GERSHTEYN, S.S.

Probability of the capture of mesons on various mesoatomic levels.
Zhur. eksp. i teor. fiz. 39 no.4:1170-1172 O '60.   (MIRA 13:11)

1. Ob"yedinennyy institut yadernykh issledovaniy.
          (Mesons--Capture)

82752

S/053/60/071/004/002/004
B004/B056

24.6600

AUTHORS: Zel'dovich, Ya. B., Gershteyn, S. S.

TITLE: Nuclear Reactions in Cold Hydrogen. I. The Mesonic
              Catalysis

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol. 71, No. 4,
              pp. 581 - 630

TEXT: The authors proceed from the catalysis of nuclear reactions in
hydrogen by μ-mesons, which was discovered in 1957 in Berkeley by
L. W. Alvarez et al. (Ref. 4). This phenomenon had been predicted also
by A. D. Sakharov (Ref. 2) and Ya. B. Zel'dovich (Ref. 3). A systematic
survey is given of the theoretical papers dealing with muon catalysis,
and the possibility of a nuclear synthesis in cold hydrogen by means of
"piezonuclear reactions" under high pressure is dealt with. The follow-
ing reaction equations are mentioned: $p + p \rightarrow d + e^{+} + \nu$ (2.2 Mev) (I);

$$p + d = He_3 + \gamma \text{ (5.4 Mev) (II)}; \quad d + d = \begin{cases} t + p \text{ (4 Mev)} \\ He_3 + n \text{ (3.3 Mev) (III)}; \\ He_4 + \gamma \text{ (24 Mev)} \end{cases}$$

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Nuclear Reactions in Cold Hydrogen   S/053/60/071/004/002/004
I. The Mesonic Catalysis   B004/B056

$d + t = He_4 + n$ (17.6 Mev) (IV); $p + t = He_4 + \gamma$ (20 Mev) (V), and

$t + t = He_4 + 2n$ (10 Mev) (VI). The quantum-mechanical tunnel effect is

discussed, and it is stated that with the interatomic distances existing
in ordinary molecules, no nuclear reaction occurs, but that such a reac-
tion becomes possible if the electron is replaced by a μ^{-}-meson. Part 2
describes the experiments carried out in Berkeley (Ref. 4) and in Liver-
pool (Ref. 5). Part 3 deals with the catalysis of nuclear reactions in
hydrogen by means of μ-mesons, viz.: 1) The formation of the $p\mu$ mesic
atom; 2) The formation of $pp\mu$ mesic molecules; 3) The transition of the
μ-meson from a proton to a deuteron; 4) The formation of $pd\mu$- and
$dd\mu$-mesic molecules, and 5) nuclear reaction in mesic molecules. In
part 4 the mesic molecular processes in hydrogen are dealt with on the
basis of Ref. 17. The adiabatic approximation for ordinary molecular
processes is discussed, a precise defination of the adiabatic approxima-
tion for hydrogen mesic molecules is derived (Fig. 6, appendix I), a
calculation of the levels of mesic molecules (Table II, Figs. 7,8), and
of the binding energies (Table III) is given, transition of the μ-meson
from a light to a heavy isotope (Tables IV, V), the scattering of mesic

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Nuclear Reactions in Cold Hydrogen.

I. The Mesonic Catalysis

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atoms on nuclei (Table VI), the formation of mesic molecules (Table VII), and the transitions among the levels of mesic molecules are discussed. Furthermore, the calculated probability for the various mesic molecular processes are compared with experimental data, and in this way agreement, at least as regards the order of magnitude, is found. Part 5 deals with the nuclear reactions in mesic molecules. The following reaction constants are enumerated: $C_{III} = 2.10^{-16}$ cm^3/sec; $C_{IV} = 2.10^{-14}$ cm^3/sec and $C_{II} = 1.25.10^{-22}$ cm^3/sec, and for the probability of the nuclear reaction, the equation $w = C|G(0)|^2$ (C = reaction constant, $G(0)$ = value of the wave function at a nuclear distance $R = 0$) (Tables VIII, IX) is written down. The nuclear reaction in the pdμ and ptμ mesic molecule is then discussed. In part 6 it is stated that no continuous nuclear reaction occurs. Part 7 mentions further experimental research work in the field of the μ-catalysis as being desirable. In appendix II, a calculation of mesic molecules with the same nuclei, and in appendix III a calculation of the spin states of mesic molecules is given. The authors

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Nuclear Reactions in Cold Hydrogen.   S/053/60/071/004/002/004
I. The Mesonic Catalysis   BC04/B056

mention papers by Panovskiy (Ref. 24) and A. B. Migdal (Ref. 44).
There are 9 figures, 9 tables, and 44 references: 17 Soviet, 16 US,
6 British, 2 German, 2 Italian, 2 Japanese, and 1 Swiss.

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S/056/61/040/002/046/047
B102/B201

AUTHOR: Gershteyn, S. S.

TITLE: Transitions between the hyperfine-structure levels in meso-
               deuterium atoms

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40,
               no. 2, 1961, 698-707

TEXT: The author wanted to calculate the cross section of the transition of
mesodeuterium atoms into a lower hyperfine-structure state $(F = 1/2)$ caused
by exchange collisions with deuterons. Ya. B. Zeldovich has already pointed
out that a muon exchange between protons in liquid hydrogen leads to a fast
transition of $p\mu$ atoms from an upper state of hyperfine structure $(F = 1)$ to
a lower one $(F = 0)$. This gives rise to a complete depolarization of the
muons in hydrogen and is of great importance for the reaction $\mu^- + p \rightarrow n + \nu$;
in this reaction, the neutrons are entirely longitudinal-polarized, and the
probability (in the case of V-A interaction) of muon capture by $p\mu$ atoms is
quadrupled. The author has examined the transition $F = 3/2 \rightarrow F = 1/2$
between the hyperfine-structure levels of mesodeuterium atoms in collisions

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of the mode $d\mu + d \rightarrow d + d\mu$, its value for the capture $\mu^- + d \rightarrow 2n + \nu$, and for the catalysis of nuclear reactions by muons. The first part of the paper offers a calculation of the transition cross section for an energy difference

$$(3) \quad \Delta\epsilon = \frac{8\pi}{3}\beta_\mu\beta_N g\,(2i+1)\,|\psi(0)|^2 = \frac{8}{3}\frac{\beta_\mu\beta_N}{a_\mu^3}\,g\,(2i+1)\left(1+\frac{m_\mu}{M_d}\right)^{-3} \approx 0.046\,\mathrm{eV}$$

between the hyperfine-structure levels of a $d\mu$ atom; $(\vec{F} = \vec{s} + \vec{i}$, $\vec{s}$-muon spin, i-deuteron spin); $g = 0.8565$ the hydromagnetic ratio for the deuteron, β_μ and β_N Bohr magnetons, $a_\mu = \hbar^2/m_\mu e^2$; m_μ and M_d denote muon and deuteron mass, respectively; $(e = \hbar = m_\mu = 1)$. A transition occurring in a $d\mu + d$ collision is examined, with the Hamiltonian of the system being given by

$$(5)$$

$$H = -\frac{1}{2M_d}\Delta_{R_1} - \frac{1}{2M_d}\Delta_{R_2} - \frac{1}{2}\Delta_r - \frac{1}{r_1} - \frac{1}{r_2} + \frac{1}{R} +$$

$$+ \frac{4}{3}g\beta_\mu\beta_N\left\{\frac{\delta(r_1)}{r_1^2}(\mathbf{sI}_1) + \frac{\delta(r_2)}{r_2^2}(\mathbf{sI}_2)\right\},$$

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$r = \left| \vec{r}_\mu - \vec{R}_d \right|$, the distance between muon and deuteron, $\vec{R}_1$ and $\vec{R}_2$ are the co-ordinates of the two deuterons, and the remaining denotations are evident. Based on these premises, a system with $J = 3/2$ and the total spin $I = 2$ of the two deuterons is first considered, and after a lengthy calculation

$$K(R) \sim \gamma R^{-1} e^{ik_1 R}, \qquad L(R) \sim (z e^{ik_1 R} - e^{-ik_1 R})/2ik_1 R.$$

(13) and

$$k_1 = (M_d e)^{1/2}, \qquad k_2 = [M_d (e + \Delta e)]^{1/2} \approx (M_d \Delta e)^{1/2} \qquad (e \ll \Delta e).$$

(15)

$$L_{1/2} = \left\{ R - \frac{(\lambda_g + 5\lambda_u) + 6ik_2 \lambda_g \lambda_u}{6 + ik_2(5\lambda_g + \lambda_u)} \right\} \frac{1}{R},$$

$$K_{1/2} = - \frac{\sqrt{5}(\lambda_g - \lambda_u)}{6 + ik_2(5\lambda_g + \lambda_u)} \frac{1 + ik_2 R}{R}.$$

are obtained, where $k_2 R \ll 1$. The direct result is the transition cross section: $\sigma_{3/2} \approx \frac{5}{9} \pi (\lambda_g - \lambda_u)^2 k_2/k_1$. Similar considerations are then made for a

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system with the spin $J = 1/2$. One obtains: $\sigma_{1/2} = \frac{8}{3} \pi (\lambda_g - \lambda_u)^2 k_2 / k_1$ with

$$(20). \qquad R_0 \ll R \ll 1/k_2$$

$$K_{1/4} = \frac{\sqrt{2}(\lambda_g - \lambda_u)}{3 + ik_1(\lambda_g + 2\lambda_u)} \frac{(1 + ik_1 R)}{R}, \qquad L_{1/4} = \left\{ R - \frac{(2\lambda_g + \lambda_u) + 3ik_1\lambda_g\lambda_u}{3 + ik_1(\lambda_g + 2\lambda_u)} \right\} \frac{1}{R}.$$

When considering the statistical weight of the states,

$$(22) \quad \sigma_{F=1/4 \to 1/4} = \frac{1}{3}\sigma_{1/4} + \frac{1}{6}\sigma_{1/4} = \frac{1}{3}\pi(\lambda_g - \lambda_u)^2 k_2/k_1.$$

holds, and the probability is given by (23) $W = N_d \sigma_{F=1/r \to 1/4} v = \pi(\lambda_g^2 - \lambda_u)^2 N_d v/3$,

with $v^* = 2(\Delta\varepsilon/M_d)^{1/2}$, the velocity of the nucleus after the transition, N_d

the number of deuterium nuclei per cm^3. Section 2 of the paper deals with
the muon depolarization and the elastic scattering cross section of $d\mu$ atoms
in lower states of hyperfine structure. $\sigma_y = \frac{4}{27} \pi(\lambda_g - \lambda_u)^2$ is obtained

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$B102/B201$

for the scattering cross section in the re-orientation of the mesic atom momentum, and the re-orientation probability for deuterium is found to be $W_y = Nvc_y = 5 \cdot 10^5 \text{ sec}^{-1}$, which is of the same order as the $\mu \to e + \nu + \bar{\nu}$ decay probability; thence it can be concluded that the mesons are practically depolarized in their entirety. The $d\mu + d$ scattering cross section ($F = 1/2$) is expressed by

$$(32). \qquad \sigma_{(F=1/2)}^{(s)} = \frac{2}{9}\left(\frac{5\lambda_g + \lambda_u}{6}\right)^3 + \frac{1}{3}\left(\frac{\lambda_g + 2\lambda_u}{3}\right)^2.$$

The effect of transitions $F = 3/2 \to F = 1/2$ upon the capture $\mu^- + d \to 2n + \nu$ is briefly examined. A capture from $F = 3/2$ is only possible if the muon capture does not follow the V-A variant. The final part of the paper deals with the effect of the transitions $F = 3/2 \to 1/2$ upon the muon catalysis. With

$$(33),$$

$$\chi_{1,M_j} = -C_1 S_{1,M_j}^{(1/2)}(p,\,d;\,\mu) + C_2 S_{1,M_j}^{(1/2)}(p,\,d;\,\mu),$$

$$\chi_{1,M_j}' = C_2 S_{1,M_j}^{(1/2)}(p,\,d;\,\mu) + C_1 S_{1,M_j}^{(1/2)}(p,\,d;\,\mu)$$

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(35)

$$W_{x_1} = \tfrac{1}{12}(-C_1 + 2\sqrt{2}C_2)^2 \approx 0,39,$$

$$W_{x_1}' = \tfrac{1}{12}(2\sqrt{2}\,C_1 + C_2)^2 \approx 0,36, \qquad W_{x_0} = \tfrac{1}{4}.$$

is obtained for the probability of the system having the states χ_1, χ_1', χ_0. The yields of the reaction of the pdμ formation from dμ ($F = 1/2$) are obtained in

(36)

$$Y_\gamma = \left\{ 0,39\,\frac{C_1^2 R}{\lambda_0 + |C_1^2(R+A)} + 0,36\,\frac{C_2^2 R}{\lambda_0 + C_2^2(R+A)} + \tfrac{1}{4}\,\frac{R}{\lambda_0 + R + A} \right\},$$

$$Y_\mu = \left\{ 0,39\,\frac{C_1^2 A}{\lambda_0 + C_1^2(R+A)} + 0,36\,\frac{C_2^2 A}{\lambda_0 + C_2^2(R+A)} + \tfrac{1}{4}\,\frac{A}{\lambda_0 + R + A} \right\}, \quad (36)$$

where Y_μ and Y_γ denote the yield of the p + d → He reaction in the pdμ molecule or on muon conversion with emission of a γ-quantum, respectively. Academician Ya. B. Zel'dovich is thanked for advice, L. I. Lapidus, A. A. Logunov, Ya. A. Smorodinskiy, and M. I. Shmushkevich for discussions. A. M. Moskalenko is mentioned. There are 19 references: 12 Soviet-bloc and 7 non-Soviet-bloc.

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Transitions between .

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute
               of Nuclear Research)

SUBMITTED: September 30, 1960

Card 7/7

24.4500

24715
S/056/61/040/005/018/019
B109/B212

AUTHORS: Gershteyn, S. S., Krivchenkov, V. D.

TITLE: Terms of an electron in a field of two different Coulomb
             centers

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40,
             no. 5, 1961, 1491-1502

TEXT: It is demonstrated that the Neuman-Wigner theorem on the im-
possibility of intersection of terms of the same symmetry is not valid
for electrons located in the field of two Coulomb centers with the
charges Z_1 and Z_2. The terms for large and small distances between
differently charged nuclei are analyzed. The Schrödinger equation
describing the problem of two Coulomb centers reads as follows:

$$-\frac{1}{2} \Delta \Psi + \left(-\frac{Z_1}{r_1} - \frac{Z_2}{r_2} \quad \frac{Z_1 Z_2}{R} \right) \Psi = E\Psi \qquad (1),$$

Where R denotes the internuclear distance, r_1, r_2 the distance of the

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Terms of an electron in a field of two...

electron from the first and the second nucleus. After the elliptic coordinates

$$\xi = (r_1 + r_2)/R, \qquad \eta = (r_1 - r_2)/R, \qquad \psi = \arctan(y/x), \qquad (2)$$

have been introduced, the following expression is set up for the wave function:

$$\Psi = X(\xi) Y(\eta) e^{im\psi} \qquad (3)$$

The Hamiltonian of the system reads

$$\hat{H} = -\frac{2}{R^2(\xi^2 - \eta^2)}\left\{\frac{\partial}{\partial\xi}(\xi^2 - 1)\frac{\partial}{\partial\xi} + \frac{\partial}{\partial\eta}(1 - \eta^2)\frac{\partial}{\partial\eta} + \frac{\xi^2 - \eta^2}{(\xi^2 - 1)(1 - \eta^2)}\frac{\partial^2}{\partial\varphi^2}\right\} -$$

$$- \frac{2Z_1}{R(\xi - \eta)} - \frac{2Z_2}{R(\xi + \eta)} + \frac{Z_1 Z_2}{R}, \qquad (9)$$

or $\hat{H}(R) = \hat{H}(R_0) + \hat{V}$, where $\hat{H}(R_0)$ shows the eigenvalues E_1^O and E_2^O and the eigenfunctions ψ_1^O and ψ_2^O, and $\hat{V} = \frac{\delta\hat{H}}{\delta R}\delta R$. From the orthogonality of the functions ψ_1^O and ψ_2^O the following expression is obtained for functions of

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$$24718$$
$$B109/B212$$

the same symmetry:

$$\left\langle \frac{1}{r_1} \right\rangle_{12} = \frac{\pi R^4}{4} \frac{(E_1^0 - E_2^0)}{(A_1 - A_2)} \{\langle \xi^2 \rangle_{12} \langle \eta \rangle_{12} - \langle \xi \rangle_{12} \langle \eta^2 \rangle_{12}\}. \tag{14}$$

and also an analogous expression for $\left\langle \frac{1}{r_2} \right\rangle_{12}$. Hence,

$$V_{12} = \text{const} \cdot (E_1^0 - E_2^0) \delta R \tag{15},$$

and in this approximation V_{12} vanishes at the same time as $E_1^0 - E_2^0$, i.e.,
interaction of terms having the same symmetry is possible. The number of
roots of the functions $X(\xi)$ and $Y(\eta)$ in the intervals $1 < \xi < \infty$ and
$-1 < \eta < 1$ does not change for different parameters R. This fact can be
utilized to compare terms at large and small distances between the nuclei.
If n_ξ denotes the number of zeros of $X(\xi)$ $(1 < \xi < \infty)$ and n_η that of
$Y(\eta)$ $(-1 < \eta < 1)$, then, with $R \to 0$, $n_\xi = n_r$, $n_\eta = 1 - |m|$, where 1 denotes the
orbital angular momentum, and n_r the radial quantum number of the bound
atom. For $R \to \infty$ the elliptic coordinates will change over into parabolic
ones. In order to compare the terms at small and large distances, n_ξ and

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n_η have therefore to be expressed by parabolic quantum numbers of the free
atoms. For $R \gg 1$ one obtains $n_\xi = n_1$, where n_1 denotes the parabolic quantum
number; the new variable
$$\mu = R(1 + \eta), \quad 0 \leqslant \mu \leqslant 2R \quad (23)$$
is introduced for n_η if $R \gg 1$. This yields
$$Y(\mu) = \mu^{|m|/2} e^{-p\mu/R} F(-n_2; |m| + 1; 2P\mu/R) \quad (25),$$
where n_2 is a positive integer. (25) has n_2 roots. For $Z_1 = Z_2$
$n_\eta = 2n_2 + 1$ for antisymmetric terms, and $n_\eta = 2n_2$ for symmetric terms. If
$Z_1 \neq Z_2$, the following expression is obtained with the help of
$$\mu_1 = R(1 - \eta), \quad 0 < \mu_1 \leqslant 2R \quad (31):$$
$$Y = \mu_1^{|m|/2} e^{-p\mu_1/R} F(\alpha; |m| + 1; 2p\mu_1/R) \quad (33),$$
where
$$\alpha = -n_2 - n(Z_2 - Z_1)/Z_1 \quad (34).$$

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S/056/61/040/005/018/019
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For $\alpha > 0$ ($Z_1 > Z_2$, $0 \leqslant n_2 < n(Z_1 - Z_2)/Z_1$ (35)) one has $n_\eta = n_2$; if $\alpha < 0$ and $Z_2 n/Z_1$ is no integer, then an oscillation of the wave function (Fig. 1) will occur near Z_2. n_η is described by

$$n_n = n_2 + 1 + \text{Ent}\left[n_2 + n(Z_2 - Z_1)/Z_1\right] \quad (37),$$

where $\text{Ent}(x)$ denotes the integral part of x. If $\alpha < 0$ and $Z_2 n/Z_1 = n'$, where n' denotes an integer, the following is valid: $n_\eta = n_2 + n'_2$ if, with $R \to \infty$, the electron is at the nucleus having the smaller charge (in the other case $n_\eta = n_2 + n'_2 + 1$). Fig. 2 shows the behavior of the terms for the case of a σ-term at $Z_1 = 2$, $Z_2 = 3$. The parabolic quantum numbers (n_1, n_2, m) are given in parentheses; the prime denotes the quantum numbers belonging to the nucleus Z_2. At sufficiently large Z, certain terms of the nucleus Z, which are located below the K-level of the hydrogen atom when vanishing at infinity, will intersect the corresponding hydrogen terms. This appears already when $z \geqslant 3$ and increases the

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Terms of an electron in a field of two...

probability for a charge exchange during a collision between a hydrogen
atom and the nucleus Z. The authors thank L. D. Landau, L. I. Lapidus,
A. A. Logunov, and Ya. A. Smorodinskiy for discussions, and also
N. S. Isayeva for preparing the manuscript. The paper refers to a book
of G. Bete (Kvantovaya mekhanika prosteyshikh sistem, ONTI, M.-L., 1934).
There are 3 figures and 9 references: 2 Soviet-bloc and 7 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State
               University). Ob"yedinennyy institut yadernykh issledovaniy
               (Joint Institute of Nuclear Research)

SUBMITTED: December 26, 1960
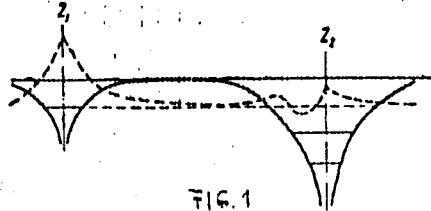
FIG.1

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S/056/61/043/005, 018, 019

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Terms of an electron in a field of two...

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FIG 2
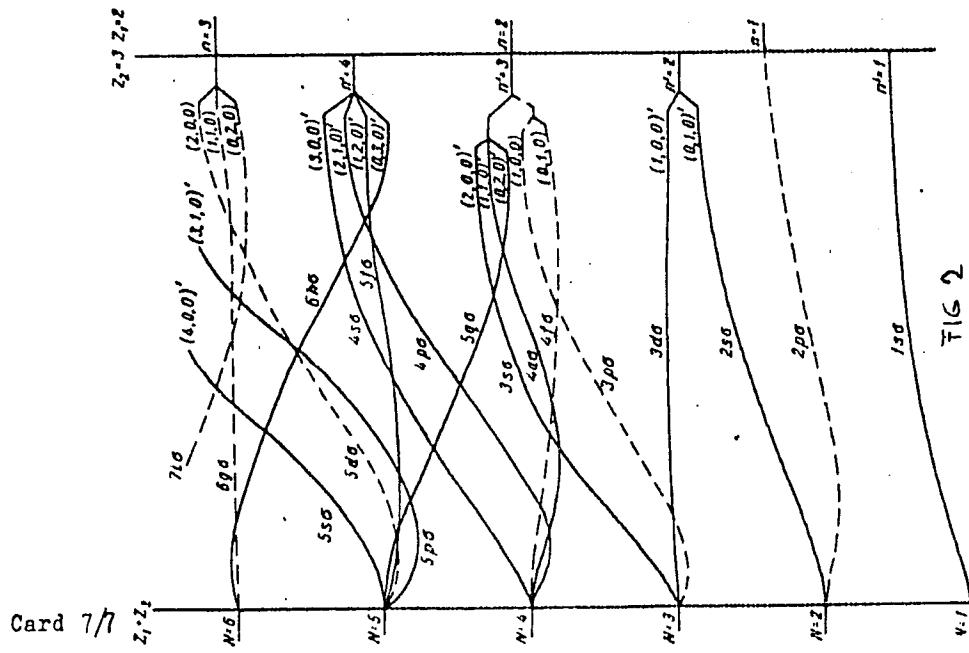
GERSHTEYN, S.S.

Transitions between hyperfine structure levels in deuterium
mesic atoms. Zhur. eksp. i teor. fiz. 40 no.2:698-707
F '61.   (MIRA 14:7)

1. Ob"yedinennyy institut yadernykh issledovaniy.
                    (Mesons)

GERSHTEYN, S.S.; KRIVCHENKOV, V.D.

Electron terms in the field of two dissimilar Coulomb
centers. Zhur. eksp. i teor. fiz. 40 no.5:1491-1502 My '61.
(MIRA 14:7)

1. Ob"yedinennyy institut yadernykh issledovaniy. 2. Moskovskiy
gosudarstvennyy universitet (for Krivchenkov).
(Electrons) (Coulomb functions)

GERSHTEYN, S.S.; SARANTSEVA, V.R., tekhn. red.

[Transfer of negative mesons from hydrogen to the nuclei of
other elements] Perekhody otritsatel'nykh mezonov ot vodoroda k
iadram drugikh elementov. Dubna, Ob"edinennyi in-t iadernykh
issl., 1962. '24 p.   (MIRA 15:6)
(Nuclear reactions)   (Mesons)   (Hydrogen)

GERSHTEYN, S.S.

"Transitions of Negative Mesons from Hydrogen to Nuclei of Other Elements"

report presented at the Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Joint Inst. for Nuclear Research
Lab. of Theoretical Physics, Dubna, 1962

GERSHTEYN, S. S.

"Life Time of π^- Mesons in Hydrogen"

report presented at the Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Joint Institute for Nuclear Research
Lab. of Theoretical Physics, Dubna, 1962

PHASE

S/056/62/042/002/022/055
B1C0/B104

26.2212
24.6200
AUTHORS: Dzhelepov, V. P., Yermolov, P. F., Kushnirenko, Ye. A.,
               Moskalev, V. I., Gershteyn, S. S.

TITLE: Experimental study of μ^--mesatomic processes in hydrogen
               gas

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42,
               no. 2, 1962, 459 - 449

TEXT: The experimental study of the capture of a negative meson by a proton
$\mu^- + p \rightarrow n + \bar{\nu}$ can give important information on weak interactions The
probability of this process depends on the spin state of the hyperfine
structure of the hydrogen muonic atom as well as on the mesomolecule pro-
duction probability $\lambda_{pp\mu}$. The authors give results of experiments conducted
at the OIYaI (see Association entry) synchrocyclotron with a diffusion
chamber containing technically pure hydrogen and placed in a constant mag-
netic field of 7200 oe. The method of investigation is based on the fact
that the neutral $p\mu$ mesic atom after its formation covers a certain distance
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B108/B104

Experimental study of ...

before the decay of the μ-meson. The principal difficulty is the presence of O and C nuclei the protons of which may transfer μ-mesons. At a hydrogen pressure of 22.7 at, the cross section σ_{pp} of elastic scattering of $p\mu$ mesic atoms from protons is $(1.7 ^{+0.4}_{-0.5}) \cdot 10^{-19}$ cm^2. The probabilities of μ-meson transfer from protons to deuterons, λ_d, and to complex nuclei (C and O), λ_z, as extrapolated to the density of liquid hydrogen are $(0.95 ^{+0.14}_{-0.2}) \cdot 10^{10}$ sec^{-1} and $(1.2 ^{+0.8}_{-0.5}) \cdot 10^{10}$ sec^{-1}, respectively. The production probability $\lambda_{pp\mu}$ in liquid hydrogen is $(0.6 ^{+0.8}_{-0.5}) \cdot 10^6$ sec^{-1}. The λ values agree well with theory. σ_{pp} is near the theoretical value calculated without considering the hyperfine structure of the $p\mu$ mesic atom. At present experiments are carried on in order to improve the experimental values of the above quantities, in particular of $\lambda_{pp\mu}$. The authors thank Ya. B. Zel'dovich for discussions as well as T. N. Tomilina, Ye. I. Rozanov, Ye. M. Kuchinsky, A. V. Brzhestovskaya, N. P. Vasilistov, Ye. A. Kurchevskaya, L. Krasnoslobodtseva, T. Sazhneva, and Yu. Saykina for help. There are 4

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S/056/62/047/002/027/055
B158/B104

Experimental study of ...

figures, 1 table, and 18 references: 9 Soviet and 9 non-Soviet. The four
most recent references to English-language publications read as follows:
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4, 575, 1960. L. Wolfenstein, V. L. Telegdi. Proc. of the 1960 Ann. Intern.
Conf. on High Energy Physics at Rochester, Publ. Univ. Rochester. 1961,
pp. 529, 715; Ta-Yon Wu et al. Nucl. Phys., 16, 432, 1960; J. G. Fetkovich
et al. Phys. Rev. Lett., 4, 570, 1960; M. Shiff. Preprint EFINS - 61-31.
Report 551, June, 1961.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute
              of Nuclear Research)

SUBMITTED: October 26, 1961

Card 3/3

[illegible], V.I. [illegible], M., GERSHTEIN, S.S., [illegible], Yu. V., [illegible], V.I.,
[illegible], P. I.

"[illegible]ntal Investigation of μ^- Mesonic Atomic Processes in
[illegible] Hydrogen"

report presented at the Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Joint Inst. for Nuclear Research
Lab. of Nuclear Problems
Lab. of Theoretical Physics

S/056/62/043/002/047/053
E108/E102

AUTHOR: Gershteyn, S. S.

TITLE: Transfer of negative mesons from hydrogen to nuclei of
             other elements

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
             no. 2(8), 1962, 706-719

TEXT: It is shown that the high probability of transfer of negative
mesons from hydrogen to other nuclei is connected with the great number
of intersections of the molecular terms that correspond to charge
exchange. The cross section of muon transfer from the hydrogen K-orbit
to carbon and oxygen nuclei is calculated (transfer probabilities
$\approx 2.8 \cdot 10^{10}$ and $\approx 5.6 \cdot 10^{10}$ sec^{-1}, respectively, in a liquid-hydrogen
chamber). The process of cascade transition of a mesic atom into the
normal state is considered. In carbon and oxygen, the transfer of a muon
leads, with a probability of some 80%, to the appearance of an Auger
electron of several kev. The probability of muon transfer to helium
nuclei is very low as the system $\mu\mu$He is an exception among the systems

Card 1/2

Transfer of negative mesons from ...

S/056/62/043/???/047/093
B108/B102

$\mu_{\pm}$ because there is no intersection of the terms corresponding to charge exchange from the hydrogen K-orbit. The probability of second-kind inelastic collisions of hydrogen mesic atoms on highly excited levels with protons is very high and entails the rapid transition of the mesic atoms to lower energy levels. This effect may throw light upon the short lifetime of negative pions in hydrogen. There are 2 figures and 2 tables.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
              Institute of Nuclear Research)

SUBMITTED: March 31, 1962

Card 2/2

S/056/62/043/004/057/061
B1C4/B186

AUTHORS: Gershteyn, S. S., Nguyen Wang Kh'yeu, Eramzhyan, R. A.

TITLE: On the possibility of detecting neutral currents in
              experiments with neutrinos

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
              no. 4(10), 1962, 1554-1556

TEXT: S. Bludman (Nuovo Cim., 9, 433, 1958) and Ya. B. Zel'dovich
(ZhETF, 36, 1964, 1959) introduced terms of the form

$$L' = \frac{G}{\sqrt{2}}(\bar{v}\,\hat{O}\,v)(\bar{N}\,\hat{O}\tau_3 N)\,, \qquad \hat{O} = \gamma_\mu (1 + \gamma_5)\,, \qquad (1)$$

in the weak interaction Lagrangian. Through the interaction
$v + N \longrightarrow v + N$ (2), these terms must lead to stars without any leptons
resulting from the scattering of high-energy neutrinos on nuclei. With
neutrino energies of 1 Bev, the above mentioned process had a cross
section of about 10^{-38} cm^2 and should therefore be detectable. Moreover,

Card 1/3

On the possibility of detecting ...

S/C56/62/043/004/057/061
B104/B156

it is possible to prove the interaction (2) in experiments with low-energy antineutrinos. This interaction leads to the excitation of nuclear levels: $\bar{\nu} + Z \longrightarrow \bar{\nu} + Z^*$ (3). This excitation can be observed from the characteristic emission $Z^* \longrightarrow Z + \gamma$. The differential cross section of neutron scattering through the angle θ with excitation of a nucleus has, in the case of an interaction described by (1), the form

$$d\sigma/d\Omega = (2\pi)^{-2} G^2 \left[a_0 (1 + \cos\theta) + b_0 \left(1 - \tfrac{1}{3} \cos\theta \right) \right] (E_\nu - \Delta E)^2, \qquad (4), \text{ where}$$

$$a_0 = \left| \int d\tau \langle Z^* | \sum_A \tau_3 e^{i\mathbf{k r}} | Z \rangle \right|^2, \qquad b_0 = \left| \int d\tau \langle Z^* | \sum_A \tau_3 \sigma e^{i\mathbf{k r}} | Z \rangle \right|^2, \qquad (5),$$

ΔE is the excitation energy of the nucleus, E_ν is the energy of the antineutrino. The total excitation cross section is

$$\sigma = \frac{G^2}{\pi} b_0 (E_\nu - \Delta E)^2. \qquad (6).$$

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On the possibility of detecting ...

S/056/62/043/004/C57/C61
B104/B166

As regards order of magnitude, this cross section is equal to the cross section of the process $\bar{\nu} + p \rightarrow e^+ + n$ in the experiments of F. Reines and C. L. Cowan (Phys. Rev., 113, 273, 1959). The excitation of an Li^7 nucleus is examined as an example. Using data of R. E. Carter et al. (Phys. Rev., 113, 280, 1959) the authors obtained

$$\sigma'(Li^7) > \int_{\Delta E}^{\infty} p_e(E)\, \sigma(E)\, dE \approx 2 \cdot 10^{-43} cm^2. \qquad (7).$$

It is stated that the excited nuclei are polarized in the direction of motion of the antineutrino, and that therefore the gamma emission too has a definite polarization. This feature can be useful in distinguishing the process (5) from the background.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research). Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University) (R. A. Eramzhyan)

SUBMITTED: July 31, 1962

Card 3/3

GERSHTEYN, S.S.; FOLOMESHKIN, V.N.; ZHELOVA,N.N.,tekhn.red.

[Neutrino scattering on a polarized electron] Rasseianie
neitrino na poliarizovannom elektrone. Dubna, Ob"edinen-
nyi in-t iadernykh issledovanii, 1963. 2 p.
(MIRA 17:1)

ACCESSION NR: AP4019257   S/0056/64/046/002/0818/0818

AUTHORS: Gershteyn, S. S.; Polomeshkin, V. N.

TITLE: Scattering of the neutrino by a polarized electron

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 818

TOPIC TAGS: neutrino, antineutrino, neutrino polarized electron
scattering, scattering cross section, neutrino scattering, antineu-
trino scattering, Feynman Gell Mann scheme

ABSTRACT: In view of the importance of the experimental observation
of the (ev) (ev) interaction, the existence of which is predicted by
the Feynman and Gell-Mann scheme (Phys. Rev. v. 109, 192, 1958),
notice is taken of the strong spin dependence of the $\nu + e$ and $\overline{\nu} + e$
scattering cross sections, given by

Card   1/3

ACCESSION NR: AP4019257

$$\sigma_{\bar{\nu}} = 2\sigma_0\omega^2(1+\lambda)/(1+2\omega) \approx \sigma_0\omega(1+\lambda), \quad \omega \gg 1,$$

$$\sigma_{\nu} = \frac{1}{3}\sigma_0\omega\left\{\left(1 - \frac{1}{(1+2\omega)^3}\right) + \lambda\left[\left(1 + \frac{1}{\omega}\right)\left(1 - \frac{1}{(1+2\omega)^3}\right) - \right.\right.$$

$$\left.\left. - \frac{3}{2}\frac{1}{\omega}\left(1 - \frac{1}{(1+2\omega)^3}\right)\right]\right\} \approx \frac{1}{3}\sigma_0\omega(1+\lambda), \quad \omega \gg 1,$$

where $\sigma_0 = 2G^2m^2/\pi = 8.4 \times 10^{-45}$ cm^2, $\omega = E/m$, E -- neutrino (anti-neutrino) laboratory-system energy, m -- electron mass, and λ -- electron polarization in the neutrino (antineutrino) beam direction. It is possible that this circumstance can be used in the scattering of a neutrino in magnetized ion to separate the effects of $\nu(\bar{\nu})$ + e scattering from the background. "The authors are grateful to B. Pontecorvo and L. B. Okun' for discussions." Orig. art. has: 1 formula.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research)

Card 2/3

L 2734-66   EWT(m)   DIAAP
ACCESSION NR: AP5024338   UR/0367/65/002/002/0257/0260

AUTHOR: Gershteyn, S.; Pontekorvo, B.

TITLE: Mesic atom production during decay of heavy hypernuclei.

SOURCE: Yadernaya fizika, v. 2, no. 2, 1965, 257-260

TOPIC TAGS: heavy nucleus, muon, particle production, hypernucleus

ABSTRACT: Muon decay of heavy hyperfragments is theoretically studied. It is assumed that a muon appears in the bound state of the mesic atom when a heavy Λ-hyperfragment is exposed to radiation by antineutrinos with discrete energy. This process is relatively probable since the radius of the muon orbit in the mesic atom is much less than the radius of the corresponding electron orbit in the atom, and the Pauli exclusion principle does not prohibit the production of a muon in the 1S-state of any mesic atom. Muon K-production of a free Λ-particle is considered. It is shown that the probability of muon production as discrete μ-mesic atoms is comparable to the probability of continuous spectrum production. It is found that muon L-production is in the 2S-state in heavy hyperfragments is of the same order of

Card 1/2

L 2734-66
ACCESSION NR: AP5024338

magnitude as K-production. Experiments are suggested for verifying the theoretical
muon K- and L-production in heavy nuclei. "In conclusion, it gives us pleasure to
thank S. M. Bilen'kiy and M. Ya. Danysh for consultation." Orig. art. has: 9
formulas.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of
Nuclear Research)

SUBMITTED: 06Mar65   ENCL: 00   SUB CODE: NP

NO REF SOV: 002   OTHER: 004

Card 2/2

GERSHTEYN, S.S.; PONOMAREV, L.I.; PUZYNINA, T.P.

Quasi-classical approximation in the problem of two centers.
Zhur. eksp. i teor. fiz. 48 no.2:632-643 F '65.
(MIRA 18:11)

1. Ob"yedinennyy institut yadernykh issledovaniy.

Relation of vitamin C to the female sex hormone follic-
ulin   M. D. Shelnerman and V. G. Gershtein (Kharkov
Med. Inst.)   Usharinie i Ginekol. 1947, No. 4, 35-7.
Ascorbic acid (in 3 daily doses of 6 mg. each) does not in
itself initiate the sexual discharge in castrated mature
white female mice. Combination with 0.5 units of follic-
ulin produces the discharge within 4 days. Cryst.
ascorbic acid at 30 mg. daily does not cause growth of the
uterus of infantile mice in comparison with controls, but
combined with 25 γ of folliculin it increased the av. size
of infantile uterus to 0.202 g., while this dosage of folliculin
alone gave but 0.083 g. av.   G. M. Kosolapoff

ASM-SLA   METALLURGICAL LITERATURE CLASSIFICATION

GERSHTEYN, YA. B

25679

Likvidatsiya avarii Paroprovoda na khodu. Energet Byulleten', 1949, No. 7, s. 29-30

SO: LETOPIS' No. 34

GERSHTEYN, Ya. E.

33107

Rekonstruktsiya Gazovoy Topki (Kotla Garbe). Za Ekonomiyu Topliva, 1949, No 10, c. 30-31

SO: L atopis' Zhurnal'nykh Statey, Vol. 45, Moskva, 1949

GERSHTEYN, Ya.L.

Bicycle trips of the regional studies club. Geog.v shkole 19 no.6:60-63 N-D '56.

(School excursions) (Tourism)

(MLRA 10:1)

CA

Increase in the ash content of fuel dried separately by
flue gases before its utilization. K. O. Gephtgin.
Trans. Thermo-Techn. Inst. Moscow 1933, No. 8, 8-15.
A calcn. of the effect of heat on the coal.   A. A. B.

A S B . SE A   METALLURGICAL LITERATURE CLASSIFICATION

GERSHTEYN, YE. G.

PA 16179
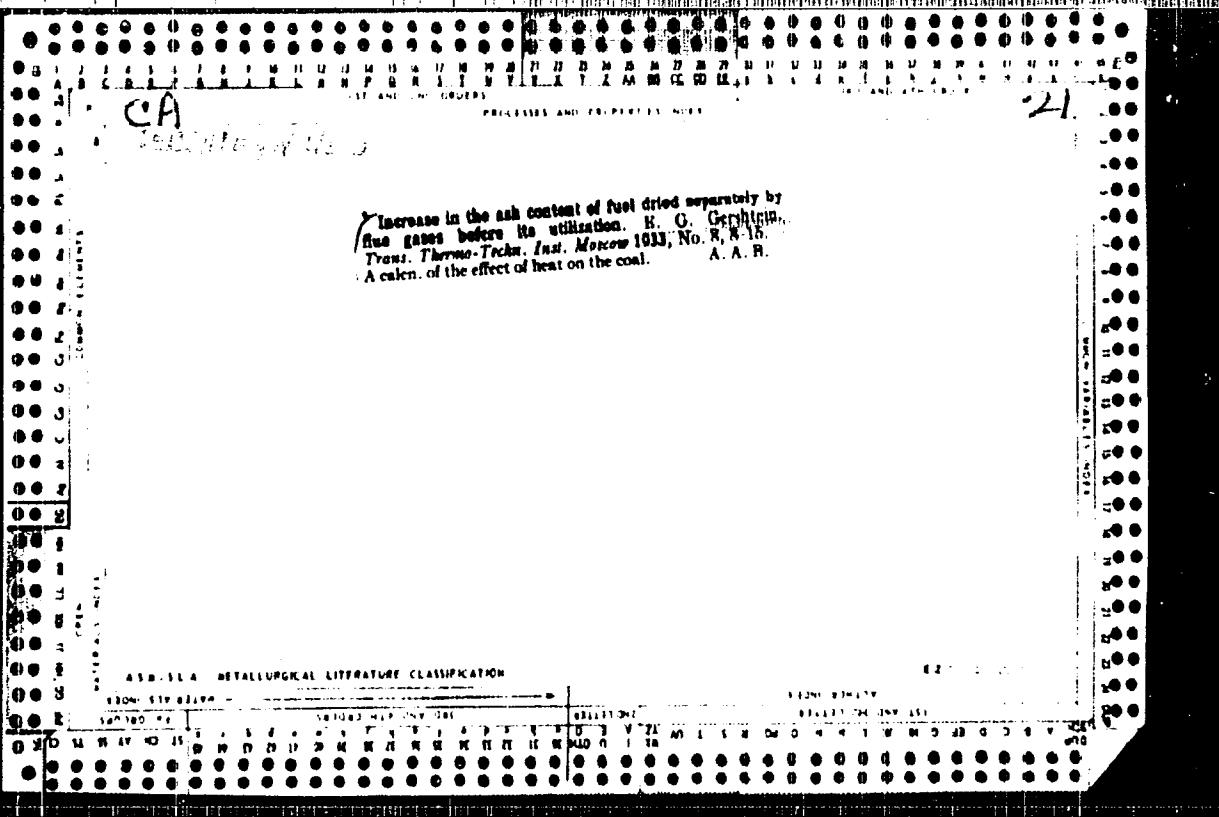
USSR/Electricity - Power Electric   Jan 50
            Superheaters, Steam

"Method of Increasing the Reliability of Steam Superheaters," Ye. G. Gershteyn, A. I. Kryukov, V. A. Stepanova, 4 pp

"Elek Stants" No 1

Describes boiler reconstruction during 1938-39 campaign to reduce accidents by switching from 2- to 4-path superheaters. Shows advantages of increasing number of paths both for positive effects and steam pressure drop. Discusses other desirable features. Cites figures for

16179

USSR/Electricity - Power, Electric   Jan 50
            (Contd)

past 10 years' boiler operation of this super-heater showing reduction of average pipe breakage to one break per 3½ years.

16179

ASIMOVA, T.V., inzhener; GERSHTEYN, Ye.G., inzhener.

Principal scheme for a steam boiler with supercritical parameters
at the Philo power plant in the U.S.A. Teploenergetika 4 no.10:82-83
O '57.
(MIRA 10:9)
(United States--Electric power plants)

GERSHTEYN, Ye.G., inzhener.

Value of using washers with steam superheaters. Elek. sta. 28 no.6:
14-17 Je '57.

(Superheaters)   (MIRA 10:8)

GERSHTEYN, Ye.G., inzh.

Conclusions from statistics of high-pressure boiler defects.
Elek.sta. 29 no.8:8-11 Ag '58.   (MIRA 11:11)
                         (Boilers)

GERSHTEYN, Ye.G., inzh.

Temperature criteria for the reliability of steam superheaters. Elek. sta.
29 no.10:10-14 O '58.   (MIRA 11:11)
        (Superheaters)

SOV/96-59-8-9/27

AUTHORS: Gershteyn, Ya.G., Valk, Ya.G., Syromyatnikov, V.M.,
            Engineers

TITLE: Fault Rates on Standardised High Pressure Boilers

ABSTRACT: This article gives a general analysis of boiler fault
         statistics. The fault rate is defined as the ratio of the
         number of faults on a group of boilers in a given period
         to the total operating time of all the boilers in a group,
         including those without faults, expressed in boiler months.
         As will be seen from Table 1, there has been a reduction
         in the fault rate of heating surfaces of Soviet boilers
         in recent years, while the distribution of faults between
         the design, erection, operation and repair remains about
         the same. Tube faults can arise from ash wear or similar
         causes connected with inadequate adaptation of the boiler
         to different operating conditions. Latterly such tube
         faults were classified separately and the figures in
         Table 2 show that in 1956-57 they accounted for about 30%
         of all faults. Therefore, at the present time, more than
Card 1/3 half the faults of heating surfaces are associated with

SOV/96-59-8-9/27

Fault Rates on Standardised High Pressure Boilers

manufacturing defects or unsuitability of the design for the operating conditions. Tables 1 and 2 relate to faults that involve boiler shut-down but not to other troubles that were located during normal boiler repair periods. The continuous operating time of boilers is still inadequate: this will be seen from Table 3, where the number of boilers which had no faults on the heating surfaces during the year is expressed as a percentage of the total number of boilers of the type in question. With the introduction of unit type plant it will be particularly necessary to increase the operating time of boilers. A brief analysis is made of the way in which different types of boilers are affected, first with reference to defects of design and manufacture, and secondly with respect to defects of operation. The data in Table 4 indicate that boilers type TP-230-2 had more faults than other boilers but it should be remembered that most of them work on anthracite dust or other difficult types of fuel. During three or four years operation only a little over half of boilers type TP-230-2 burning anthra-

Card 2/3   cite dust escaped shut-down by faults arising from their

SOV/96-59-8-9/27

Fault Rates on Standardised High Pressure Boilers

  unsuitability for the fuel used. New large boilers are not
  so highly standardised as those considered in this article,
  so they should be better adapted to local conditions and
  more reliable. There are 2 figures and 6 tables.

ASSOCIATION: ORGRES

Card 3/3

GERSHTEYN, Yu., inzh.

Use of epoxy compounds in ship repair. Rech. transp. 23
no.12:21-23 D '64.
(MIRA 18:6)

GERSHTEYN, Yu., inzh.

Reconditioning the blocks of the 3D6 engine with epoxy resins.
Rech. transp. 23 no.1:31 Ja '64.   (MIRA 18:11)

GERSHTEYN, Yu.M.; ISPRAVNIKOVA, A.G.,kand. tekhn. nauk, rukovoditel' raboty

Fire prevention measures in the production of carbon disulfide
by the retort method. Pozh. bezop. no.4:58-68 '65.
(MIRA 19:1)

GERSHTEYN, Yu.S., inzhener;   KOZYREV, D.P., inzhener.

Fitting hydraulic gear drives by using a dynamometer. Sudostroenie
22 no.3:34-35 Mr '56.

(Marine engines)   (MLRA 9:8)

GERSHTEYN, Yu.S.,inzh.; SOBININ, A.I.,inzh.

Installation of electric-propulsion motors and drive shafts on the
icebreaker "Lenin." Sudostroenie 26 no.9:57-60 S'60.   (MIRA 13:10)
    (Lenin (Atomic ship)) (Ship propulsion, Electric)

GARMASHEV, Dmitriy Leonidovich, kand. tekhn. nauk; KUDRYAVTSEV, Fedor Aleksan-
drovich, inzh.; MARKOV, Aleksandr Panteleymonovich, inzh.; GERSHTEYN,
Yu.S., inzh., retsenzent; ROKHLIN, A.G., kand. tekhn. nauk, retsen-
zent; ZHIDYAYEV, O.A., nauchnyy red.; OZEROVA, Z.V., red.; KRYAKOVA,
D.M., tekhn. red.

[Modern methods of assembling marine shafting] Sovremennye metody
montazha sudovykh valoprovodov. Izd.2., ispr. i dop. Leningrad,
Gos. soiuznoe izd-vo sudostroit. promyshl., 1961. 280 p.
(MIRA 14:10)

(Shafting)   (Ships—Equipment and supplies)

GERSHTEYN, Yu.S., inzh.

    Installation of the main turbogenerators on the atomic icebreaker
"Lenin." Sudostroenie 27 no.8: 56-58 Ap '61.   (MIRA 14:9)
       (Lenin (Atomic ship)) (Marine gas turbines)

ACC NR: AR6022390   (N)   SOURCE CODE: UR/0398/66/000/003/A017/A017

AUTHOR: Gershteyn, Yu. V.

TITLE: Investigation of epoxy compound strength under vibrating loads

SOURCE: Ref. zh. Vodnyy transport, Abs. 3A99

REF SOURCE: Tr. Leningr. in-ta vodn. transp., vyp. 82, 1965, 96-100

TOPIC TAGS: shipbuilding engineering, structure vibration, vibration analysis, ship, marine engine, inland waterway transportation, cyclic strength, epoxy plastic

ABSTRACT: An actual check of vibration at different points aboard the passenger motorship Leningradets was made in order to determine the actually existing oscillations in hull structures and machinery. The resistance to vibration of epoxy compounds was determined in a laboratory installation which simulated the vibration occurring in ships' structures. It was established that bonded seams withstood loading and retained the strength of the bond when oscillation amplitudes reached 5 mm and the load lasted for 2×10^6 cycles. Epoxy mastics of various compositions withstood lengthy vibrational loads (5×10^6 cycles). 2 figures. [Translation of abstract]

SUB CODE: 13, 11 /

Card 1/1   UDC: 629.12:624.021.09-752

GERSHUN, A.; KRAYTSEROV, M.

Our work with state farms. Den. i kred. 17 no.3:64-65
Mr '59.   (MIRA 12:4)
        (Odessa Province--State farms--Finance)

OPTICS   SEE ILC

ACC NR: AP7000004

SOURCE CODE: UR/0070/66/011/006/0933/0935

AUTHOR: Sysoyev, L. A.; Timan, B. L.; Gorshun, A. S.; Rayskin, E. K.; Konvisar, L. V.; Komar', V. K.

ORG: All-Union Scientific Research Institute of Monocrystals, Scintillators and Extra Pure Chemical Materials (Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, stsintillyatsionnykh materialov i osobo chistykh khimicheskikh veshchestv)

TITLE: Growing cadmium sulfide crystals for ultrasonics amplification

TOPIC TAGS: single crystal growth, semiconductor single crystal, cadmium sulfide, ultrasonics amplification, photosensitivity, dark current, annealing, crystal orientation

ABSTRACT: Conditions were determined for growing CdS monocrystals with optimum properties for ultrasonic wave amplification. Equipment was designed for growing crystals from a melt under inert gas at several hundred atmospheres pressure, moving the container with the crystallizing material through a high temperature zone. The cadmium and sulfur to be used contained about $10^{-4}\%$ oxygen and about $10^{-5}\%$ of other impurities; cadmium was used in excess, and most of it was removed by zone purification. Dark resistance and photosensitivity were increased and thermal stresses in the monocrystal were removed by annealing in a bed of fine crystalline CdS powder

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UDC: 548.52

ACC NR: AP7000004

under H_2S at atmospheric pressure for 24 hours at $1323°K$. After annealing the dark
resistance was 5×10^{10} ohm. cm and could be changed by 10^5-10^6 times by illumination.
The quality of the hexagonal CdS crystal of wurtzite structure grown parallel to the
C_6 axis depends on its orientation with respect to the melt: surfaces terminating in
Cd atoms lead to the desired monocrystal; S atoms result in defective polycrystals,
Orientation can be determined by examination of the piezoelectric effect and the type
of etch pits of the base planes (0001) and (0001). Optimum growth was obtained with a
temperature gradient of 3-5 degrees/mm at the crystallization front; crystal growth at
10-12 mm/hr. Examination of a CdS crystal grown under these conditions showed it was
suitable for amplifying ultrasonic waves. It was established the increased noise
level at maximum amplification was not associated with transmission of the ultrasonic
waves through the crystal. Orig. art. has: 4 figures.

SUB CODE: 20/ SUBM DATE: 19Jul64/ ORIG REF: 001/ OTH REF: 003

Card 2/2

L 15929-66

ACC NR: AP6004423   SOURCE CODE: UR/0051/66/020/001/0183/0184

AUTHOR: Bochkov, Yu. V.; Georgobiani, A. N.; Gershun, A. S.; Sysoyev, L. A.;
Chilaya, G. S.

ORG: none

TITLE: Ultraviolet electroluminescence of zinc sulfide

SOURCE: Optika i spektroskopiya, v. 20, no. 1, 1966, 183-184

TOPIC TAGS: electroluminescence, zinc sulfide, single crystal, UV radiation

ABSTRACT: Ultraviolet electroluminescence was observed in pure single crystals of
zinc sulfide grown from a melt under inert gas pressure. Specimens 150 μ thick were
subjected to pulsed voltage with an amplitude of 4.5 kv, a duration of 1.7 μsec and
a duty factor of $1.5 \cdot 10^4$. The voltage was applied through indium electrodes. The
luminescence of the specimens is stable at a constant voltage and increases approxi-
mately exponentially with voltage. A voltage increase from 2.7 to 4.5 kv increases
the luminescence intensity by approximately one order of magnitude. It is assumed
that this luminescence is due to recombination of electron-hole pairs created by

Card 1/2

UDC: 535.376-3

L 15929-66

ACC NR: AP6004423

electric discharge in the crystal. There is a sharp cutoff in luminescence at 330 mμ due to the natural absorption of the crystal lattice. It is shown that this emission could not be caused by air breakdown in microcracks. Orig. art. has: 1 figure.

SUB CODE: 20/ SUBM DATE: 27Jul65/ ORIG REF: 001/ OTH REF: 000

Card 2/2

L 46931-66   EWT(1)/EWT(m)/T/EWP(t)/ETI   IJF(n)   JD
ACC NR: AP6015501   N   SOURCE CODE: UR/0181/66/008/005/1633/1635

AUTHOR: Gershun, A. S.; Sysoyev, L. A.; Timan, B. L.

ORG: VNII of Single Crystals, Scintillation Materials and Super Pure Materials, Khar'-kov (VNII monokristallov, stsintilyatsionnykh materialov i osobo chistykh veshchestv)

TITLE: Some properties of the volt-ampere characteristics of thin CdS single crystals with non-ohmic contacts

SOURCE: Fizika tverdogo tela, v. 8, no. 5, 1966, 1633-1635

TOPIC TAGS: cadmium sulfide, indium, electric hysteresis

ABSTRACT: X- and Z-cuts of CdS crystals 100 to 200 μ thick were prepared with In electrodes deposited on both sides of their surfaces in a vacuum of 10^{-5} mm Hg. The In contacts were deposited at (a) room temperature and (b) upon a crystal preheated to 300 degrees. The volt-ampere characteristic of Z-cuts prepared at room temperature showed a pronounced hysteresis. It appears that the external voltage is compensated by the internal emf generated in the In-CdS-In system under the influence of the applied electrical field. The X-cuts with In electrodes prepared at room temperature had a residual voltage; however, the generated inverse current is smaller by one order of magnitude. The difference in the behavior of the In contacts on surfaces of the X- and Z--cuts might be caused by the different crystallographic and chemical composition of the __

Card 1/2

ACC NR: AP6015501   0

specimens. The volt-ampere characteristics of the specimen with X-cut contacts prepar-
ed on a preheated crystal showed only an insignificant hysteresis, whereas with the Z-
-cut prepared in the same manner, the hysteresis was quite pronounced. The presence of
hysteresis is related to the nonohmicity and to the inertial properties of the system.
Orig. art. has: 1 figure.

SUB CODE: 20/   SUBM DATE: 14Sep65/   OTH REF: 003

awm.

Card 2/2

GERSHUN, B.

Lower-level business accounting in construction projects of Novokuznetsk.
Na stroi. Ros. 3 no.12:16 D '62.   (MIRA 16:2)

1. Nachal'nik otdela truda i zarabotnoy platy upravleniya
Sibmetallurgstroy.
            (Novokuznetsk—Construction industry—Accounting)

GOYDENKO, P.P., inzh.; ABELEV, B.I., inzh., GERSHUN, I.D., inzh.

Automatic voltage regulator for synchronous generators. Elektrotekhnika
35 no.4:44-45 Ap '64.   (MIRA 17:4)

GERSHUN, L.Z.; ABRAMOV, A.G.; DMITRIYEV, L.G.

Using an exiter to start a generator used as a synchronous compensator.
Energ.biul. no.8:26-27 Ag '53.   (MLRA 6:8)
                                                                 (Dynamos)

GERSHUN, L.Z., inzhener; ABRAMOV, A.G., inzhener; DMITRIYEV, L.G., inzhener.

Starting a generator in the capacity of a synchronous compensator with the aid of an exciter. Energetik 2 no.5:15-17 My '54.   (MLRA 7:6)
    (Dynamos)

GERSHUN, M.I. [Hershun, M.I.]; KUCHERENKO, A.G. [Kucherenko, A.H.]; KOCHETOVA,
V.G. [Kochetova, V.H.]; TIMCHENKO, R.S. [Tymchenke, R.S.]

Organization of the department for centralized shoe upper production
in shoe factories. Leh.prom. no.2:85-88 Ap-Je '65.

(MIRA 18:10)
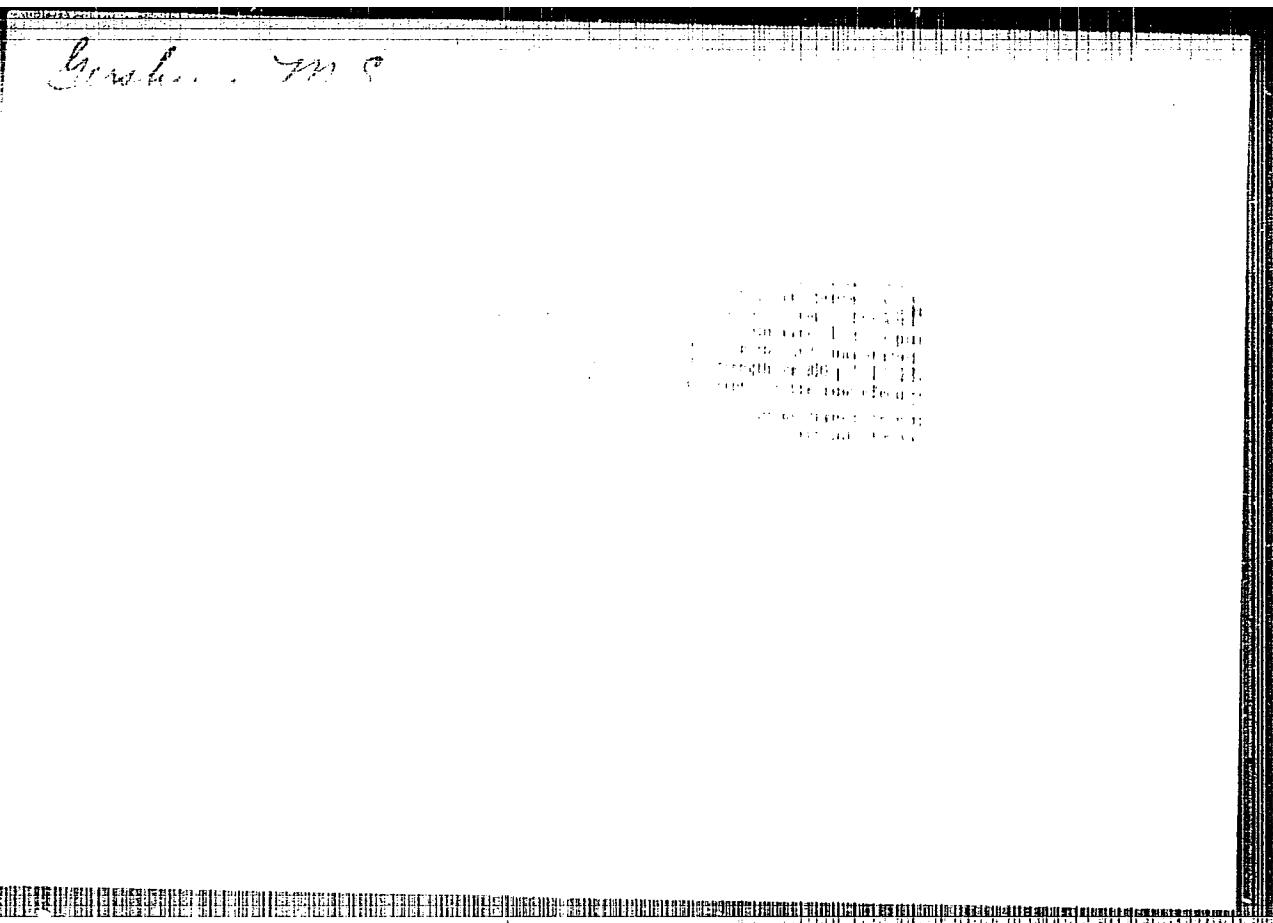
USSR / General and Specialized Zoology. Insects. Forest Pests.   F

Abs Jour   : Ref Zhur - Biol., No 17, 1958, No 78586

Author   : Corabum, N. S.
Inst   : Not given
Title   : Control of Poplar Pests

Orig Pub   : Sb. rabot po lesn. kh-vu. A.-I. Goslesbumizdat, 1957, 71-73

Abstract   : In Central Asia, damage produced by the metallic wood-borer
              Melanophila picta and often together with it by the clear-
              winged moth Paranthrene kungossana bring about the death of
              seedlings, saplings and young (to 5 years old) poplars. The
              small poplar metallic wood-borer has a one-year cycle of
              development. Flight of the beetles - from the beginning of
              May to the end of June. The beetles feed on many species
              (poplar, willow, mulberry, etc.) eating the leaves and
              petioles on the young branches. Laying of eggs - from the II

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USSR / General and Specialized Zoology.   Insects.   P
        Forest Pests.

Abs Jour   : Ref Zhur - Biol., No 17, 1958, No 78386

decade of May, in the creeks and deepening of
the bark of the collum and the first third of
the trunk. Larvae first food on phloem, then
on xylem. From August, they are in the cradle
and, from the third decade of April, pupate.
Most efficacious against the beetles and hatching
larvae is smearing and spraying the trunks with
a 20% suspension of 5% dust of DDT before the
start of the flight of the beetles. Also effec-
tive is treatment of the trees with dusts or sus-
pensions of DDT and hexachlorcyclohexane. The
poplar clear-winged moth has a one-year genera-
tion. Phenological terms of development, char-
acteristics of the laying of the eggs, of the
primary damaging of the trunks and chemical mea-
sures of control are the same for clear-winged
moth and metallic wood-borer. -- A. P. Adrianov.

Card 2/2

2.

USSR/General and Special Zoology - Insects   P

Abs Jour : Ref Zhur - Biol., No 25736

Author   : Gershun M.
Inst   : Not Given
Title   : The Effect of Low Temperature on the Hibernating Reserve
            Stock of the Cobweb Tick. (Vliyaniye nizkikh temperatur na
            zimuyushchiy zapas pautinnogo kleshchika).

Orig Pub : Khlopkovodstvo, 1957, No 1, 51-52

Abstract : The cobweb ticks were resistant to cold. In experiments
            they began to die only to 18-19 deg below 0. When exposed
            for 2-24 hours to 20 deg below 0 30% of the ticks died; 60%
            of the ticks died when exposed to 25° below 0 and 100% died
            when exposed to 29° below 0. Thus, the decrease in the ticks'
            numbers in the spring because of low winter temperatures in
            Uzbekistan was negligible. In April 70% of the ticks died
            at 12.8° below 0 and only 4-5% died at 3° below 0. The de-
            crease of temperature in the UzbSSR did not exterminate the
            spring reserve of the ticks, but only delayed the period of
Card   : 1/1   their mass reproduction.

MERZON, A.C., insh.; GERSHUN, M.O., insh.; JEMERNYA, N.V., insh.

Some potentials for the increase of labor productivity on the
conve, orized lines of shoe factories. Nauch.-issl.trudy Ukr
NIIKP no.13:237-246 '62.

(MIRA 18:2)

GERSHUN, M.I. [Hershun, M.I.]; SOKOLOVA, L.Yu.

Some potential for the increase of labor productivity in the enter-
prises of the light industry of the former Lugansk Economic Council.
Leh.prom. no.1:86-87 Ja-Mr '63.
(MIRA 16:4)

1. Ukrainskiy nauchno-issledovatel'skiy institut kozhevenno-obuvnoy
promyshlennosti (for Gershun). 2. Byvshiy Lugnaskiy sovet narodnogo
khozyaystva (for Sokolova).

MERZON, A.; GERSHUN, N.

Group wages of assembly-line workers in shoe factories.
Sots.trud. 7 no.6:61-63   Je '62.
(Wages—Shoe industry)   (MIRA 16:2)

GERSHUN, N.O., inzh.; KUSHNIR, V.M., inzh.

Economic effectiveness of shoe assembly without lacing.
Izv.vys.ucheb.zav.; tekh.leg.prom. no.2:3-6 '60.
(MIRA 13:11)

1. Ukrainskiy nauchno-issledovatel'skiy institut kozhevenno-
obuvnoy promyshelennosti.
(Shoe manufacture)

MERZON, A.G.; GERSHUN, N.O.; SHINKAREV, I.I.; PUZINOVSKIY, E.I.;
KUCHERENKO, A.G.

Collective wages in the conveyerized production lines of shoe
factories. Kozh.-obuv.prom. 4 no.3:8-10 Mr '62.   (MIRA 15:5)
                    (Wages—Shoe industry)

127-12-9/28

AUTHORS: Lugovskiy, S.I., Professor, Doctor of Technical Sciences and
              Dymchuk, G.K. and Gershun, O.S., Mining Engineers

TITLE: On the Reserve of Air for Mine Ventilation (O rezerve vozdukha
              dlya provetrivaniya rudnikov)

PERIODICAL: Gornyy Zhurnal, 1957, No 12, pp 33-35 (USSR)

ABSTRACT: The amount of air for ventilation of mines is computed usually
              by taking into account an approximate coefficient of reserve.
              In a series of cases the calculated air quantity proved to be
              insufficient for the ventilation of mines. One of the reasons
              for this insufficiency are the considerable leakages through
              caved workings. A part of them, however, can be eliminated,
              and the total amount of leakages can be reduced by 70%. It is
              therefore recommended to increase the value of the air reserve
              coefficient from 1.1 or 1.25 as used presently to 1.4 up to
              1.6, even after taking into account the leakage reduction.
              The article contains 2 tables.

AVAILABLE: Library of Congress

Card 1/1

DUGANOV, G.V., dots., kand.tekhn.nauk; GERSHUN, O.S., inzh.

Investigating the amount of carbon dioxide in Krivoy Rog
Basin iron mines. Nauch.dokl.vys.shkoly; gor.delo. no.4:
105-110 ' 58.
(MIRA 12:1)

1. Predstavleno kafedroy rudnichnoy ventilyatsii Dnepropetrov-
skogo gornogo instituta imeni Artema.
(Krivoy Rog--Iron mines and mining)
(Carbon dioxide) (Mine ventilation)

DUGANOV, G.V., dotsent; GERSHUN, O.S., inzh.

Establishing air supply standards for Krivoy Rog Basin mines.
Izv.vys.ucheb.zav.; gor.zhur. no.11:66-70 '58. (MIRA 12:8)

1. Dnepropetrovskiy gornyy institut
                (Krivoy Rog--Mine ventilation)

GERSHUN, G.S., gorn.inzh.

Ventilation of deep pit mines. Izv. DGI 31:81-87 '58.

(Strip mining) (Mine ventilation)   (MIRA 11:7)

MILETICH, A.F., dotsent; YAROVOY, I.M., dotsout; GERSHUN, O.S., inzh.;
GRETSINGER, B.Ya., inzh.

Investigating gas emission in mining single gaseous seams. Izv. vys.
ucheb. zav. gor. zhur. no.8:65-72 '60.   (MIRA 13:9)

1. Dnepropetrovskiy ordena Trudovogo Krasnogo Znameni gornyy institut
im. Artema. Rekomendovana kafedroy rudnichnoy ventilyatsii i tekhniki
bezopasnosti.

(Mine gases)

GERSHUN, O. S., Cand. Tech. Sci.   (diss) "Investigation of Some
Problems of Boring in Metal Mines of Ukraine," Kiev, 1961, 13 pp.
(Kiev Polytech. Inst.) 180 copies (KL Supp 12-61, 265).

NOVOZHILOV, Mikhail Galaktionovich, prof., doktor tekhn. nauk; SELYANIN,
Vitaliy Georgiyevich, kand. tekhn. nauk; TROP, Abram Yefimovich,
prof., doktor tekhn. nauk; Prinimal uchastiye GERSHUN, O.S.,
kand. tekhn. nauk; RZHEVSKIY, V.V., prof., doktor tekhn. nauk,
retsenzent; ROGATIN, N.N., inzh., retsenzent; GEYMAN, L.M., red.
izd-va; MESHCHANKINA, I.S., tekhn. red.

[Deep open pits]Glubokie kar'ery. Moskva, Gosgortekhizdat, 1962.
275 p.   (MIRA 16:1)
                 (Strip mining)

AHRAMOV, G.A., prof., doktor tekhn.nauk; GERSHUN, O.S., kand.tekhn.nauk

Forced and forced-exhaust ventilation as a means of controlling leaks in the caving area. Gor. zhur no.4:63-67 Ap '63.   (MIRA 16:4)

1. Dnepropetrovskiy gornyy institut.
                    (Mine ventilation)

GERSHUN, U.S., kand. tekn. nauk

Calculating the ventilation of the Komsomolets Mine in reorganization of the "Marlia" shaft. Shakht. stroi. 8 no.6:10-13 Je '64.

(MIRA 17:10)

EBSKIN, S. I. -- "The Attention of the Pupils during Class and Methods of
    Attracting and Holding It." Kazakh State Pedagogical Institute imeni
    Abay. Alma-Ata, 195 . (Dissertation for the Degree of Candidate in
    Pedagogical Sciences.)

So; Anishaya Letopis' No 3, 195

ZHANUZAKOV, N.I., GERSHUN, V.I.

Feather grass disease in sheep. Veterinariia 42 no.8 1965.
Ag '65.   (MIRA 18:11)

1. Nachal'nik veterinarnogo otdela Veterinarnoy laboratorii
Kustanayskoy oblasti (for Zhanuzakov). 2. Direktor
Veterinarnoy laboratorii Kustanayskoy oblasti (for Gershun).

GELSHUN, V.I., veter vrach

Observing enzootic infectious pustular dermatitis in sheep.
Veterinariia 42 no.11:44-45 N '65.
(MIRA 19:1)

1. Borovskaya veterinarnaya laboratoriya Sverdlovskoy oblasti.

PROCESSES AND PROPERTIES INDEX

3199. Action of Audio-Frequency Alternating Currents on the Ear.

ASM TLA   METALLURGICAL LITERATURE CLASSIFICATION

SHERBININ, A. K.
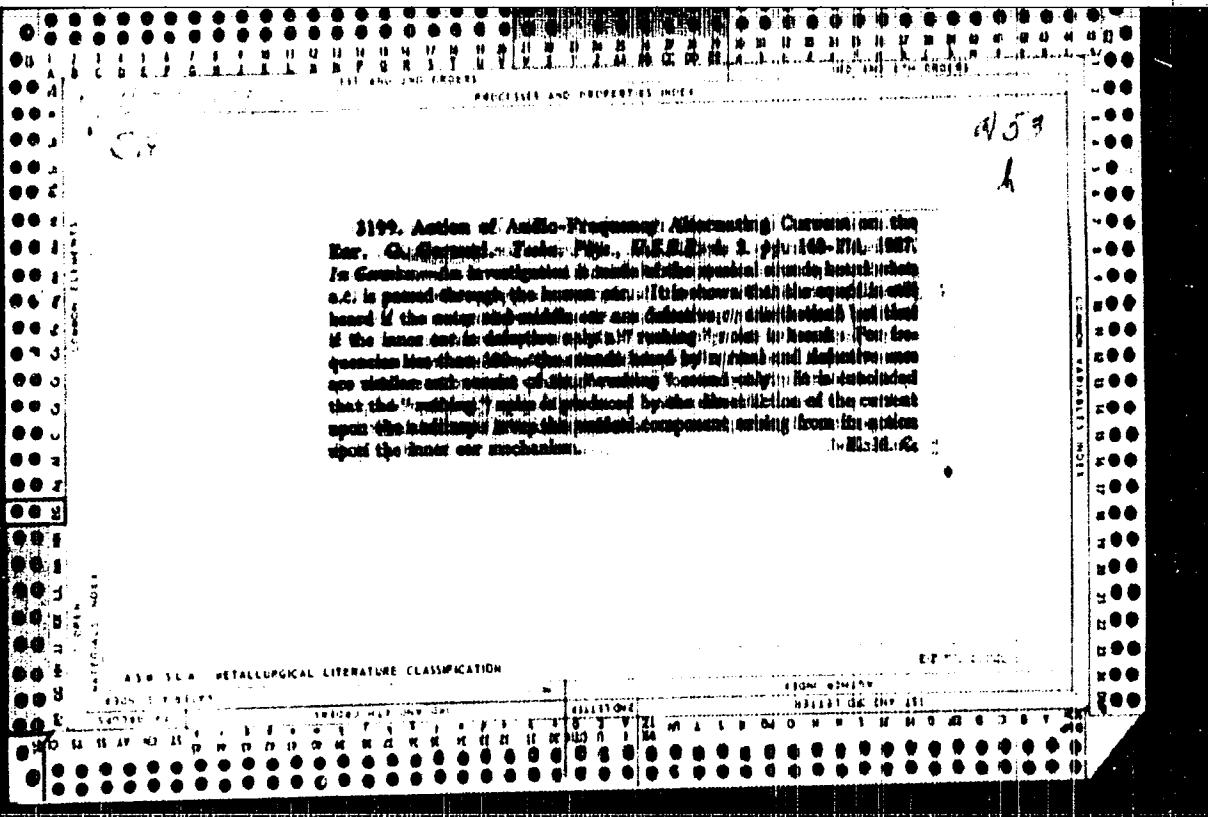
"Advances in the electro-physiological study of Blood Disappearances." (e. Kharey Gershani G. V.

SO: Advanced in Contemporary Biology (Uspekhi Sovremennoi Biologii) Vol. VI, No. 3 1937

GERSCHUNI, G.V.

BC

Cochlear potentials in man, G. V. Gershuni, A. M. Andreev, and A. A. Arapova (Compt. rend. Acad. Sci. U.R.S.S., 1937, 16, 429—430).—Experiments were carried out on 5 subjects in whom the ear-drum was destroyed. Two joined ebonite tubes, one carrying the electrodes and the other for the conduction of sound, were introduced into the external auditory meatus, and the sound was conveyed to the ear either from an ordinary whistle or from a rubber hose connected to a moving-coil speaker. A very powerful amplifier ($\times$ 800,000) was employed, but even with this oscillograph records could be obtained only from one subject. The oscillations ceased when the sound was interrupted. The difficulties associated with this type of work in man are discussed.

C. A. A.