AUTHOR: Gorbis, Z.R. (Odessa) SOV/24-58-9-13/31

TITLE: Equations Giving Criteria for Convective Heat Exchange in Two-phase Flows of the "Gaseous Suspension" Type (Kriterial'nyye uravneniya konvektivnogo teploobmena v dvukhfaznykh potokakh tipa "gazovzves'")

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 9, pp 94 - 102 (USSR)

ABSTRACT: After a brief discussion of the equation of continuity, the equations of motion and energy in two-phase flow are stated. By the use of similarity transformations on the three equations, non-dimensional functional forms are obtained for the parameters of the system. The first criterion discussed characterises the uniform motion of the particles with given limiting relative velocity. Then the coefficient of resistance of the two-phase flow is discussed. Having considered the hydro-mechanical criterion equations, the author turns to the heat transfer criterion equation and obtains a functional relationship for the Nusselt number involving the Reynolds number and the Prandtl number. With the aid of experimental results, explicit forms are derived for the coefficient

Card1/2

Equations Giving Criteria for Convective Heat Exchange in Two-phase Flows of the "Gaseous Suspension" Type

of resistance and the Nusselt number. There are 5 figures and 15 Soviet references.

ASSOCIATION: Tekhnologicheskiy institut im. Stalina (Technological Institute imeni Stalin)

SUBMITTED: May 18, 1957

24(3) SOV/143-58-10-15/24

AUTHOR: Gorbis, Z.R.

TITLE: The Theory and Calculation Method of "Gazovzves'" Heat Exchangers

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Energetika, 1958, Nr 10, pp 118-125 (USSR)

ABSTRACT: In 1947, Z.F. Chukhanov [Ref 1] showed the high effectiveness of the heat exchange in the "gazovzves'" (gas suspension). Such heat exchangers consist of cooling and heating chambers connected in series by a solid heat carrier. The gas particles are moved by mechanical or pneumatic means. The author presents in his paper calculation elements for "gazovzves'" heat exchanger chambers. However, these calculation elements obviously require further improvement in refard to accuracy be collecting experimental and operation data. The author presents basic equations for determining the desired heater surface, formulae for calculating the height of the chambers for cooling of the gas and heating of the air, pressure losses

Card 1/2

The Theory and Calculation Method of "Gazovzves'" Heat Exchangers

within the heat exchanger chambers and formulae for determining the air temperature to be achieved when the height of the chambers is known. There are 1 graph and 10 references, 9 of which are Soviet and 1 English.

ASSOCIATION: Odesskiy tekhnologicheskiy institut imeni I.V. Stalina (Odessa Institute of Technology imeni I.V. Stalin) Kafedra teplotekhniki (Chair of Heat Engineering)

SUBMITTED: October 24, 1958

GORBIS, Z.R.; ZHIDKO, V.I.; ZELINSKIY, G.S.

Studying the aerodynamics of grain in a fluidized bed. Izv. vys.ucheb.zav.; pishch.tekh. no.2:110-115 '59. (MIRA 12:8)

1. Odesskiy tekhnologicheskiy institut im. I.V.Stalina.
(Grain) (Fluidization)

GORBIS, Z. R., and BAKHTIOZIN, R. A.

"Experimental Investigations on Convective Heat Transfer of Flows with Dust Particles."

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, June 1961.

GORBIS, Z. R., and KALONDAR'YAN, V. A.

"Experimental Investigation of Heat Transfer of a longTudinally Moving Layer of Loose Material."

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, June 1961.

GORBIS, Z. R., KALENDAR'YAN, V. A., and BAKHTIOZIN, R. A.

"Thermal Properties of Synthetic Graphite Particles."

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, June 1961.

GORBIS, Z.R., kand.tekhn.nauk, dotsent; BAKHTIOZIN, R.A., inzh.

Concerning the aerodynamic characteristic of graphite particles. Izv. vys. ucheb. zav.; energ. 4 no.11:101-104 N '61. (MIRA 14:12)

1. Odesskiy tekhnologicheskiy institut. Predstavlena kafedroy teplotekhniki.

(Graphite) (Pneumatic-tube transportation)

29546 S/089/61/011/005/011/017
B102/B101

15.2250
21.2300

AUTHORS: Gorbis, Z. R., Kalender'yan, V. A.

TITLE: Physical properties of a layer of particles of artificial graphite

PERIODICAL: Atomnaya energiya, v. 11, no. 5, 1961, 450 - 454

TEXT: The authors investigated the physical, mechanical, and thermophysical properties of graphitized breakage from electrode plants of Zaporozh'ye and Novocherkassk. The ash content of the graphite layers was not above 0.5%, particle sizes were between 0.4 and >2.88 mm. The specific weight and γ_v (the weight per m^3) of the dry granular material as well as the specific weight of single particles were determined with an accuracy of 1 - 2%. It was found that γ_v of the dry material was the higher, the lower the particle size was. This weight was also determined for moving graphite layers (which may be used as coolants) in smooth and ribbed tubes at velocities between 3 and 80 cm/sec. γ_v was found to be nearly constant for increasing flow rate up to a critical value dependent

...external
...graphite layers was
...density, only for the mixture an
...erved. From the thermal diffusivity a, the

Card 1/3

Physical properties of a...

heat conduction was determined using the relation $\lambda = ac\gamma_v$, c being the mean specific heat. λ was found to drop hyperbolically with increasing porosity β. The experimental curves agree in shape but lie somewhat above Bogomolov's theoretical hyperbola. Agreement was also found with data by M. I. Kozak (Zh.tekhn.fiz. no. 11, 1952) and K. F. Fokin (Stroitel'naya teplotekhnika ograzhdeniya chastey zdaniy (Construction thermotechnics of enclosing parts of buildings) M., Gosstroyizdat, 1937). λ as a function of layer density ε was given by Bogomolov as: $\lambda = 21.7\lambda_{air} \log \frac{0.74-0.31\varepsilon}{0.74-\varepsilon}$. For an industrial mixture ($0.55<\varepsilon<0.65$) it holds: $\lambda = 34.8\,\lambda_{air} \log \frac{0.74-0.31\varepsilon}{0.74-\varepsilon}$. The temperature dependence of λ for $t \leqslant 400^{\circ}C$ can be described by $\lambda_t = \lambda_o\left[1 + \beta_1(t_1-60)+\beta_2(t_2-225)\right]$ kcal/m·hr·°C. λ_o is the effective heat conduction coefficient at $60^{\circ}C$, β_1 and β_2 are temperature coefficients: $0.807\cdot10^{-3}/^{\circ}C$ for $60<t_1<225^{\circ}C$ and $1.75\cdot10^{-3}/^{\circ}C$ for $225<t_2<400^{\circ}C$. There are 5 figures, 2 tables, and 6 Soviet references.

SUBMITTED: March 28, 1960
Card 3/3

32537
S/096/62/000/001/006/008
E025/E435

26.5700

AUTHORS: Gorbis, Z.R., Candidate of Technical Sciences
Kalender'yan, V.A., Engineer

TITLE: Heat emission of a layer moving logintudinally in smooth cylindrical channels

PERIODICAL: Teploenergetika, no.1, 1962, 75-79

TEXT: Little study has been made of heat exchange between a flow of granular material and a heating surface. Investigations quoted have involved low intensity of heat exchange (Ref.1: Yu.P.Kurochkin. IFZh no.3, 1958 and Ref.2: S.V.Donskov, Teploenergetika, no.11, 1958) or the factors involved have been studied only between narrow limits (Ref.3: M.S.Brinn, S.J.Friedman, F.A.Glukkert, R.L.Pigford. Industrial and Eng. Chemistry, vol.40, no.8, 1948 and Ref.4: P.N.Nikolayev, Candidate thesis. Moscow Institute of Chemical Machinery, 1952) and the particles of the flow have been assumed to move like a rod. There are no data for channels of annular cross-section nor for any channels with the factors involved varied over a wide range. The heat exchange to the wall from the layer is assumed to

Card 1/8 5

Heat emission of a layer ...

represent a two-phase medium described by the generally assumed coefficient of heat transfer corresponding to the Newton-Leibnitz law. The following assumptions are made: the heat output of the layer is studied for longitudinal external streamlining of the heated surface in vertical smooth channels of circular section; the parameters of the system are varied over wide ranges; the heat transfer from the layer to the wall is defined as a component part of the heat transfer from the layer to the water; the heat transfer is studied for the direction of heat flow from the layer to the wall, since it is advantageous first to heat the layer; the heat transfer is studied for the steady state and for steady motion of the granular heat carrier round a closed circuit. In the tests 13 annular channels of various characteristics, provided with inspection windows to enable the motion to be studied, were used. Temperatures were measured by two mutually perpendicular sets, each of 17 copper-constantan thermocouples. A set of measurements on heat transfer lasted two to three hours. Measurements were made of the coefficient of heat transfer from the various layers, the coefficient of heat loss from the water to the wall and the coefficient of heat transfer

Heat emission of a layer ...

from the layer to the wall was calculated from them. The net outflow of water and of the heat carrier was measured to 0.01 kg, the temperature to 0.05°C and the temperature of the heat carrier at the output to 0.5°C. The quantity of heat transmitted was determined from the net flow and heating of the water. The density of the layer in steady motion was determined by sampling. The granular material used was graphite waste from the Zaporozhskiy and Novocherkasskiy elektrodnykh zavodov (Zaporozhe and Novocherkassk Electrode Works) with an average weight particle size of 1.22 mm and four fractions were obtained by sieving with mean particle sizes 3.33, 2.08, 0.77 and 0.4 mm. A table is given of the physical properties at 55°C of the layer used in the experiments and also published values of the properties of the particle material at 0°C. The relationship obtained by the author between the thermal conductivity of a fixed layer and the porosity at 55°C is shown in Fig.2. This qualitatively confirms Bogomolov's results (Ref.7: A.F.Chudnovskiy, Heat exchange in dispersion media, Gostekhizdat, 1954) and a formula is given for it. About 300 experiments were carried out varying the parameters over wide

ranges. It was found that the intensity of heat exchange decreases with increase of the ratio L/D (L is the length and D the diameter of the heating surface). This confirms the results of M.S.Brinn et al (Ref.3) and P.N.Nikolayev (Ref.4). The relation between the coefficient of heat transfer and the velocity of the layer is shown in Fig.4 which also shows the decrease of the coefficient of heat transfer with increase of the diameter. The heat transfer is a function of the ratio of the effective width of the tube to the diameter of the particles. The heat exchange increases with decrease of the particle size. The relationships between the density of the layer and the velocity and between the heat transfer and density of packing of the particles of the moving layer are described. No effect of hydrodynamical similarity was observed though the range of variation was wide. It is stated that the authors' results are in good agreement with the experiments of the papers quoted in the references. There are 7 figures, 1 table and 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc. The reference to an English language publication (Ref.3) is quoted in the text.

Card 4/5

32537
S/096/62/000/001/006/008
E025/E435

Heat emission of a layer...

ASSOCIATION: Odesskiy tekhnologicheskiy institut
(Odessa Technological Institute)

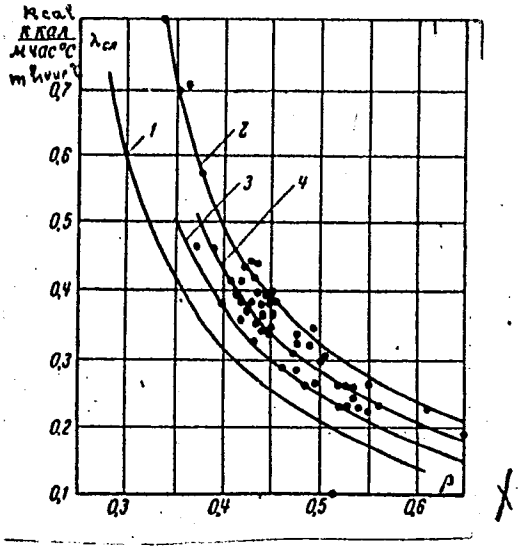


Fig.2. Dependence of the coefficient of thermal conductivity of the layer $\lambda_{сл}$, kcal/m h °C, on the porosity of the layer.

Curve 1 - calculated by the Bogomolov formula
Curves 2 and 3 - limits of the experimental values
Curve 4 - average values

Card 5/8 5

KALENDER'YAN, V. A.; BAKHTIOZIN, R. A.; GORBIS, Z. R.

Thermophysical and other characteristics of artificial graphite particles. Teplo- i massoper. 1:131-139 '62. (MIRA 16:1)

1. Odesskiy tekhnologicheskiy institut.

(Graphite) (Powders)

S/143/62/000/004/004/006
D238/D307

AUTHOR: Gorbis, Z.R., Candidate of Technical Sciences, Docent

TITLE: Some heat-exchange problems of dispersed flows from a wall

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Energetika, vol 5, no. 4, 1962, 95 - 103

TEXT: Use has been made recently of heat transfer processes employing streams of solid particles travelling in a gas in the form of a dense layer or a gaseous suspension. In such two-component stream there is a clear division between the individual components, and therefore, the travelling layer and gaseous suspension can be combined into one group of coarsely dispersed streams. The effective utilization of these heat carriers requires the investigation of the mechanics of motion and heat transfer of a free-flowing medium in narrow channels, the aerodynamics and heat-exchange of streams of gaseous suspension with different concentrations of the solid phase, and the process of erosion both of the solid particles and the heating surface. The results of work along these lines are described as car-

Card 1/3

ried out during 1957 and 1958. The nature of the motion of the layer largely governs the intensity of heat transfer. A study was made of the motion in a circular channel in the form of a glass tube 1,500 mm long and diameter 65/55 mm and with a smooth cylindrical rod, together with ribbed rods, rod diameter 25 mm and rib diameter 55 mm. Graphite was used in five fractions, namely 2.88, 2.08, 1.44, 0.77 mm and <0.5 mm. The experimental results indicated an optimum velocity for each fraction. The results are shown to be in agreement with M.S. Brinn, and S.I. Fridmann. (Industrial and Engineering Chemistry, 1948). A study of heat-transfer by a gaseous suspension flow to a wall was made on concentrations up to 50 kg/kg. In this case heat-exchange with a heat-transmitting wall (recuperative heat-exchange) is governed largely by the thermal resistance of the zone near the wall. It is proposed that for each form of heat transfer of a gaseous suspension, with concentrations less than 1.5 (turbulent conditions), with concentrations between 1.5 and 50 (transitional conditions), and with concentrations greater than 50 (laminar conditions), there are corresponding heat-transfer and aerodynamic laws. In the extra-high concentration range (in the order of thousands) occurring for example in a descending stream, the gaseous suspension

S/143/62/000/004/004/006
D238/D307

Some heat-exchange problems of ...

converts to a travelling layer. There are 5 figures.

ASSOCIATION: Odesskiy tekhnologicheskiy institut imeni M. V. Lomonosova (Odessa Technological Institute, imeni M.V. Lomonosov)

SUBMITTED: March 25, 1961

Card 3/3

S/170/62/005/010/003/009
B112/B 186

24.5200

AUTHOR: Gorbis, Z. R.

TITLE: Differential equations for the heat transfer of dispersion streams of the "moving bed" type

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, v. 5, no. 10, 1962, 32-39

TEXT: The heat transfer in binary media is investigated. The equations of continuity, motion and energy are obtained by considering each of the components separately. These equations read as follows:

$$\varepsilon\left(\frac{\partial \rho_r}{\partial \tau}+\frac{\partial W_{rx}}{\partial x}+\frac{\partial W_{ry}}{\partial y}+\frac{\partial W_{rz}}{\partial z}\right)+ \qquad (4)$$

$$+\beta\left(\frac{\partial \rho_r}{\partial \tau}+\frac{\partial W_{rx}}{\partial x}+\frac{\partial W_{ry}}{\partial y}+\frac{\partial W_{rz}}{\partial z}\right)=0.$$

(continuity),

Card 1/3

Differential equations for the ...

$$(\varepsilon\rho_r + \beta\rho_r)\frac{Dv_{cx}}{d\tau} = (\varepsilon\rho_r + \beta\rho_r)g_x - \frac{\partial P_c}{\partial x}\varepsilon + \mu\beta\nabla^2 v_{cx} + \\ + \varepsilon\left(\frac{\partial S_x}{\partial x} + \frac{\partial S_x}{\partial y} + \frac{\partial S_x}{\partial z}\right), \quad (9)$$

$$(\varepsilon\rho_r + \beta\rho_r)\frac{Dv_{cy}}{d\tau} = (\varepsilon\rho_r + \beta\rho_r)g_y - \frac{\partial P_c}{\partial y}\varepsilon + \mu\beta\nabla^2 v_{cy} + \\ + \varepsilon\left(\frac{\partial S_y}{\partial x} + \frac{\partial S_y}{\partial y} + \frac{\partial S_y}{\partial z}\right), \quad (9')$$

$$(\varepsilon\rho_r + \beta\rho_r)\frac{Dv_{cz}}{d\tau} = (\varepsilon\rho_r + \beta\rho_r)g_z - \frac{\partial P_c}{\partial z}\varepsilon + \mu\beta\nabla^2 v_{cz} + \\ + \varepsilon\left(\frac{\partial S_z}{\partial x} + \frac{\partial S_z}{\partial y} + \frac{\partial S_z}{\partial z}\right). \quad (9'')$$

(motion), and

Card 2/3

Differential equations for the ...

$$\varepsilon\gamma_r c_r \frac{DT_r}{d\tau} + \beta\gamma_r c_r \frac{DT_r}{d\tau} = \lambda_r \varepsilon_r \nabla^2 T_r + \lambda_r \beta_r \nabla^2 T_r + 4k_r \sigma_0 (\bar{T}_n^4 - T^4)_r \varepsilon_r + \quad (14)$$

$$+ 4k_r \sigma_0 (\bar{T}_n^4 - T^4)_r \beta_r ,$$

(energy). The symbol $D/d\tau$ denotes the substantial derivation. A number of analytical solutions are obtained.

ASSOCIATION: Tekhnologicheskiy institut imeni M. V. Lomonosova, g. Odessa (Technological Institute imeni M. V. Lomonosov, Odessa)

SUBMITTED: December 20, 1961

Card 3/3

GORBIS, Z.R., knad.tekhn.nauk; KALENDER'YAN, V.A., inzh.

Heat transfer from a layer of bulk material moving in longitudinal finned channels. Teploenergetika 9 no.11:84-86 N '62. (MIRA 15:10)

1. Odesskiy tekhnologicheskiy institut.
(Heat--Transmission)

36771
S/089/62/012/005/002/014
B102/B104

26.5200 26.2232
26.2221

AUTHORS: Gorbis, Z. R., Bakhtiozin, R. A.

TITLE: Investigation of convective heat transfer from a gas-graphite suspension during its flow in vertical channels

PERIODICAL: Atomnaya energiya, v. 12, no. 5, 1962, 378-384

TEXT: Heat-removal in gas reactors can be considerably improved by using a mixture of gas and graphite dust as coolant (D. Schluderberg et al. Gaseous Suspensions - a New Reactor Coolant, 19, No. 8, 67 (1961)). Published data on such coolants, however, are inadequate. The authors studied the convective heat transfer from the inner wall of a copper tube to the gas-graphite suspension flowing through. The theory is examined on the basis of simplifying assumptions. The convective heat transfer coefficient is given by the approximate relation $\alpha_c \simeq \frac{1}{8} v_g \rho_g (c_g \zeta'_g + c_s \zeta'_s)$; ρ - specific weight, v - absolute velocity, c - specific heat, ζ' - local friction coefficient; the subscript g refers to gas, s to solid. For a pure gas, $\alpha_g = \frac{1}{8} \zeta_g c_g \rho_g v_g$, so that

Card 1/3

Investigation of convective heat ...

$\alpha_c/\alpha_g = Nu_c/Nu_g \simeq 1 + mc_s/c_g\mu$; μ - weight concentration of solid particles in the gas flow, $m = f(Re_g, Re_s, D/d_s)$; D and d_s are the equivalent diameters of channel and particles. The experiments were made in the concentration range $\mu < 50$ for which the contact heat exchange α_k in the gas suspension is proportional to D/d_s and $\alpha_k/\alpha_g = 11\ Re^{0.01}(D/d_s)^{0.2}\mu^{-0.6}$. Two apparatuses were specially constructed for the experiments, such that a) the mixture flows in a circuit which is closed for the graphite dust and open for the gas (air); b) the heat transfer of the suspension can be considered as a component of the heat transfer to the water counterflow; c) in the part of the tube where the heat transfer is measured, the heat flux is directed from the suspension to the tube wall; d) the effect of the graphite particle concentration, and size, of the tube diameter and the gas flow rate can be determined in accordance with the theoretical assumptions. The measurements were made with 12, 20, 25 and 33 mm tube width and 0.15, 0.4, 0.77, 1.44, 2.08 mm particle diameter. Results: With increasing Re the relative intensity of the heat transfer of the suspension

decreases. The heat transfer depends on the kind of the gas (for CO_2 Pr and c_s/c_g are somewhat higher, for He somewhat lower than for air) and on its temperature. The form of the solid particles has almost no effect; if the particle size is reduced, the heat transfer is improved; somewhere an optimum exists. The results were found to depend on the heat-flux direction: If the suspension is cooled the heat exchange is less intense than when it is heated. There are 5 figures.

SUBMITTED: May 16, 1960

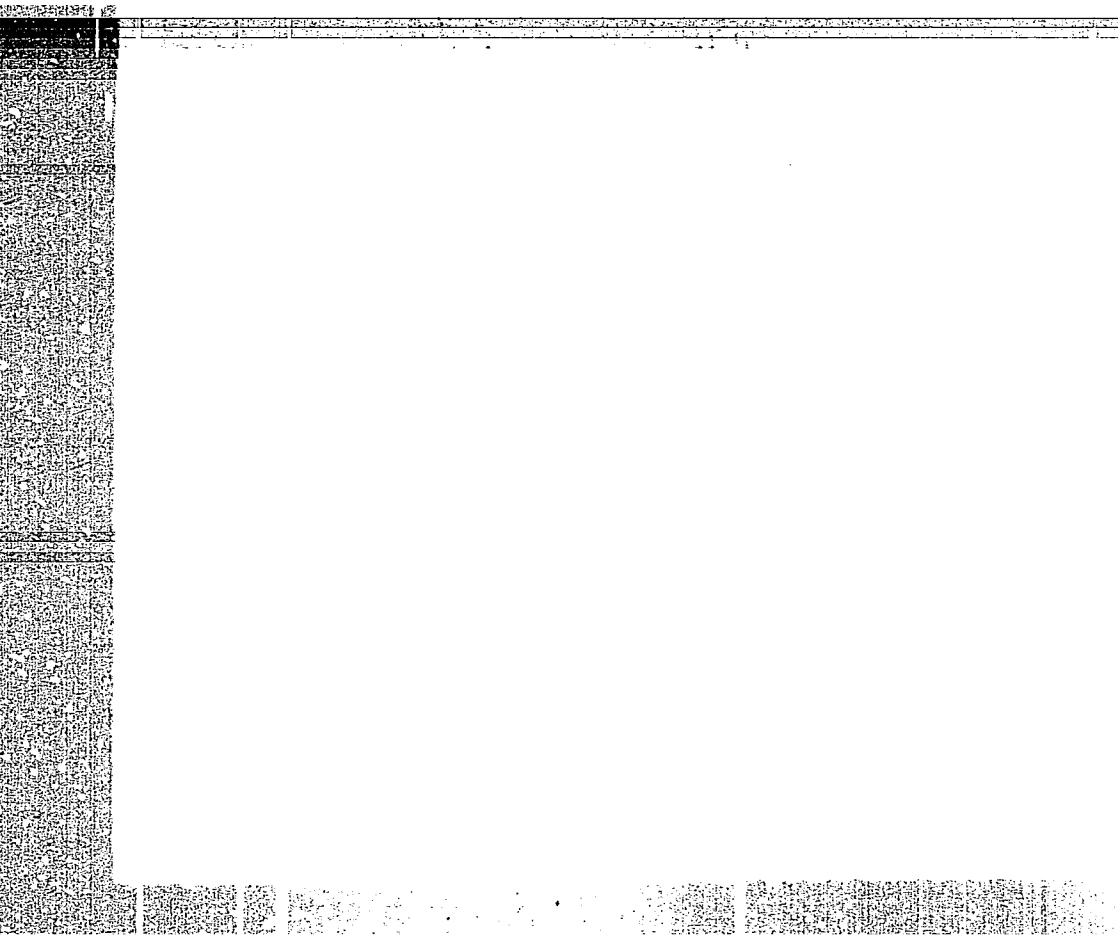
Card 3/3

GORBIS, Z. R. (Odessa technological institute Lomonosov)

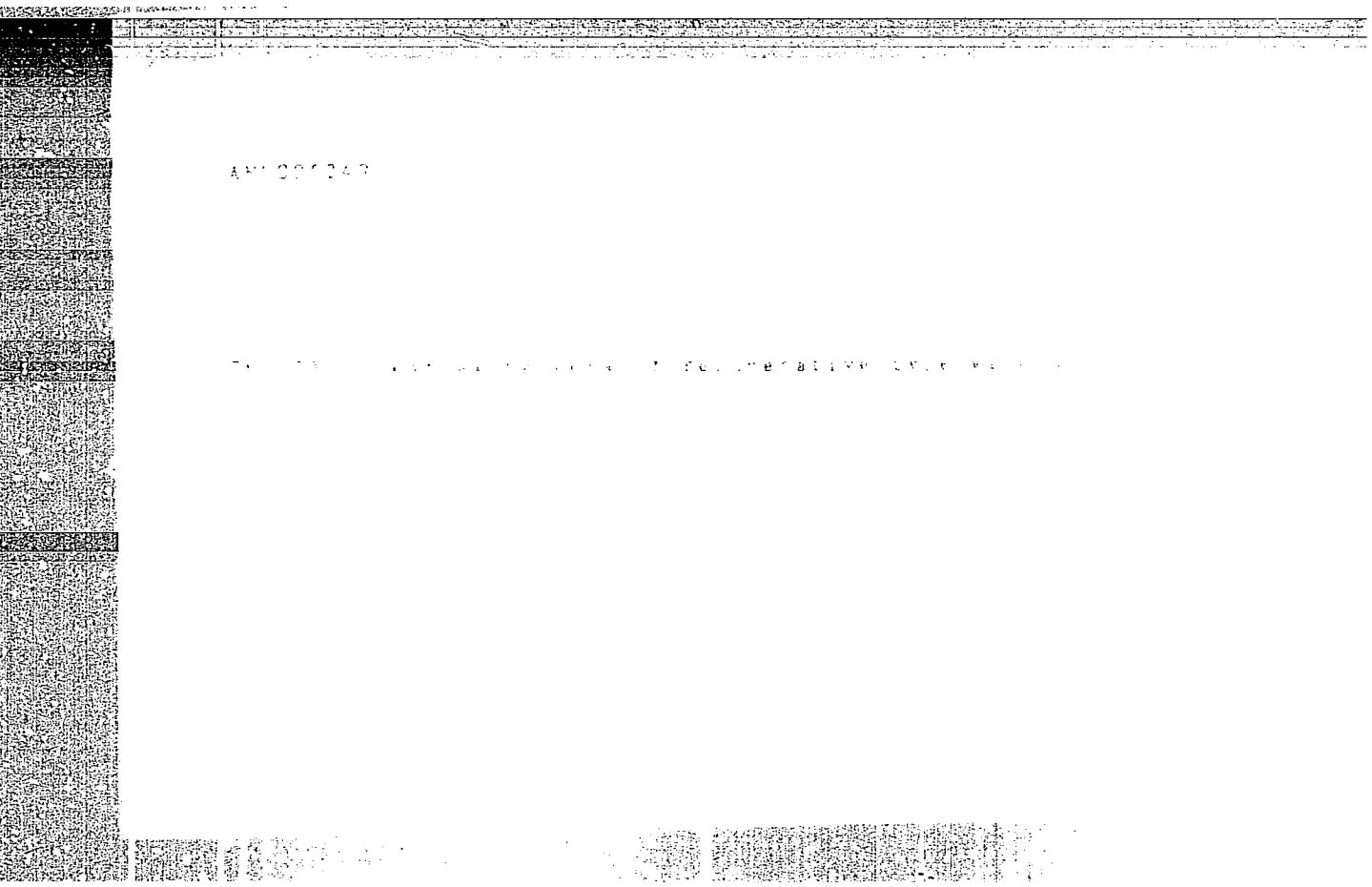
"About work of an analogous direction by heat radiation of through-flow dispersal of gas--hard particles".

Report presented at the Section on Heat Exchange in Single Phase Medium, Scientific Session, Council of Acad. Sci. Ukr SSR on High Temperature Physics, Kiev, 2-4 Apr 1963.

Reported in Teplofizika Vysokikh temperatur, No. 2, Sep-Oct 1963, p. 321, JPRS 24,651. 19 May 1964.



a layer under the action of gravitational forces are considered.



GORBIS, Z. R.

"Main heat-transfer regularities of continuous dispersed flows."

report submitted for 2nd All-Union Conf on Heat & Mass Transfer, Minsk, 4-12 May 1964.

Odessa Technological Inst.

YEL'KIN, G. I.; GORBIS, Z. R.

"Investigation of the elements of mechanics, aerodynamics, and heat transfer in a counterflow suspension."

report submitted for 2nd All-Union Conf on Heat & Mass Transfer, Minsk, 4-12 May 1964.

Odessa Technological Inst.

L 4549-66 EWT(l)/EWP(e)/EWP(m)/EWT(m)/EPF(c)/EWP(i)/EPF(n)-2/T/FCS(k)/EWP(b) IJP(c) WW/WH

ACCESSION NR: AP5020940 UR/0170/65/009/002/0177/0179 103 100 B
533.601 + 536.248

AUTHOR: Gorbis, Z. R.; Tonkonogiy, Yu. L. 44,55

TITLE: Aerodynamics and heat exchange of a falling (non-dense) gravitational bed 21,44,55 4,44,55

SOURCE: Inzhernerno-fizicheskiy zhurnal, v 9, no 2, 1965, 177-179

TOPIC TAGS: gravitation, aerodynamics, heat exchange, gas flow, aluminum silicate, silica, graphite

ABSTRACT: A falling (non-dense) gravitational bed is formed by a dense bed of a dispersion medium moving in a vertical channel when the velocity of the medium is increased to the supercritical. The non-dense bed differs from the dense bed not merely in the concentration of the solid component but also in the totaly different mechanics of motion and the heat transfer mechanism. An ejecting effect appears in the non-dense bed, it causes appreciable motion of the gas in the channel. The present author performed an experimental investigation of the dense bed with the aid of two assemblies. The flow and the volumetric concentration of the solid phase, as well as gas flow, were measured in the assembly used for the investigation of the mechanisms and aerodynamics. Aluminosilicate, silica sand, and graphite 15 were used as the mater-

Card 1/3

ACCESSION NR: AP5020940

3

tals. The mean dimension of the particles determined by means of the formula

$$d_r = \frac{1}{\Sigma g_i / d_i},$$

varied from 0.03 to 4 mm. A generalized relationship for the true volumetric concentration in the non-dense bed is presented. The other assembly was used to study the heat transfer characteristics of the wall of the falling bed when the temperature dropped; the study was made in a tubular duct in the temperature range up to 850C. The temperature factor in the heat exchange process is considered to be the most interesting factor in the experiments. The strong screening effect of the particles and the concentration of particles are also considered. The maximun mean heat exchange coefficients along the length of the channel are presented; it is noted that further intensification of the heat exchange of the non-dense bed should be expected with a longer channel and smaller particles, due to the resultant increase in gas velocities. Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: Tekhnologicheskiy institut im M. V. Lomonosova, Odessa (Technological Institute)

44,55

L 4549-66

ACCESSION NR: AP5020940

SUBMITTED: 28Jan65 ENCL: 00 SUB CODE: ME,TD

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Card KC 3/3

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000516110009-8"

L 05424-67 EWT(m)

ACC NR: AP6024698 SOURCE CODE: UR/0170/66/011/001/0048/0053

AUTHOR: Gorbis, Z. R.; Belyy, L. M.; Shumakov, I. K.

ORG: Institute of Technology im. M. V. Lomonosov, Odessa (Tekhnologicheskiy institut)

TITLE: Study by radioactive methods (tracer particles) of the particle residence time in countercurrent gas suspensions

SOURCE: Inzhenerno-fizicheskiy zhurnal, v. 11, no. 1, 1966, 48-53

TOPIC TAGS: heat exchange, gas flow, drag coefficient, trace analysis

ABSTRACT: The size of various devices which use the principle of dragged gas suspension depends to a significant degree on the residence time of solid particles (reacting, exchanging heat, etc.) in the operating zone of the instrument. Consequently, the authors used the tracer method for a very precise and simple estimate of the particle residence time in a free or dragged gas suspension. Helical screen inserts within the suspension extend by as much as one order of magnitude the particle residence time in a counterflow gas suspension and allow control of various possible types of solid particle motion (rolling, rolling-falling, fluidization with and without falling, etc.). A complete evaluation of the efficiency of the

Card 1/2 UDC: 541.182.2/.3

L 05424-67

ACC NR: AP6024638

present method of mechanical drag generation requires more data on thermodynamics and heat transfer of such systems. Orig. art. has: 4 formulas and 4 figures.

SUB CODE: 07,20/ SUBM DATE: 08Feb66/ ORIG REF: 003

Card 2/2

(GORBIS, Z. YA.

[illegible] FOR MEASURING THE TEMPERATURE OF SOLID PARTICLES.
Gorbis, Z. Ya. Teploenergetika (Heat Pwr Engng, Moscow), Nov. 1954, [illegible]
USSR, Ref. Zh. Khim. (Ref. J. Chem., Moscow), 1956, (23), 77071). The instrument described includes a streamlined element, containing the hot junction of a thermocouple, which is submerged in the stream of air and particles.

GORBIYENKO, A.K.

28435
S/185/61/006/002/007/020
D210/D304

24.2300 (1068, 1147, 1164)

AUTHORS: Afanas'yev, M.H., Vil'yams, A.P., Horbiyenko, A.K., and Syborenko, L.I.

TITLE: A remote proton magnetometer

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 6, no. 2, 1961, 191 - 195

TEXT: Normally for measurements of magnetic fields in the range 1.5 to 13 koe and higher it is necessary to use different detectors using protons, nuclei of lithium and denterium. In this paper the authors describe a proton magnetometer capable of measuring magnetic fields from 1.5 to 13 koe using a single proton detector operating at frequencies up to 60 Mc/s. The difficulty of measuring with a single proton detector lies in the need to use very high frequencies. This can be obviated by using lithium and denterium detectors which require lower frequencies because of their higher electromagnetic ratios; however, the disadvantage of these

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A remote proton magnetometer

detectors is that they have a low signal to noise ratios compared to the proton detector. The magnetometer was constructed in three parts. The detector was connected to the principal part of the magnetometer by a cable 0.7 m long. The control section of the magnetometer was placed in a control chamber 20 m away from the magnet. In order to transmit through the cable a frequency of 60 Mc/s, necessary for measuring a field strength of 13 koe an additional coil of inductance L_k was utilized as first suggested by Popov, A. I. of the Institute of Technical Physics, AS UkrSSR. The inductance of this coil is considerably smaller than the total inductance of the detector coil and the high frequency cable. The operation of the magnetometer was carried out in two ranges. In the lower range (7.5 to 22 Mc/s) the impedance of the detecting system was made up of the detector coil, the capacity and inductance of the cable, the capacity of the variable condenser and the input capacity of the magnetometer. In the higher range (20 to 60 Mc/s) the additional coil L_k was included in the detector circuit. The ran-

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A remote proton magnetometer

ges were selected remotely by means of a relay. Slow tuning was achieved by altering the capacity of the variable condenser with a reversable motor. The magnetic field was indicated approximately on a calibrated scale the signal being generated by a potentiometer on the axis of the condenser. For accurate measurements the generator was tuned to an accuracy of 10^{-5} by varying slowly the anode potential on the generator lamp by means of the potentiometer. The frequency was measured with a crystal controlled meter. The magnetic field was measured with an accuracy of $5 \cdot 10^{-5}$ at a signal-to-noise ratio of 15 to 50 which is sufficient for automatic field stabilization. A circuit diagram of the electronic control unit is given in the paper. There are 3 figures and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: H.W. Knoebel and E.L. Hahn, The Review of Scientific Instruments, 22, 904, 1951; N.B. Blonbergen, E.M. Pureell, K.N. Paund, Phys. Rev., 73, 679, 1949.

ASSOCIATION: Fizyko-tekhnichnyy instytut AN URSR, m. Kharkiv
(Technical Physics Institute AS UkrSSR, Khar'kov)

SUBMITTED: July 1, 1960

Card 3/3

5(2) SOV/80-32-5-6/52

AUTHORS: Ganz, S.N., Vilesov, G.I., Gorbman, S.I., Leybovich, S.B.

TITLE: The Combination of the Purification Process of a Nitrogen-Hydrogen Mixture From CO_2 With the Preparation of Ammonium Carbonates. Communication I.

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 5, pp 969-975 (USSR)

ABSTRACT: The separate and combined absorption of NH_3 and CO_2 depending on the physical-chemical and hydrodynamic conditions of the process is investigated here. For this purpose horizontal rotary absorbers with high rpm were used /Refs 1-4/. At a temperature of 17-18°C and a pressure of 749 mm Hg, the absorption reaches 100% at 250 rpm. If the NH_3 supply is more than 500 m^3 per m^3 of absorbent · hr, the revolutions must be increased to 850-900 per min. Under highly turbulent conditions the productivity of the apparatus is 40-41 times greater than that of packed columns. The absorption of CO_2 by ammonia water at 18°C and a supply of 500 m^3/m^3.hr at a CO_2 content of 11.8% in the gas reaches its maximum of 98.5% at 2,000 rpm. An increase of the supply rate reduces the degree of absorption. A maximum of absorption is reached at a CO_2 content of 11% in the gas. The highest

Card 1/2

The Combination of the Purification Process of a Nitrogen-Hydrogen Mixture From CO_2 With the Preparation of Ammonium Carbonates. Communication I.

rate of the process can be attained at a stoichiometric NH_3:CO_2 ratio 1:1. The combined absorption of NH_3 and CO_2 differs only slightly from the separate absorption. The degree of absorption decreases with the increase of the ammonium carbonate concentration in the solution, which is explained by the higher viscosity of the solution and the higher vapor pressure of NH_3 and CO_2. An excess of ammonia shows the most favorable results in this case.
There are: 1 diagram, 10 graphs and 4 Soviet references.

SUBMITTED: September 12, 1957

5(2) SOV/80-32-5-7/52

AUTHORS: Ganz, S.N., Leybovich, S.B., Gorbman, S.I.

TITLE: The Investigation of the Rate of Conversion of $CaSO_4$ to $(NH_4)_2SO_4$ in Combining This Process With the Absorption of NH_3 and CO_2 Under Highly Turbulent Conditions. Communication II.

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 5, pp 975-978 (USSR)

ABSTRACT: A rational method of purifying a nitrogen-hydrogen mixture from CO_2 is the combination of this process with the conversion of $CaSO_4$ to ammonium sulfate. Horizontal rotary apparatuses were used, in which intensive mixing of the gaseous and liquid phases increases the reaction rate. To a 116 g/l solution of $(NH_4)_2SO_4$ a finely ground powder of $CaSO_4 \cdot 2H_2O$ in the amount of 100 g was added. The conversion of gypsum attains 90-94% in a three-minute contact of the two phases at 400-500 rpm. For the absorption of CO_2 the gypsum suspension in the apparatus was saturated with ammonia to 8.4% NH_3. At 1,200 rpm, 27.5 - 28°C, 750 mm Hg, a gypsum content of 126 g/l and a CO_2 content of 10.6% in the gas, the absorption of CO_2 c[illegible] to an end in the 12th minute due to the complete consumpti[illegible] gypsum and NH_3, if the supply rate is 250 m^3/m^3.hr. The ab[illegible]

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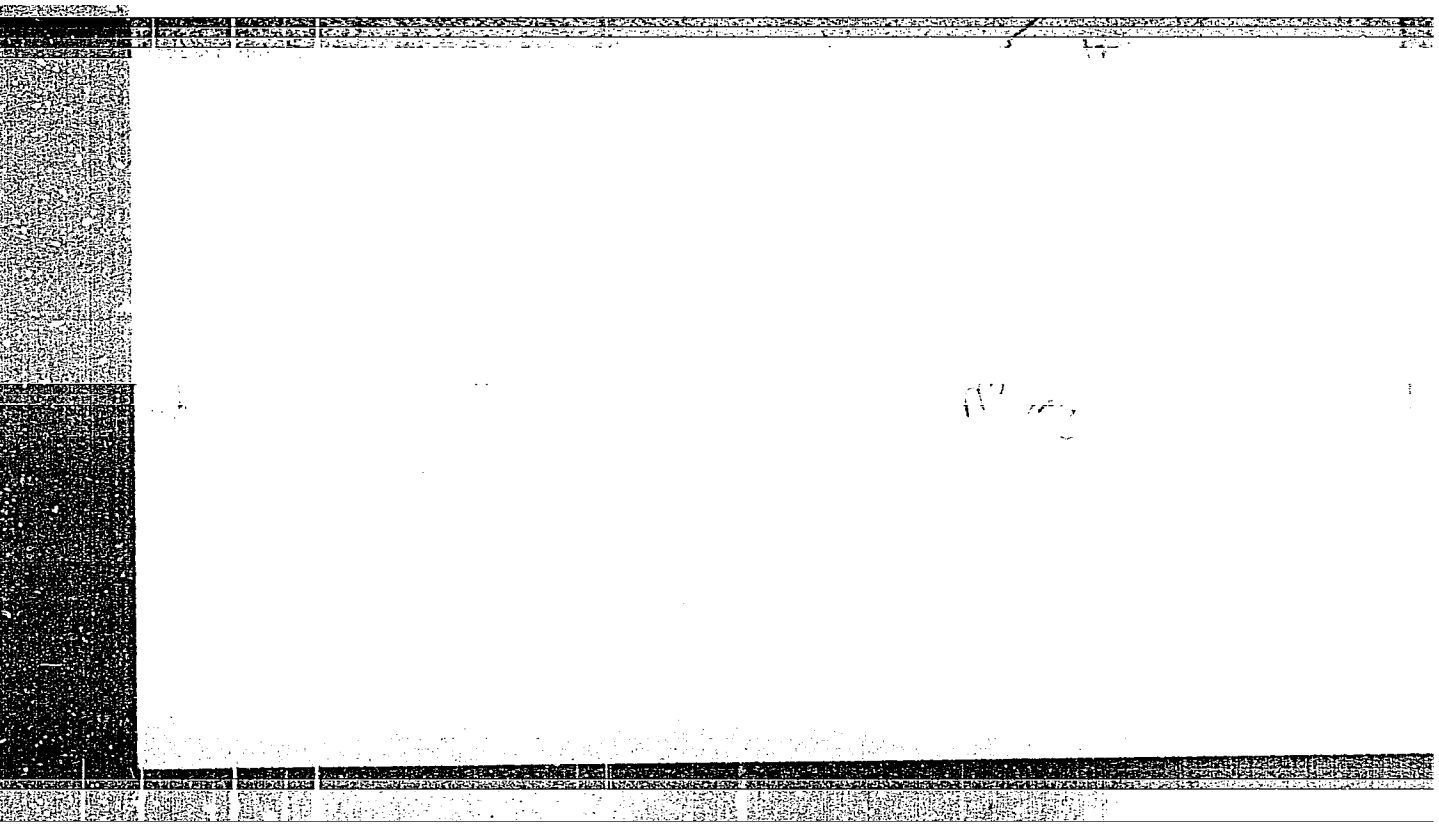
The Investigation of the Rate of Conversion of $CaSO_4$ to $(NH_4)_2SO_4$ in Combining This Process With the Absorption of NH_3 and CO_2 Under Highly Turbulent Conditions. Communication II.

rate is increased with the supply rate. The concentrations of 64 g/l $CaSO_4$ and 57 g/l $(NH_4)_2SO_3$ ensure a maximum of the reaction rate. The optimum temperature lies between 28 and 38°C. There are: 3 graphs and 7 Soviet references.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskiy institut (Dnepropetrovsk Chemical-Technological Institute)

SUBMITTED: September 12, 1957

Card 2/2



APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000516110009-8"

GORBONOS, M. M.

USSR (600)

Sugar - Manufacture and Refining

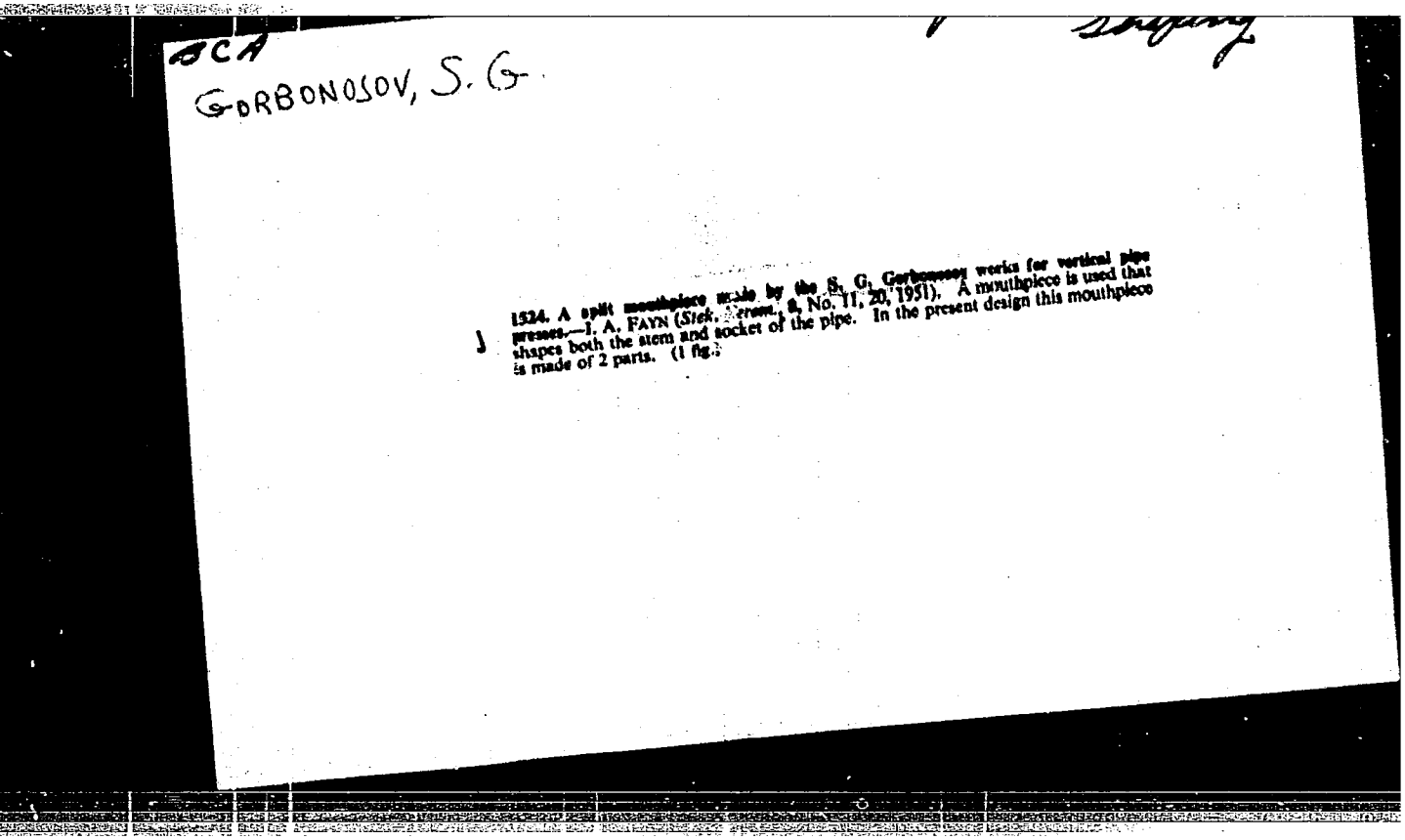
More attention to increasing the productivity of each unit. Sakh. prom. No. 7, 1952.

9. Monthly List of Russian Accessions, Library of Congress, October 1952, Uncl.

GORBONOS, M.M.

At the Odessa Sugar Refinery. Sakh. prom. 31 no.2:4 '57.
(MLRA 10:4)

1. Odesskiy rafinadnyy zavod.
(Odessa--Sugar industry--Equipment and supplies)



SCA

GORBONOSOV, S. G.

1524. A split mouthpiece made by the S. G. Gorbonosov works for vertical pipe presses.—I. A. FAYN (*Stek. i Farf.*, 1951, 8, No. 11, 20).—A mouthpiece is used that shapes both the stem and socket of the pipe. In the present design this mouthpiece is made of 2 parts. (1 fig.)

GORBONOSOVA, N. B.; LASKIN, S. B. (Leningrad)

Work conditions of radio operators on Baltic Sea steamships. Gig. truda i prof. zab. no.1:49-51 '62. (MIRA 15:2)

1. Basseynovaya sanitarno-epidemiologicheskaya stantsiya Severo-Zapadnogo Vodzdravotdela.

(RADIO OPERATORS--DISEASES AND HYGIENE)

Gerbonov, M. A.

POLAND/Acoustics. J

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10189

Author : Gerbonov, M.A.
Inst : Not given
Title : Investigation of the Absorption of Ultrasonic Waves in Benzyl Alcohol by Pulse Methods.

Orig Pub: Sb. stud. nauchn. rabot po estestv. matem. tsiklu Mosk. obl. ped. in-t, 1956, 1, 39-56

Abstract: A pulse method was used to measure the absorption of ultrasonic waves in benzyl alcohol at frequencies of 6.4 and 11.6 Mc in the temperature range from -17 to 40°.

It was found that in this range of frequencies the square-law dependence of the absorption on the frequency is retained. Absorption diminishes with increasing temperature.

A detailed description of the pulse apparatus is given.

Card : 1/1

KRUPSKAYA, A., apparatchitsa; GORBORUKOV, A.; VARUKHA, P.; KHACHIK'YAN, A.; NORKINA, V.; MAYOROVA, V., kontroler; ARONOVICH, V.; MOZHEVITINOV, V., pensioner, yuriskonsul't, obshchestvennik

Interview with our reporter. Sov.profsoiuzy 7 no.2:40-44, 48-49, 51-55

1. Novo-Kubanskiy sakharnyy zavod (for Krupskaya). 2. Predsedatel' komiteta profsoyuza Apsheronskogo avtoremontnogo zavoda(for Gorborukov). 3. Direktor Kubanskogo sel'skokhozyaystvennogo instituta (for Varukha). 4. Chlen profsoyuznogo posta po kontrolyu za stroitel'stvom zhilogo doma (for Norkina). 5. Chlen Starominskogo raykoma profsoyuza meditsinskikh rabotnikov (for Khachik'yan). 6. Zavodskaya izmeritel'naya laboratoriya. Predsedatel' komissii obshchestvennogo kontrolya za rabotoy Krasnodarskogo raypishchetorga (for Mayorova). 7. Predsedatel' kul'tkomissii profsoyuza zavoda izmeritel'nykh priborov (for Aronovich).
(Labor and laboring classes)

GORBOV, A.

Committee of innovators. Avt.transp. 39 no.10:9 O '61. (MIRA 14:10)

(Highway transport workers)

GORBOV, A., inzh.; IVANOV, A., inzh.

Organizing the repair of motor-vehicle tires. Avt.transp. 39 no.9:24-25 S '61. (MIRA 14:10)
(Tires, Rubber--Repairing)

CA

Continental salt concentrations in the Kulundina desert. A. F. Gortsov. *Doklady Akad. Nauk S.S.S.R.* 71, 921-4 (1950).—The alluvial sediments in the depressions of east Kazakhstan, Altaf, and Salair are mostly the products of glacial and interglacial water deposition. The arid climate is favorable for the formation of typical salt marshes and salt lakes. The chem. character of the salts is very variable. Chlorides and sulfates of Na prevail; the concn. of the salt waters also varies widely, from fresh water to supersatd. solns. Halite, thenardite, mirabilite, natron, or gaylussite are typical crystn. products. Three lake groups of the Kulundina depression were investigated for their hydrological and chem. conditions: (1) those around the Ishtyka Lake, (2) the basin of the salt desert with the weakly mineralizing Berdalsaf and Malinova lakes, and (3) the soda lake of Tanatar, with its salt marshes. The chem. character of the affluxing waters is typically sodic-carbonatic, with CO_3^{--} prevailing over Cl^- (ratio about 3.0), while in the lakes proper the CO_3^{--} and Cl^- concns. are about equal. The sodium carbonate waters are originating from the strong leaching of the sands of the glacial and interglacial sediments, which are prevailingly arkose sands, with 30 to 60% alkali feldspar and acidic plagioclase. These feldspars are derived from effusive rocks of the Altaf Ore Mts. which were freighted by the glacial ice streams to the depressions. Actual surface waters (av. of 120 analyses) confirm the theory of leaching of such alk. primary rock debris: they are all of the $Na\text{-}CO_3$ type. The climatological conditions of the more arid period of interglacial time were more favorable for the production of Cl^-, SO_4^{--} and Na^+, Mg^{++} solns. which are enriched in the end states of the salt lake deposits, while the higher humidity and cooler temp. conditions of the post-glacial recent period favor the Na_2CO_3 leaching from the desert bottoms. The chlorides are the salts of highest mobility in this natural differentiation cycle; they are followed by the less mobile sulfates, and last by the carbonates. W. Eitel

GORBOV, A. F.

Water - Composition. Lakes - Kulundin Desert.

Zonality of the chemical composition of waters in the Kulundin Steppe; Dokl. An SSSR 81 no. 5, 1951.

Monthly List of Russian Accessions, Library of Congress, May 1952. UNCLASSIFIED.

Vsesoyuznyy Nauchno-issledovatel'skiy
Institut Galurgii.
Red. 19 July 1951

CH

8

Formation of thenardite in lakes of the Kulundina steppe. A. F. Chufyev. *Doklady Akad. Nauk S.S.S.R.* 74, 0[illegible] (1950).—The salt lakes Lonnoy, Malikonoy, and Kochkor[illegible] with brines of high NaCl concn. (d. 1.30 to 1.32) chiefly deposit in the upper horizons NaCl, in deeper layers mirabilite ($Na_2SO_4.10H_2O$). Thenardite is observed in peculiar spots which occur in flat dishlike basins, of 1 to 25 m. diam. on a karst-like surface; even in summer time, these basins contain a brine. From the abundant mud inclusions, the thenardite is black, with very coarse crystals in a layer of 20 to 40 cm. thickness above the mud. The geol. conditions are very particular; there are deep holes in a layer of thick mud above the mirabilite deposit. Near the deepest points of the basins, there are orifices of channels from which a colorless brine circulates during the season changes. The temp. in the mud layer is 25 to 27° in summer, and NaCl and mirabilite crystals are formed all through the mud. The surface of the layer is very uneven, with many erosion cavities brought about by the circulating solns. in the summer season. The chem. process of the thenardite formation is a typical "incongruent melting" of the mirabilite under summer conditions; the satd. solns. penetrate through the mud layer, and enhance the crystn. equilibria on both sides, while the contact with the NaCl layer enhances the pptn. of the thenardite. W. Rittel

GORBOV, A. F

15-57-7-9418

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 7, p 98 (USSR)

AUTHOR: Gorbov, A. F.

TITLE: The Chemical Formula of Kornerupine (O khimicheskoy formule kornerupina)

PERIODICAL: Tr. Vses. n.-i. in-ta galurgii, 1956, Nr 32, pp 407-409

ABSTRACT: A comparison of chemical analyses of kornerupine from various deposits, as well as calculations of their molecular relations, shows that its formula has been subjected to systematic changes. The extreme representatives of the kornerupine series may be expressed by the formulas $(Mg,Fe)_{12}Al_{14}B_2Si_{10}O_{56}$ and $(Mg,Fe)_9Al_{16}B_2Si_{10}O_{56}\cdot H_2O$. Kornerupine is an aluminoborosilicate, approximating grandidierite or tourmaline in composition but characterized by a

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15-57-7-9418

The Chemical Formula of Kornerupine (Cont.)

lower content of B, Ca, and alkalies.
Card 2/2

S. M. Korenevskiy

Carbonatization of the borates of Indera. A. F. Gorbov. *Doklady Akad. Nauk S.S.S.R.* 109 [illegible]. On the hydrolysis of borates: cf. Nikolaev [illegible] *ical Study of Native Borates* 1947. [illegible] About 70% of the Inder borates are [illegible] while the Ca borates only make up about [illegible] posits. Szaibelyite is easily hydrolyzed, and the [illegible] alk. solns. form with CO_2 sol. or insol. carbonates [illegible] aragonite), besides gypsum and epsomite. The Ca borates remain unchanged. Ten complete chem. analyses are given of szaibelyite samples in different degrees of carbonization. They distinctly show the simultaneous removal of MgO and B_2O_3 in the "bulk" compns., with increasing CO_2 and CaO, by the action of CO_2 and $CaSO_4$ contg. waters. Epsomite and sassolite, H_3BO_3, are dissolved and withdrawn from the deposits. W. Eitel

GORBOV, A.F.

Formation and distribution of borate deposit of the volcanic sedimentary type. Trudy VNIIG no.40:3-70 '60.
(MIRA 14:11)

(Borates)

GORBOV, A.F.

Principles of the genetic classification of borates. Trudy VNIIG no.40:392-446 '60. (MIRA 14:11)
(Borates--Classification)

GORBOV, B.D.

AID P - 1394

Subject : USSR/Electricity

Card 1/1 Pub. 26 - 21/30

Authors : Gorbov, B. D., and Kazak, I. A., Engs.

Title : Experiment in melting sleet on single 35-kv radial distribution lines without disconnecting consumers.

Periodical : Elek. Sta., 2, 55, F 1955

Abstract : The authors describe the method used which consists in applying a melting current. A diagram gives the connection details.

Institution: None

Submitted : No date

GORBOV, F. [D.]

AID P - 1813

Subject : USSR/Aeronautics

Card 1/1 Pub. 35 - 8/18

Author : Gorbov, F., Lt.Col. of the Medical Service, Kand. of Med. Sci.

Title : The problem of orientation in space

Periodical : Vest. voz. flota, 3, 40-44, Mr 1955

Abstract : The author explains the action of forces on the human body in flight. He is especially concerned with the physiological reactions of the labyrinth of the ear and the whole apparatus of equilibrium.

Institution: None

Submitted : No date

Summary of article D 28309, Jul '55

GORBOV, F. D.

AID P - 1984

Subject : USSR/Aeronautics

Card 1/1 Pub. 135 - 8/20

Authors : Bryanov, I., Gorbov, F., Lt. Cols. of the Medical Service and Timofeyev, B., Sen. Lt.

Title : Flyers' sport games

Periodical : Vest. voz. flota, 5, 47-51, My 1955

Abstract : In the first part of this article, "Some problems of physiology", the author explains physiological reactions in flight and the possibility of developing certain necessary flying qualities. In the second part, "Our experiment in leading sport games", the author cites the advantages of games over other physical exercises and gives examples of special training which may be acquired in games.

Institution: None

Submitted : No date

GORBOV, F.D.

AID P - 4620

Subject : USSR/Aeronautics - physiology of flying

Card 1/1 Pub. 135 - 9/23

Author : Gorbov, F. D., Lt. Col. of med. service, Candid. of med. sci.

Title : How to understand physiological fundamentals of spatial orientation.

Periodical : Vest. vozd. flota, 4, 47-50, Ap 1956

Abstract : The author discusses the problems of spatial orientation and arrives to the conclusion that of particular importance to the pilots is such physical training, which develops the sense organs for coordinated work. The article may be of some value.

Institution : None

Submitted : No date

GORBOV, F.D., kand.med.nauk, podpolkovnik med.sluzhby; CHAYNOVA, L.D.

Experimental psychological study of flying personnel. Voen.-med. zhur. no.10:36-41 O '59. (MIRA 13:3)
(AVIATORS, psychol.)
(PSYCHOLOGICAL TESTS)

CHAYNOVA, L.D.; GOKBOV, F.D. (Moskva)

"Difficult conditions" arising in tasks of complex differentiation under limited activity. Vop. psikhol. 6 no. 6:123-130 N-D '60. (MIRA 13:12)

(Flight--Physiological aspects)

VOLYNKIN, Yu.M.; YAZDOVSKIY, V.I.; GENIN, A.M.; VASIL'YEV, P.V.; GYURDZHIAN, A.A.; GUROVSKIY, N.N.; GORBOV, F.D.; SERYAPIN, A.D.; BELAY, V.Ye.; BAYEVSKIY, R.M.; ALTUKHOV, G.V.; KOPANEV, V.I.; KAS'YAN, I.I.; YEGOROV, A.D.; SIL'VESTROV, M.M.; SIMPURA, S.F.; TERENT'YEV, V.G.; KRYLOV, Yu.V.; FOMIN, A.G.; USHAKOV, A.S.; DEGTYAREV, V.A.; VOLOVICH, V.G.; STEPANTSOV, V.I.; MYASNIKOV, V.I.; YAZDOVSKIY, V.I.; KASHIN, P.S., tekhn. red.

[First space flights of man; the scientific results of the medicobiological research conducted during the orbital flights of the spaceships "Vostok" and "Vostok-2"] Pervye kosmicheskie polety cheloveka; nauchny rezul'taty mediko-biologicheskikh issledovanii, provedennykh vo vremia orbital'nykh poletov korablei-sputnikov "Vostok" i "Vostok-2." Moskva, Izd-vo Akad. nauk SSSR, 1962. 202 p. (MIRA 15:11)
(SPACE MEDICINE) (SPACE FLIGHT TRAINING)

S/245/62/000/001/002/002
1015/1215

AUTHOR: Gorbov, F. D. (Moscow)

TITLE: The mechanism of retrograde and antegrade amnesia

PERIODICAL: Voprosy psikhologii, no. 1, 1962, 37–44

TEXT: The mechanism of retrograde and antegrade amnesia has not been studied, and no satisfactory explanation of this phenomenon exists. Paroxysmal memory disorders are frequently observed among high-speed aircraft crews. In these cases three is no concurrent loss of conscious activity. Both types of amnesia were found to be associated with cortical hyperactivity. Since memory is a psychic phenomenon, it is assumed that loss of memory is also due to extreme tension in the individual. An inverse relationship between memory, trace-formation, and motion was established. Extreme tension during motion activity suppresses memory, whereas the necessity to remember brings about arrest of motion. Both types of amnesia are considered normal memory processes, masked under normal conditions and exposed during psychic tension or loss of consciousness.

Card 1/1

GORBOV, F.D. (Moskva)

Space psychology. Vop.psikhol. no.6:3-13 N-D '62. (MIRA 16:2)
(Astronautics--Psychology)

GORBOV, F.D., kand.med.nauk

Training of cosmonauts. Zdorov'e 8 no.5:6-7 My '62. (MIRA 15:5)
(SPACE FLIGHT TRAINING)

[redacted]; KORESHKOV, Aleksey Aleksandrovich; LAGUTINA, Ye.V., red.; NAZAROVA, A.S., tekhn. red.

[Space medicine] Kosmicheskaia meditsina. Moskva, Izd-vo "Znanie," 1963. 55 p. (Narodnyi universitet kul'tury: Fakul'tet zdorov'ia, no.7) (MIRA 16:8)
(SPACE MEDICINE)

ACCESSION NR: AT4042671 S/0000/63/000/000/0137/0140

AUTHOR: Myasnikov, V. I.; Gorbov, F. D.; Yazdovskiy, V. I.

TITLE: Effects of prolonged isolation

SOURCE: Konferentsiya po aviatsionnoy i kosmicheskoy meditsine, 1963. Aviatsionnaya i kosmicheskaya meditsina (Aviation and space medicine); materialy* konferentsii. Moscow, 1963, 137-140

TOPIC TAGS: hypokinesia, blood circulation, man, hypodynamia, physiological function, functional effect

ABSTRACT: Subjects were kept for periods of 10--15 days in continuous isolation in a special chamber. Isolation was assured by absence of two-way communication and almost complete exclusion from all external sources of light, sound, and other stimulii. One-way communication from the subject to the experimentor was performed for limited periods. Evaluation of the functional condition of the organism was performed on the basis of the observation of behavior and emotional reactions, the dynamics of bioelectrical activity of the cortex, the determination of the quickness of response of the motor reaction, and the carrying out of experi-

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ACCESSION NR: AT4042671

mental psychological tasks, and comments of the subjects, which were recorded on a magnetic tape. The experiments indicated that a sharp limitation of general afferentation has considerable effect on the subjects. Neuropsychiatric changes at various stages of the experiment were very varied. The recording of many psychological and physiological indices makes it possible to establish qualitative peculiarities of these changes. In particular, it makes it possible to determine and establish limits for conditions of strain and fatigue. The monotony of the surroundings, the poverty of external impressions, and the solitude were revealed as factors having independent significance as conditions and causes of development of strain and fatigue. This, in turn, determines not only the necessity but also the possibility of setting up countermeasures against these conditions by using stimulation calculated to produce the optimum interaction between the afferent systems.

ASSOCIATION: none

SUBMITTED: 27Sep63 ENCL: 00 SUB CODE: LS

NO REF SOV: 00 OTHER: 00

Card 2/2

VOLYNKIN, Yu.M.; YAZDOVSKIY, V.I., prof.; GENIN, A.M.; GAZENKO, O.G.; GUROVSKIY, N.N.; YEMEL'YANOV, M.D.; MIKHAYLOVSKIY, G.P.; GORBOV, F.D.; SERYAPIN, A.D.; BAYEVSKIY, R.M.; ALTUKHOV, G.V.; KOPANEV, V.I.; KAS'YAN, I.I.; MYASNIKOV, V.I.; TERENT'YEV, V.G.; BRYANOV, I.I.; FEDOROV, Ye.A.; FOMIN, V.S.; ARUTYUNOV, G.A.; ANTIPOV, V.V.; KOTOVSKAYA, A.R.; KAKURIN, L.I.; TSELIKIN, Ye.Ye.; USHAKOV, A.S.; VOLOVICH, V.G.; SAKSONOV, P.P.; YEGOROV, A.D.; NEUMYVAKIN, I.P.; TALAPIN, V.F.; SISAKYAN, N.M., akademik, red.; KOLPAKOVA, Ye.A., red.izd-va; ASTAF'YEVA, G.A., tekhn.red.

[First group space flight; scientific results of medical and biological studies carried out during the group orbital flight of manned satellites "Vostok-3" and "Vostok-4] Pervyi gruppovoi kosmicheskii polet; nauchnye rezul'taty mediko-biologicheskikh issledovanii, provedennykh vo vremia gruppovogo orbital'nogo poleta korablei-sputnikov "Vostok-3" i "Voskot-4." Moskva, Izd-vo "Nauka," 1964. 153 p. (MIRA 17:3)

VOLYNKIN, Yu.M.; ARUTYUNOV, G.A.; ANTIPOV, V.V.; ALTUKHOV, G.V.; BAYEVSKIY, R.M.; BELAY, V.Ye.; BUYANOV, P.V.; BRYANOV, I.I.; VASIL'YEV, P.V.; VOLOVICH, V.G.; GAGARIN, Yu.A.; GENIN, A.M.; GORBOV, F.D.; GORSHKOV, A.I.; GUROVSKIY, N.N.; YESHANOV, N.Kh.; YEGOROV, A.D.; KARPOV, Ye.A.; KOVALEV, V.V.; KOLOSOV, V.A.; KORESHKOV, A.A.; KAS'YAN, I.I.; KOTOVSKAYA, A.R.; KALIBERDIN, G.V.; KOPANEV, V.I.; KUZ'MINOV, A.P.; KAKURIN, L.I.; KUDROVA, R.V.; LEBEDEV, V.I.; LEBEDEV, A.A.; LOBZIN, P.P.; MAKSIMOV, D.G.; MYASNIKOV, V.I.; MALYSHKIN, Ye.G.; NEUMYVAKIN, I.P.; ONISHCHENKO, V.F.; POPOV, I.G.; PORUCHIKOV, Ye.P.; SIL'VESTROV, M.M.; SERYAPIN, A.D.; SAKSONOV, P.P.; TERENT'YEV, V.G.; USHAKOV, A.S.; UDALOV, Yu.F.; FOMIN, V.S.; FOMIN, A.G.; KHLEBNIKOV, G.F.; YUGANOV, Ye.M.; YAZDOVSKIY, V.I.; KRICHAGIN, V.I.; AKULINICHEV, I.T.; SAVINICH, F.K.; STEMPURA, S.F.; VOSKRESENSKIY, O.G.; GAZENKO, O.G., SISAKYAN, N.M., akademik, red.

[Second group space flight and some results of the Soviet astronauts' flights on "Vostok" ships; scientific results of medical and biological research conducted during the second group space flight] Vtoroi gruppovoi kosmicheskii polet i nekotorye itogi poletov sovetskikh kosmonavtov na korabliakh "Vostok"; nauchnye rezul'taty medikobiologicheskikh issledovanii, provedennykh vo vremia vtorogo gruppovogo kosmicheskogo poleta. Moskva, Nauka, 1965. 277 p. (MIRA 18:6)

GORBOV, F.D.; NOVIKOV, M.A.

Experimental psychology study of a group of astronauts. Probl. kosm biol. 4:17-26 '65. (MIRA 18:9)

L 11781-66 FSS-2/EWT(1)/FS(v)-3 DD

ACC NR: AP6003276 SOURCE CODE: UR/0246/66/066/001/0081/0088

AUTHOR: Gorbov, F. D. (Moscow); Kuznetsov, O. N. (Moscow); Lebedev, V. I. (Moscow)

ORG: none

TITLE: The modeling of psychosensory disorders under conditions of short-term weightlessness

SOURCE: Zhurnal nevropatologii i psikhiatrii, v. 66, no. 1, 1966, 81-88

TOPIC TAGS: human physiology, parabolic flight, weightlessness, space psychology, spatial disorientation, ~~depersonalization~~

ABSTRACT: The authors reviewed 10 Western and 28 Soviet sources to demonstrate that the reaction of healthy subjects to short-term weightlessness (20—60-sec parabolic flights) can be used as a model of some clinical psychosensory disorders such as depersonalization, derealization, the "end-of-the-world" syndrome, etc. The reaction characteristics of subjects exposed to weightlessness fall into three categories. In the first, weightlessness is tolerated without difficulty or unpleasant sensation, and working ability is not impaired. It is stated that all Soviet cosmonauts fall into this category. The second category consists of subjects who experience acute sinking, tumbling, soaring, counterrotational, and upside-down sensations, accompanied by sensations of discomfort, fear, and loss of spatial orientation during the first 4—5 sec of weightlessness. These sensa-

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ACC NR: AP6003276

tions are interchangeable with those of happiness, playfulness, and euphoria. Subjects in the second category ultimately adapt to subsequent flights. The third category consists of individuals whose illusory reactions to weightlessness are more severe and persist throughout the entire weightless period, often resulting in seasickness. Some individuals of a subgroup of the third category experience acute sinking sensations which lead to hysteria, involuntary screaming, and increased motor activity, persisting throughout the entire weightless period. Such a complete loss of spatial orientation is compared to depersonalization or the "end-of-the-world" syndrome. In general, there are many significant features common to both psychosensory disorders and those perceptual sensations observed during parabolic flights. An analysis of psychophysiological reactions to short-term weightlessness can serve to confirm theories of the origins of disintegrative psychosensory disorders. Weightlessness data indicates that psychosensory reactions have three phases: In the first phase, there is a dissociation of analyzer activity which can be accompanied by unpleasant sensations and unstable spatial illusions; in the second phase, depersonalization reactions occur although the subject interprets the illusions rationally; in the third phase, depersonalization and derealization occur with delirious illusory interpretations by the subject. It is concluded that the analysis of psychosensory reactions to short-term weightlessness can lead to an understanding of the pathogenic mechanisms of clinical psychosensory disorders, just as studies of specific reactions to isolation and sensory deprivation can serve to elucidate some heretofore unclear questions concerning various psychiatric syndromes. [CD]

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L 11781-66
ACC NR: AP6003276

SUB CODE: 22,06/ SUBM DATE: 22Jun65/ ORIG REF: 028/ OTH REF: 010/
ATD PRESS: 4150

HW
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GORBOV, F.D.; KUZNETSOV, O.N.; LEBEDEV, V.I. (Moskva)

Modeling of psychosensory disorders under the effect of temporary weightlessness. Zhur.nevr. i psikh. 66 no.1:81-88 '66.
(MIRA 19:1)

1. Submitted June 22, 1965.

L 31152-66 RD

ACC NR: AT6003836 SOURCE CODE: UR/2865/65/004/000/0017/0026

AUTHOR: Gorbov, F. D.; Novikov, M. A.

ORG: none

TITLE: Experimental psychological testing of cosmonaut teams

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 17-26

TOPIC TAGS: cosmonaut training, cosmonaut selection, Rorschach test, space psychology, psychologic stress, space flight simulation, behavior pattern

ABSTRACT: Because of the enormous speed of spaceflight, many ordinarily unnoticed, insignificant factors become psychophysiological stressors with potentially serious consequences. Flight conditions which act as psychological stressors are: 1) the continuous nature of flight activity; 2) the rigorous sequence of operations required by flight programs; 3) time-deficit conditions; 4) "remoteness" of sensory functions (all information, even about one's own body position, available only at second hand from instruments); 5) "postural" factors (i.e., disruption of "seat-of-pants" orientation by alteration or absence of gravity forces); 6) the "novelty"

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factor (tension induced by novel conditions); and 7) reduced afferentation (due to weightlessness, isolation, and noise impeding perception of instrument and communications signals). The importance of all these factors as stressors became known through study of the reactions to them of inadequately trained personnel.

Functional tests are of great importance in eliminating unsuitable cosmonaut candidates and enhancing resistance in the candidates chosen, since a high level of functional capacity is required to resist various known and predicted factors. Functional tests have proven effective both in uncovering hidden pathologies and in eliminating personnel with inadequate psychopathological characteristics.

An experimental battery of test stressors modeling one or another factor of dangerous or unreproducible situations (e.g., plane crashes) was devised in consultation with experienced air crews. The first step in this work was to isolate the psychological factors and to devise rigorously reproducible methods for studying them.

A single psychological factor—suggestibility—will be taken as an example. Suggestibility was studied experimentally by determining indi-

vidual electrophysiological characteristics during assimilation of rhythms (rhythmical light stimulation, Livanov stimulation, and trigger stimulation) in conjunction with hypnopedia. In addition, "tandem" verbal experiments revealing the "leader" and the "led" members of each pair of subjects were used. These were supplemented by Rorschach tests and by Uglov's placebos in conjunction with standardized drug tests.

Group studies were also undertaken, to elucidate the mechanisms of cooperation and teamwork. The concept of strategy is basic in considering the behavior of groups and of individual members of groups. The work of the sociometrists (Moreno) was rejected as reactionary and mystical, and that of the group dynamicists (Levin's hierarchical approach) as too rigid (since it regards the subordination of one link to another as predetermined and unalterable for all sets of circumstances in which the group may find itself).

The studies of group behavior followed two main lines of investigation: 1) psychological aspects of pilot interaction during interdependent activity, and 2) psychological aspects of cohabitation under complex conditions of prolonged group isolation. Both lines of study included investigation of psychophysiological compatibility and functional subordination, and evaluation of the integrative behavior of the group.

Psychophysiological compatibility is based on community of interests, aims, needs, and the absence of pronounced egocentric tendencies. In addition, people living in close proximity and engaging in intensive activity are affected by mutual suggestion and induction, imitation, and reciprocal syntony. Experimental observations were based on verbal and behavioral reactions and psychoemotional manifestations. Compatibility was characterized by isodirectionality not only of external behavioral reactions of the subjects, but also of their physiological indices during periods of intensive activity and emotional stress. Harmonious teamwork was characterized by the imposition by one subject of his response reactions on the others, and by isodirectionality of pulse variations with a high (0.65) coefficient of correlation. Unharmonious team activity was marked by the absence of mutually imposed behavior and a low correlation of autonomic reactions.

The integrative action of the group was studied by the "homeostat," a device similar in principle to the "cooperative four-man showerbath" recently created in a Moscow health institute. This showerbath is so designed that four persons bathing simultaneously can obtain sufficient quantities of near-comfortable water only by cooperating. "Egocentric" behavior

directed at obtaining more than one's share prompts the other bathers to make adjustments, which automatically cause the offender to be drenched with icy or scalding water. The conditions of the "game" demand a "conflict strategy" of cooperation.

The homeostat consists of a device for modeling and solving problems of various degrees of difficulty, controlled by three or four interconnected inputs of equal strength. Work indices of each operator are automatically recorded and the dynamics of his activities evaluated during the experiment, making it possible to discern and follow the formulation of individual strategies. Problems of all degrees of complexity were used, from very simple ones solved in seconds to very difficult ones which were beyond the powers of the group. Although the subjects learned to solve the problems, they could not usually describe the processes by which they had done so. When the group failed to solve a problem, one of its members would be replaced by a laboratory worker familiar with homeostat operation. Once this group, including the laboratory worker, had succeeded in solving the problem, the group as originally constituted (with the absent member restored) was also able to solve the problem, as though the original failure had been due to inability on the part of the absent member. Just how this learning transfer (lab worker to group and group to absent member) takes place is also unclear.

In solving integrative problems, the choice of individual strategies reflects psychologically subordinate interaction and functional subordination within the group. Group problem solving is generally characterized by differences in the contribution of each subject to the solution. Almost always one subject can be identified as directing the general strategy of the group, while the other members involuntarily and even unconsciously defer to his leadership. Apparently functional subordination is an essential feature of group activity, but it does not follow from this that the "leader" of a group during one type of activity will remain the leader if a different activity is substituted. The stability of subordinative interrelations must be evaluated by subsequent behavior of the group in new integrative test situations.

The types of interaction discussed are compared to Sherrington's funnel concept of the competition of reflexes for a final common path. In the latter situation the effector system occupying the path does not entirely displace other systems; there occurs rather a game-type interaction, in which the weight and influence of each effector system changes at the moment of reaction. Something similar occurs when an experimental group engaged in interdependent activity moves from problems of a given complexity to problems of a different degree of complexity. Each of the subjects, who are

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functioning in a sense as complex efferent systems, changes his output, his strategy during the period of activity. This analogy is not claimed to be complete, and the authors do not regard the activity of several subjects interconnected through the homeostat as a model of the interrelations between pyramidal, extrapyramidal, and purely segmental effects of the forward process of the spinal cord on the effector systems of the extremities. Nevertheless, in complex systems composed of equivalent interconnections, the immediate effects of the removal of one element may be general in character. Orig. art. has: 2 tables. [ATD PRESS: 4091-F]

SUB CODE: 05 / SUBM DATE: none

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L 47295-66 EEC(k)-2/EWT(1)/FSS-2 SCTB TT/DD/RD/GW

ACC NR: AP6032042 SOURCE CODE: UR/0245/66/000/005/0067/0071

AUTHOR: Gorbov, F. D. (Moscow); Kosmolinskiy, F. P. (Moscow); Myasnikov, V. I. (Moscow) 41 B

ORG: none

TITLE: Some characteristics of the effect of increased and decreased afferentation on the human organism from the standpoint of space psychophysiology 2

SOURCE: Voprosy psikhologii, no. 5, 1966, 67-71

TOPIC TAGS: human physiology, space physiology, space psychology, psychologic stress, isolation test, HUMAN SENSE, PSYCHOPHYSIOLOGY

ABSTRACT: Characteristics of human reactions to increased and decreased afferentation were studied using a variety of approaches. Formation of the "man—spacecraft—surrounding atmosphere" concept was studied in experiments with centrifuges and special testing units of the author's invention [not described]. In order to produce an excess of sensory information, various types of communication were imitated and interference close to the signal frequency being used was introduced. Results of these experiments were compared with data from sensory deprivation experiments and requirements for good nervous tolerance of changes in afferentation were formulated. Studies have shown that sensory deprivation produces important psychophysiological shifts, including lowered work capacity, loss of general tone, and appearance of apathy.

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However, it is considered that the high degree of motivation associated with actual spaceflight will prevent the occurrence of pathological states such as depression, hallucination, and personality disintegration. The cosmonaut selection and training program is also mentioned as a factor in preventing severe psychic disturbances during prolonged isolation. Spaceflight situations presenting the cosmonaut with an excess of sensory information occur routinely during radiocommunication with Earth, during repair work or special scientific investigations, or in any complex spaceflight situation. In-flight aircraft refueling is considered a good model of a stress situation because it requires attention, accurate work, and a high degree of motor coordination. Furthermore, the refueling operation is usually performed when the pilot is in a state of poor physiological tone due to previous use of the automatic pilot. While refueling, pilots are under great emotional stress, and physiological limits are pushed (heart beat up to 160—186 beats/min, breathing rate up to 40—50 times/min, weight loss up to 5—7% of total). Psychophysiological analysis of these data reveals two main reasons for the acute strain. First, the pilot is upset by the narrowing of his field of vision to include the other aircraft. Secondly, psychological difficulty is created by the combination of two types of activity, the well-known habits of normal piloting and the unfamiliar tasks associated with refueling. Several preventive measures for avoiding nervous and emotional strain in conditions of sensory deprivation or excess information are suggested. First, the necessary postural and motor habits must be acquired, and the cosmonaut must learn to program situations correctly in advance. Stress can be avoided if the optimum work-rest regimes are observed and special patterns of motor activity are followed.

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In order to increase general physiological supplementary tone and to reduce nervous tension, the following amounts of vitamins are reoommended: 300 mg of ascorbic acid, 50—150 mg of vitamin P, 25 mg of vitamin B_1, and others. [JS]

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Card 3/3

ACC NR: AT6036516 SOURCE CODE: UR/0000/66/000/000/0094/0095

AUTHOR: Vasil'yev, V. K.; Gorbov, F. D.; Novikov, M. A.; Savvin, A. B.; Tambiyev, Ye. Z.

ORG: none

TITLE: Investigation of the possibility of creating a conflict situation during interdependent cooperative pilot teamwork by means of mathematical modeling [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24 to 27 May 1966.]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 94-95

TOPIC TAGS: mathematical model, group dynamics, space psychology, cosmonaut training, homeostasis

ABSTRACT: In recent years the "man-machine" problem has commanded increasing attention. Two trends have emerged from investigations devoted to this problem: the first involves a study of a possible optimum relationship between the operator and the machine; and the second considers the solution to mission-oriented problems by the operator. The majority of experiments have been devoted to the characteristics of one operator inter-

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acting with a mechanical system. However, the operator teamwork is of special interest.

The "homeostat" device makes it possible to conduct experimental tests on an operator participating in a team and receive quantitative data which can be used to construct a mathematical model of their interdependent activity.

Present information indicates that during the solution of "difficult" problems on the homeostat, there is a division of responsibility among the operators necessary for fullfilling the mission. Therefore, the possibility exists of constructing a heuristic model from experimental data by considering the differentiated nature of different operator tasks in one group or another.

Two approaches to studying operator tactics on the homeostat can be demonstrated; a) operator performance in a nonconflicting situation where the problem can be solved; b) operator performance in a conflicting situation where the problem cannot be solved. The latter approach is of special interest in selecting special, mission-oreinted groups (space-flight teams, expeditionary groups etc.).

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A mathematical model was constructed reflecting the operation of the homeostat in standard regime (static model). Based on this model, it is possible to select exchange-coefficient values corresponding to a predetermined conflicting or nonconflicting situation. Some data have been obtained on the dynamic characteristics of operators during teamwork.
[N. A. No. 22; ATD Report 66-116]

SUB CODE: 05, 06 / SUBM DATE: 00May66

Card 3/3

ACC NR: AT6036535 SOURCE CODE: UR/0000/66/000/000/0127/0129

AUTHOR: Gorbov, F. D.; Myasnikov, V. I.

ORG: none

TITLE: Trace reactions on human electroencephalograms and their significance in evaluating the functional state of the organism /Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24 to 27 May 1966./

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 127-129

TOPIC TAGS: biotelemetry, electroencephalography, space medicine, space physiology, psychophysiology

ABSTRACT: The broad introduction of automatic, telemechanical, and cybernetic devices and electronic computer technology has created problems, one of which involves reliability from the standpoint of human work capacity in a man-machine system. Complex interrelationships developing between a man and machine often lead to functional shifts in the operator, characterized by emotional strain, sleepiness, or manifestations of fatigue. The possibility of such shifts necessitates continuous monitoring and timely recognition of initial deviations in the functional condition of the organism.

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ACC NR: AT6036535

According to the literature and electrographic indices, a pronounced similarity is noted between drowsiness and fatigue. The necessity of isolating these states was the basis of a detailed clinical and mathematical analysis. The basic index was the characteristics of the EEG trace reactions dynamics or exalted bursts of alpha rhythm in response to a light stimulus.

Since the physical characteristics of the light stimulus (flash frequency and brightness) remained constant throughout the investigation and EEG trace reactions were qualitatively altered, comparing the duration of alpha-rhythm bursts on various days made it possible to judge the functional condition of the central nervous system.

The stagnant nature of alpha-rhythm exaltation (e. g., interrupted only by a subsequent stimulus) on a background of scattered, slow waves and a decrease in the amplitude of brain biopotentials on the EEG baseline curve were reliable signs of fatigue. On the other hand, brief, synchronized bursts of alpha rhythm (duration no greater than 10 sec) were characteristic of a drowsy state. This was indicated by the fact that an exaltation of alpha-rhythm occurred only after the repeated application of a light stimulus in these subjects. The basis was provided for concluding that manifestations of drowsiness during wakeful periods

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under conditions of prolonged isolation must be considered as a highly developed capacity against depression and a generally favorable protective and adaptive reaction of the organism against monotony and a uniform setting. On the other hand, manifestations of fatigue obviously require the adoption of special prophylactic and organizational measures.

[W. A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66

Card 3/3

ACC NR: AT6036536 SOURCE CODE: UR/0000/66/000/000/0129/0130

AUTHOR: Gorbov, F. D.; Novikov, M. A.; Bystritskaya, A. F.; Gerasimovich, A. A.; Karova, M. A.

ORG: none

TITLE: Homeostatic principle in modeling group activity [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24 to 27 May 1966.]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 129-130

TOPIC TAGS: homeostasis, cosmonaut training, cosmonaut selection, group dynamics, space psychology

ABSTRACT: Investigations conducted on the "Homeostat" model using 3 operators have demonstrated the importance of using the principle of group-integrative evaluation. The effectiveness of a group can not be prognosed by individual criteria; the success of the solution is determined not only by the activity of each operator, but by the nature of group interaction. An understanding of group strategy as a whole and the tactics of individual operators is of great importance. The strategy of a group must change

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