn in the disordered state, a number of workers[1-3] have shown that the reversible magnetization curves taken at liquid helium temperatures lie significantly below the curves taken at liquid hydrogen temperature and do not attain saturation at tens of thousands of oersteds. Magnetization curves of this type could be due to a rapid temperature variation of the magnetic anisotropy. To resolve this question a study is required on single crystals — the magnetization curves being taken in various crystallographic directions. We have performed such a study.

From a large single crystal of the alloy Ni_3Mn with face-centered cubic lattice in the disordered state, specimens of prismatic shape ($1.2 \times 1.2 \times 18$ mm³) were cut, the long axes of which were parallel respectively to the three crystallographic directions: [111], [110], [100]. The reversible magnetization curves of these specimens were taken at room temperature and at liquid nitrogen, hydrogen, and helium temperatures.

The results are given in the figure. From the curves it is seen that at room temperature for all crystallographic directions there is a linear dependence of induction on field, and there is no anisotropy.

On going to nitrogen temperature the character of the curves undergoes a marked change. Firstly, the curves $4\pi I(H)$ assume a form typical of a ferromagnet. Secondly, magnetic anisotropy appears; it increases on lowering the temperature to liquid-hydrogen temperature, but does not change essentially on further cooling to liquid-helium temperature. The crystallographic direction [100] remains the difficult, [111] the easy, and [110] the intermediate direction throughout the temperature interval studied (from 77.8 to 4.2° K). In spite of the fact that the magnetic anisotropy (a measure of which is the area included between the curves for the [100] and [111] axes) does not in-



crease significantly on changing the temperature from 20.4 to 4.2° K, the curves for the easy and difficult directions at 4.2° K lie considerably below the curves at 20.4° K and magnetic saturation requires large fields.

It should be remarked that the saturation fields at all temperatures are much smaller than the saturation fields obtained earlier[1,2] in polycrystalline specimens. Measurements of the coercive force H_c show that at nitrogen temperature for all crystallographic directions it is fractions of an oersted, but at hydrogen temperature it is of the order of oersteds. This data differs greatly from the data obtained on polycrystalline specimens in which we obtained for H_c more than a hundred oersted at nitrogen temperature and a thousand oersted at hydrogen temperature. The main explanation for this probably resides in the fact that, because various types of structural distortions are present, polycrystalline specimens are much harder magnetically than single-crystal specimens of the same material.

An analysis of the results obtained shows that the increase of saturation field with decreasing temperature — even for the easy direction of magnetization (see curves for the [111] axis at 77.8, 20.4, and 4.2° K) — cannot be due to an increase in the magnetic anisotropy when the ferromagnetic alloy studied is cooled to a low temperature. A more reasonable assumption is that, at temperatures below nitrogen in the disordered alloy Ni_3Mn, a transition is possible from a ferromagnetic to an antiferromagnetic state with comparatively low critical fields ($\leq 10^3$ oe) at which magnetic saturation is attained (parallel magnetizations of the magnetic sublattices).

From what has been said follows the necessity for neutron diffraction studies and detailed measurements of the temperature dependence of the magnetic anisotropy constant, in order to resolve definitely the unusual magnetic properties of Ni_3Mn alloys in the disordered state at low temperatures.

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ASYMMETRY OF URANIUM FISSION AT HIGH PROTON ENERGIES

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AT low bombarding-particle energies, the fission of uranium is mostly asymmetrical. The mass curve of the fission product yield has two maxima with a deep trough between them. As the particle