article for their contributions in this field. There are 27 references: 14 Soviet-bloc and 13 non-Soviet-bloc. The four most recent references to English language publications read as follows:

Ref.8: Williams W.E. J. Fluid. Mech., 1960, v.8, no.3;
Ref.9: Shmoys J., Mishkin E. Phys. of Fluids, 1960, v.3, no.4;
Ref.22: Long R.R. J. Fluid. Mech., 1960, v.7, no.1;
Ref.23: Kapur J.N. Appl. Scient. Res., 1960, v.A9, no.2-3.

SUBMITTED: January 9, 1961

Card 2/2

X

31627
S/207/61/000/006/002/025
A001/A101

26.1410

AUTHORS: Tkalich, V.S., Tkalich, Ye.F. (Sukhumi)

TITLE: On non-steady screw motions in multi-component magnetic hydrodynamics

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 6, 1961, 8 - 16

TEXT: The purpose of this work was investigation of non-steady screw motions in multi-component magnetic hydrodynamics. The authors introduce in the analysis the analogs of electromagnetic potentials (φ, rotB) and total momentum (P_k) of the unit of mass of k-type ions. A definition of "screw" motions is given as motions satisfying the condition:

$$\text{rot } P_k = a_k \left(P_k - \frac{\mu e_k}{cm_k} \text{rot } B\right) \qquad (1.4)$$

The present work is restricted to studying "homogeneous" screw motions in which $a_k = a_k(t)$ i.e., quantities are independent of space coordinates. Then the system of equations given is linear with respect to the functions sought for, which

Card 1/3

On non-steady screw motions ...

are magnetic and electric fields and velocities V_k. Solving the system the authors express magnetic field in terms of a single vector F depending on coordinates and time and electric field in terms of the gradient of an arbitrary harmonic function φ_o. If $a_k \neq 0$, momenta P_k and velocities V_k are expressed in terms of vector F. If $a_k = 0$, momentum P_k is a gradient, and such motions represent a generalization of potential motions in conventional hydrodynamics. Using harmonic-conjugated functions the authors solve the system of equations for the case of potential motions and find the vector fields of quantities E, H and V_k. The next case considered is steady motions; in case of the absence of any magnetic field, the equation of motion in the steady case is reduced to Bernoulli's equation. In the case of traveling waves, energy W_k depends on magnetic field H_o and derivatives of function F. Several extreme cases of function F presenting a special interest are analyzed. One or another form of this function is selected depending on the mutual orientation of the magnetic field vector and direction of propagation of traveling waves. For the case of waves traveling along the magnetic field H_o, which is applicable to plasma waveguides in which magnetic field is oriented along the waveguide axis, the form of F-function looks as follows:

$$F = F(q_1, q_2, \gamma_3 x_3 + \omega t) \qquad (5.1)$$

Card 2/3

31627
S/207/61/000/006/002/025
A001/A101

On non-steady screw motions ...

As an example the authors consider propagation of axial-symmetrical waves in a cylindrical waveguide. Introducing dimensionless quantities for frequency, density and phase velocity the authors derive a dispersion equation and find the conditions under which its solution is a real quantity. There are 17 references, 16 of which are Soviet-bloc.

SUBMITTED: February 16, 1961

Card 3/3

SALTANOV, N.V. (Sukhumi); TKALICH, V.S. (Sukhumi)

Riemann waves. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.6: 26-32 N-D '61. (MIRA 14:11)

(Magnetohydrodynamics)

28776 S/057/61/031/010/009/015
B109/B102

10.2000
24.6712

AUTHORS: Tkalich, V. S., and Saltanov, N. V.

TITLE: Waves of finite amplitude in non-ideal magnetohydrodynamics

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 10, 1961, 1231-1235

TEXT: The present paper deals with computing the properties of a wave of finite amplitude, propagating along a magnetic field, in dependence on conductivity, viscosity, and other plasma parameters. If V and H are functions of time and of a space coordinate r, the relations $H_1 = H_0/r^n$, $V_1 = v_0/r^n$ can be derived from the known basic equations

$$\left.\begin{aligned} &\frac{\partial \mathbf{H}}{\partial t} = \operatorname{rot}(\mathbf{V}\times\mathbf{H} - \nu_m \operatorname{rot}\mathbf{H}),\quad \operatorname{div}\mathbf{H}=0,\quad \operatorname{div}\mathbf{V}=0,\\ &\frac{\partial \mathbf{V}}{\partial t} + \nabla W = \mathbf{V}\times\operatorname{rot}\mathbf{V} - \frac{1}{4\pi\rho}\mathbf{H}\times\operatorname{rot}\mathbf{H} - \nu\operatorname{rot}\operatorname{rot}\mathbf{V},\\ &W \equiv \frac{V^2}{2} + \frac{p}{\rho} + F. \end{aligned}\right\} \quad (1)$$

Card 1/5

(H_0 denotes an arbitrary constant, $v_0 = v_0(t)$ an arbitrary function of time, $n = 0$ (plane symmetry) or 1 (cylinder symmetry), subscript 1 denotes the components of the vectors $\vec{V}$ and $\vec{H}$). The energy W of the unit mass of the fluid considered (without magnetic-field contribution) is assumed to be a linear function of the second and third space coordinates q_2 and q_3: $W = w(r,t) + Q_2 q_2 + Q_3 q_3$, where $Q_2(t)$, $Q_3(t)$ are arbitrary functions of time. In this case, the linear equations

$$\left.\begin{aligned} &\left(D_{2m} + \frac{\partial}{\partial r}\frac{v_0}{r^n}\right)H_2 = \frac{\partial}{\partial r}\frac{H_0}{r^n}V_2; \quad \left(D_2 + \frac{v_0}{r^n}\frac{1}{r^n}\frac{\partial}{\partial r}r^{2n}\right)V_2 = \\ &= \frac{H_0}{4\pi\rho}\frac{1}{r^{2n}}\frac{\partial}{\partial r}r^n H_2 - \frac{Q_2}{r^n}, \\ &D_{2m} \equiv \frac{\partial}{\partial t} - v_m\frac{\partial}{\partial r}\frac{1}{r^n}\frac{\partial}{\partial r}r^n; \quad D_2 \equiv \frac{\partial}{\partial t} - v\frac{\partial}{\partial r}\frac{1}{r^n}\frac{\partial}{\partial r}r^n, \end{aligned}\right\} \quad (3)$$

$$\left.\begin{aligned} &\left(D_{3m} + \frac{v_0}{r^n}\frac{\partial}{\partial r}\right)H_3 = \frac{H_0}{r^n}\frac{\partial V_3}{\partial r}; \quad \left(D_3 + \frac{v_0}{r^n}\frac{\partial}{\partial r}\right)V_3 = \\ &= \frac{H_0}{4\pi\rho r^n}\frac{\partial H_3}{\partial r} - Q_3, \\ &D_{3m} \equiv \frac{\partial}{\partial t} - v_m\frac{1}{r^n}\frac{\partial}{\partial r}r^n\frac{\partial}{\partial r}; \quad D_3 \equiv \frac{\partial}{\partial t} - v\frac{1}{r^n}\frac{\partial}{\partial r}r^n\frac{\partial}{\partial r}. \end{aligned}\right\} \quad (4)$$

Card 2/5

Waves of finite amplitude...

hold for the second and third components of $\vec{H}$ and $\vec{V}$. By adequate specializations the results obtained are identical with those obtained by S. A. Regirer (DAN SSSR, 127, 983, 1959; IFZh, 2, no. 8, 1959), Ya. S. Uflyand (ZhTF, XXX, 799, 1960) and I. B. Chekmarev (ZhTF, XXX, 338, 1960; ZhTF, XXX, 920, 1960). Upon introducing the vector potential $\vec{a} \equiv (A_2, A_3)$ in (3), (4), the equation

$$\left.\begin{aligned}\left[\left(\frac{\partial}{\partial t}+v_0\frac{\partial}{\partial r}-\nu\frac{\partial^2}{\partial r^2}\right)\left(\frac{\partial}{\partial t}+v_0\frac{\partial}{\partial r}-\nu_m\frac{\partial^2}{\partial r^2}\right)-\frac{H_0^2}{4\pi\rho}\frac{\partial^2}{\partial r^2}\right]\mathbf{a}=\\ =H_0\mathbf{e}\times\mathbf{Q}+\mathbf{C}',\quad \mathbf{Q}\equiv(Q_2, Q_3),\quad \mathbf{C}\equiv(C_2, C_3),\end{aligned}\right\} \tag{9}$$

is obtained for $\vec{a}$, where $\vec{e}$ is the unit vector in the direction of r. Special cases: (A) $v_0 = \nu = \nu_m = \vec{Q} = \vec{C} = 0$. Then,

$$\left.\begin{aligned}A_2=\frac{h_{03}}{k}\sin(kr)\sin(\omega t+\varphi_3),\quad A_3=-\frac{h_{02}}{k}\sin(kr)\sin(\omega t+\varphi_2),\\ \omega=\frac{skH_0}{\sqrt{4\pi\rho}},\quad (s=\pm 1),\end{aligned}\right\} \tag{11}$$

Card 3/5

will be a solution of (9), where h_{02}, h_{03}, φ_2, φ_3 are arbitrary constants. From the vector potential one obtains as usually $\vec{H}$, $\vec{V}$, and $\vec{E}$:

$$\left.\begin{aligned} H_e &= h_{0e}\cos(kr)\sin(\omega t + \varphi_e), \\ V_e &= \frac{sh_{0e}}{\sqrt{4\pi\rho}}\sin(kr)\cos(\omega t + \varphi_e), \quad (e = 2, 3). \end{aligned}\right\} \tag{12}$$

$\vec{E} = -[\vec{V}\cdot\vec{H}]/c$. If there is a fluid layer of the thickness L between two layers of ideal conductance at r = 0 and r = L, the dispersion equation $\omega = sm\pi H_0/L\sqrt{4\pi Q}$ is obtained for this layer from the conditions of continuity, m being an integral number. (B) $\vec{Q} = \vec{C} = 0$: the solution of (9) is

$$A_e = a_{0e}\exp ik(r + \int v_1 dt),$$

$$v_1 = -v_0 + \frac{ik(\nu + \nu_m)}{2} + \frac{sH_0}{\sqrt{4\pi Q}}\sqrt{1 - \frac{\pi Q k^2(\nu - \nu_m)^2}{H_0^2}}, \tag{14}$$

where a_{0e} is an arbitrary complex constant, and k denotes the wave number

Card 4/5

(Im k = 0). From this follows

$$\left.\begin{aligned} H_e = h_{0e} e^{-\gamma t}\cos(\Phi + \varphi_e),\ V_e = \frac{s h_{0e}}{\sqrt{4\pi\rho}} e^{-\gamma t}\cos(\Phi + \Phi_0 + \varphi_e),\\ \Phi = k\left[r + \sqrt{1 - \pi\rho k^2 (\nu - \nu_m)^2 / H_0^2}\,\frac{s H_0}{\sqrt{4\pi\rho}} t - \int v_0 dt\right],\\ \gamma = \frac{(\nu + \nu_m) k^2}{2},\quad \sin\Phi_0 = \frac{s\sqrt{\pi\rho}\, k (\nu - \nu_m)}{H_0}, \end{aligned}\right\} \quad (15)$$

where h_{0e}, φ_e are arbitrary real constants. (15) represents a signal of finite amplitude in a finite conducting fluid, moving at the velocity v_0 along H_0. In case of $|H_0| \gg H_*$ (where $H_* \equiv \sqrt{\pi\rho k^2 (\nu - \nu_m)^2}$) the propagation rate of the signal is approximately equal to the velocity in the ideal fluid. The authors thank Ye. F. Tkalich for discussions. Ya. I. Frenkel' (ZhTF, XIV, 97, 1944) is mentioned. There are 24 references: 18 Soviet and 6 non-Soviet. The three most important references to English-language publications read as follows: I. N. Kapur, Appl. Sci. Res., A8, 198, 1959; T. Kakutani, J. Phys. Soc. Jap., 15, 1316, 1960; W. E. Williams, J. Fluid. Mech., 8, 321, 1960.

SUBMITTED: January 9, 1961

Card 5/5

S/051/61/031/010/009/015
B109/E102

Waves of finite amplitude...

SUBMITTED: January 9, 1961

Card 6/6

S/179/62/000/002/005/012
E032/E514

24.6711

AUTHOR: Tkalich, V.S. (Sukhumi)

TITLE: Stationary motions of high-temperature plasma

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, no.2, 1962, 30-37

TEXT: This paper is concerned with the theoretical aspects of the insulating properties of a "magnetic wall". The first section formulates the equations of motion for a particle in a stationary electromagnetic field. Terms describing the interaction at small distances are neglected. The second section is concerned with a quantitative description of plasma (nonrelativistic) in a self-consistent field. The presence of cyclic coordinates is assumed and the generalized Maxwell distribution function is derived. The analysis is then specialized to the two-parametric and one-parametric stationary cases. In the final section expressions are derived which may be used to estimate the insulating efficiency of a magnetic grid. The paper is

Card 1/2

entirely theoretical, no numerical computations are reported.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Gruzinskoy SSR
(Physico-technical Institute, Academy of Sciences, Georgian SSR)

SUBMITTED: April 24, 1961

S/258/62/002/003/001/008
I006/I206

AUTHOR: Tkalich, V.S. (Sukhumi)

TITLE: The steady state problem of magnetohydrodynamics with two coordinates Chapligin transformation

PERIODICAL: Inzhenernyy zhurnal. v.2, no.3, 1962, 43-53

TEXT: The steady state problem of magnetohydrodynamics with one cyclic coordinate is considered. A cyclic coordinate is defined as a coordinate upon which pressure, entropy, velocity, magnetic field and Lamé parameters of curvilinear coordinate system are independent. The principal symmetry integrals are deduced. By a transformation analogous to Chapligin's transform, linear equations are derived for the analogs of potential and stream function.

SUBMITTED: February 5, 1961

Card 1/1

S/179/62/000/005/002/012
E032/E314

AUTHOR: Tkalich, V.S. (Sukhumi)

TITLE: On the stationary problem of magnetic hydromechanics in the two-dimensional case; colliding streams of a conducting liquid

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, no. 5, 1962, 32 - 38

TEXT: This paper is concerned with the magnetohydromechanics of a non-ideal conducting liquid. The analysis is concerned with the stationary problem in the case where there is only one "quasi-cyclic coordinate". The coordinate (x^3) is defined as "quasi-cyclic" if the magnetic field $\underline{H}$, the velocity $\underline{V}$ and the metric tensor $g_{k\ell}$ are independent of x^3 and the electric-field potential Φ and the total pressure P are linear functions of it. The analysis begins with the Gromeka-Lamb equations. The conditions for the fact that the x^3 coordinate is quasi-cyclic and the magnetic field and velocity vectors are solenoidal are then substituted into these equations, leading

Card 1/2

On the stationary problem S/179/62/000/005/002/012
E032/E314

formulae for the field and velocity components in curvilinear form in terms of the generalized current functions. It is then shown that the general partial differential equations for the system include the ideal liquid as a special case. The case where the medium is dissipative is then considered in the general form and again it is shown that classical hydrodynamics is included as a special case. A class of solutions is obtained in the case when the current functions satisfy the Helmholtz equation and an expression is obtained for the analogue of the Bernouilli equation. Next, it is assumed that the motion is almost of the potential type and expressions are derived for the lift force and its moment, which are generalizations of the Chaplygin formulae and Zhukovskiy theorem. The final section is concerned with two plane symmetric and uniform-at-infinity streams travelling in opposite directions against each other. It is assumed that they are incompressible but conducting and that there are no body forces. Under these assumptions the present theory and the results of T.S. Solomakhova (Vestn. MGU, seriya 1, Mat., mekh., 1961, no. 1) are used to obtain expressions for the complex potential for each of the streams.

SUBMITTED: May 18, 1962

Card 2/2

32694
S/040/62/026/001/011/023
D237/D304

26.1410

AUTHOR: Tkalich, V.S. (Sukhumi)

TITLE: Two-parameter motion in magneto-gas-dynamics (Gromeka and Chaplygin transformations)

PERIODICAL: Akademiya nauk SSSR. Otdeleniya tekhnicheskikh nauk. Prikladnaya matematika i mekhanika, v. 26, no. 1, 1962, 96-103

TEXT: Starting with the system of equations of ideal magnetic gas dynamics of adiabatic motion, the two-parameter stationary case in absence of electric field in the given direction is discussed. The author uses the transformations of I.S. Gromeka (Ref. 2:Sobr. soch. Izd-vo AN SSSR, 1952). To obtain the solution of equations of motion in the form of two scalar equations in two unknown scalar functions, the first equation representing the law of change of the 3rd component of velocity vortex, and the 2nd equation giving the law of energy change per unit mass are given. With the help of an additional assumption of the absence of

Card 1/3

Two-parameter motion ...

internal volume forces, the obtained solution is reduced to a canonical system which is then transformed into a linear one, by means of C.A. Chaplygin's (Ref. 15: O gazovykh strugakh (On Gaseous Streams), Gostekhizdat, 1949) transformation. Basic physical properties of Chaplygin flows so obtained are deduced. Motion in a longitudinal magnetic field is discussed together with general gas dynamical properties, and finally the motion in an arbitrarily directed magnetic field. The last is found to consist of several alternating zones of elliptic and hyperbolic flows. In particular it was found that when the flow velocity is lower than the thermal velocity, then hyperbolic flow is possible, while for the flow velocity higher than thermal, elliptic flow occurs. The author thanks I.I. Nochevkina, N.V. Saltanov, K.P. Stanyukovich, E.F. Tkalich, F.I. Frankl (deceased) and I.M. Yur'yev for useful criticisms. There are 24 references: 16 Soviet-bloc and 8 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: J.N. Kapur, Bull. Calcutta Math. Soc., 1959, no. 1, v. 51; L. Woltjer, Astrophys. J., 1959, no. 2, v. 130; R.R. Long, J. Fluid Mech. 1960, no. 1, v.7; M.Z. Krzywoblocki and J. Mutant, Acta Phys. Austriaca, 1960, no. 1, v. 13.

Card 2/3

32694
S/040/62/026/001/011/023
D237/D304

Two-parameter motion ...

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Gruzinskoy SSR
(Physico-Technical Institute AS Georgian SSR)

SUBMITTED: October 20, 1961

Card 3/3

34204
S/057/62/032/002/004/022
B104/B102

24.6714

AUTHORS: Tkalich, V. S., and Saltanov, N. V.

TITLE: Nonlinear Langmuir oscillations

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 2, 1962, 156-160

TEXT: The authors study plane, cylindrical and spherical oscillations of an electron plasma with allowance for the electric force, the pressure and frictional forces between the electrons and the surrounding ions and neutral particles. The authors proceed from the system

$$\left.\begin{aligned} &\frac{\partial v}{\partial t}+\frac{v\partial v}{\partial r}=-\frac{\partial p}{nm\partial r}-\left(\frac{e}{m}\right)E-\nu v,\\ &\frac{\partial r^k E}{r^k\partial r}=4\pi e(n_0-n),\quad \frac{\partial E}{\partial t}-4\pi env=0. \end{aligned}\right\} \qquad (1)$$

where n is the number of electrons per unit volume, n_0 = const is the

Card 1/6

Nonlinear Langmuir oscillations

number of ions per unit volume, ν is the effective collision frequency between electrons and heavy particles, k = 0, 1,2 hold for plane, cylindrical and spherical cases, respectively. Using Lagrange variables the authors obtain

$$\frac{d^2r}{dt^2}+\nu\frac{dr}{dt}+\Omega^2 r+\frac{1}{\frac{mn\partial r}{\partial r_0}}\frac{\partial p}{\partial r_0}=\frac{C(r_0)}{r^k},\quad C(r_0)=\frac{4\pi e^2}{m}\frac{\psi}{q}. \tag{5}$$

from (1) where r is the running coordinate of the volume element, $\Omega^2 = 4\pi n_o e^2/m(k+1)$, q = 1, 1π, 4π, $\psi = \psi_* + q\int_{r_*}^{r} n(r_1)r_1^k dr_1$, where ψ_* and r are arbitrary constants. The solutions of this differential equation are correct if the trajectories of the electron volume elements determined by them do not intersect each other. An intersection of th trajectories would lead to the formation of shock waves. Several examples with non-intersecting trajectories are studied. For a cold plasma (p = 0) Abel's second-order equation

Card 2/6

Nonlinear Langmuir oscillations

$$v\frac{\partial v}{\partial r}+\nu v+\Omega^2 r=\frac{C(r_0)}{r^k}. \qquad (6)$$

is obtained from (5) with the aid of the independent variables r and r_o. For k = 0 it is found that the oscillation period is independent of the amplitude, the ion density and the frictional force:

$$r=\frac{C(r_0)}{\Omega^2}+Re^{-\frac{\nu t}{2}}\cos(\omega t+\delta),\quad \omega\equiv\sqrt{\Omega^2-\frac{\nu^2}{4}}, \qquad (7)$$

$$\left.\begin{aligned} v&=-\Omega Re^{-\frac{\nu t}{2}}\sin(\omega t+\delta+\delta_0),\quad \sin\delta_0=\frac{\nu}{2\Omega},\\ E&=\frac{m\Omega^2}{e}Re^{-\frac{\nu t}{2}}\cos(\omega t+\delta),\\ n&=n(r_0)\left\{\frac{n(r_0)}{n_0}+e^{-\frac{\nu t}{2}}[R'\cos(\omega t+\delta)-R\delta'\sin(\omega t+\delta)]\right\}^{-1}, \end{aligned}\right\} \qquad (8)$$

$n(r_o)$ is the electron density distribution at t = 0. The relations

Card 3/6

Nonlinear Langmuir oscillations

between R, δ, velocity and density distributions at the time t = 0 are

$$\left.\begin{aligned} v(r_0) &= -\Omega R \sin(\delta + \delta_0), \\ n(r_0) &= n_0\left[1 - \frac{d}{dr_0}(R\cos\delta)\right]. \end{aligned}\right\} \qquad (9).$$

A sufficient condition for the non-intersection of the volume trajectories is $|dv(r_0)/\Omega\, dr_0| < 1$, i. e., the distribution of $v(r_0)$ must be sufficiently homogeneous. For $\nu = 0$ (no friction) and on the condition that the motion of the electron gas is adiabatic ($p = \sigma(r_0)n^{\gamma}$)

$$T = 2\int_{\mu\,\min}^{\mu_{\max}} \frac{d\mu}{\sqrt{2\delta_0 - \Omega^2\mu^2 + \frac{2n_*\Omega^2}{n_0}\int\frac{d\mu}{\mu^k} - 2a_*\int\frac{d\mu}{\mu^{(\gamma-1)(k+1)-1}}}}. \qquad (18)$$

is derived for the period of the motion. For k = 0 the pressure is approximated according to S. A. Chaplygin (Izbrannyye trudy po mekhanike

Card 4/6

Nonlinear Langmuir oscillations

i matematike. GITTL, M., 1954) with $p = p_0 - p_* n_0/n$, where p_0 and p_* are constants. Thus the equation of motion (5) can be written as

$$\frac{d^2r}{dt^2} + \nu\frac{dr}{dt} + \Omega^2 r - c_*^2\frac{\partial^2 r}{\partial\xi^2} = \Omega^2\xi. \qquad (21).$$

By separating the variables, particular solutions are obtained from which conditions for the non-intersection of the trajectories are derived. The larger the oscillation amplitudes, the smaller the inhomogeneity in the distribution of the physical quantities must be at the beginning in order that the various electron volume elements do not intersect during their motion. The authors thank A. G. Sitenko for his interest. There are 21 references: 18 Soviet and 3 non-Soviet. The two references to English-language publications read as follows: J. M. Dawson, Phys. Rev., 113, no. 2, 383, 1959; E. A. Jackson. Phys. of Fluids, 3, no. 5, 831, 1960.

Card 5/6

X

39802

24.2321
24.1750

S/179/62/000/003/002/015
E202/E492

AUTHOR: Tkalich, V.S. (Moscow)

TITLE: Compression of plasma cord by longitudinal magnetic field in the presence of shock wave

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, no.3, 1962, 11-14

TEXT: A situation similar to that occurring in the theta-pinch installations is discussed. The growing external longitudinal magnetic field constricts plasma with an axial magnetic field. The plasma is formed as a result of the shock wave passing through a stationary non-conducting gas in which there is also a longitudinal magnetic field. The problem is formulated using the fundamental M.H.D. equations and considering a radial motion of plasma $\bar{V} = (v,0,0)$ in a longitudinal magnetic field $\bar{H} = (0,0,H)$ in a system of cylindrical coordinates r, θ, z. If θ and z are cyclic, a system of motion with homogeneous relative deformations exists which was solved earlier by L.I.Sedov (DAN SSSR, v.90, no.5, 1953). Applying the latter solutions and taking into consideration the high degree of ionization in the

Card 1/2

vicinity of the shock wave, the author derives expressions for the various states of plasma in parametric form, introducing an auxiliary parameter ε. This treatment is followed by a detailed analysis of the motion of the shock wave relating the coordinates of the latter with the coordinates of the pinch. The work is concluded by formulating the initial and the boundary conditions from which the necessary desiderata for the shock wave to be effective are also deduced.

ASSOCIATION: Energeticheskiy institut AN SSSR
(Power Engineering Institute AS USSR)

SUBMITTED: May 8, 1961

L 15061-65 EWT(1)/EWG(k)/EPA/...

ACCESSION NR: AP4045263

5/0057/64/034/009/1588/1592

AUTHOR: Tkalich, Ya.F.; Tkalich, V.S.

TITLE: Contribution to the theory of the stationary states of a high-temperature plasma; extraction of current from a plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.9, 1964, 1588-1592

TOPIC TAGS: plasma, high temperature plasma, current carrier, stationary solutions

ABSTRACT: The stationary extraction of current from a plasma and the structure of the transition region are discussed theoretically. It is assumed that there is no magnetic field, and that the electric field is everywhere parallel to the x-axis of a Cartesian coordinate system. The plasma occupies the half-space x>0. Under these conditions the system is in a stationary state, the distribution function for the x-component of the velocity of the charged particles must be a function of $H = \alpha - mv^2/2$, where α and α are constants, m is the mass of the particle, V is the electrostatic potential, and v is the velocity. The distribution function for the current-carrying component of the plasma is assumed to have the form

$$F = f(\alpha)(\exp((H^* - H)/kT) - \exp\alpha((H^* - H)/kT)$$

1/2

L 15061-65
ACCESSION NR: AP4045268

for v negative and H > H*, and to vanish otherwise. Here α is a parameter greater than unity which is allowed to approach unity in the result, H* is a constant, and f(a) is a normalizing factor. A simple Maxwell-Boltzmann distribution is assumed for the non-current-carrying component. From this distribution function, expressions are derived for the current, density, and "temperature" (the mean square deviation of the velocity from its mean), and the dependence of the poential on x is calculated. The current is assumed to leave the plasma through a surface of potential V_0 which the non-carrying component is prevented by the potential barrier from reaching. It is found that when V_0 is sufficiently great, the current is proportional to $V_0^{3/2}$. Stationary states of the type discussed are shown to be possible provided the temperature of the extracted component is not too great. In these states the density decreases with increasing potential, and consequently with increasing velocity, and the temperature increases with increasing density, as in ordinary hydrodynamics. In conclusion, the authors express their gratitude to A.A.Plyutto and N.V.Saltanov for their participation in discussions." Orig.art.has: 24 formulas.

ASSOCIATION: none

SUBMITTED: 14Oct63 ENCL: 00

SUB CODE: ME NR REF SOV: 012 OTHER: 002

2/2

L 22536-65 EWT(1)/EWP(m)/EPA(sp)-2/EWG(v)/EWA(d)/EPR/EPA(w)-2/T-2/EWA(m)-2
Pd-1/Pe-5/P1-4/Pa-4/Pab-10 IJP(c)

ACCESSION NR: AP4038519 S/0020/64/156/003/0529/0532

AUTHOR: Saltanov, N. V.; Tkalich, V. S.

TITLE: On a nonstationary gas magnetohydrodynamics problem. An analogon of a Riemann wave

SOURCE: AN SSSR. Doklady*, v. 156, no. 3, 1964, 529-532

TOPIC TAGS: nonstationary gas magnetodynamics, relativistic gas magnetohydrodynamics, Riemann wave, Sedov equation

ABSTRACT: The authors consider the nonstationary problem of gas dynamic and of the gas magneto-hydrodynamics in two cyclic coordinates. The initial equations are transformed by means of the symmetry integrals into a system of two scalar equations, for the determination of the total pressure and the first velocity component. Transformation to the ρ, ψ, θ -variables results in an equation which is identical with the Sedov's equation (L. I. Sedov, Problems of Hydrodynamics and Aerodynamics in a Plane, M-L, 1950). By using methods developed for the

Card 1/2

L 22536-65

ACCESSION NR: AP4038519

analysis of stationary gas-dynamical problems, results are obtained for the nonstationary case. Riemann waves in a quasibarotropic medium were also studied. The method is also applicable to the analysis of nonrelativistic cases of the gas magneto-hydrodynamics. Orig. art. has: 15 equations

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko (Kiyev State University)

SUBMITTED: 27May63 ENCL: 00 SUB CODE: ME

NR REF SOV: 015 OTHER: 000

Card 2/2

TKALICH, Ye.F.; TKALICH, V.S.

Steady-state theory of a high-temperature plasma; segregating the current from a plasma. Zhur. tekh. fiz. 34 no.[illegible] 538-[illegible] 1964.
(MIR [illegible])

L 36469-66 EWP(m)/EWT(1) WW/GD

ACC NR: AT6016718 (N) SOURCE CODE: UR/0000/65/000/000/0045/0048

AUTHOR: Tkalich, V. S.

65

ORG: Institute of Hydromechanics AN UkrSSR (Institut giromekhaniki ANUkrSSR) B+1

TITLE: Continuous flow of a fluid with finite conductivity around a half body

SOURCE: AN UkrSSR Gidrodinamika bol'shikh skorostey (High speed hydrodynamics), no. 1. Kiev, Izd-vo Naukova dumka, 1965, 45-48

TOPIC TAGS: fluid flow, heat conductivity, boundary layer theory, magnetic field

ABSTRACT: The article considers the steady state problem for an incompressible nonviscous fluid of finite conductivity with a single cyclic coordinate. Using previously published results in a Cartesian system of coordinates, the author finds the following class of thin solutions:

$$\left.\begin{aligned} &\vec{H}=a\nabla\xi\times\vec{e}_3+h\vec{e}_3;\quad \vec{U}=a\nabla\xi\times\vec{e}_3+\left[u_0(\xi)+\frac{ah}{4\pi\alpha\rho}\right]\vec{e}_3\\ &\vec{E}=\frac{\delta h-aau_0'}{c\alpha}\nabla\xi+\frac{c}{4\pi\sigma}\nabla h\times\vec{e}_3;\quad 0<\alpha\\ &P=P_0-\rho F-\frac{\delta\rho(\nabla\xi)^2}{2};\quad \alpha^2=\frac{a^2}{4\pi\rho}=\delta \end{aligned}\right\} \quad (1)$$

Card 1/2

L 36469-66

ACC NR: AT6016718

The article arrives at final expressions which characterize the distribution of the magnetic field at any given point in the flow. In particular, they permit investigation of the structure of the magnetic boundary layer. Orig. art. has: 10 formulas.

SUB CODE: 20, 12/ SUBM DATE: 30Sep65/ ORIG REF: 007

Card 2/2

ACC NR: AP7005434 SOURCE CODE: UR/0382/66/000/002/0012/0016

AUTHOR: Tkalich, V. S.

ORG: none

TITLE: Subsonic flow about a profile in magnetogasdynamics

SOURCE: Magnitnaya gidrodinamika, no. 2, 1966, 12-16

TOPIC TAGS: hodograph, magnetogasdynamics

ABSTRACT: A stationary, two-coordinate magnetogasdynamic problem is investigated, and the solution is derived in the plane of the Chaplygin-Sedov hodograph. An approximation is constructed on the basis of physical and mathematical analogy and used to solve the problem of uninterrupted subsonic flow past a singly-connected profile. Relations for lift and moments, which are generalizations of the Chaplygin and Prandtl-Glauert formulas, are obtained and analyzed. The author thanks Professor G. A. Dombrovskiy for valuable advice. Orig. art. has: 4 formulas. [JPRS: 38,764]

SUB CODE: 20 / SUBM DATE: 07May65 / ORIG REF: 014 / OTH REF: 002

Card 1/1

UDC: 533.011.3:538.4

RODYAKIN, V.V.; ANDREYEV, A.Ye.; BOYKO, Yu.N.; VAYNSHTEYN, G.M.; KARGIN, V.M.; BRODSKIY, E.Ye.; KHABAROVA, N.P.; TKALICH, V.S.; Prinimali uchastiye; PIROZHOK, Ye.V.; YURCHENKO, S.Y. [deceased]; MUNTYANOV, I.P.; SUKHORUKOVA, N.Yu.; BULANAYA, N.K.; AKHTEMENKO, N.Ya.; BRAGIN, A.M.

Handling of molten metallic magnesium. TSvet. met. 37 no.12· 53-56 D '64. (MIRA 18:2)

L 15891-66 EWT(1)/EWP(m)/T-2 LIP(c) GS

ACC NR: AT6004254 SOURCE CODE: UR/0000/65/000/000/0005/0014

AUTHOR: Tkalich, V.S.

ORG: Hydromechanical Institute of the AN UkrSSR (Institut gidromekhaniki AN UkrSSR)

TITLE: The steady state problem in magnetohydrodynamics. Flow around a profile

SOURCE: AN UkrSSR. Issledovaniya po prikladnoy gidrodinamike (Research in applied hydrodynamics). Kiev, Izd-vo Naukova dumka, 1965, 5-14

TOPIC TAGS: magnetohydrodynamics, jet flow, hydrodynamics

ABSTRACT: In the steady state case the system of equations for ideal magnetohydrodynamics has the following form:

$$\left.\begin{aligned} &\operatorname{div}\vec{H}=0;\quad \operatorname{div}\vec{U}=0;\quad \vec{U}\times\vec{H}=c\nabla\Phi\\ &\nabla\mathcal{B}=\vec{U}\times\operatorname{rot}\vec{U}-\frac{1}{4\pi\rho}\vec{H}\times\operatorname{rot}\vec{H}\\ &\mathcal{B}\equiv\frac{\vec{U}^2}{2}+\frac{p}{\rho}+\Pi;\quad P\equiv p+\frac{\vec{H}^2}{8\pi};\quad \vec{E}=-\nabla\Phi \end{aligned}\right\}\qquad (1)$$

Card 1/2

where $\vec{H}$ is the magnetic field; $\vec{U}$ is the velocity; ρ is the density; p is the hydrodynamic pressure; P is the total pressure; Φ is the potential electric field; F is the potential of the external forces; and, ε is the hydrodynamic energy per unit volume. The problem is developed mathematically in a system of curvilinear coordinates. In the case of flow around a thin slightly curved profile, the following final expressions are obtained for the lifting force Q and its moment,

$$Q=2i\delta\rho a w^2 e^{i\theta}\left[\pi\theta+\int_{-a}^{a}\frac{F(\zeta)\,d\zeta}{(a-\zeta)\sqrt{a^2-\zeta^2}}\right];$$

$$M=-\delta\rho w^2\left[\pi\theta a^2-2\int_{-a}^{a}\frac{F(\zeta)\zeta\,d\zeta}{\sqrt{a^2-\zeta^2}}\right].$$

In these expressions, the positive constant w and the angle of attack, θ, characterize the complex potential of the unperturbed flow. These expressions differ from the analogous expressions in classical hydrodynamics in that the multiplier $\delta = \pm 1$; in addition, the quantity w has a different physical sense. Orig. art. has: 19 formulas.

SUB CODE: 20/ SUBM DATE: 26Aug65/ ORIG REF: 016/ SOV REF: 000 OTH REF: 000

Card 2/2

L 15656-66 EWT(1)/EWP(m)/T-2 IJP(c)
ACC NR: AP6003200 SOURCE CODE: UR/0382/65/000/004/0035/0040

AUTHOR: Saltanov, N. V.; Tkalich, V. S.

ORG: none

TITLE: A nonstationary, one-dimensional problem in magnetogasdynamics. Riemann waves

SOURCE: Magnitnaya gidrodinamika, no. 4, 1965, 35-40

TOPIC TAGS: magnetogasdynamics, Riemann wave, relativistic plasma

ABSTRACT: Introducing appropriate transformations, the relativistic equations of motion and continuity and equation of induction are rewritten to coincide with Sedov's equations in Rudnev's form, with accuracy up to the symbols. This permits use of known stationary solutions in the analysis of nonstationary problems and vice versa. Conditions for linearizing the problem are also indicated. In the process of linearizing the problem, the Riemann waves are obtained. By imposing further restrictions on the physical variables the problem is reduced to a nonrelativistic case which emphasizes the two extreme cases of very long and very short wave. Orig. art. has: 25 formulas.

SUB CODE: 20/ SUBM DATE: 25Dec64/ ORIG REF: 008/ OTH REF: 000

Card 1/1 UDC: 533.95 : 538.3

ANDREYEV, A.Ye.; RODYAKIN, V.V.; VAYNSHTEYN, G.M.; KARGIN, V.M.; BRODSKIY, E.Ye.; BOYKO, Yu.N.; TKALICH, V.S.; KHABAROVA, N.P.

Changes in the quality of magnesium during the refining process. TSvet. met. 37 no.10:44-47 O '64. (MIRA 18:7)

L 59208-65 EPF(n)-2/EPA(w)-2/EWP(1)/EWG(m) Pi-4/Po-4/Pz-6 IJP(c) AT/WW

ACCESSION NR: AR5017535 UR/0058/65/000/006/G012/G012

SOURCE: Ref. zh. Fizika, Abs. 6G30 37 B

AUTHORS: Tkalich, Ye. F.; Tkalich, V. S.

TITLE: The stationary symmetrical multicomponent plasma problem 21

CITED SOURCE: Dokl. 3-y Sibirsk. konferentsii po matem. i mekhan., 1964, Tomsk, Tomskiy un-t, 1964, 354-355

TOPIC TAGS: multicomponent plasma, kinetic equation, Maxwell distribution, plasma temperature, plasma density

TRANSLATION: A system of collisionless kinetic equations is introduced, describing a multicomponent plasma. The solution of these equations, in the particular case of one cyclic coordinate, is represented in the form of a formal generalization of Maxwell's distribution. The obtained distribution is used in the calculation of the density, macroscopic velocity, and the temperature. Yu. Ivanov.

SUB CODE: ME ENCL: 00

Card 1/1

L 3975' 65 EWG(j)/EWT(m)/EPF(c)/EWP(t)/EPF(n)-2/EPR/EWP(b) Pr-4/Ps-4/Pu-4
IJP(c) JD

ACCESSION NR: AP4047423 S/0136/64/000/010/0045/0047

AUTHORS: Andreyev, A.Ye.; Rodyakin, V.V.; Vaynshteyn, G.M.; Kargin, V.M.; Brodskiy, E.Ye.; Boyko, Yu.N.; Tkalich, V.S.; Khabarova, N. P.

TITLE: Changes in magnesium quality during the refining process

SOURCE: Tsvetny*ye metally*, no. 10, 1964, 45-47

TOPIC TAGS: nitrogen, oxygen, chlorine, impurity, magnesium, flux refinement, recovery, transport

ABSTRACT: The method of oxygen and nitrogen control in magnesium was used to assess the effectivity of removing admixtures. Flux refining was employed and specimens taken from two cells of each electrolyzer as well as before and after refining and 15 to 20 min settling. The quality of refined Mg did not differ substantially from that of the crude ore. The amounts of Fe in Mg changed negligibility and the higher content in the crude product was attributed to the drastic temperature drop that accompanies the transport of the metal to the refining furnaces. Neither did chlorine undergo any major changes and the proposed process did not affect the quality

Card 1/2

L 39755-65
ACCESSION NR: AP4047423

of the metal with respect to chlorine. Thus, the authors were able to retain the original level of oxygen and nitrogen in Mg by combining the proper temperature conditions with flux refining and settling time. The combined refining process is recommended until the transport of crude Mg is improved at which time it will become possible to use crude Mg as a reducing agent. Orig. art. has: 1 table and 1 figure.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NR REF SOV: 006 OTHER: 002

Card 2/2

L 59208-65 EPF(n)-2/EPA(w)-2/EWT(1)/EWG(m) Pi-4/Po-4/Pz-6 IJP(c) AT/WW

ACCESSION NR: AR5017535 UR/0058/65/000/006/G012/G012

37
B

SOURCE: Ref. zh. Fizika, Abs. 6G90

AUTHORS: Tkalich, Ye. F.; Tkalich, V. S.

21

TITLE: The stationary symmetrical multicomponent plasma problem

CITED SOURCE: Dokl. 3-y Sibirsk. konferentsii po matem. i mekhan., 1964, Tomsk, Tomskiy un-t, 1964, 354-355

TOPIC TAGS: multicomponent plasma, kinetic equation, Maxwell distribution, plasma temperature, plasma density

TRANSLATION: A system of collisionless kinetic equations is introduced, describing a multicomponent plasma. The solution of these equations, in the particular case of one cyclic coordinate, is represented in the form of a formal generalization of Maxwell's distribution. The obtained distribution is used in the calculation of the density, macroscopic velocity, and the temperature. Yu. Ivanov.

SUB CODE: ME ENCL: 00

Card 1/1

SALTANOV, N.V.; TKALICH, V.S.

Nonsteady-state magneto-gas dynamic problem. Dokl. AN SSSR 156 no. 3:529-532 '64. (MIRA 17:5)

1. Kiyevskiy gosudarstvennyy universitet im. T.G.Shevchenko. Predstavleno akademikom L.I.Sedovym.

TKALICH, Ye.F.; TKALICH, V.S.

Contribution to the theory of stationary states of a high-temperature plasma; a plasmoid with a longitudinal magnetic field. Zhur. tekh. fiz. 33 no.7:815-819 Jl '63. (MIRA 16:9)
(Plasma (Ionized gases)) (Magnetic fields)

TKALICH,V.S.;TKALICH,YE.F. (Sukhumi)

"On steadystate symmetric problem of high-temperature plasma"

Report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow 29 Jan - 5 Feb 64.

SALTANOV, N.V.; TKALICH, V.S. (Sukhumi)

"On the unsteady problem of magnetogasdynamics; an analogue of L.I. Sedov's hodograph method; Riemann waves"

Report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow 29 Jan - 5 Feb 64.

L 18362-63 EPR/EPA(b)/EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(w)-2 AFFTC/ASD/ESD-3/AFWL/IJP(C)/SSD Pb-4/Pd-4/Pz-4/Pi-4/Po-4/Pab-4

ACCESSION NR: AP3003950 AT/WW S/0057/63/033/007/0815/0819

92

AUTHOR: Tkalich, Ye.F.; Tkalich, V.S.

TITLE: Theory of the stationary states of a high temperature plasma; a plasmoid with a longitudinal magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v.33, no.7, 1963, 815-819

TOPIC TAGS: high-temperature plasma, plasmoid , plasma tube

ABSTRACT: The purpose of the present paper was to develop a general method for treating steady motions of plasmas when a simplifying symmetry is involved. The plasma is described by the kinetic equation without collision terms. This is written for an N component plasma in tensor form in general curvilinear coordinates. Maxwell's equations and the kinetic equation are specialized to the case of steady motion and the presence of one cyclic coordinate (one coordinate on which the quantities of interest do not depend). The distribution function then depends only on the Hamiltonian and the cyclic momentum. The logarithm of the distribution function is expanded in a power series in the Hamiltonian and the cyclic momentum, and only the linear terms are retained. The resulting distribution function is further simplified by the assumption (which occasions no loss of generality) that the two

Card 1/2

L 18362-63
ACCESSION NR: AP3003950

non-cyclic coordinates are mutually orthogonal. The distribution function so obtained is said to enable one to estimate the rate at which particles leak through a barrier as a result of long range collisions (electromagnetic interactions), but the calculation is not given. The above derivation is repeated for the case in which two coordinates are cyclic. The special case of cylindrical coordinates in which the non-cyclic coordinate is the radius is discussed in some detail, with terms quadratic in the momenta retained in the expansion of the logarithm of the distribution function. The resulting equations for a two component plasma are approximately integrated on the assumption that the ion temperature is sufficiently low so that the space charge can be regarded as neutralized. Depending on the value assigned to a constant of integration, the resulting solution can represent a plasma filament or a plasma tube. In the case of a thin-walled tube, the density distribution across the wall is approximately Gaussian, and the wall thickness must exceed the electron Larmor radius. Orig.art.has: 35 formulas.

ASSOCIATION: none

SUBMITTED: 15Feb62	DATE ACQ: 07Aug63	ENCL: 00
SUB CODE: PH MM	NO REF SOV: 006	OTHER: 005

Card 2/2

3c

L 21201-65 EPA(s)-2/EWT(m)/EPF(n)-2/EPR/EWP(t)/EPA(bb)-2/EWP(b) Ps-4/
Pad/Pt-10/Pu-4 IJP(c) JD/WW/HW/JG S/0136/64/000/012/0053/0056
ACCESSION NR: AP5000940

AUTHOR: Rodyakin, V.V., Andreyev, A. Ya., Boyko, Yu.N., Vaynshteyn, G.M., Kargin, V.M., Brodskiy, E.Ye., Khabarova, N.P., Tkalich, V.S.

TITLE: Transportation of liquid metallic magnesium

SOURCE: Tsvetnyye metally, no. 12, 1964, 53-56

TOPIC TAGS: liquid magnesium, liquid magnesium transport, titanium production, magnesium contamination, vacuum ladle, nickel impurity

ABSTRACT: A special vacuum ladle was designed for the transportation of liquid magnesium which protects against reaction with nitrogen and oxygen and contamination by inclusions. The metal was sampled from the electrolytic cells, from the vacuum ladle and from the reactor, which is the route the magnesium followed, and the content of O, N, Cl, Fe, Si and Ni was determined in these samples. The content of all impurities except nickel dropped during the intake and transportation of the magnesium. The quality of the magnesium deteriorated when charged into the reactor, the nitrogen and oxygen contents in the samples having increased owing to poor air-tightness of the charging unit. The content of chlorine also increased. The magnesium was contaminated with nonmetallic

Card 1/2

L 21201-65
ACCESSION NR: AP5000940

inclusions mainly during the operations of sampling from the electrolytic cells and when pouring into the reducing reactors; the content of metallic impurities remained unchanged. To improve the sampling methods, and thus avoid contamination, further studies are to be directed toward excluding contact of the magnesium with the air, creation of a shielding atmosphere, and reduction of the number of operations associated with pouring the liquid magnesium from vessel to vessel. "Ye. V. Pirozhok, S.V. Yurchenko (deceased), I.P. Muntyanov, N. Yu. Sukhorukova, N.K. Bulanaya, N. Ya. Akhtemenko and A.M. Bragin also took part in the work." Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 01 SUB CODE: MM, IE

NO REF SOV: 001 OTHER: 000

Card 2/3

ACCESSION NR: AR5017535 UR/0058/65/000/006/G012/G012

37
B

SOURCE: Ref. zh. Fizika, Abs. 6G90

AUTHORS: Tkalich, Ye. F.; Tkalich, V. S. 21

TITLE: The stationary symmetrical multicomponent plasma problem

CITED SOURCE: Dokl. 3-y Sibirsk. konferentsii po matem. i mekhan., 1964, Tomsk, Tomskiy un-t, 1964, 354-355

TOPIC TAGS: multicomponent plasma, kinetic equation, Maxwell distribution, plasma temperature, plasma density

TRANSLATION: A system of collisionless kinetic equations is introduced, describing a multicomponent plasma. The solution of these equations, in the particular case of one cyclic coordinate, is represented in the form of a formal generalization of Maxwell's distribution. The obtained distribution is used in the calculation of the density, macroscopic velocity, and the temperature. Yu. Ivanov.

SUB CODE: ME ENCL: 00

Card 1/1

L 18362-63 EPR/EPA(b)/EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(w)-2 AFFTC/ASD/ESD-3/AFWL/LJP(C)/SSD Ps-4/Pd-4/Pz-4/Pi-4/Po-4/Pab-4

ACCESSION NR: AP3003950 AT/WW S/0057/63/033/007/0815/0819

92

AUTHOR: Tkalich, Yo.F.; Tkalich, V.S.

TITLE: Theory of the stationary states of a high temperature plasma; a plasmoid with a longitudinal magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v.33, no.7, 1963, 815-819

TOPIC TAGS: high-temperature plasma, plasmoid , plasma tube

ABSTRACT: The purpose of the present paper was to develop a general method for treating steady motions of plasmas when a simplifying symmetry is involved. The plasma is described by the kinetic equation without collision terms. This is written for an N component plasma in tensor form in general curvilinear coordinates. Maxwell's equations and the kinetic equation are specialized to the case of steady motion and the presence of one cyclic coordinate (one coordinate on which the quantities of interest do not depend). The distribution function then depends only on the Hamiltonian and the cyclic momentum. The logarithm of the distribution function is expanded in a power series in the Hamiltonian and the cyclic momentum, and only the linear terms are retained. The resulting distribution function is further simplified by the assumption (which occasions no loss of generality) that the two

Card 1/2

L 18362-63
ACCESSION NR: AP3003950

non-cyclic coordinates are mutually orthogonal. The distribution function so obtained is said to enable one to estimate the rate at which particles leak through a barrier as a result of long range collisions (electromagnetic interactions), but the calculation is not given. The above derivation is repeated for the case in which two coordinates are cyclic. The special case of cylindrical coordinates in which the non-cyclic coordinate is the radius is discussed in some detail, with terms quadratic in the momenta retained in the expansion of the logarithm of the distribution function. The resulting equations for a two component plasma are approximately integrated on the assumption that the ion temperature is sufficiently low so that the space charge can be regarded as neutralized. Depending on the value assigned to a constant of integration, the resulting solution can represent a plasma filament or a plasma tube. In the case of a thin-walled tube, the density distribution across the wall is approximately Gaussian, and the wall thickness must exceed the electron Larmor radius. Orig.art.has: 35 formulas.

ASSOCIATION: none

SUBMITTED: 15Feb62	DATE ACQ: 07Aug63	ENCL: 00
SUB CODE: PH MM	NO REF SOV: 006	OTHER: 005

Card 2/2

TKALICH, Ye.F.; TKALICH, V.S.

Contribution to the theory of stationary states of a high-temperature plasma; a plasmoid with a longitudinal magnetic field. Zhur. tekh. fiz. 33 no.7:815-819 Jl '63. (MIRA 16:9)
(Plasma (Ionized gases)) (Magnetic fields)

ACCESSION NR: AR5017535

UR/0058/65/000/006/

37
13

SOURCE: Ref. zh. Fizika, Abs. 6G90

AUTHORS: Tkalich, Ye. F.; Tkalich, V. S.

21

TITLE: The stationary symmetrical multicomponent plasma problem

CITED SOURCE: Dokl. 3-y Sibirsk. konferentsii po matem. i mekhan., 1964, Tomsk, Tomskiy un-t, 1964, 354-355

TOPIC TAGS: multicomponent plasma, kinetic equation, Maxwell distribution, plasma temperature, plasma density

TRANSLATION: A system of collisionless kinetic equations is introduced, describing a multicomponent plasma. The solution of these equations, in the particular case of one cyclic coordinate, is represented in the form of a formal generalization of Maxwell's distribution. The obtained distribution is used in the calculation of the density, macroscopic velocity, and the temperature. Yu. Ivanov.

SUB CODE: ME ENCL: 00

Card mb 1/1

AUTHOR: [illegible]

ABSTRACT: The stationary extraction of current from a plasma and the structure of the magnetic regime are discussed theoretically. It is assumed that there is no magnetic field, and that the electric field is everywhere parallel to the x-axis of a Cartesian coordinate system and is a function only of x. Under these conditions and provided the system is in a steady state, the distribution function for the x-component of the velocity of the charged particles must be a function of H = eV +

for v negative and H > H*, and to vanish otherwise. Here a is a parameter greater than unity which is allowed to approach unity in the result, H* is a constant, and f(a) is a normalizing factor. A simple Maxwell-Boltzmann distribution is assumed

which the non-carrying component is prevented by the potential barrier from reach-

the temperature of the extracted component is not too great. In these states the

TKALICH,V.S.; TKALICH,YE.F. (Sukhumi)

" On steadystate symmetric problem of high-temperature

Report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow 29 Jan - 5 Feb 64.

VASIL'YEV, A.A.; TKALIN, I.M.; SHTEYNSHNAYDER, M.B.

Line assembly of the movable parts of electric meters. Priborostroenie no.4:21-23 Ap '63. (MIRA 16:4)
(Assembly-line methods)

TKALIN, Ivan Mikhaylovich; PETROV, V.A., retsenzent; SHTEYNSHNAYDER, M.B., inzh., nauchn. red.; ALEKSEYEVA, Ye.A., red.

[Assembly-line production of electrical instruments] Potochnoe proizvodstvo elektricheskikh priborov. Moskva, Energiia, 1965. 343 p. (MIRA 18:7)

1. Zavod "Vibrator", Leningrad (for Shteynshmayder).

SEREBRENITSKIY, Pavel Pavlovich; CHEKHOV, Vladimir Nikolayevich; TKALIN, I.M., nauchn. red.

[Mechanization and automation of winding operations in the manufacture of electrical instruments] Mekhanizatsiia i avtomatizatsiia namotochnykh rabot v elektropriborostroenii. Moskva, Energiia, 1965. 140 p. (MIRA 18:10)

TKALYA, A.

Issuing wages to fattening centers attached to sugar plants. Den. i kred. 21 no.9:73-74 S '63. (MIRA 16:10)

1. Starshiy ekonomist Cherkasskoy oblastnoy kontory Gosbanka.

VERFEL, Jaroslav, inz.; TKANY, Zdenek, doc. inz. dr. CSc.

Sinking of uncased ditches at the Nechranice Waterworks.
Inz stavby 12 no. 2: 54-62 F '64.

1. Geologicky pruzkum, n.p., Brno.

TKANY, Zdenek, dr., inz., C.Sc.

Percussion drilling of deep boreholes. Rudy 11 no.4:110-116 Ap '63.

1. Geologicky pruzkum, n.p., Brno.

TKANY, Zdenek, dr. inz., nositel cestneho odznaku "Nejlepsi pracovnik geologicke sluzby"

Technology of boring by diamond bits. Geol pruzkum 5 no.9: 262-265 S '63.

1. Geologicky pruzkum, n.p., Brno.

TKANY, Zdenek, doc. dr. inz. kandidat technickych ved

Work of the bit in percussion boring. Geol pruzkum 6 no.11: 325-327 N '64.

1. Higher School of Technology, Brno.

JEDLICKA, Miroslav, inz.; TKANY, Zdenek, doc. inz. dr. CSc.

Stabilizing sliding slopes by draining them by horizontal boreholes. Inz stavby 13 no.3:107-113 Mr '65.

1. Geologicky pruzkum National Enterprise, Brno (for Jedlicka)
2. Higher School of Technology, Brno (for Tkany).

TKASH, M.; SAMSONOV, V.; BORODʹKO, I. (Vorkuta, Komi ASSR); LOGACHEV, A. (Lipetsk)

From the editor's mail. Sov. profsoiuzy 19 no.15:22 Ag '63. (MIRA 16:8)

1. Neshtatnyy instruktor gorodskogo komiteta Kommunisticheskoy partii Ukrainy, Krivoy Rog, Dnepropetrovskoy obl. (for Tkach).
2. Predsedatelʹ rabochego komiteta lesopromyshlennogo khozyaystva "Glavleskhoza", Maykop, Krasnodarskogo kraya (for Samsonov).
3. Neshtatnyye korrespondenty zhurnala "Sovetskiye profsoyuzy" (for Borodʹko, Logachev).

(Socialist competition)

L 1996-66 EWT(m)/EWA(h)

ACCESSION NR: AP5020263 UR/0367/65/002/001/0124/0130 39 30B

AUTHOR: Meshcheryakov, V. A.; Nemenov, L. L.; Solov'yev, L. D.; Strokach, P.; Tkebuchava, F. G. 44,55

TITLE: Mechanism of emission of hard γ quanta in the reaction π + n → π + γ + N 19,44,55

SOURCE: Yadernaya fizika, v. 2, no. 1, 1965, 124-130

TOPIC TAGS: photon emission, pion proton interaction, nuclear interaction, pion pion interaction

ABSTRACT: The authors analyze the mechanism of hard-photon emission when pions interact with nucleons. The contributions of different Feynman diagrams to the cross section of this process are first analyzed, and it is shown by comparison with experimental data that various contributions and interferences of the high-order diagrams can be neglected. From the experimental data on the reaction $\pi^- + p \to \pi^- + \gamma + p$ the authors determine the interaction constant for the reaction $\gamma + \pi \to \pi + \pi$, and find it to be equal to $C^2 = 0.9 \pm 0.5$. Only the single-meson diagrams are taken into account, and the contribution of diagrams with rescattering are neglected. Diagrams in which γ quanta are emitted by nucleons are likewise neglected. The solution of the dispersion equation for the amplitude of the process in question is obtained in this paper as a function of only a single constant,

Card 1/2

L 1996-66
ACCESSION NR: AP5020263

9

which facilitates the analysis of experimental data, inasmuch as they are too scanty for the determination of two constants. "The authors thank B. M. Pontecorvo for interest in the work and L. I. Lapidus for valuable hints." Orig. art. has: 3 figures and 22 formulas.

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

SUBMITTED: 04Dec64 ENCL: 00 SUB CODE: NP

NR REF SOV: 005 OTHER: 005

Card 2/2 DP

NEDOLIVKO, L.F.; TKEBUCHAVA, G.I.

Case of osteopoecilia. Vest. rent. i rad. 36 no. 2:68 Mr-Ap '61.
(MIRA 14:4)

(BONES—DISEASES)

TKEBUCHAVA, G.I.

Leiomyoma of the esophagus. Vest.khir. 82 no.2:89-91 F '59. (MIRA 12:2)

1. Iz khirurgicheskoy kliniki usovershenstvovaniya vrachey (nach.-prof. P.A. Kupriyanov) Voyenno-meditsinskoy ordena Lenina akademii imeni S.M. Kirova. Adres avtora: Leningrad, pr. K. Marksa, d. 7/8, khirurgicheskaya klinika usovershenstvovaniya vrachey Voyenno-meditsinskoy akademii ordena Lenina im. S.M. Kirova.

(ESOPHAGUS, neoplasms
leiomyoma (Rus))
(LEIOMYOMA, case reports
esophagus (Rus))

TKEBUCHAVA, G.I.

Perforation of the wall of the cecum by Ascaris. Vest. khir. 84 no. 2:125-126 F '60. (MIRA 14:1)
(ASCARIDS AND ASCARIASIS) (CECUM—DISEASES)

TKELSHELASHVILI, N.D.

On the first Soviet electric locomotive. Elek. i tepl. tiaga no.11: 22 N '57. (MLRA 10:11)

1. Mashinist-instruktor depo Khashuri Zakavkazskoy dorogi.
(Electric locomotives)

TKEMALADZE, L.A. [deceased]

Precast reinforced concrete double-curvature shells for roofs of medium size. Trudy nauch. korr. Inst. stroi. dela AN Gruz. SSR. no.2:121-124 '58. (MIRA 12:7)
(Roofs, Shell)

TKEMALADZE, L.M.

Effect of an altrahigh-frequency field on certain liver functions in experimental hepatitis. Vop.kur.fizioter. i lech.fiz.kul't. 23 no.3:268-269 My-Je '58 (MIRA 11:7)
(LIVER)
(ELECTRICITY--PHYSIOLOGICAL EFFECT)

TKEMALADZE, L. M.

TKEMALADZE, L. M. -- "The Effect of an Ultra-High-Frequency Electrical Field on Certain Functions of the Liver in Experimental Hepatitis." Georgian State Publishing House for Medical Literature. Tbilisi State Medical Inst. Tbilisi, 1955. (Dissertation for the Degree of Candidate in Medical Sciences).

So.: Knizhnaya Letopis', No. 2, 1956.

ANANIASHVILI, G.D.; TKEMALADZE, M., red.

[Fundamental principles of bioenergetics] Osnovnye polozheniia bioenergetiki. Tbilisi, Gos. izd-vo "Sabchota Sakartvelo," 1961. 124 p. (MIRA 14:11)

(Bioenergetics)

TKEMALADZE, N.M., prof.; APRIDONIDZE, L.I., gornyy inzh.

Performance of the K-52m cutter-loader on an inclined coal seam. (MIRA 18:2)
Ugol' 39 no.11:38 N '64.

TKEMALADZE, Nikolay Markozovich

[Principles of the theory and calculations of mine transportation equipment] [Osnovy teorii i raschety rudnichnykh transportnykh ustanovok. Tbilisi, Gos.izd-vo "TSodna"] Pt.1. 1963. 333 p. [In Georgian]

TKEMALADZE, N. M.

May 48

USSR/Minerals
Coal
Mining Methods

"A Fast Method of Excavating the Main Drifts of the 'Yugo-Vostochnaya' Mine in Tkibul," N. M. Tkemaladze, Engr, 2 pp

"Ugol'" No 5 (266)

Subject mines are being worked through two main galleries. Describes dimensions of two drifts and shows how they have aided in the exploitation of this mine.

1/49T76

FDB

MSHVENIYERADZE, D.M.; TOGONIDZE, V.R.; KVACHADZE, D.Ye.; SHENGELIYA, L.T.; DZHAPARIDZE, N.N.; CHKHEIDZE, V.V.; SACHALELI, I.A.; TKEMALADZE, R.K.

Results of studying the compaction of loess by heavy tampers in the city of Rustavi. Trudy GPI [Gruz.] no.1:139-144 '63. (MIRA 18:2)

TKEMALADZE, Sh.G.

Cancer of the larynx in a 15-year-old girl. Vest.otorin. 20 no.2:125 Mr-Ap '58. (MIRA 12:11)

1. Iz kliniki bolezney ukha, gorla i nosa (zav. - prof.S.N. Khechinashvili) Tbilisskogo instituta usovershenstvovaniya vrachey.

(LARYNX--CANCER)

TKEMALADZE, Sh.G., ordinator

Experimental study of the wound healing process following laryngectomy. Vest. otorin. 22 no.1:55-59 Ja-F '60. (MIRA 14:5)

1. Iz kafedry bolezney ukha, gorla i nosa (zav. - prof. S.N. Khechinashvili) Tbilisskogo gosudarstvennogo instituta usovershenstvovaniya vrachey i kafedry topograficheskoy anatomii i operativnoy khirurgii (zav. - prof. Sh.S.Toidze) Tbillisskogo meditsinskogo instituta.

(LARYNX—SURGERY)

KHECHINASHVILI, S.N.; TOIDZE, Sh.S.; TKEMALADZE, Sh.G.

Technic of stuture of pharyngeal defect in total laryngectomy. Vest. oto-rin. 18 no.3:49-51 My-Je '56. (MLRA 9:8)

1. Iz kliniki bolezney ukha, gorla i nosa (zav. - prof. S.N. Khechinashvili) i kafedry topograficheskoyanatomii i operativnoy khirurgii (zav. - prof. Sh.S.Toidze) Tbilisskogo gosudarstvennogo instituta usovershenstvovaniya vrachey.
(LARYNX, surgery,
excis., total, pharyngeal suture (Rus))

TKEMALADZE, Sh. G., Cand. Medic. Sci. (diss) "On Question of Healing of Wounds After Complete Removal of Larynx, (Experimental and Clinical Observations," Tbilisi, 1961, 26 pp. (Tbilisi Med. Inst.) 160 copies (KL Supp 12-61, 289).

GEGESHIDZE, G.A.; TKESHELASHVILI, G.K., red.; NATISHVILI, A.G., red.izd-va; GIORGADZE, O.N., red.izd-va; TODUA, A.R., tekhn.red.

[Continuous and automatic lines in some enterprises of the electric machinery industry in Georgia] Potochnye i avtomaticheskie linii na nekotorykh predpriiatiiakh elektromashinostroitel'noi promyshlennosti Gruzinskoi SSR. Tbilisi, Izd-vo Akad. nauk Gruzinskoi SSR, 1960. 162 p. (MIRA 15:5)
(Georgia--Electric machinery) (Automation)

TKESHELASHVILI, G.K., kand.tekhn.nauk, dotsent

Concept of total power in a nonsymmetrical multiphase current network. Izv. vys. ucheb. zav.; energ. 6 no.8:33-38 Ag '63. (MIRA 16:9)

1. Gruzinskiy politekhnicheskiy institut imeni V.I.Lenina. Predstavlena kafedroy elektricheskikh stantsiy, setey i sistem.
(Electric networks)

TSKHILAKHVILI, K. V.

"The Treatment of Certain Dermatoses with Mineral Waters."

Vestnik vererologii i dermatologii (Bulletin of Venerology Dermatology), No 1, January-Feberuary 1954 (Biomper), Moscow.

8(0)

SOV/112-59-2-2777

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 2, p 72 (USSR)

AUTHOR: Tkeshelashvili, G. K.

TITLE: Computing the Stream Distribution by Successive Approximation Method (K raschetu potokoraspredeleniya metodom posledovatel'nykh priblizheniy)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Energetika, 1958, Nr 1, pp 25-29

ABSTRACT: A modification of the successive approximation method is presented suitable for determining the stream distribution in a complicated closed circuit neglecting losses. To reduce the number of corrections and to quicken convergence of the problem solution, a set of equations is considered that ties the numerical values of corrections in various meshes. In a practical application of the method, the calculations can be restricted to the third correction. A numerical example is offered.

A.A.K.

Card 1/1

ACC NR: AP7008868 SOURCE CODE: UR/0105/66/000/008/0095/0095

AUTHOR: Abelishvili, L. G.; Al'tgauzen, A. P.; Baychor, M. Yu.; Gabashvili, N. V.; Dididze, M. S.; Yefroymovich, Yu. Ye.; Kotiya, A. K.; Kupradze, G. D.; Kurdiani, I. S.; Natushil, A. V.; Nikol'skiy, L. Ye.; Razmadze, Sh. M.; Svenchanskiy, A. D.; Smelyanskiy, M. Ya.; Tkesheleshvili, G. K.

ORG: none

TITLE: Professor Grigoriy Artemyevich Sisoyan (on his 70th birthday)

SOURCE: Elektrichestvo, no. 8, 1966, 95

TOPIC TAGS: electric engineering personnel, electric furnace, academic personnel

SUB CODE: 09

ABSTRACT: G. A. Sisoyan graduated from the Moscow Power Engineering Institute in 1931. In 1932 he went to work at the Georgian Polytechnical Institute in the theoretical and general electrical engineering department. Sisoyan has worked and published many works in the area of electric furnaces. He has also worked in the area of investigation of electric spark action. He has published over 50 scientific works. He has also been active in university level teaching. Orig. art. has: 1 figure. [JPRS: 38,330]

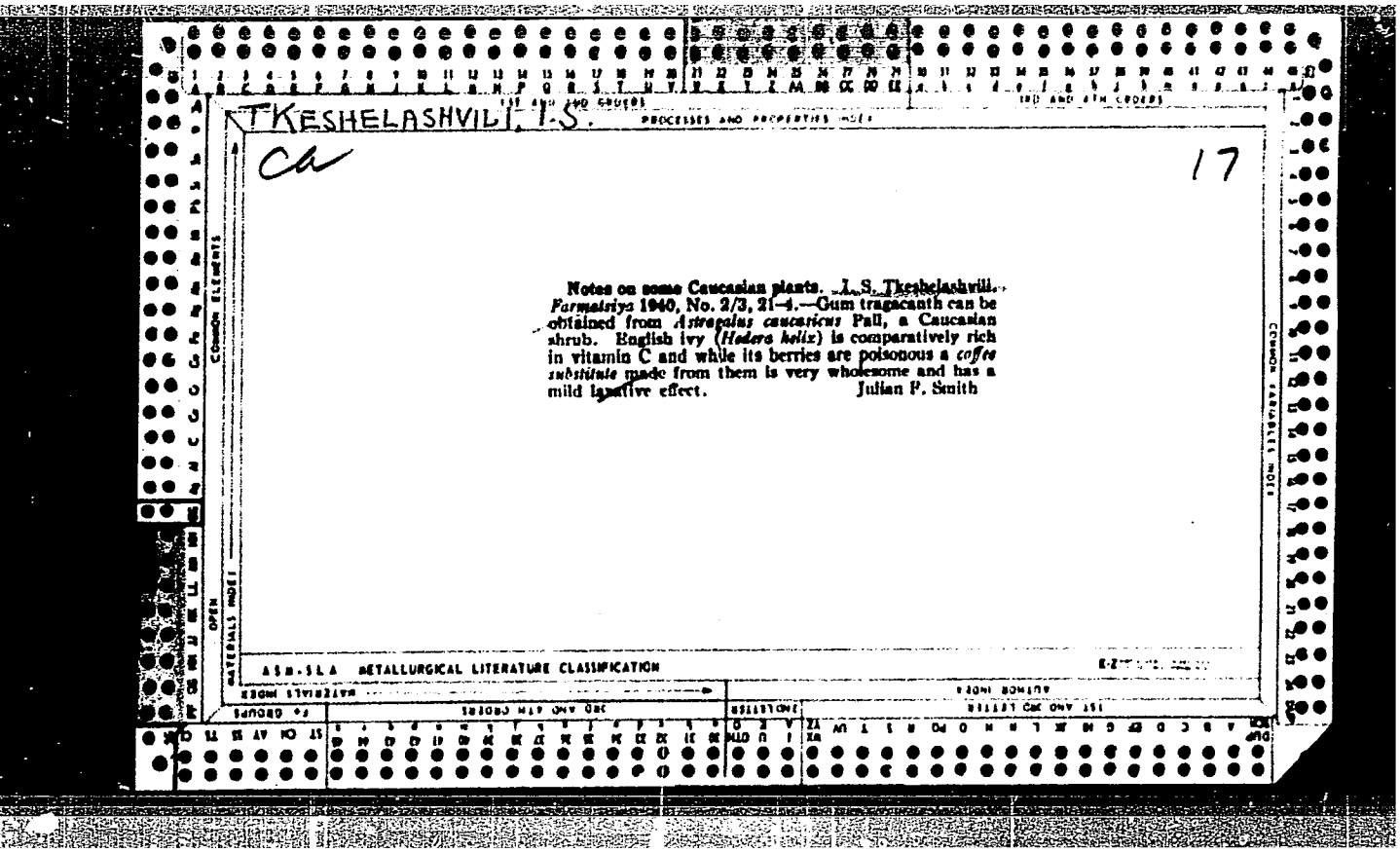
UDC: 621.36

Card 1/1

TKESHELASHVILI, G.K., kand. tekhn. nauk

Calculation of current distribution by means of consecutive approximations. Izv. vys. uchob. zav.; energ. no. 1:25-29 Ja'58. (MIRA 11:7)

1. Gruzinskiy ordena Trudovogo Krasnogo Znameni politekhnicheskiy institut im. S.M.Kirova.
(Electric networks)



TKESHELASHVILI, I. S.

Ca

17

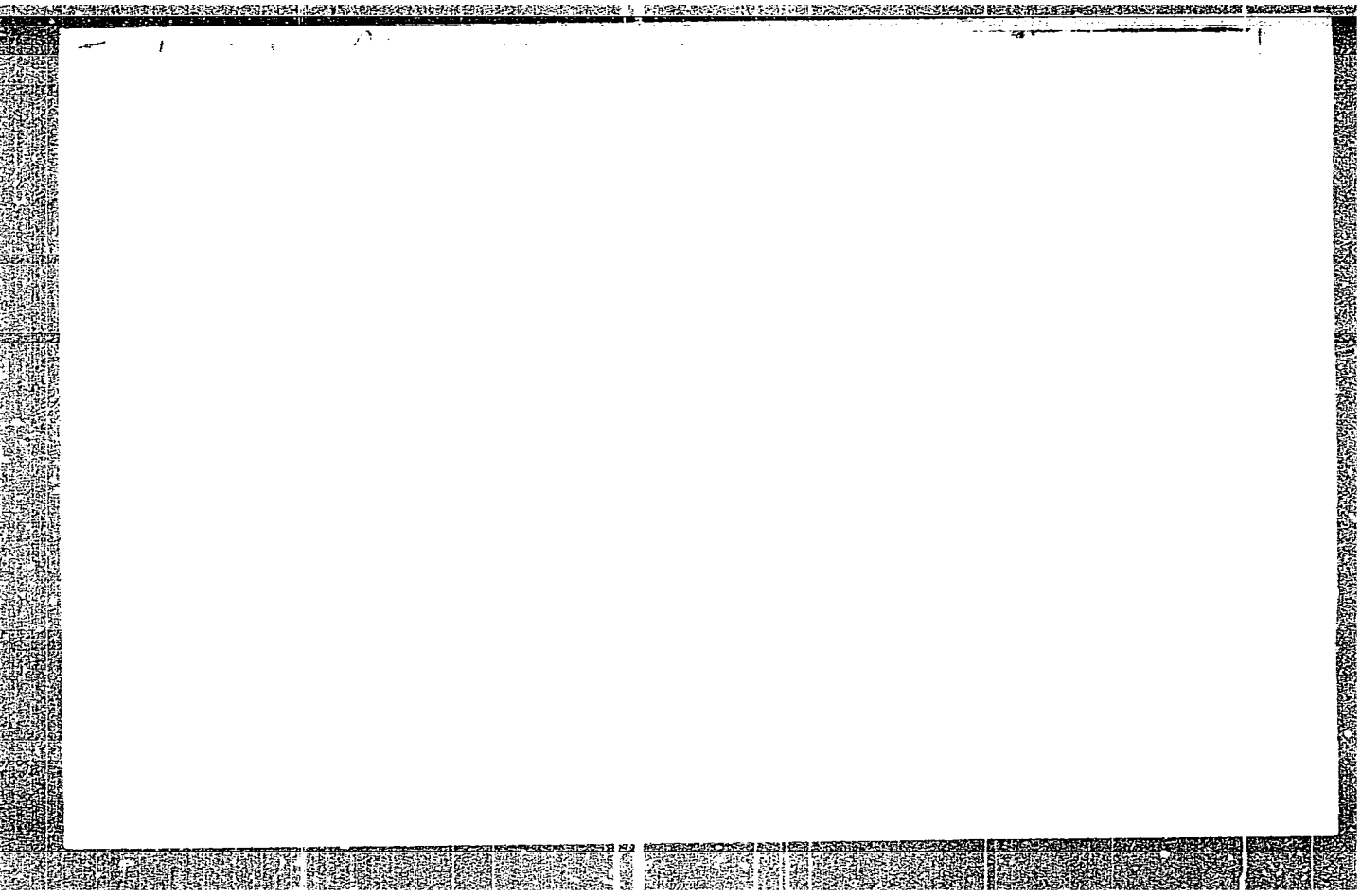
Notes on some Caucasian plants. I. S. Tkeshelashvili. *Farmatsiya* 1940, No. 2/3, 21–4.—Gum tragacanth can be obtained from *Astragalus caucasicus* Pall, a Caucasian shrub. English ivy (*Hedera helix*) is comparatively rich in vitamin C and while its berries are poisonous a *coffee substitute* made from them is very wholesome and has a mild laxative effect. Julian P. Smith

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

TKESHELASHVILI, L. K.

TKESHELASHVILI, L. K. -- "The Quantitative Diffusion and Rate of Restoration of Phosphoryl Choline and Phosphoryl Ethanolamine in the Animal Organsim." Georgian State Publishing House for Medical Literature. Tbilisi State Medical Inst. Tbilisi, 1955. (Dissertation for the Degree of Candidate of Medical Sciences)

SO: Knizhnaya letopis', No. 4, Moscow, 1956



APPROVED FOR RELEASE: 07/16/2001 CIA-RDP86-00513R001756010004-7"

TKESHELASHVILI, L. K.

"Quantitative Distribution of Phosphorylcholine and Phosphorylethanolamine in the Animal Organism," by L. K. Tkeshelashvili, Academy of Sciences Georgian SSR, Institute of Physiology imeni I. S. Beritashvili, Tbilisi, Soobshcheniya Akademii Nauk Gruzinskoy SSR, Tbilisi, Vol 17, No 8, 56, pp 711-717

The author describes the methods used and results obtained in experiments conducted to determine the quantitative distribution of phosphoric esters of choline and ethanolamine in the cerebrum and internal organs of the animal organism. The experiments which were carried out on rats, rabbits, and dogs established that phosphorylcholine and phosphorylethanolamine were present in the animal organism in considerable quantities, with phosphorylethanolamine predominating. The quantity of phosphorylcholine in the brain and internal organs of the animals varied from 2.2 to 14.35 milligrams in 100 grams of fresh tissue. Largest quantities of it were found in the liver (rats and rabbits); lesser quantities were found in the heart and kidneys. It was equally distributed in all parts of the brain of the dog, with the exception of the cerebellum, where phosphorylcholine was present in smaller quantities. Phosphorylethanolamine was found in considerable quantities in the spleen of rats and rabbits, and in the grey matter of the cerebral hemispheres of dogs in quantities varying from 14 to 40 milligrams in 100 grams of fresh tissue.

Sum 1258

908. SINUS THROMBOSIS IN 33 YEARS (1921-1953) EXPERIENCE OF A CLINIC (Russian text) - Tkeshelashvili L. K. - SBORN. TRUD. TBIL. MED. INST. 1957, 1 (173-174)

3,462 case histories of patients suffering from inflammations of the middle ear are analysed. Sinus thrombosis constitutes the most common intracranial complication. It occurs 2.5 times more frequently in cases of chronic otitis than in cases of acute otitis. The administration of sulphonamides and antibiotics has brought about a lowering of the number of cases of sinus thrombosis but this does not exclude the possible need for surgical treatment. References 40. (S)

Inst. Physiology im Beritashvili

USSR/Human and Animal Physiology. (Normal and Pathological). Metabolism. Metabolism of Lipids. I

Abs Jour: Ref Zhur-Biol., No 17, 1958, 79275.

Author : Tkeshelashvili, L.K.
Inst :
Title : Rate of Renewal of Phosphorylcholine and Phosphoryl-ethanolamine in the Animal Organism.

Orig Pub: Soobshch. AN GruzSSR, 1957, 18, No 4, 413-419.

Abstract: The rate of renewal of phosphorylcholine (I) and phosphoryl-ethanolamine (II) was studied in the brain, liver, spleen, kidneys, heart and skeletal muscles of rats and rabbits, and in various sections of the brain (grey and white matter of the cerebral hemispheres, the cerebellum and myelencephalon) of dogs to which $Na_2HP^{32}O_4$ was introduced subcutaneously

Card : 1/2

USSR/Human and Animal Physiology (Normal and Pathological), Metabolism. Metabolism of Lipids.

Abs Jour: Ref Zhur-Biol., No 17, 1958, 79275.

or suboccipitally. It was shown that the I and II are renewed in animal organism at a rapid rate, but differently in different organs. Relatively the most specific activity (P^{32} in I and II) of P^{32} in inorganic phosphate was found in the brain and kidneys; the least, in the skeletal muscles. From investigations of sections of the brain, the greatest rate of turnover was noted in the white matter of the brain.

Card : 2/2