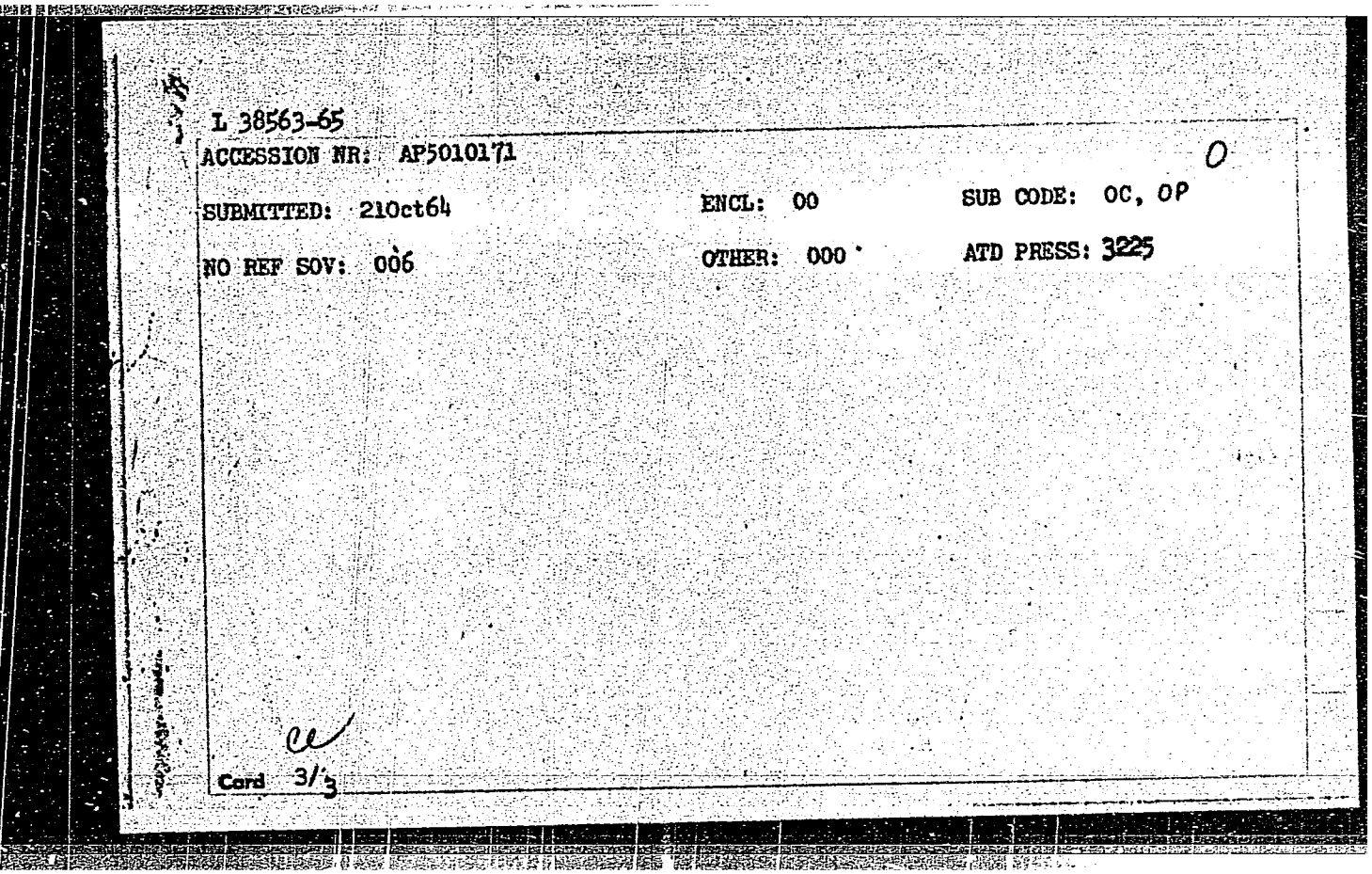
L 38563-65

ACCESSION NR: AP5010171

quinoline, polypropiolic acid, polymeric Schiff's bases, polyazines and polynitriles. All of these polymers were insoluble, colored solids with absorption maxima in UV and were p-type semiconductors in the air. They could be divided into two groups with respect to their catalytic effect on the oxidation of ascorbic acid: 1) photosensitizing polymers, such as heat-treated polyacronitrile, polyquinolines, polypropiolic acid, and poly-Schiff's bases, all of which promoted the photooxidation of ascorbic acid, which is not oxidized without catalyst; 2) catalysts in the dark: polynitriles and paracyanogen, the catalytic effect of which in general was inhibited by illumination in the sequence UV light > white light > red light. The following observations were made on the photosensitizing effect of the heat-treated polyacronitrile: 1) the presence of carbonized structures was not essential for the effect, since one of the most carbonized specimens displayed a very weak photosensitizing effect in the UV light and none under the white light; 2) the presence or absence of cross links was of no special influence, since polyacronitrile, heat treated in solution (which precluded the formation of cross links), displayed a rather high photosensitizing effect. Further investigation of the mechanism of the effect is being continued. Orig. art. has: 2 figures and 4 tables. [BN]

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchiyeva (Institute of Petrochemical Synthesis); Institut biokhimii im. A. N. Bakha Akademii nauk (Institute of Biochemistry, Academy of Sciences)

Card 2/3



L 38563-65
ACCESSION NR: AP5010171 0

SUBMITTED: 21Oct64 ENCL: 00 SUB CODE: OC, OP

NO REF SOV: 006 OTHER: 000 ATD PRESS: 3225

Card 3/3

NASIROV, F.M.; KRENTSEL', B.A.; DAVYDOV, B.E.

Acetylene polymerization process with a soluble catalytic system based on $AlEt_3$ and VO (acetyl acetonate)$_2$. Izv. AN SSSR. Ser. khim. no.6:1009-1016 '65. (MIRA 18:6)

1. Institut neftekhimicheskogo sinteza imeni Topchiyeva AN SSSR.

DAVYDOV, B.E.; DEMIDOVA, G.N.; NASIROV, F.M.; PIRTSKHALOVA, R.N.; ROZENSHTEYN, L.D.

Synthesis and electrophysical properties of polydiphenyldiacetylenes. Elektrokhimiia 1 no.7:876-880 Jl '65. (MIRA 18:10)

1. Institut neftekhimicheskogo sinteza AN SSSR i Institut poluprovodnikov AN SSSR.

SILIN', E.A. [Silins, E.]; MOTORYKINA, V.P.; SHMIT, I.K. [Smits, I.]; GEYDERIKH, M.A.; DAVYDOV, B.E.; KRENTSEL', B.A.

Structural transformations of polyacrylonitrile under the effect of infrared irradiation. Elektrokhimiia 2 no.1:117-122 Ja '66. (MIRA 19:1)

1. Latviyskiy gosudarstvennyy universitet i Institut neftekhimicheskogo sinteza AN SSSR, Moskva. Submitted April 27, 1965.

L 08536-67 EWT(m)/EWP(j) IJP(c) RM

ACC NR: AP6035590 SOURCE CODE: UR/0364/66/002/011/1332/1335

AUTHOR: Raskina, E. M.; Perekal'skaya, L. M.; Davydov, B. E.; Shishkina, M. V. 37

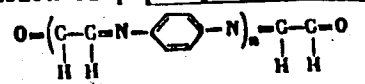
ORG: Institute of Petrochemical Synthesis im. A. V. Topchiyev, Academy of Sciences SSSR, Moscow (Institut neftekhimicheskogo sinteza Akademii nauk SSSR) B

TITLE: Preparation and study of complexes of Schiff bases

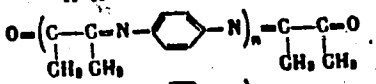
SOURCE: Elektrokhimiya, v. 2, no. 11, 1966, 1332-1335

TOPIC TAGS: organic semiconductor, semiconducting polymer, charge transfer complex

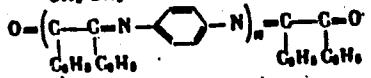
ABSTRACT: Charge transfer complexes of polymeric Schiff bases and bromine have been prepared and the effect of chemical structure on the physical, chemical and electrical properties of these complexes has been studied. The polymers (I-IV) were prepared by polycondensation of p-phenylenediamine with various dicarboxylic compounds:



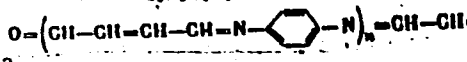
(I)



(II)



(III)



(IV)

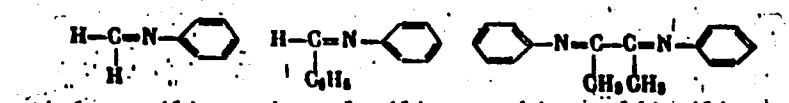
UDC: 621.315.592:547

Card 1/3

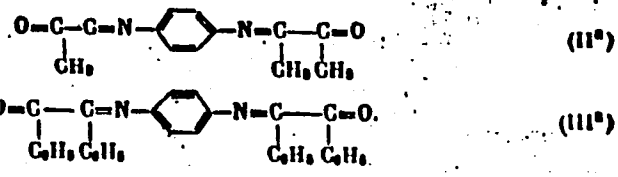
L 08536-67

ACC NR: AP6035590

For comparative purposes, analogous low-molecular-weight compounds were also prepared:



methyleneaniline benzalaniline biacetyldianiline

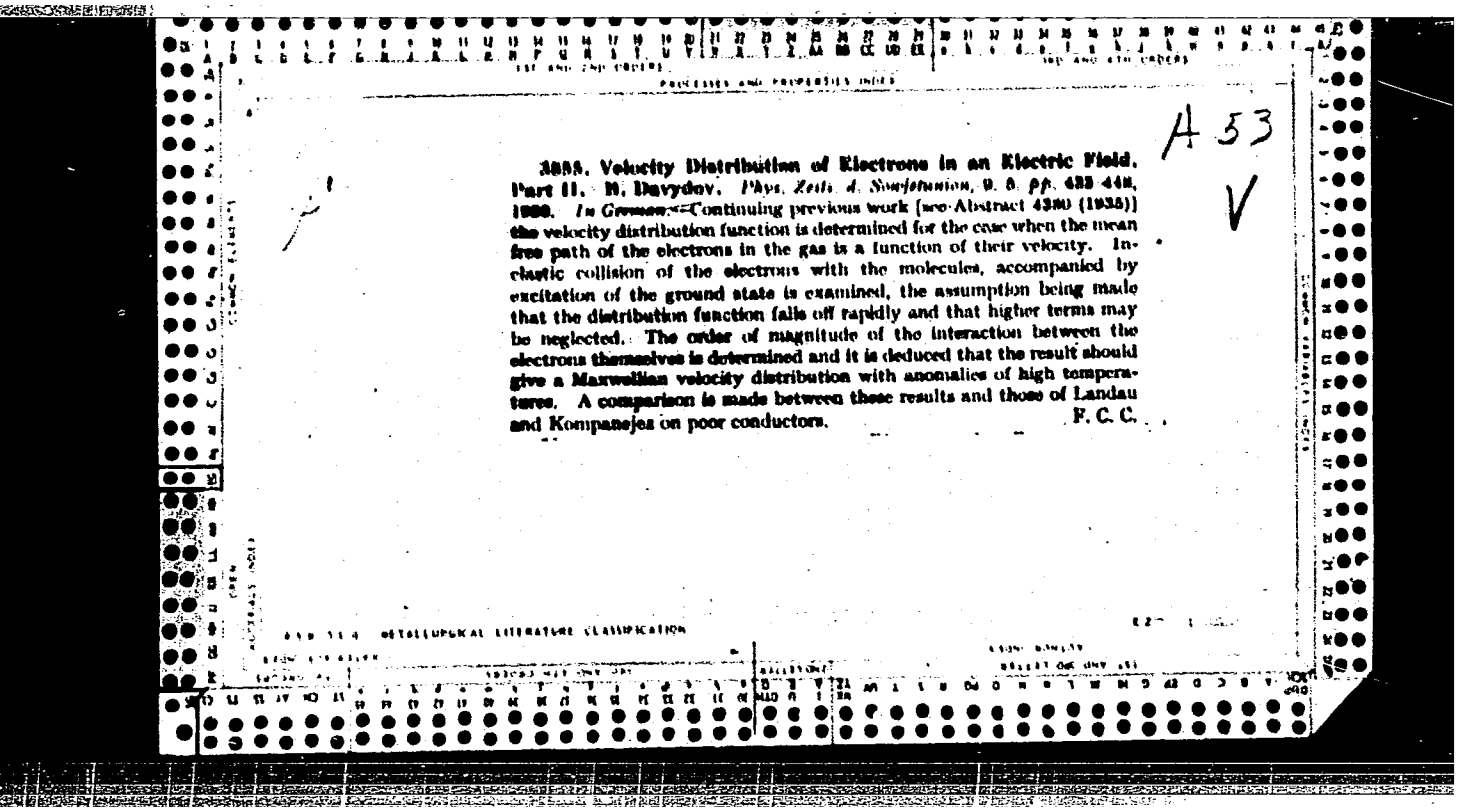


(II[a])

(III[a])

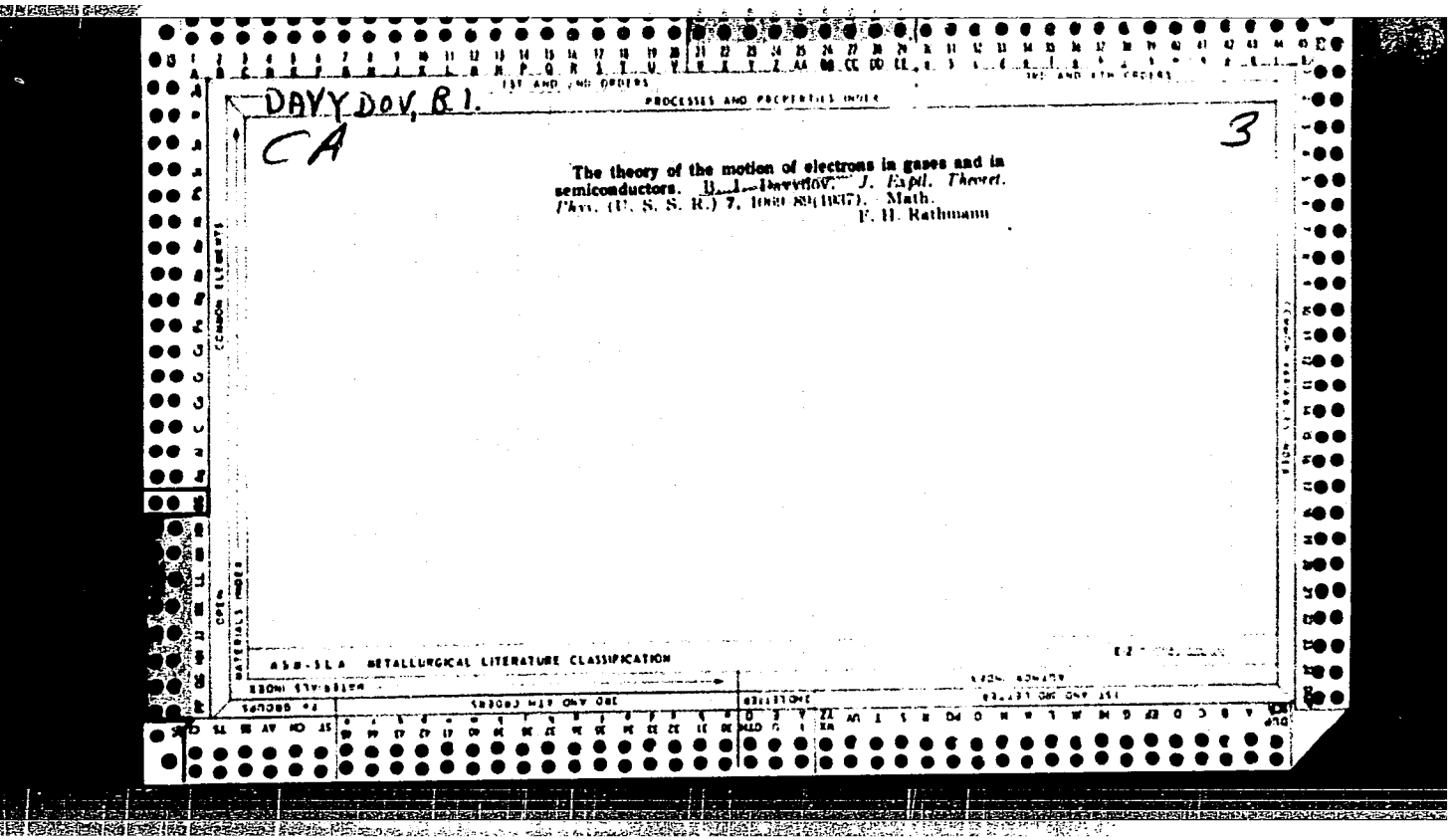
The complexes were prepared by treatment of the compounds with gaseous bromine. The results of density, x-ray-diffraction, thermal-stability, and IR and EPR spectroscopic measurements are described briefly in the source. Electrical measurements showed that for complexes of the monomeric compounds (benzalaniline, biacetyaniline, but not methyleneaniline), resistivity did not drop below 10^{11} ohm cm. On going to the dimers II[a] and III[a], resistivity dropped by more than six orders of magnitude. However, on going to the corresponding polymers, resistivity changed but little. Differences in polymer structure had a marked effect for complexes with

Card 2/3



A 53
V

3885. **Velocity Distribution of Electrons in an Electric Field. Part II.** N. Davydov. *Phys. Zeits. d. Sowjetunion*, v. 8, pp. 433-448, 1935. *In German.*—Continuing previous work [see Abstract 4380 (1935)] the velocity distribution function is determined for the case when the mean free path of the electrons in the gas is a function of their velocity. Inelastic collision of the electrons with the molecules, accompanied by excitation of the ground state is examined, the assumption being made that the distribution function falls off rapidly and that higher terms may be neglected. The order of magnitude of the interaction between the electrons themselves is determined and it is deduced that the result should give a Maxwellian velocity distribution with anomalies of high temperatures. A comparison is made between these results and those of Landau and Kompanejes on poor conductors. F. C. C.



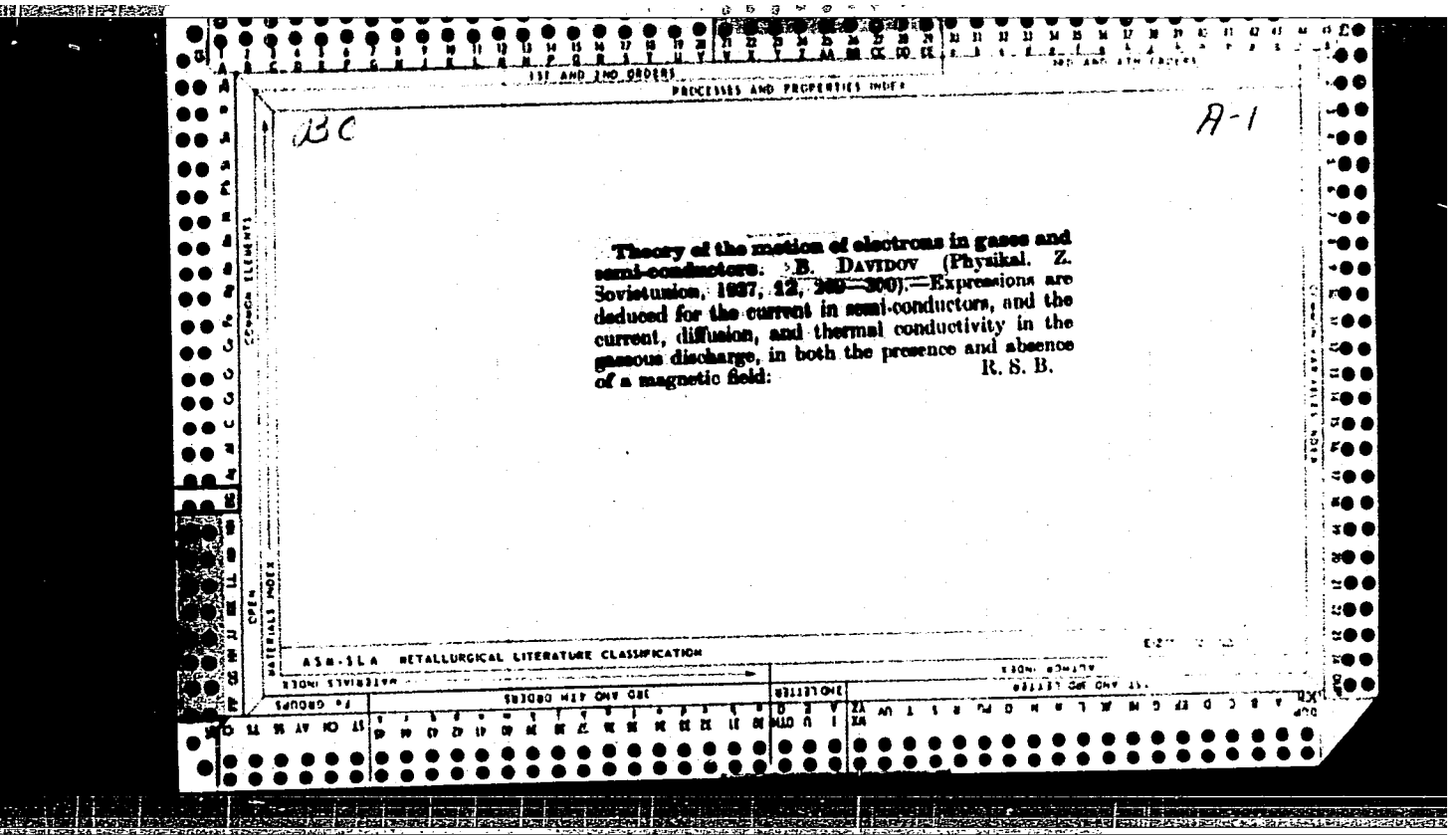
DAVY DOV, R.I.

CA

3

The theory of the motion of electrons in gases and in semiconductors. B. I. Davydov. *J. Exptl. Theoret. Phys. (U. S. S. R.)* 7, [illegible] (1937). Math.

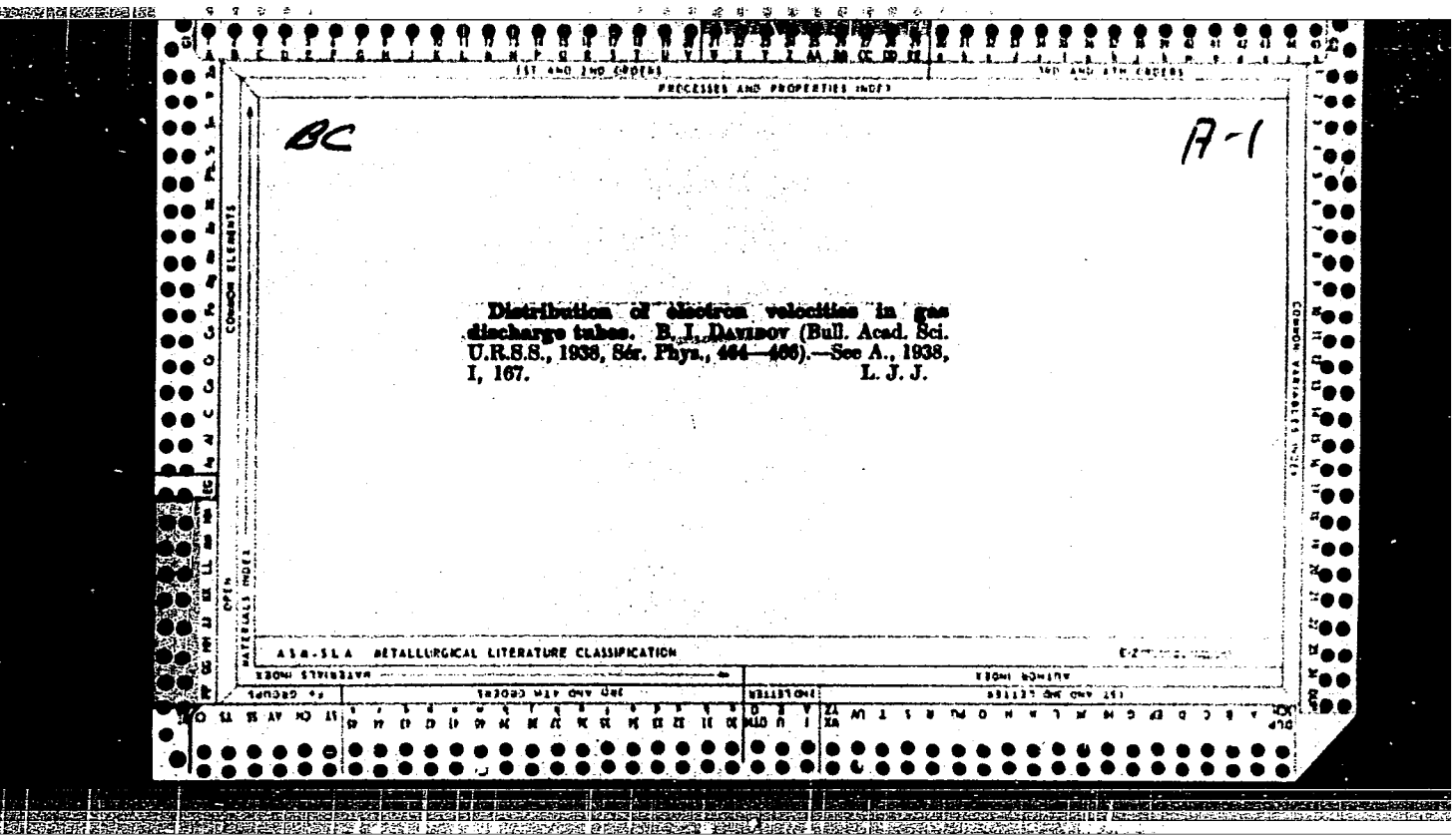
F. H. Rathmann



BC

A-1

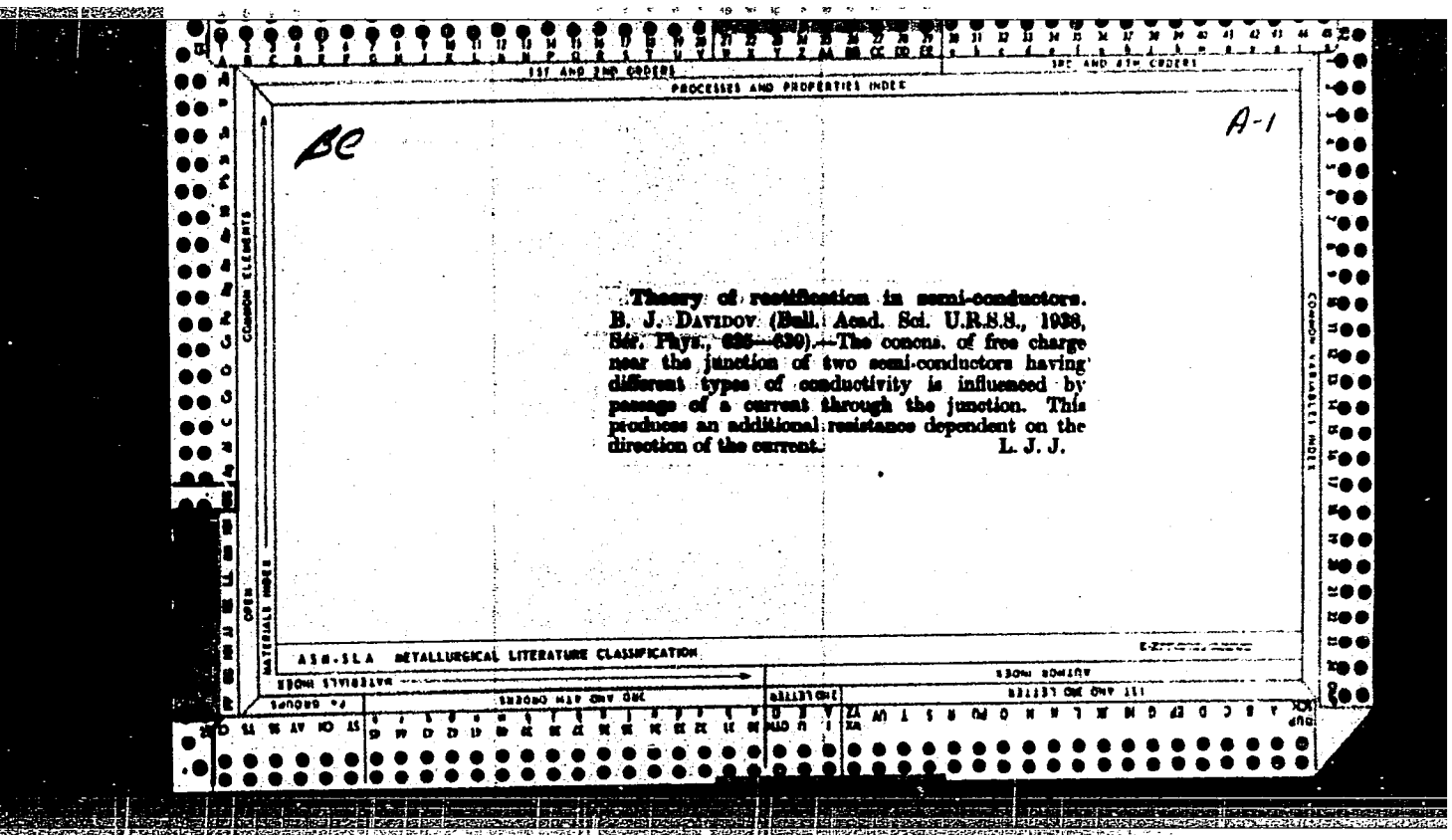
Theory of the motion of electrons in gases and semi-conductors. B. DAVIDOV (Physikal. Z. Sowjetunion, 1937, 12, 289—300).—Expressions are deduced for the current in semi-conductors, and the current, diffusion, and thermal conductivity in the gaseous discharge, in both the presence and absence of a magnetic field: R. S. B.



BC

A-1

Distribution of electron velocities in gas discharge tubes. B. I. Davidov (Bull. Acad. Sci. U.R.S.S., 1938, Sér. Phys., 464—466).—See A., 1938, I, 167. L. J. J.



1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Be

A-1

Theory of rectification in semi-conductors. B. J. DAVIDOV (Bull. Acad. Sci. U.R.S.S., 1938, Sér. Phys., 626—630).—The concns. of free charge near the junction of two semi-conductors having different types of conductivity is influenced by passage of a current through the junction. This produces an additional resistance dependent on the direction of the current. L. J. J.

COMMON ELEMENTS

OPEN

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COMMON VARIABLES INDEX

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

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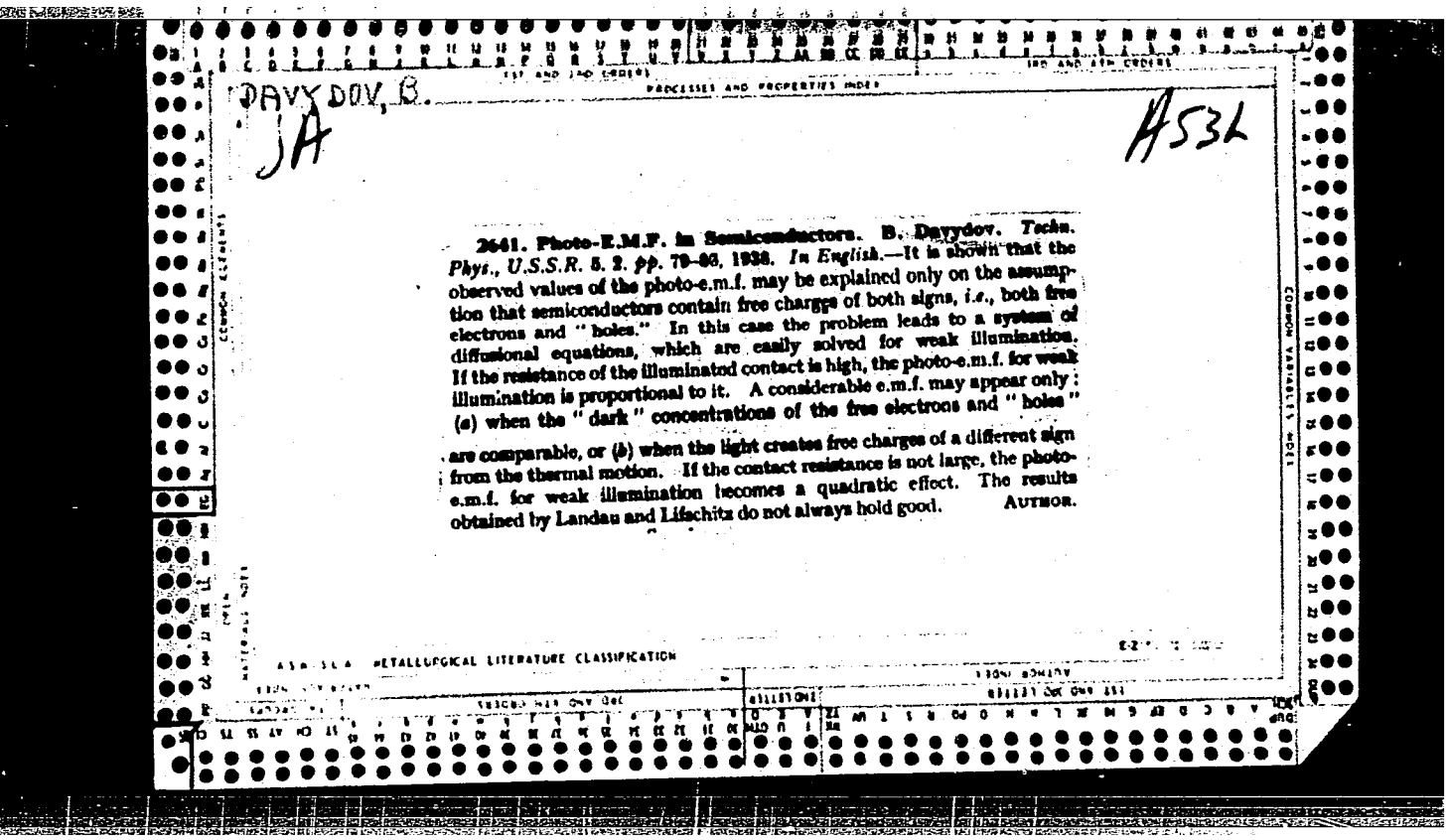
2ND AND 4TH ORDERS

1ST AND 3RD LETTER

AUTHOR INDEX

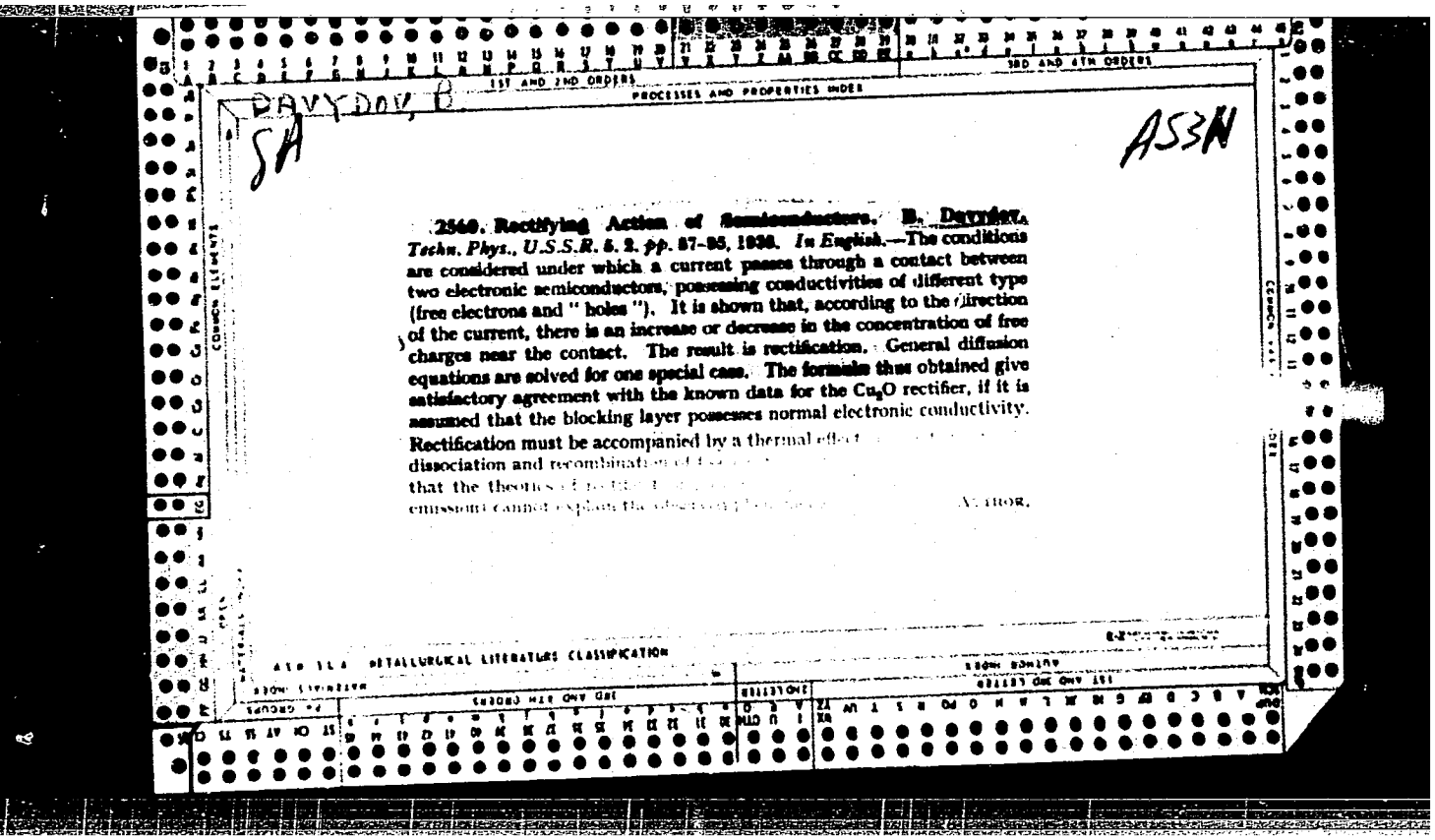


DAVYDOV, B.
JA

A534

2641. **Photo-E.M.F. in Semiconductors.** B. Davydov. *Techn. Phys., U.S.S.R.* 5. 2. *pp.* 79–86, 1938. *In English.*—It is shown that the observed values of the photo-e.m.f. may be explained only on the assumption that semiconductors contain free charges of both signs, *i.e.*, both free electrons and "holes." In this case the problem leads to a system of diffusional equations, which are easily solved for weak illumination. If the resistance of the illuminated contact is high, the photo-e.m.f. for weak illumination is proportional to it. A considerable e.m.f. may appear only: (*a*) when the "dark" concentrations of the free electrons and "holes" are comparable, or (*b*) when the light creates free charges of a different sign from the thermal motion. If the contact resistance is not large, the photo-e.m.f. for weak illumination becomes a quadratic effect. The results obtained by Landau and Lifschitz do not always hold good. AUTHOR.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

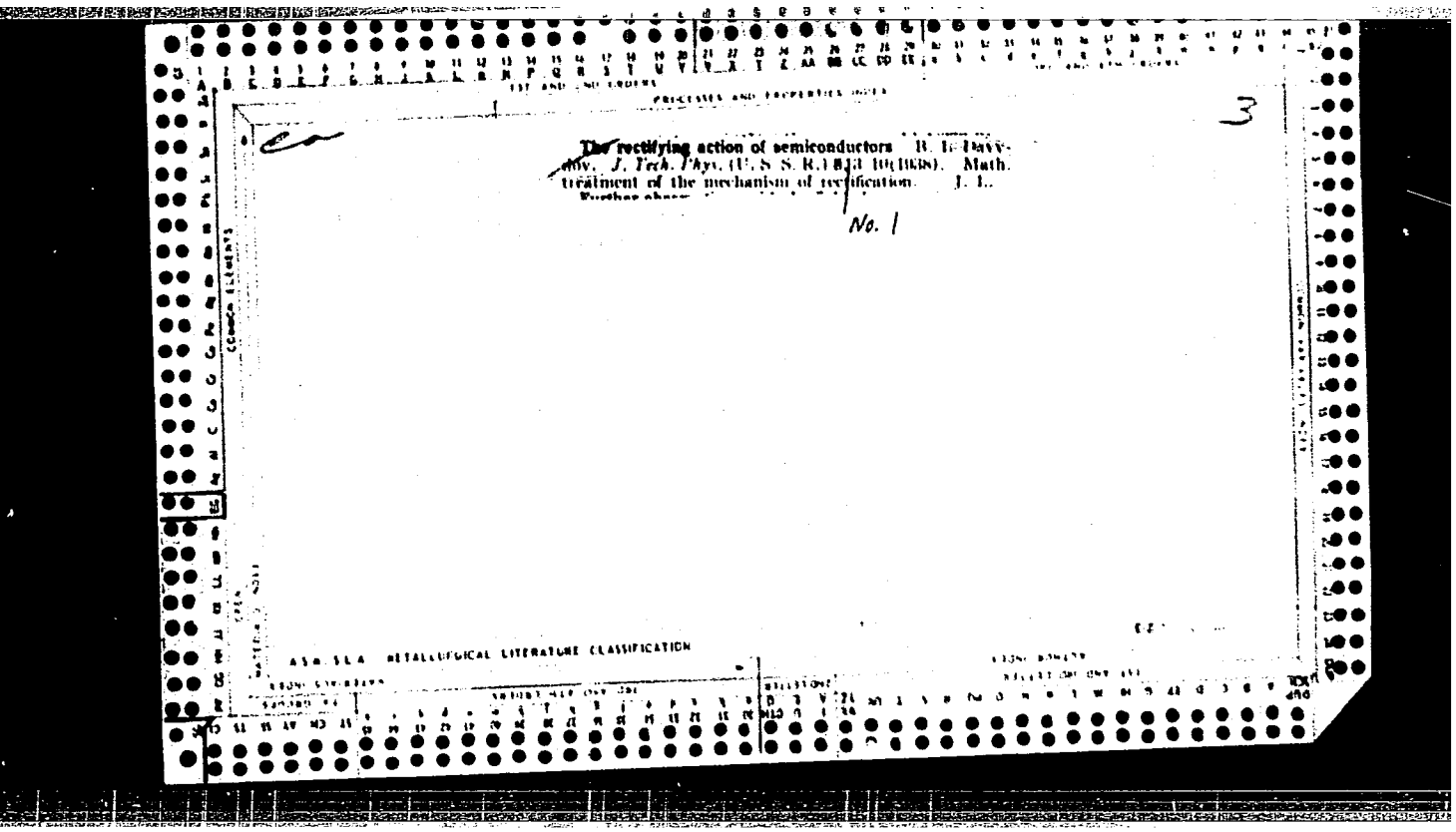
DAVYDOV, B.

SA

AS3N

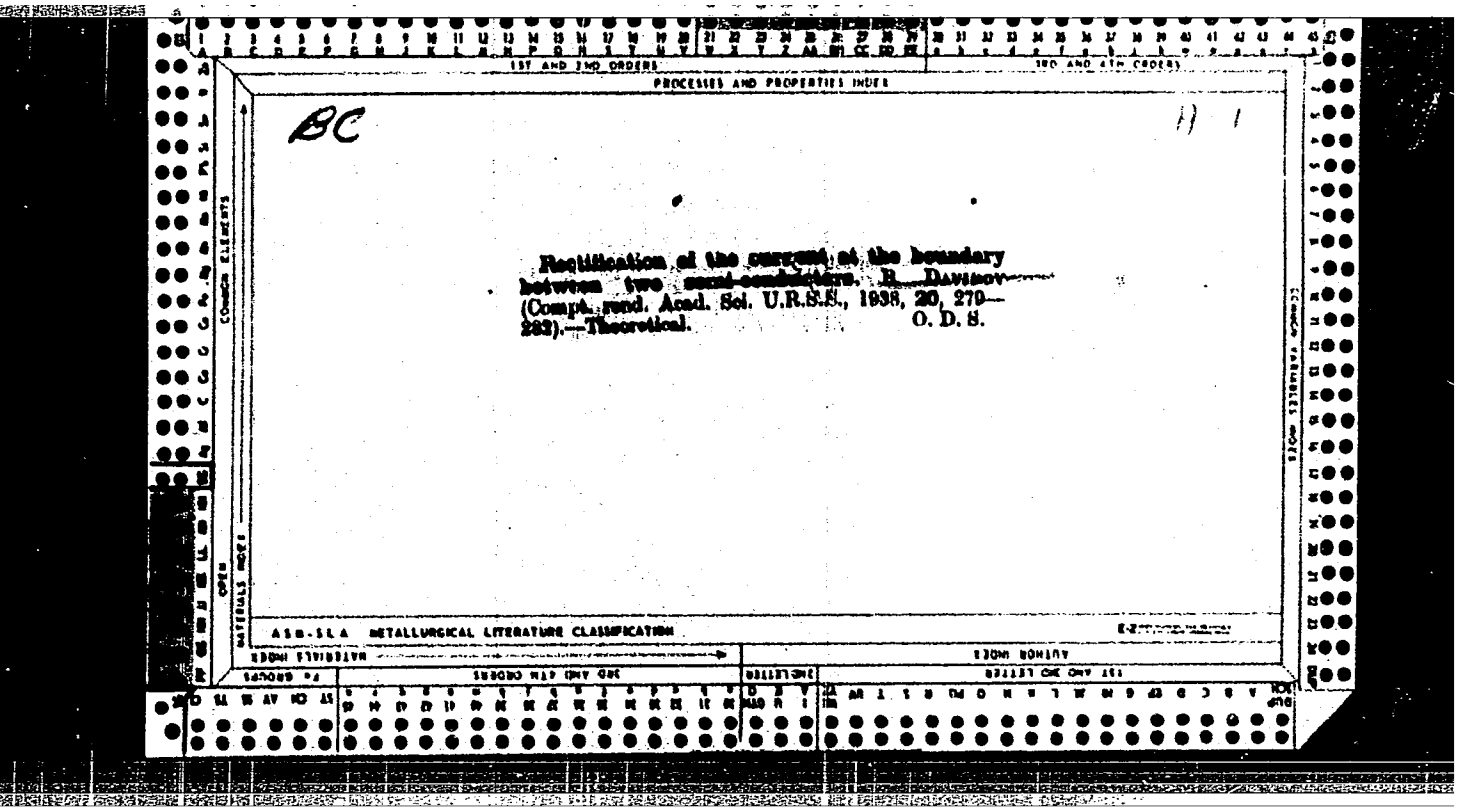
2560. Rectifying Action of Semiconductors. B. Davydov. *Techn. Phys., U.S.S.R.* 5. 2. *pp.* 87–95, 1938. *In English.*—The conditions are considered under which a current passes through a contact between two electronic semiconductors, possessing conductivities of different type (free electrons and " holes "). It is shown that, according to the direction of the current, there is an increase or decrease in the concentration of free charges near the contact. The result is rectification. General diffusion equations are solved for one special case. The formulæ thus obtained give satisfactory agreement with the known data for the Cu_2O rectifier, if it is assumed that the blocking layer possesses normal electronic conductivity. Rectification must be accompanied by a thermal effect [illegible] dissociation and recombination of [illegible] that the theories [illegible] emission cannot explain the [illegible] AUTHOR.

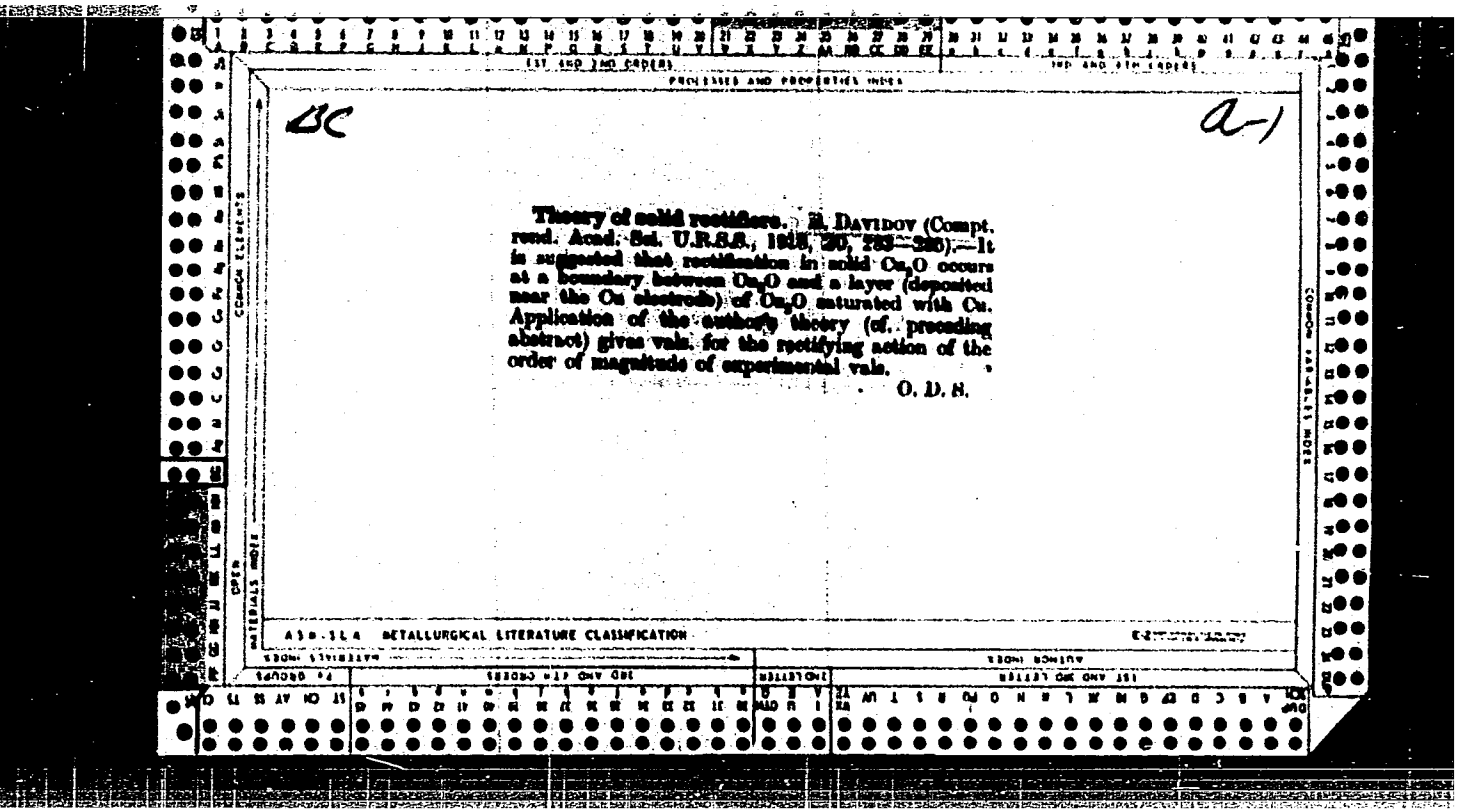
ASTIA METALLURGICAL LITERATURE CLASSIFICATION



The rectifying action of semiconductors B. I. Davydov. *J. Tech. Phys.* (U.S.S.R.) 3 87(1936). Math. treatment of the mechanism of rectification. J. L.

No. 1



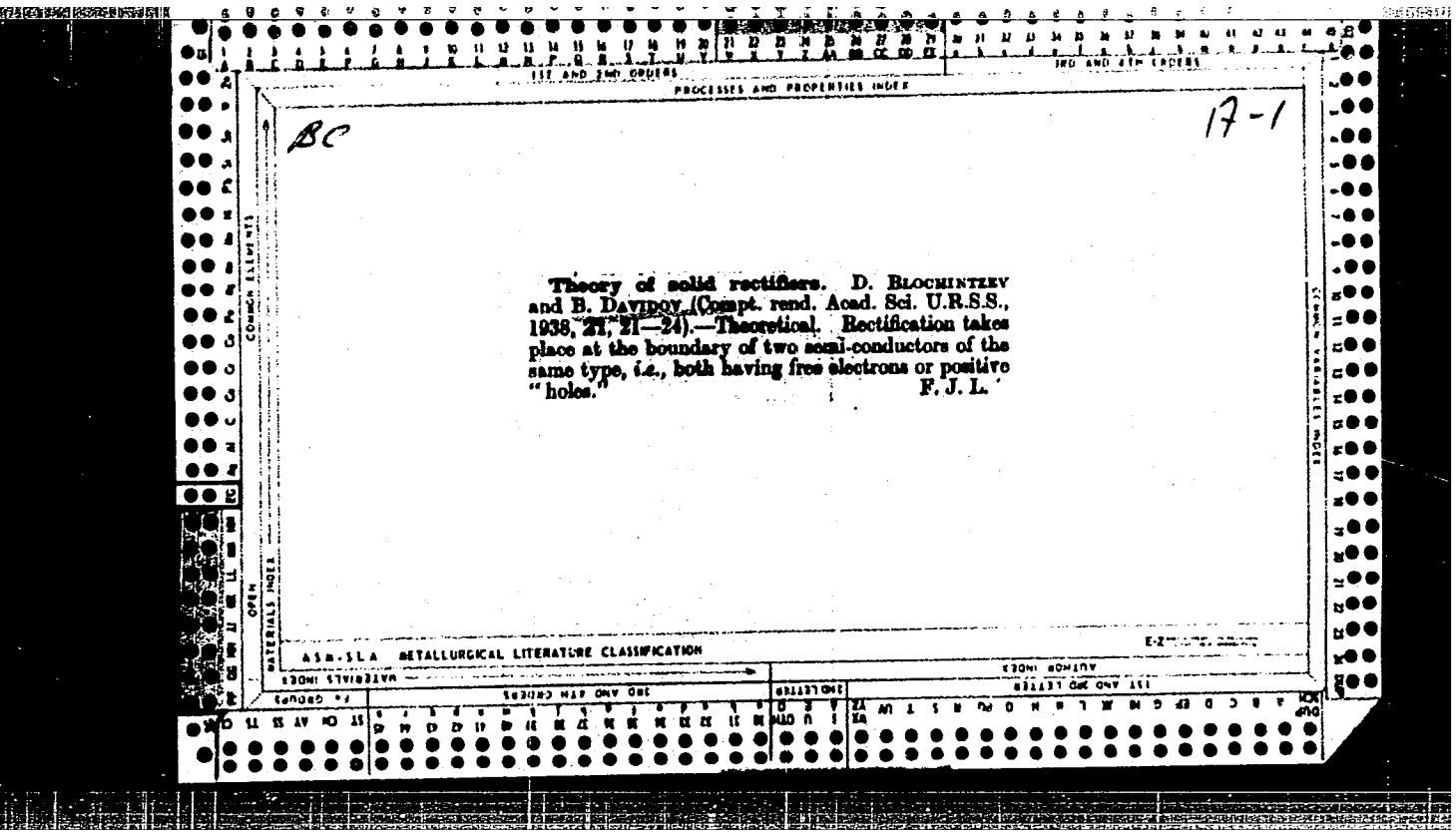


BC

a-1

Theory of solid rectifiers. B. DAVIDOV (Compt. rend. Acad. Sci. U.R.S.S., 1935, 20, 283—286).—It is suggested that rectification in solid Cu_2O occurs at a boundary between Cu_2O and a layer (deposited near the Cu electrode) of Cu_2O saturated with Cu. Application of the authors' theory (cf. preceding abstract) gives vals. for the rectifying action of the order of magnitude of experimental vals.

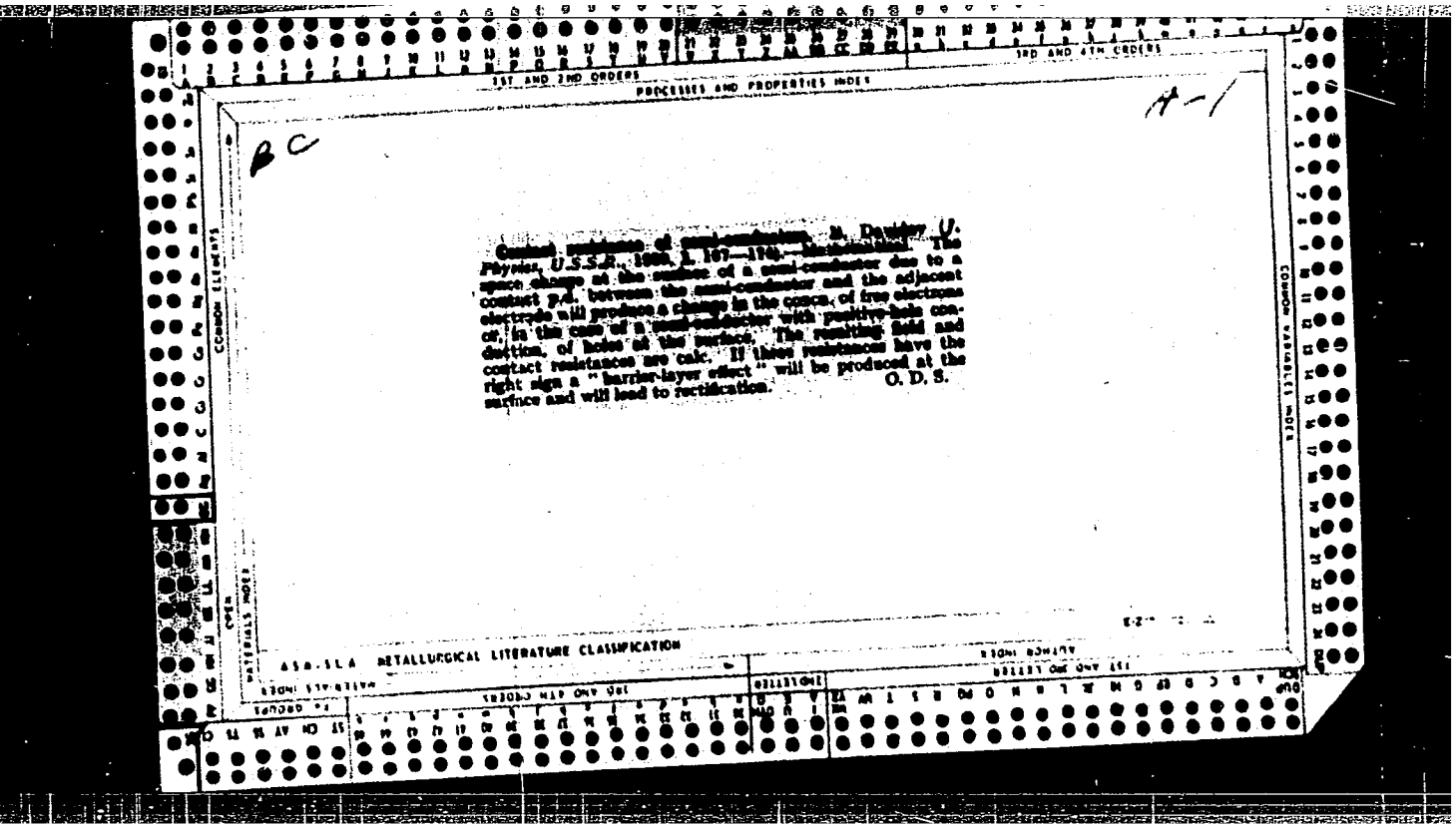
O. D. S.

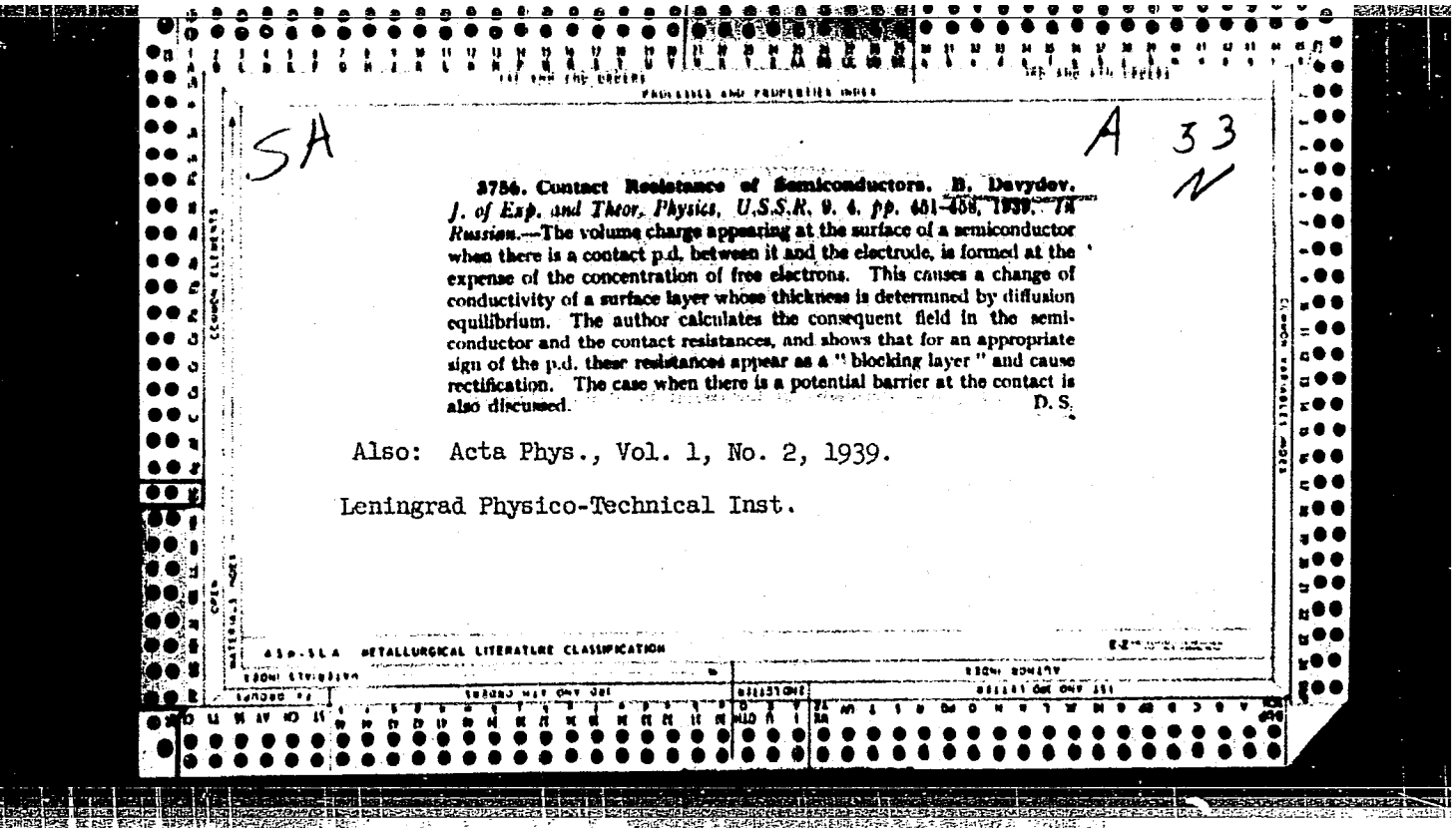


BC

17-1

Theory of solid rectifiers. D. Blochintzev and B. Davidov. (Compt. rend. Acad. Sci. U.R.S.S., 1938, 21, 21—24).—Theoretical. Rectification takes place at the boundary of two semi-conductors of the same type, *i.e.*, both having free electrons or positive "holes." F. J. L.





SA

A 33

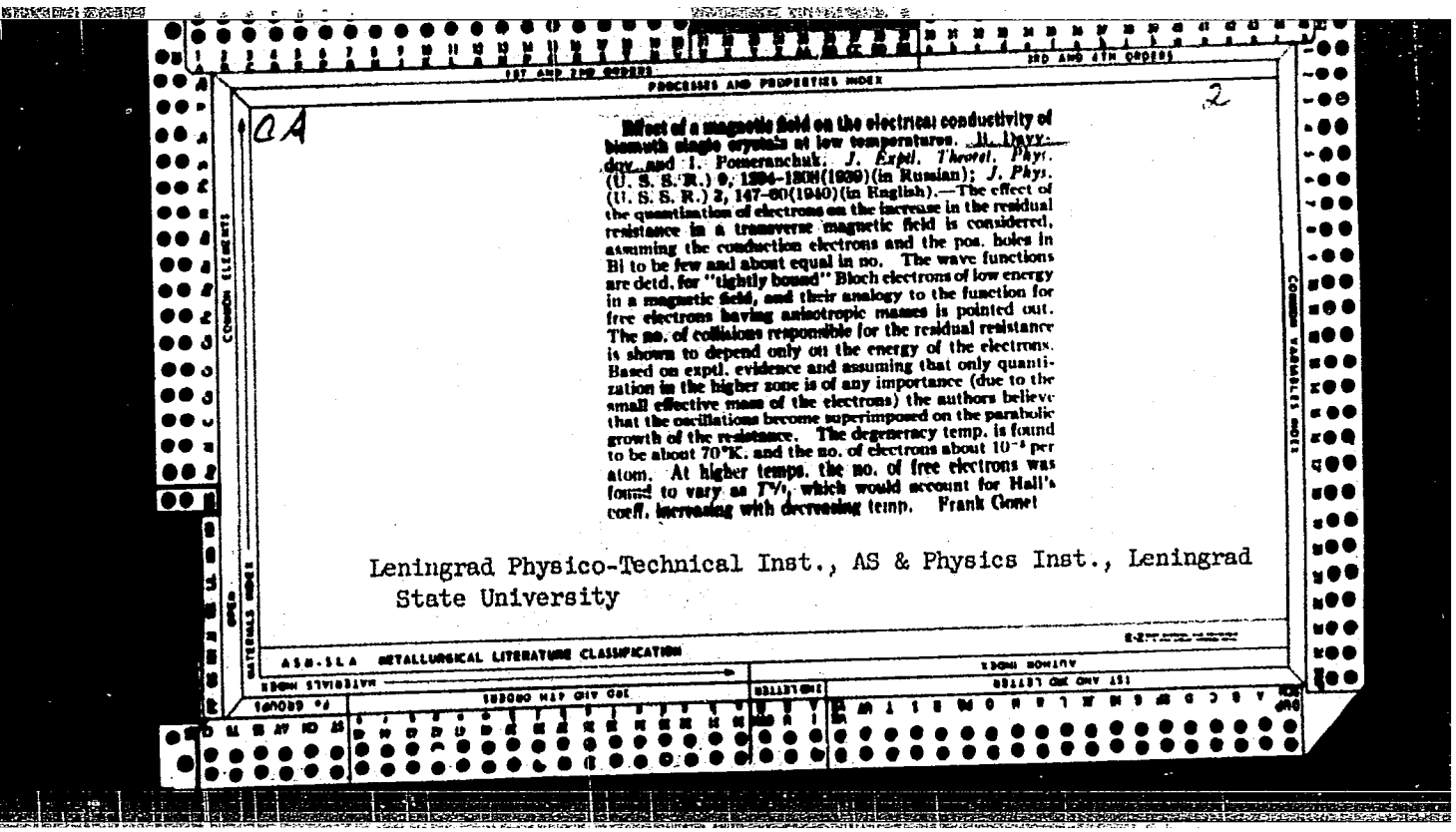
N

3786. Contact Resistance of Semiconductors. B. Davydov. *J. of Exp. and Theor. Physics, U.S.S.R.* 9. 4. pp. 451–458, 1939. In *Russian.*—The volume charge appearing at the surface of a semiconductor when there is a contact p.d. between it and the electrode, is formed at the expense of the concentration of free electrons. This causes a change of conductivity of a surface layer whose thickness is determined by diffusion equilibrium. The author calculates the consequent field in the semiconductor and the contact resistances, and shows that for an appropriate sign of the p.d. these resistances appear as a "blocking layer" and cause rectification. The case when there is a potential barrier at the contact is also discussed. D. S.

Also: Acta Phys., Vol. 1, No. 2, 1939.

Leningrad Physico-Technical Inst.

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

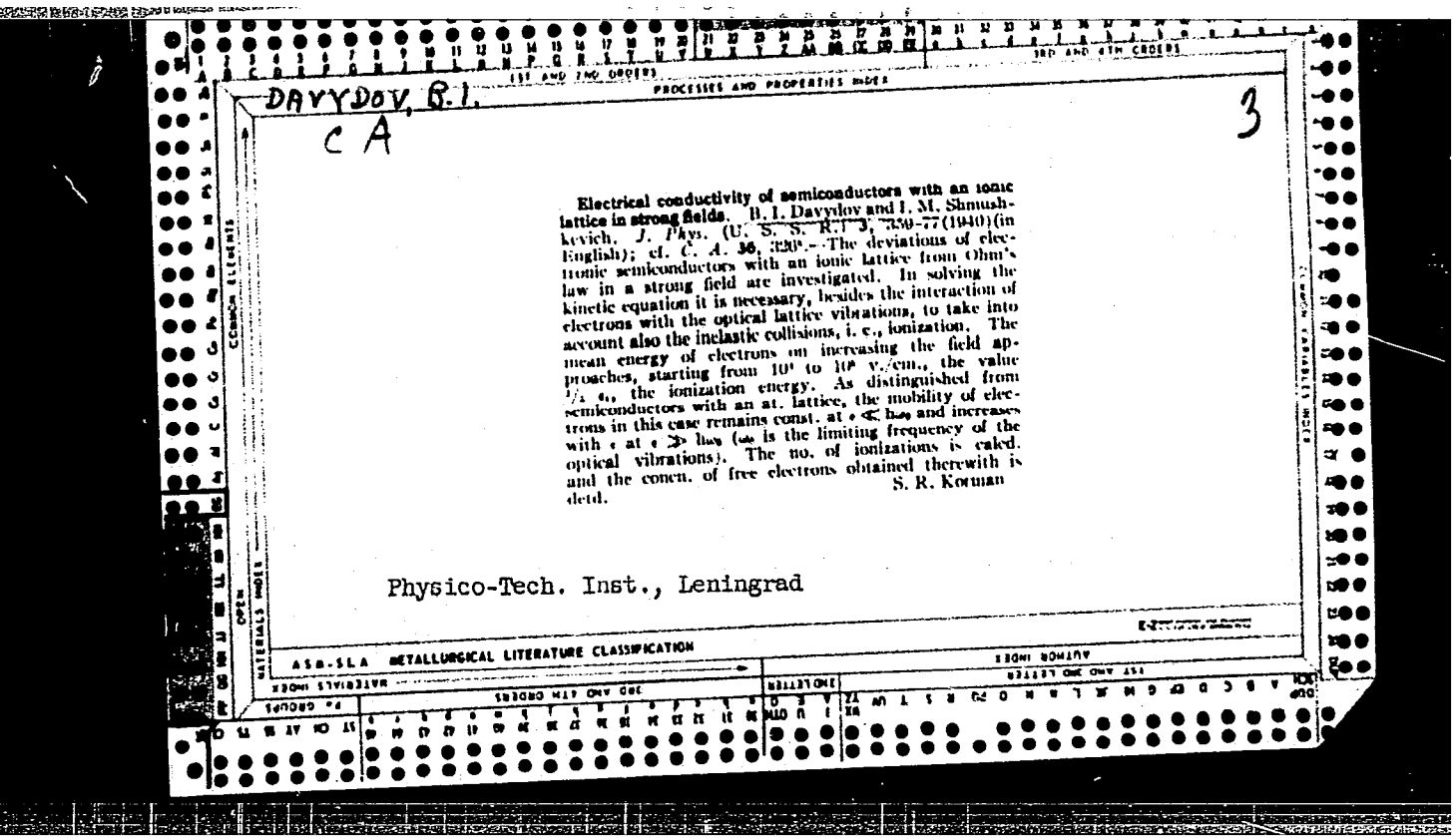
2

QA

Effect of a magnetic field on the electrical conductivity of bismuth single crystals at low temperatures. II. Davydov and I. Pomeranchuk. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 9, 1294-1303(1939)(in Russian); *J. Phys.* (U. S. S. R.) 2, 147-60(1940)(in English).—The effect of the quantization of electrons on the increase in the residual resistance in a transverse magnetic field is considered, assuming the conduction electrons and the pos. holes in Bi to be few and about equal in no. The wave functions are detd. for "tightly bound" Bloch electrons of low energy in a magnetic field, and their analogy to the function for free electrons having anisotropic masses is pointed out. The no. of collisions responsible for the residual resistance is shown to depend only on the energy of the electrons. Based on exptl. evidence and assuming that only quantization in the higher zone is of any importance (due to the small effective mass of the electrons) the authors believe that the oscillations become superimposed on the parabolic growth of the resistance. The degeneracy temp. is found to be about 70°K. and the no. of electrons about 10^{-5} per atom. At higher temps. the no. of free electrons was found to vary as $T^{3/2}$, which would account for Hall's coeff. increasing with decreasing temp. Frank Gonet

Leningrad Physico-Technical Inst., AS & Physics Inst., Leningrad State University

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



DAVYDOV, B. I.

C A

3

Electrical conductivity of semiconductors with an ionic lattice in strong fields. B. I. Davydov and I. M. Shmushkevich. *J. Phys.* (U. S. S. R.) 3, 339-77 (1940) (in English); cf. *C. A.* 36, 330⁹.—The deviations of electronic semiconductors with an ionic lattice from Ohm's law in a strong field are investigated. In solving the kinetic equation it is necessary, besides the interaction of electrons with the optical lattice vibrations, to take into account also the inelastic collisions, i. e., ionization. The mean energy of electrons on increasing the field approaches, starting from 10^4 to 10^6 v./cm., the value $^1/_4\ \epsilon_0$, the ionization energy. As distinguished from semiconductors with an at. lattice, the mobility of electrons in this case remains const. at $\epsilon \ll \hbar\omega_0$ and increases with ϵ at $\epsilon \gg \hbar\omega_0$ (ω_0 is the limiting frequency of the optical vibrations). The no. of ionizations is calcd. and the concn. of free electrons obtained therewith is detd.

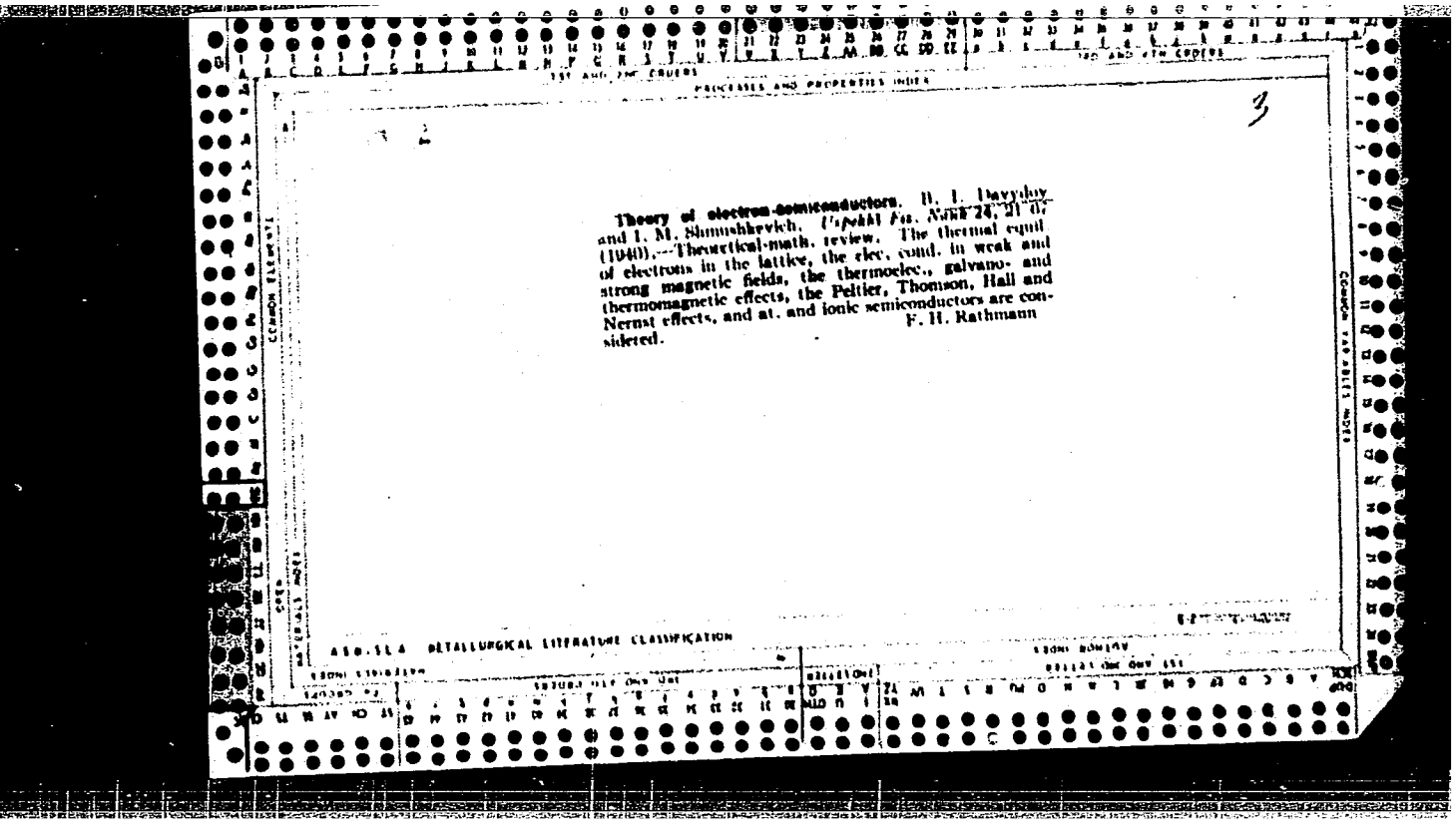
S. R. Korman

Physico-Tech. Inst., Leningrad

DAVYDOV, B. I. and Shmushkevich, I .

"Electro-Conductivity of Semiconductors with Ionized (ionic) Screen in Strong Fields," Jour. Exper. Phys., Vol. 10, no. 9-10, 1940.

Study of deviations of electronic semiconductors with ionic screens.



Theory of electron-semiconductors. B. I. Davydov and I. M. Shmushkevich. *Uspekhi Fiz. Nauk* 24, 21-67 (1940).—Theoretical-math. review. The thermal equil. of electrons in the lattice, the elec. cond. in weak and strong magnetic fields, the thermoelec., galvano- and thermomagnetic effects, the Peltier, Thomson, Hall and Nernst effects, and at. and ionic semiconductors are considered. F. H. Rathmann

DAVYDOV, B.

477 537.311.33 : 621.314.63

Transitional resistances of semi-conductors. DAVYDOV, B. / *J. Phys., U.S.S.R.*, 4, 4, *pp.* 335–339, 1941.—A theoretical paper. The contact resistance of a semi-conductor and a metal plate has been calculated for currents of any magnitude. It is assumed that the conductivity electrons have thermal energy only. The calculation does not apply to Cu_2O rectifiers. The inner transitional resistances of a polycrystalline semi-conductor are considered. They may sometimes decrease with increase of current intensity. A. J. M.

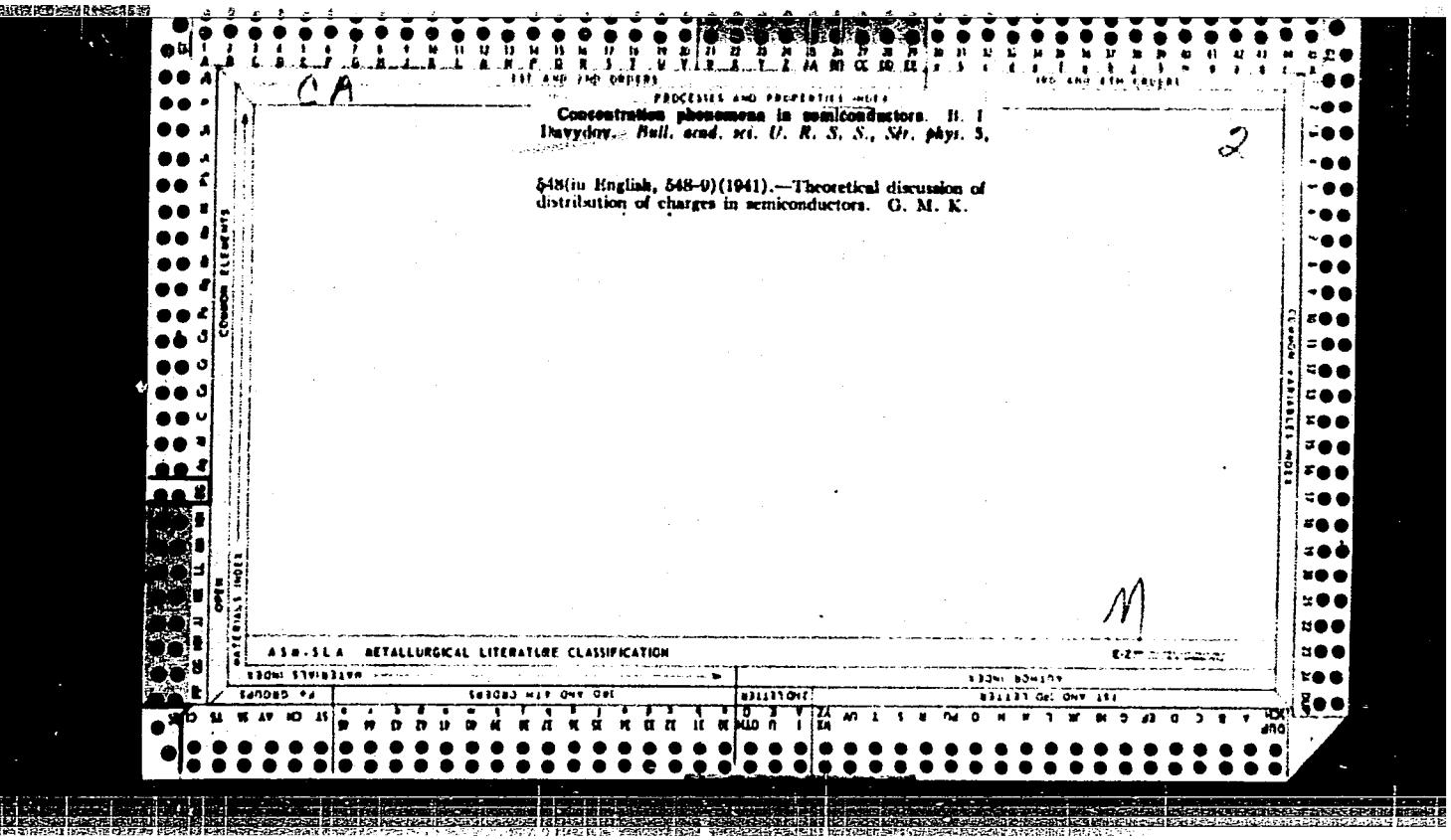
See Abstr. 417 537.312.5 : 535.215.4 : 621 : 383.8 : 621.314.63

WS

Materials & Industrial Technologies

537.311.33 1818

Electrical Conductivity of Semiconductors in Strong Electric Fields.—B. I. Davydov & I. M. Shmushkevič. (*Bull. Acad. Sci. U.R.S.S., Sér. phys.*, 1941, Vol. 5, Nos. 4/5, pp. 399–408. In Russian with English summary.) Different mechanisms which may increase the conductivity of semiconductors in strong fields are considered. The magnitude of the field at which these mechanisms become significant is evaluated. The deviations from Ohm's law in the case of a semiconductor with an ionic lattice in a strong field are examined in detail. When solving the kinetic equation, not only the interaction of electrons with the optical vibrations of the lattice, but also inelastic collisions, *i.e.* the ionization, must necessarily be taken into account. In contrast to the semiconductor with an atomic lattice, the mobility of electrons in that with an ionic lattice increases in strong fields. The dependence of the mobility on the field and the temperature has different forms according to whether kT is greater or less than $\hbar\omega_0$, ω_0 being the limiting frequency of optical vibrations of the crystal. The mobility of electrons, the number of ionizing collisions and the resulting concentration of free electrons are found for both limiting cases; the intermediate case may be interpolated.



CA

PROCESSES AND PROPERTIES INDEX

Concentration phenomena in semiconductors. II. I Davydov. *Bull. acad. sci. U. R. S. S., Sér. phys.* 5, 548(in English, 548-9)(1941).—Theoretical discussion of distribution of charges in semiconductors. G. M. K.

2

M

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION

11 E

Properties of Circuits

798. VOLTAGE FLUCTUATIONS IN SEMICONDUCTORS.— B. I. Davydov & B.Kh. Gurevich. (Journ. of Tech. Phys., (in Russian), No. 1, Vol. 12, 1942 pp. 31–35.)

It is pointed out that the mechanism of voltage fluctuations in semiconductors is similar to the shot effect in valves, the difference being that electrons are liberated by thermal movement not only on a cathode, but along the whole length of the semiconductor, and that these electrons travel only short distances. A mathematical discussion of the phenomenon is presented. It is shown that when no current passes through the semiconductor the mean square of the fluctuations can be determined from the well-known formula (1) for the Johnson effect. When a small current passes through the semiconductor this value rises in proportion to the square of the current for small currents and in proportion to the current for larger currents. These conclusions are broadly in accordance with experimental results. It was assumed in the discussion that Ohm's law remains valid for the phenomena under consideration.

Also: Zhur. Phys. 138, No. 3, Vol. 7

Leningrad Physico-Tech. Inst., AS USSR

DAVYDOV, B. I.

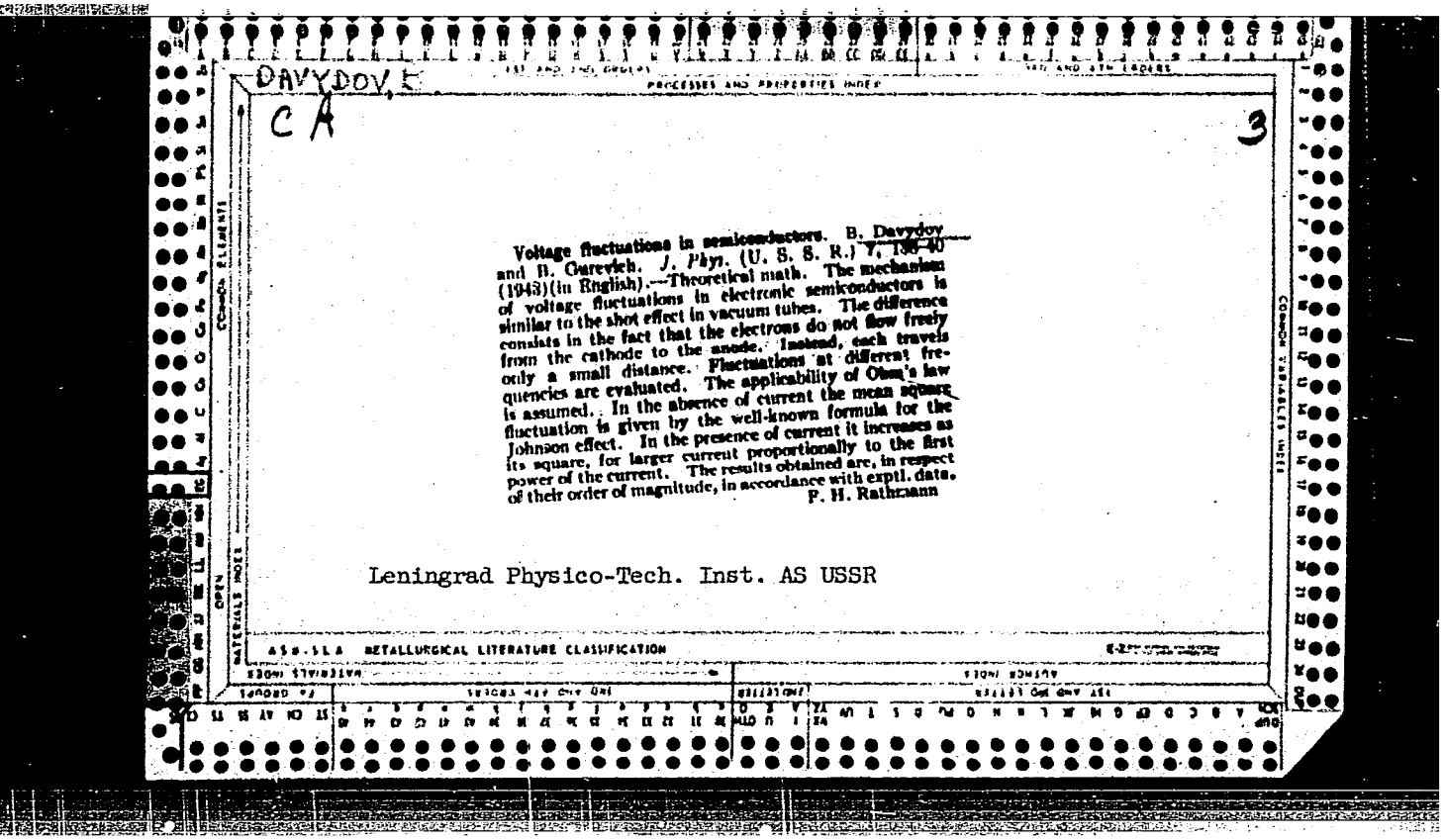
"Voltage Fluctuations in Electronic Semi-Conductors," Jour. Phys., USSR, Vol. 6, no. 5, p. 230, 1942

A general formula for the square of the voltage fluctuation is given, which reduces to these expressions for shot effect and Johnson effect under appropriate conditions. This is an abstract of a paper of the Acad. of Sci., USSR.

DAVYDOV, B. I.

"Electric Breakdown and Cumulative Ionization," Physical Review, 1943.

Owing to cumulative ionization, in calculating the balance between impact ionization and recombination in a homogeneous electric field, 3 possible equilibrium values for the no. of free electrons are obtained. This results in an S-like current/field-strength curve. The b.d. is interpreted as an abrupt transition from the lower to upper branch. An expression for the b.d. field strength is obtained. In a certain region of current densities, no stable homogeneous solutions exist, and the current is concentrated in a narrow discharge canal.

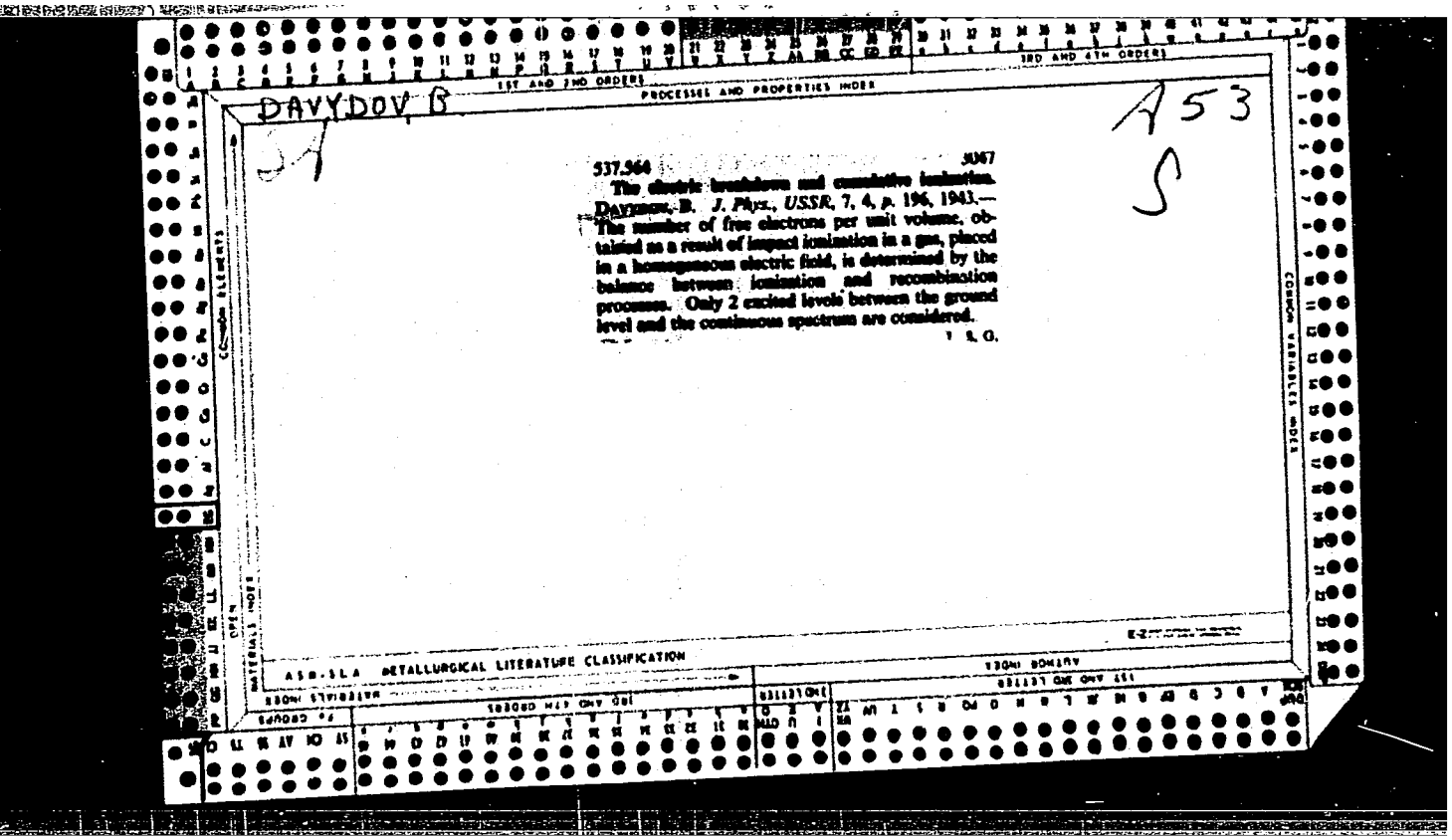


DAVYDOV, B.
CA
3

Voltage fluctuations in semiconductors. B. Davydov and B. Gurevich. *J. Phys. (U. S. S. R.)* 7, 136-40 (1943)(in English).—Theoretical math. The mechanism of voltage fluctuations in electronic semiconductors is similar to the shot effect in vacuum tubes. The difference consists in the fact that the electrons do not flow freely from the cathode to the anode. Instead, each travels only a small distance. Fluctuations at different frequencies are evaluated. The applicability of Ohm's law is assumed. In the absence of current the mean square fluctuation is given by the well-known formula for the Johnson effect. In the presence of current it increases as its square, for larger current proportionally to the first power of the current. The results obtained are, in respect of their order of magnitude, in accordance with exptl. data.
P. H. Rathmann

Leningrad Physico-Tech. Inst. AS USSR

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION


DAVYDOV, B

A53

S

537.564 3067

The electric breakdown and cumulative ionization.

DAVYDOV, B. *J. Phys., USSR*, 7, 4, p. 196, 1943.—The number of free electrons per unit volume, obtained as a result of impact ionization in a gas, placed in a homogeneous electric field, is determined by the balance between ionization and recombination processes. Only 2 excited levels between the ground level and the continuous spectrum are considered.

T. K. O.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

DAVYDOV, B.

PA-26T71

USSR/Physics Jan 1947
Quantum Mechanics
Thermodynamics

"Quantum Mechanics and Thermodynamic Irreversibility," B. Davydov, Physico-Technical Institute, Academy of Sciences of the USSR, 10 pp

"Journal of Physics" Vol XI, No 1

It is mathematically demonstrated that only quantum statistical mechanics possess elements of irreversibility, as opposed to classical mechanics.

BS 26T71

Physical Tech. Inst., AS USSR

DAVYDOV, B.

Is thermodynamic reversibility a consequence of quantum mechanics? (Answer to.) Zhur.eksp.i teor.fiz. 17 no.9:845-847 '47. (MLRA 6:7)

1. Leningradskiy fiziko-tekhnicheskiy institut Akademii Nauk SSSR.
(Thermodynamics) (Quantum theory)

L 8777-65 EWT(1)/EPA(s)-2/EWG(k)/EWI(m)/EPF(c)/EWP(j)/T Pz-6/Pc-4/Pr-4/
Pt-10 IJP(c)/RPL/RAEM(t)/ESD(dp)/ESD(t)/AFWL/ASD(a)-5 AT/RM

ACCESSION NR: AP4045801 S/0062/64/000/009/1703/1705

AUTHOR: Gugashashvili, M. I.; Davydov, B. E.; Korshak, Yu. V.; Rozenshteyn, L. D.

TITLE: Interruption on conjugation in linear polymer backbone by hetero atoms with unshared electrons

SOURCE: AN SSSR. Izv. Seriya khimicheskaya, no. 9, 1964, 1703-1705

TOPIC TAGS: organic semiconductor, semiconducting polymer, conjugated polymer, heterorganic polymer

ABSTRACT: A study was undertaken to determine the effect of hetero atoms in the backbone of polyazines investigated earlier on the activation energy for conduction. Diketones (monomers of polyazines) were used. Absorption spectra of bis(4-acetylphenyl) ether or sulfide, polyazines based thereon, ethylenedioxybis(4-acetylbenzene), and [oxybis(ethyleneoxy)]bis(4-acetylbenzene) were recorded. Comparison of these spectra showed that conjugation is interruped by the oxygen or sulfur atoms in the monomers and the polymers. Measurements of the temperature dependence of conductivity were carried out for

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L 8777-65 2

ACCESSION NR: AP4045801

sublimed thin-filmed samples of the diketones in air and vacuum, and compared with such data for 4, 4'-diacetylbiphenyl, which is free of hetero atoms. It was concluded that the high activation energies for conduction are due to interruption of conjugation by the hetero atoms. Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: Institut poluprovodnikov Akademii nauk SSSR (Institute of Semiconductors, Academy of Sciences SSSR); Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis, Academy of Sciences SSSR)

SUBMITTED: 30Jan64	ATD PRESS: 3111	ENCL: 00
SUB CODE: SS, MT	NO REF SOV: 003	OTHER: 002

Card 2/2

L 27400-65 EWT(m)/EPF(c)/EPF(n)-2/EWG(m)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4/Pu-4

RPL/ RWH/WW/GG/RM

ACCESSION NR: AP5006082 S/0204/65/005/001/0090/0096

AUTHOR: Khutareva, G. V.; Krentsel', B. A.; Shishkina, M. V.; Davydov, B. E.

TITLE: Polyermization of acetylenecarboxylic acid in the liquid and solid phases

SOURCE: Neftekhimiya, v. 5, no. 1, 1965, 90—96

TOPIC TAGS: acetylenecarboxylic acid, polymerization, radiation induced polymerization, organic semiconductor, semiconducting polymer

ABSTRACT: A study has been made of the thermal, photo, and radiation-induced polymerization of acetylenecarboxylic acid in the liquid or solid phase, or in solution:

$$HC\equiv C-COOH \rightarrow \sim HC=C(COOH)-HC=C(COOH)-HC=C(COOH)\sim$$

The effect of polymerization conditions on the occurrence of the side reactions of dehydration and decarboxylation was determined. It was found that radiation-induced polymerization is a good preparative method whereby side reactions are mini-

Card 1/2

L 27400-65
ACCESSION NR: AP5006082

3

mized. In radiation-induced polymerization, the product is a dark solid, soluble in water, ethanol, and acetone up to degrees of conversion of the order of 33%; it is radiation resistant, but it is decarboxylated to form insoluble products by light in aqueous media and by heat. The polymer gives an EPR signal and is a high-ohmic semiconductor ($\sigma_{20} = 0.6 \times 10^{-14}$ ohm^{-1} cm^{-1}). This work was done in view of the interest in a polymer which combines the properties of a conjugated system and those of a stiff-backbone polymeric electrolyte and which can be chemically modified. Orig. art. has: 5 figures, 2 tables, and 1 formula. [SM]

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchiyeva AN SSSR (Institute of Petrochemical Synthesis, AN SSSR).

SUBMITTED: 26Jun64 ENCLOSURE: 00 SUB CODE: OC, GC

NO REF SOV: 000 OTHER: 003 ATD PRESS: 3192

Card 2/2

L 21143-66 EWT(m)/EWP(j)/T/EWA(h)/EWA(l) PM

ACC NR: AP6003503 SOURCE CODE: UR/0364/66/002/001/0117/0122

AUTHOR: Silin', E. A.; Motorykina, V. P.; Shmit, I. K.; Geyderikh, M. A.; Davydov, B. E.; Krentsel', B. A.

ORG: Latvian State University (Latviyskiy gosudarstvennyy universitet); Institute of Petrochemical Synthesis, Academy of Sciences SSSR (Institut neftekhimicheskogo sinteza Akademii nauk SSSR)

TITLE: Structural changes in polyacrylonitrile during infrared irradiation

SOURCE: Elektrokhimiya, v. 2, no. 1, 1966, 117-122

TOPIC TAGS: polyacrylonitrile, IR absorption spectrum, electron spectrum

ABSTRACT: The purpose of this investigation was to study the effect of intense radiation on polyacrylonitrile. The selective interaction of radiation on the vibrational energy of individual groups of polyacrylonitrile molecules was assumed. The use of a concentrated IR beam was used to obtain a polyacrylonitrile film with treated sections of a given geometric configuration and degree of conversion. Polyacrylonitrile film was obtained by redox initiation with an average molecular

UDC: 621.315.592 : 547

Card 1/3

weight of 23000-36000. The films were prepared from 3% polyacrylonitrile solution in dimethylformamide and kept in vacuum to a constant weight. The film thickness was 8-12 microns. The films were irradiated in 10^{-5}-10^{-6} mm pressure chamber through a quartz window about 100 mm from the light source. The spectra of irradiated samples were obtained in air at room temperature. Electronic absorption spectra were taken on an SF-4 spectrophotometer and vibrational spectra were taken on an IKS-14 spectrophotometer. It was found that infrared irradiation produces significant changes in the vibrational absorption spectra of polyacrylonitrile. The IR irradiation increases the mobility of hydrogen in tertiary carbon and facilitates its migration to the nitrile group, >C=NH, which, in turn, produces intermolecular cross-linking. The hydrogen band is formed between the >C=NH group and the neighboring nitrile group. This scheme is supported by the appearance of the diffuse absorption band, shifted toward the 3.45 cm^{-1} region, which is assigned to the valence vibrations of the >N-H...N≡C-group. Electronic spectra also indicate the formation of polyunsaturated bonds. The comparison of the vibration absorption spectra of polyacrylonitrile upon thermal treatment with those of the same material irradiated with IR show that both in their initial and subsequent stages, the conversion process during IR irradiation differs from the conversions which take place during thermal treatment. Conversion of polyacrylonitrile during IR irradiation

L 21143-66
ACC NR: AP6003503

proceeds by the self-accelerating reaction scheme, the rate of which is significantly higher than during thermal treatment. A. E. Krumin participated in the experimental part of this work. Orig. art. has: 3 figures.

SUB CODE: 07/ SUBM DATE: 27Apr65/ ORIG REF: 008/ OTH REF: 012

Card 3/3 UCR

DAVYDOV, B. I.

"The Influence of the Vibrations of the Plasma on Its Electrical and Thermal Conductivity," (Work carried out in 1951); pp. 77-88.
"Ignition of an Electrodeless Discharge," (Work carried out in 1951); pp. 89-94.

"The Physics of Plasmas; Problems of Controlled Thermonuclear Reactions." Vol. I. 1958, published by Inst. Atomic Energy, Acad. Sci. USSR.
resp. ed. M. A. Leontovich, editorial work V. I. Kogan.

Available in Library.

DAVYDOV, B.I.

PA 50121

USSR/Electronics Feb 1947
Conductors, Semi

"Soviet Investigations in the Field of Electronic Semiconductors," B. I. Davydov, 8 pp

"Uspekhi Fiz Nauk" Vol XXIII, No 2

"Today's physics is tomorrow's technology." With this statement author launches discussion of various achievements by Soviet scientists in the field of electronic semiconductors. Starts his history around 1928 and carries through to 1940, mentioning work in this field by such renowned Soviet scientists as A. F. Ioffe, M. M. Moskov, V. P. Zhuz, A. V. Ioffe, etc.

IC 50121

Davydov, B.I.

Davydov, B. **Variational principle and canonical equations for an ideal fluid.** Doklady Akad. Nauk SSSR (N.S.) 69, 165–168 (1949). (Russian)

A variational principle for an ideal fluid can be obtained by considering the displacements of the fluid particles from their positions at some initial instant as variables which may be varied independently. For the independent variables one may also choose the displacements of the particles from those virtual positions for which the density ρ of the fluid is constant. However, somewhat simpler expressions are obtained if one considers these virtual positions themselves (i.e., the Lagrangian coordinates q_i in terms of x_i and t) as variables which vary independently. The author obtains a simple variational principle by varying ρ and v_i in the Lagrangian (1) $L=\frac{1}{2}\rho v_k^2-\epsilon(\rho)$, where $\epsilon'(\rho)=\int\rho^{-1}dp$ is the density of the potential energy. Since this cannot be done independently for various points some supplementary conditions must be imposed. If one assumes only that the equation of continuity (2) $\dot{\rho}+(\rho v_k)_k=0$ holds the equations for a vortex-free fluid are obtained.

In order to get the equations for a vortex fluid the author introduces instead of three Lagrangian coordinates a single coordinate α of each particle, this coordinate satisfying the condition (3) $\dot{\alpha}+\alpha_k v_k=0$.

By requiring that (3) holds and that the values of α at the initial and terminal instants remain unchanged while variation takes place, the author fixes one coordinate of each particle at these instants. Adding the left hand sides of (2) and (3) to the Lagrangian (1), after multiplying them by undetermined multipliers $-\lambda$ and φ (considered as functions of x_i and t) respectively, and varying all quantities independently in the resulting expression, the ... equations follow in the usual way. The canonical equations for λ, α and ρ, φ are found to be identical with the ... equations obtained above. Finally there is ... application to quantum liquid.

...ms.

Source: Mathematical Reviews, 1950 Vol 11 No.6

Davydov, B. I.

AUTHOR: Davydov, B. I. 60-55-26-7/16

TITLE: Phase Transitions at High Pressures (O fazovykh perekhodakh pri vysokikh davleniyakh)

PERIODICAL: Trudy Geofizicheskogo instituta Akademii nauk SSSR, 1955, Nr 26, pp 86-91 (USSR)

ABSTRACT: In studying the thermodynamic properties of solid bodies, the author calculates phase transition of the first class in hydrogen as taking place at $1.8 \cdot 10^6$ atm. accompanied by an increase in density from 0.7 to 1. He points out and discusses the mistakes in Kronig's, de Boer's, and Korringa's calculations. There are 2 figures and 8 references of which 1 is Soviet, 5 English, and 2 German.

AVAILABLE: Library of Congress

Card 1/1

Davydov, B. I. On the dynamics of the galaxy. Astr. Z. 32 (1955), 239–243. (Russian. English summary)

Inasmuch as the solution to the stea[illegible] equation for axial symmetry and [illegible] [illegible] inadequate to describe [illegible] motions in the neighborhood of [illegible] proposes a method of successive a[illegible] [illegible] order [illegible] [illegible] the second order velocity moments but does not carry the analysis further.

R. G. Langebartel.

An equation of state of solids. B. I. Davydov. *Izvest. Akad. Nauk S.S.S.R., Ser. Geofiz.* 1956, [illegible]–78.—Proceeding from the general concepts of quantum theory of solids D. obtained an approx. expression for the free energy of fundamental types of crystals [illegible] ... pressures ... [illegible]

[illegible] Macy

DAVYDOV, B. I.

BALAKINA, L.M.

3(10)

PHASE I BOOK EXPLOITATION SOV/1663

Akademiya nauk SSSR. Komitet po geodezii i geofizike.

Tezisy dokladov na XI General'noy assambleye Mezhdunarodnogo geodezicheskogo i geofizicheskogo soyuza. Mezhdunarodnaya assotsiatsiya seysmologii i fiziki nedr zemli (Abstracts of Reports Submitted to the XI General Assembly of the International Union of Geodesy and Geophysics. The International Association of Seismology and Physics of the Earth's Interior) Moscow, 1957. 108 p. /Parallel texts in Russian and English/ 1,500 copies printed.

No additional contributors mentioned

PURPOSE: This booklet is intended for geophysicists, especially those specializing in seismology.

COVERAGE: This collection of articles deals with the structure and composition of the Earth and phenomena related thereto. The majority of the articles concern studies of earthquakes and seismic waves. Other articles cover the structure of the Earth's crust and mountain roots; the elastic properties of rocks at high pressures; the piezoelectric effect of rocks and the method of modelling in tectonophysics. The collection also contains articles on the Earth's thermal history, the microseismic method of tracing storms and others.

Card 1/5

Card 2/5

55.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00050982(

active decay. In addition, there is the energy liberated of the occasion of thermonuclear reactions. These simple facts according to the opinion of the authors, convey a general explanation for the reasons of the thermodynamical irreversibility. At present nuclear processes with separation of energy occur very often in the domain of the universe surrounding, and it is only very seldom that processes with an increase of the internal energy of the nuclei occur. On a large scale this leads to a dissipation of nuclear energy. It is, however, just to this entirely concrete process to that thermodynamics refers. With the total reversibility of the general equations of mechanics irreversibility can be caused only by the initial conditions. The initial conditions, in reality, are the existence of the decaying heavy nuclei and thermonuclear synthesis. This leads to the occurrence of particles with enormous kinetic energy, which is gradually distributed over all degrees of freedom of the macroscopic systems which surround them.

SUBMITTED: June 20, 1957

AVAILABLE: Library of Congress

Card 2/2

DAVYDOV, B.I.

A great physicist; on the 50th anniversary of Ludwig Boltzmann's death. Usp.fiz.nauk 61:17-22 Ja '57. (MLRA 10:2)
(Boltzmann, Ludwig, 1844-1906)

10 (4)

AUTHOR: Davydov, B. I.

SOV/56-35-2-41/60

TITLE: The Phenomenological Equations of the Statistical Dynamics of an Incompressible Turbulent Liquid (Fenomenologicheskiye uravneniya statisticheskoy dinamiki neszhimayemoy turbulentnoy zhidkosti)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 2 (8), pp 527-529 (USSR)

ABSTRACT: A closed system of differential equations for the statistical description of the turbulent flow of a liquid can be obtained only by confining oneself to such variables as characterize the motion of the liquid. It is advantageous to use as such variables the average velocity $U_i = \bar{u}_i$ at a given point, the average pressure $P = \bar{p}$, the second moments of the pulsation velocities $R_{ij} = \overline{v_i v_j}$, and the turbulent viscosity N. The equation for U_i is obtained by ordinary averaging of the hydrodynamic equations:

$$\frac{dU_i}{dt} + \frac{\partial R_{ik}}{\partial x_k} + \frac{\partial P}{\partial x} = 0; \qquad \frac{\partial U_k}{\partial x_k} = 0$$

Card 1/4

The Phenomenological Equations of the Statistical Dynamics of an Incompressible Turbulent Liquid

SOV/56-35-2-41/60

By averaging the equations for $v_i v_j$ (which follow from the Navier (Nav'ye)-Stokes (Stoks) equation, the third moments $\overline{v_i v_j v_k}$ of the pulsation velocities and also moments which contain the derivatives with respect to the coordinates are obtained. In the first approximation all these moments may be expressed phenomenologically by the above-mentioned variables and their derivatives. Using the simplest tensor combinations, quasidiffusion equations are obtained for R_{ij}. (These equations are explicitly given). The physical meaning of the terms of this equation is discussed in a few words. Three of these terms correspond to the transfer of turbulent energy and to the energy transfer by pressure pulsations. These terms partially compensate each other. The turbulent energy is increased also by the gradient of the average velocity, it may be obtained immediately from the Navier (Nav'ye)-Stokes (Stoks) equation. The last 2 terms of the above-mentioned equation describe the smoothing of the anisotropy of turbulence by the scattering of the pulsation velocities on the pressure pulsations and the

Card 2/4

The Phenomenological Equations of the Statistical Dynamics of an Incompressible Turbulent Liquid

SOV/56-35-2-41/60

viscous dissipation of energy in the microscopic turbulence. The dimensionless universal constants figuring in the above-mentioned equation must be determined experimentally. In first approximation there is N = const for any given flow, with the exception of the boundary layer. In a turbulent boundary layer N decreases if the distance to the wall decreases. The equations derived in this paper agree in a satisfactory quantitative manner with the experiment. An approximate solution for the boundary layer may be obtained as an expansion with respect to the powers of R_{yy}/R (the x-axis is parallel to the flow and the y-axis is parallel to the wall). The relations found in first approximation are given explicitly and they agree with experimental results. There is 1 reference, 0 of which is Soviet.

ASSOCIATION: Institut fiziki Zemli Akademii nauk SSSR (Institute of the Physics of the Earth, AS USSR)

10(1)

AUTHOR: Davydov, B. I.

SOV/20-127-4-10/60

TITLE: On the Statistic Dynamics of a Noncompressable Turbulent Liquid

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 4, pp 768-771 (USSR)

ABSTRACT: In the statistic consideration of a liquid flow, the latter is characterized by a multitude of probability distributions of various hydrodynamic magnitudes or the corresponding momenta, i.e. by the mean values of the hydrodynamic velocity components and their products as well as their derivatives. The quantities are limited by a real choice of initial conditions. The complete equation system for the momenta of the liquid flows is equivalent to the functional equation. Here, the number of unknown momenta should agree with the number of differential equations considered. The mean velocity and the mean pressure, the secondary and tertiary momenta of the pulsation velocities, and the turbulent dissipation of the energy, are assumed as fundamental quantities. All other momenta resulting from the general hydrodynamic equations are expressed approximately by the fundamental quantities. This method of consideration

Card 1/3

indicated deals with the development of turbulence which occurs at high values of the Reynolds number in a room limited by solid walls and at a logarithmically profiled mean velocity. As an equation of the mean velocity, the Reynolds tensor enters into the equation, which characterizes the turbulence. On account of its smallness as compared with the total turbulence, it can be assumed for the turbulence of the dissipation energy that it is equal to $\frac{2}{3}\delta_{ij}Q$, Q denoting the total turbulent dissipation. Further, the pulsation of the pressure is neglected which also enters into the expression for the Reynolds tensor. The third and fourth terms of the equation for the mean velocity consider the scattering of the pulsating currents on the pulsation pressure. They are similar to the terms considering the collision of molecules in the ideal gas. Also here, this leads to a reduction of the secondary harmonics of the velocity distribution, i.e. in the course of time, the pulsation velocity will approach the isotropic one in every point. Finally, the influence of the solid walls on the pulsation energy is considered, and the energy equation for the

On the Statistic Dynamics of a Nonecompressable Turbulent Liquid

SOV/20-127-4-10/60

turbulent motion is set up. The consideration of the tertiary momenta (turbulent transfer) is also discussed, and the final equation for the mean velocity is found (11). There are 3 references, 2 of which are Soviet.

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta Akademii nauk SSSR (Institute of Physics of the Earth imeni O. Yu. Shmidt of the Academy of Sciences, USSR)

PRESENTED: April 20, 1959, by M. A. Leontovich, Academician

SUBMITTED: April 16, 1959

Card 3/3

10(4)

AUTHOR: Davydov, B. I.

SOV/20-127-5-12/58

TITLE: On the Statistical Theory of Turbulence

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 5, pp 980-982 (USSR)

ABSTRACT: The author refers to the equations he deduced in an earlier paper (Ref 1), and tests their applicability to the turbulence layer on a solid wall. In order to obtain the logarithmic profile of the average velocity he deduces a differential equation for the turbulent dissipation of Q. In this connection equations are referred to, which had been set up in reference 1. For the turbulent boundary layer the equation (11) is deduced: $(QS_y)' + (2 - \gamma)QR_{xy}U'_x + 2Q^2 = 0$, from which the required logarithmic profile follows. Together with the equations of reference 1, a complete system of differential equations is thus developed for all unknown quantities. On the basis of J. Laufer's paper (Ref 2) the values $\beta = \beta_1 = 10$ and $\gamma = 0.15$ are then determined for the empirical constants of the system of equations. To what extent these values are really known must

Card 1/2

yet be determined. It must further be determined whether the equations set up for a turbulent flow surrounded by solid walls are applicable also to turbulent flows without solid walls. There are 3 references, 2 of which are Soviet.

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta Akademii nauk SSSR (Institute of Geophysics imeni O. Yu. Shmidt of the Academy of Sciences, USSR)

PRESENTED: April 20, 1959 by M. A. Leontovich, Academician

SUBMITTED: April 16, 1959

Davydov, B.I.

PHASE I BOOK EXPLOITATION SOV/4490

Akademiya nauk SSSR. Institut fiziki Zemli

Voprosy teoreticheskoy seysmologii i fiziki zemnykh nedr (Problems in the Theory of Seismology and Physics of the Earth's Interior) Moscow, 1960. 172 p. (Series: Its: Trudy, no. 11 (178)) Errata slip inserted. 1,700 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut fiziki Zemli imeni O. Yu. Shmidta

Resp. Ed.: V.A. Magnitskiy, Doctor of Technical Sciences; Ed. of Publishing House: V.A. Kalinin; Tech. Ed.: S.G. Tikhomirova.

PURPOSE: This collection of articles is intended for astrophysicists, geophysicists, and seismologists.

COVERAGE: This issue of the Transactions of the Institute of Physics of the Earth imeni O. Yu. Shmidt contains articles on theoretical problems in seismology and on recent investigations in the field of earthquake mechanics. Four out of fourteen

~~Card 1/4~~ 1/2

DAVYDOV, B.I.

Acetylcholine metabolism in the hypothalamic region of the brain in dogs after acute radiation sickness. Radiobiologiia 1 no.3:394-398 '61. (MIRA 14:10)

(CHOLINE) (GAMMA RAYS--PHYSIOLOGICAL EFFECT)
(HYPOTHALAMUS)

27.2400

30357

S/205/61/001/004/016/032
D298/D303

AUTHOR: Davydov, B. I.

TITLE: The acetyl choline metabolism of the cerebral thalamic region in dogs which have endured acute radiation sickness

PERIODICAL: Radiobiologiya, v. 1, no. 4, 1961, 550-554

TEXT: Due to the considerable morphological and functional differences between the various regions of the brain, the author thought it would be of interest to study the radiation shifts in the acetyl choline metabolism in these individual regions. The aim of the present study was to determine the intensity of acetyl choline synthesis, its content and the cholinesterase activity in the cerebral thalamus of dogs 4 - 6, 9 - 10 and 14 months after general gamma-irradiation. The dogs were irradiated from a Co source with a dose of 400 r ($LD_{50/30}$). One dog received a dose of 600 r ($LD_{70/30}$). The irradiated dogs showed changes in the inten-

Card 1/3

4

The acetyl choline...

S/205/61/001/004/016/032
D298/D303

sity of acetyl choline synthesis, its content and the cholinesterase activity in the thalamic region. Acetyl choline synthesis increased in intensity in dogs irradiated 4 - 6 (158 ± 21%, $p \leq 0.05$) and 9 - 10 months (206 ± 23, $p < 0.001$) after irradiation. [Abstracter's note: p - probability of the difference.] Some 14 months after irradiation, the test animals showed no differences from the control dogs. Statistically probable changes in the acetyl choline content were found 9 - 10 and 14 months after irradiation. In the first case they corresponded to a rise to 194 ± 7%, but in the second case to a drop to 49 ± 9%. A slight rise in cholinesterase activity was detected 4 - 6 and 9 - 10 months after irradiation. Some 14 months after irradiation, a reliable drop in cholinesterase activity (79 ± 5%, $p < 0.001$) was noted. Within 9 - 10 months of irradiation, a disturbance in the normal correlation of the indices of acetyl choline metabolism occurred in the thalamus. There are 4 tables and 23 references: 14 Soviet-bloc and 9 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: P. D. MacLean, Psychosom. Med., 17, 5, 355, 1955; J. H. Quastel, in the symposium: Neurochemistry, p. 153, 1955; LGregoire, J. Gregoire,

Card 2/3

4

30357

The acetyl choline...

S/205/61/001/004/016/032
D298/D303

N. Limozin, Bull. Soc. Chem. Biol., 37, 1, 65, 1955; K. Pfeiffer, Internat. Review of Neurology, ed by Pfeiffer a. o., N.-Y., 1959.

SUBMITTED: March 16, 1961

Card 3/3

DAVYDOV, B.I.; KLASSOVSKIY, Yu.A.

Cholinesterase activity of the blood serum and fatty infiltration in the liver of dogs after acute radiation sickness. Radiobiologiia 1 no.5:711-714 '61. (MIRA 14:11)
(GAMMA RAYS--PHYSIOLOGICAL EFFECT) (LIPID METABOLISM)
(LIVER) (CHOLINESTERASE)

80562
S/020/61/136/001/007/037/...A
B019/B056

10.2000

AUTHOR: Davydov, B. I.

TITLE: Statistical Dynamics of an Incompressible Turbulent Fluid

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 1, pp. 47-50

TEXT: Using results obtained in earlier papers (Refs. 1,2) by the author, a complete system of differential equations is derived for the mean velocity U_i of a turbulent flow, the second pulsation moments $R_{ij}=v_iv_j$ and the third pulsation moments $S_{ijk} = v_iv_jv_k$, where $v_l = u_l - U_l$, and further, the dissipation of the energy $Q = \nu(dv_i/dx_k)^2$ at a given point, where ν denotes viscosity. The first three of these differential equations given here are taken from earlier papers:

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Statistical Dynamics of an Incompressible Turbulent Fluid

S/020/61/136/001/007/037/...
B019/B056

$$dU_i/dt + \partial R_{ik}/\partial x_k + \partial P/\partial x_i = \nu \partial^2 U_i/\partial x_k^2, \quad \partial U_k/\partial x_k = 0; \qquad (1)$$

$$dR_{ij}/dt + R_{ik}\partial U_j/\partial x_k + R_{jk}\partial U_i/\partial x_k + \partial S_{ijk}/\partial x_k + \beta Q\,(R_{ij} - {}^1/_3\,\delta_{ij}R)/R + B_{ij} - {}^1/_3\delta_{ij}B_{kk} + {}^2/_3\delta_{ij}Q = \nu\partial^2 R_{ij}/\partial x_k^2; \qquad (2)$$

$$dS_{ijk}/dt + S_{ijl}\partial U_k/\partial x_l + S_{jkl}\partial U_i/\partial x_l + S_{ikl}\partial U_j/\partial x_l + R_{il}\partial R_{jk}/\partial x_l + R_{jl}\partial R_{ik}/\partial x_l + R_{kl}\partial R_{ij}/\partial x_l + \beta_1 Q S_{ijk}/R = 0. \qquad (3)$$

The differential equation for Q derived in earlier papers appears to be little satisfactory to the author who, proceeding from an investigation of the "dissipation flow" $C_i = \nu v_i (\overline{\partial v_k/\partial x_l})^2$, derives the following equation:

$$\frac{dQ}{dt} + \frac{\partial C_k}{\partial x_k} + \alpha\frac{Q}{R}R_{ik}\frac{\partial U_i}{\partial x_k} + 4\frac{Q^2}{R} = \nu\frac{\partial^2 Q}{\partial x_k^2}. \qquad (12)$$

As fifth differential equation he obtains:

$$\frac{dC_i}{dt} + C_k\frac{\partial U_i}{\partial x_k} + R_{ik}\frac{\partial Q}{\partial x_k} + \frac{2}{9}Q\frac{\partial R_{ik}}{\partial x_k} + \frac{\beta_2 Q}{R}C_i = 0. \qquad (15)$$

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88562

Statistical Dynamics of an Incompressible Turbulent Fluid

S/020/61/136/001/007/037
B019/B056

By using this system in the most general case, 23 quasilinear equations are obtained for the components, whose number, however, may be reduced in concrete cases due to symmetry properties of the problem. According to this system, a turbulent boundary layer is finally investigated. There are 4 references: 3 Soviet.

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta Akademii nauk SSSR (Institute of Physics of the Earth imeni O. Yu. Shmidt of the Academy of Sciences, USSR)

PRESENTED: July 11, 1960, by M. A. Leontovich, Academician

SUBMITTED: June 27, 1960

Card 3/3

S/169/63/000/003/034/042
D263/D307

AUTHORS: Davydov, B.I. and Magnitskiy, V.A.

TITLE: Problems of high pressures in the physics of the Earth's deeper layers

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 3, 1963, 7, abstract 3G32 (In collection: Eksperim. issled. v obl. glubinnykh protsessov, M., AN SSSR, 1962, 16-21)

TEXT: The main problem in the experimental study of the internal structure and composition of the Earth is the performance of investigations at high pressures. A graph is given which shows the propagation velocities of longitudinal seismic waves V_p in deeper parts of the Earth, in the B, C, D, E and F layers; the graph is constructed chiefly from seismological data. A graph of the density distribution within the Earth was constructed by Bullen from gravimetric data. M.S. Moledenskiy determined the actual densities. Pressure within the Earth depends little on the accepted rule of densities. According to the results of Guternberg, at the bottom

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Problems of high pressures ...

of the crust the pressure is 10^4 kg/cm^2, in the intermediate layer C it is 1.5 - 2 x 10^5 kg/cm^2, on the outer boundary of the core - 1.5 x 10^6 kg/cm^2 and at the center of the Earth - of the order of 3.5 x 10^6 kg/cm^2. Temperatures of the deep layers of the Earth can only be determined theoretically, on the basis of these or other assumptions. The calculations are also considerably complicated by the fact that little information is as yet available concerning the distribution of radioactive substances within the globe. At a depth of 100 km the temperature apparently reaches 1500°C and at the outer boundary of the core it is 4000-5000°C. Composition of the Earth and the nature of boundaries between various layers is at present only hypothetical, particularly below the B layer. Several authors propose that in the zone between B and D layers the chemical composition undergoes a change, and polymorphic transitions of minerals takes place. The problems can be solved by experiments in the field of high pressure physics. At the present time pressures of 150 x 10^3 atm have already been achieved, at temperatures of the order of 2000°C. One of the main directions of future studies should be an investigation of the properties of the more important rock-forming

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Problems of high pressure ...

minerals, e.g. olivine, enstatite, diopside, augite etc. under conditions corresponding to those in the depths of the Earth. Study of the chemical reactions and phase transitions at high pressures and temperatures is also of considerable interest. One of the main problems is a physical characteristic of the substance of the Earth's core.

[Abstracter's note: Complete translation]

Card 3/3

DAVYDOV, B.I.

Cholinesterase activity of the blood serum in dogs exposed to general γ-irradiation. Pat.fiziol.i eksp.terap. 6 no.2:23-26 Mr-Ap '62. (MIRA 15:8)

(CHOLINESTERASES) (GAMMA RAYS--PHYSIOLOGICAL EFFECT)

DAVYDOV, Boris Ivanovich; ROGINSKIY, Boris Yakovlevich; BONDARENKO, [illegible], red.; RODIN, Ye.D., red.; MORALEVICH, O.D., red. izd-va; TIKHONOVA, Ye.A., tekhn. red.

[Linear programming in the economics and operation of the merchant marine] Primenenie lineinogo programmirovaniia v ekonomike i ekspluatatsii morskogo transporta. Moskva, Izd-vo "Morskoi transport," 1963. 94 p. (MIRA 17:2)

ACCESSION NR: AT4042646 S/0000/63/000/000/0023/0026

AUTHOR: Antipov, V. V.; Vy*sotskiy, V. G.; Davy*dov, B. I.; Dobrov, N. N.; Morozov, V. S.; Murin, G. F.; Nikitin, M. D.; Saksonov, P. P.

TITLE: Some problems in providing radiation safety in space flight

SOURCE: Konferentsiya po aviatsionnoy i kosmicheskoy meditsine, 1963. Aviatsionnaya i kosmicheskaya meditsina (Aviation and space medicine); materialy* konferentsii. Moscow, 1963, 23-26

TOPIC TAGS: radiation safety, space flight, spaceflight factors, cosmic radiation effect, vibration, acceleration, radiation protection, dosimetric control, biological dosimeter, solar flare, antiradiation drug/RBE

ABSTRACT: Although protons are an important component of primary cosmic radiation, experimental data on their biological action under space conditions and their RBE compared with x-rays and gamma-rays are lacking. It has been established that the RBE of protons with energies in excess of 100 Mev (LD_{50} for rodents) is a little less than one. However, the data on which this figure is based were obtained with various particle accelerators of high-dose power and pulsed radiation,

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ACCESSION NR: AT4042646

conditions not found in space. The RBE of alpha-particles and high-energy nuclei of the heavier elements has been estimated as lying between 2 and 10. Laboratory verification with animals is unfortunately impossible, since sufficiently powerful accelerators do not exist. The combined effect of radiation and other space-flight factors (vibration, acceleration, modified atmosphere, etc.) is another important area where few experimental data are available. It is necessary to know in what ways and to what extent cosmic radiation contributes to the total effect of space flight on the human body, and what is the qualitative and quantitative influence of other space-flight factors on the biological effect of radiation, in order to formulate scientifically-based antiradiation drugs and safety measures. Experiments have shown that the development of radiation damage is modified by acceleration and vibration, the effect depending on when and in what sequence these factors occur. Animals subjected to vibration and acceleration 5 to 7 days after irradiation showed a poorer tolerance to these factors than nonirradiated animals. In addition, the vibration and acceleration aggravated the course of the radiation sickness. Vibration and acceleration prior to irradiation not only failed to aggravate radiation sickness, but even somewhat abated its severity. Without experimental data on RBE and the combined effects of spaceflight factors, permissible levels of radiation cannot be scientifically established. A conditional

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permissible dose of 25 ber (biological equivalent roentgen) has been set, but is subject to revision upward or downward as actual data on the effect of various cosmic radiation components and the effectiveness of antiradiation measures are accumulated. The ideal type of radiation protection would be mechanical shielding (i. e., an actual screen of lead or some other material) but this is technologically impossible at present. The majority of chemical antiradiation agents cannot be used under space-flight conditions. Since radiation effects are not confined to humans, not only the crew members but the whole spaceship biocomplex (plants, animals on board, etc.) must be protected lest the equilibrium of the closed ecology be upset by hereditary or other effects. Basic elements of a radiation safety system for spacecraft will be: 1) dependable dosimetric control of the radiation level in the spaceship cabin by means of ship, individual, and biological dosimeters; 2) scientific forecasting of radiation conditions in space, especially solar chromoshpheric flares; and 3) effective pharmacological and biological agents for protection against the harmful effects of cosmic radiation.

ASSOCIATION: none

Card 3/4

ACCESSION NR: AT4042646

SUBMITTED: 27Sep63 ENCL: 00 SUB CODE: LS

NO REF SOV: 000 OTHER: 000

Card 1 4/4

ANTIPOV, V. V.; VYSOTSKIY, V. G.; DAVYDOV, B. I.; DOBROV, N. N.; MOROZOV, V. S.; MURIN, G.F.; NIKITIN, M. D.; SAKSONOV, P. P.

"Some problems in providing radiation safety in space flight."

report presented at the 5th Intl Space Science Symp, Florence, 12-16 May 64.

PARIN, V. V.; DAVYDOV, B. I.; PANCHENKOVA, E. F.

"The results of the investigations of the biological influence of some factors connected with cosmic flights."

report submitted for 15th Intl Astronautical Cong, Warsaw, 7-12 Sep 64.

L 11001-65 EWG(j)/EWG(r)/EWT(l)/FS(v)-3/EWG(v)/FCC/EEC-4/EEC(t)/EWG(a)/EWG(c)/
EWA(h) Pc-4/Pe-5/P1-4/Po-4 Pq-4/Pae-2/Pob AMD/ESD/ASD(a)-5/AEDC(a)/AFTC(b)/
ESD(dp)/ESD(gs)/ESD(t) DD/GW/WS

ACCESSION NR: AP5046783 B S/0293/64/002/005/0797/0804

AUTHOR: Antipov, V. V.; Davy*dov, B. L.; Panchenkova, E. F.; Salmonov, P. P.; Chernov, G. A.

TITLE: Reactivity of the organism following exposure to some space-flight factors

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 5, 1964, 797-804

TOPIC TAGS: ionizing radiation, corpuscular radiation, centrifugation, physical endurance, simulation test, rat, mouse, space flight simulation

ABSTRACT: Experiments were conducted on 700 mice and 80 rats to study the resistance of the organism following accelerations, high-energy proton radiation, and the combined effects of acceleration and ionizing radiation. In the first series of experiments, the resistance of animals to prolonged exercise following acceleration was investigated. In one case, mice were studied 15 min, 1, 2, and 4 hr, and 1, 3, and 7 days after a single exposure to a 20-min, 8-g, chest-to-

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L 11004-65
ACCESSION NR: AP4046783

spine acceleration. In another case, animals were exposed to centrifugation three times in one week, 4 hr after which they were subjected to exercise. The second series of tests involved the exposure of male rats to 700—850 and 1400—1770 rad (60 ± 10 rad/min) doses of 120-Mev protons. Irradiation took place in an OIYal synchrocyclotron with a current density of 10^8—10^9 protons/cm^2. sec^{-1}. The animals were then tested for endurance during exercise 40 days after irradiation. Finally, the weight of the spleen and left adrenal was measured. In the third series, endurance to exercise was investigated following the combined action of acceleration (8 g for 15 min) and ionizing radiation (400—700 rad). Exercise consisted of swimming until exhausted in a water tank where the water temperature was 10—20C. It was found that the physical endurance of mice was statistically lower 4 hr after acceleration, with increased endurance 7 days afterwards. There was a seasonal variation in the physical endurance in animals exposed to accelerations. Changes in the reactivity of centrifuged animals to physical strain was correlated with shifts in blood ceruloplasm. Physical endurance was lowered in animals 40 days after 700—1770 rad doses of 120-Mev

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L 1400-65
ACCESSION NR: AP4046783

protons. Preliminary centrifugation somewhat increased the resistance of animals to ionizing radiation. Orig. art. has: 2 tables and 3 figures.

ASSOCIATION: none

SUBMITTED: 07May64 ENCL: 00 SUB CODE: LS, PH

NO REF SOV: 010 OTHER: 007 ATD PRESS: 3135

Card 3/3

SAKSONOV, P.P.; ANTIPOV, V.V.; DOBROV, N.N.; SHASHKOV, V.S.; KOZLOV, V.A.; PARSHIN, V.S.; DAVYDOV, B.I.; RAZGOVOROV, B.L.; MOROZOV, V.S.; NIKITIN, M.D.

Prospects for pharmacochemical protection against radiation injury in space flight. Probl. kosm. biol. 4:119-126 '65. (MIRA 18:9)

L 29511-65 EWG(j)/EWG(r)/EWT(l)/EWG(v)/EWG(a)/EWG(c)/FS(v)-3 Pe-5 DD/RD

ACCESSION NR: AP5005444 S/0293/65/003/001/0159/0166

AUTHOR: Davydov, B. I.; Antipov, V. V.; Saksonov, P. P.

TITLE: Reaction of the irradiated organism to critical accelerations

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 1, 1965, 159-166

TOPIC TAGS: x irradiation, acceleration, acceleration effect, radiation effect, mouse, acceleration adaptation, centrifugation

ABSTRACT: A study has been made of the effects of radiation on the ability of male mice to withstand critical magnitudes of acceleration. In all, 1100 animals were studied. In evaluating the viability of animals exposed to acceleration, their condition was determined after exposure. The purpose of using an extremely high acceleration was to reveal those subtle and unstable compensatory mechanisms which are not ordinarily apparent. Animals were irradiated in an RUM-11 device in doses of 250, 500, 700, and 850 r (13 r/min) and then exposed to accelerations of 40—42 g for 3 min in a back-to-chest position. The radius of the centrifuge was 0.31 m. At these accelerations, approximately 50% of the control animals died. Any trend which differed from this figure was used as an index of changes in stability on the part of the irradiated animals. Some results of the experiments are given in Table 1 and Figs. 1, 2, 3, and 4 of the Enclosure. The authors concluded that mice

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L 29511-65

ACCESSION NR: AP5005444

became more tolerant of acceleration 1—7 days after exposure to 250, 500, and 700 r. There is a relationship between the irradiation dose and the acceleration tolerance. Control animals exposed to preliminary centrifugation showed increased resistance to repeated accelerations which was not observed in animals irradiated with 760 r on the first day after exposure. Orig. art. has: 2 tables and 6 figures. [CD]

ASSOCIATION: none

SUBMITTED: 09Jul64 ENCL: 05 SUB CODE: PH, LS

NO REF SOV: 007 OTHER: 012 ATD PRESS: 3197

Card 2/2

I. 38546-65 EEO-2/FSF(h)/FSS-2/EWG(r)/EWT(l)/FS(v)-3/EEC(k)-2/EWG(v)/EWA(d)/
ACCESSION NR: AP5009550 EWG(a)-2, UR/0293/65/003/002/0315/0324
EWG(j)/EWG(c) Pc-4/Pe-5/Pq-4/Pac-4/Pae-2/Pi-4 TT/DD/WD/GW

AUTHOR: Parin, V. V.; Antipov, V. V.; Davydov, B. I.; [illegible] 51
Panchenkova, E. F.; Chernov, G. A.; Nesterenko, A. I. B

TITLE: Results of investigations on the biological effectiveness of a number of space-flight factors

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 2, 1965, 315-324

TOPIC TAGS: space flight, biological effect, serotonin, ceruloplasmin, vibration, acceleration, ionizing radiation

ABSTRACT: The authors studied the individual and combined effects of vibration, acceleration, and ionizing radiation on mice, rats, guinea pigs, dogs, and apes. In the first series of experiments, mice and guinea pigs were subjected to vertical vibration with frequencies of 35 and 70 cps and an amplitude of 4 mm. The duration of the experiments was 15—60 min. A frequency of 700 cps with an amplitude of 0.005 mm lasting 60 min was also tried. Two hours after the first exposure to vibration, serotonin content was lowered. In general, serotonin content throughout the experiment was 68% lower than in

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L 38546-65
ACCESSION NR: AP5009650

control animals. In mice exposed to 35 cps for 15 min, the serotonin content returned to normal after one day. However, in mice exposed to 70 and 700 cps for 60 min, the level remained low for up to six days after exposure. Ceruloplasmin activity was generally unchanged in most animals exposed to vibration, except for one group exposed to 30 cps for 1 hr. In this group, serotonin activity increased by a factor of 4 compared to the control level. In the second series, mice were subjected to 10- and 30-g accelerations for 5 and 30 min. A 10-g acceleration for 5 min produced a lowered serotonin content 2 hr after exposure. The decrease lasted up to six days after exposure at a level 71% lower than in control animals. Upon exposure to 10 g for 30 min, serotonin content was not lowered until the 6th day. Ceruloplasmin activity was cut in half during the first 2 hr after exposure and returned to normal levels 4 hr later. One to six days afterwards, activity was 2.5—4 times greater than in the control group. Exposure to 30 g for 5 min produced these same effects with the exception of ceruloplasmin activity which increased 2 hr after exposure. In the third series, mice, rats, guinea pigs, dogs, and apes were irradiated with 300, 900, 600, and 540 r. Eleven apes exposed to 540 r showed lowered serotonin content up to the

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L 38546-65
ACCESSION NR: AP5009650

16th day (death) after exposure. Of 45 dogs exposed to 600 r, 42 died. Serotonin content in these animals decreased up to death (15 days). Of particular interest was the reaction of mice and rats to gamma irradiation. In these animals, as contrasted to guinea pigs, dogs, and apes, 50% of the total serotonin content was in the skin. This difference was attributed to the fact that unlike mice and rats, guinea pigs, dogs, and apes are inclined to react hemorrhagically to irradiation. In the fourth series dogs were exposed to the combined action of acceleration or vibration and ionizing radiation. These animals were exposed to vibration (70 cps, 0.4 mm, 60 min) or acceleration (8 g, 3 min) from 2 hr to 1 day prior to cobalt-60 irradiation (100r, 3.4 r/min). Acceleration of 8 g, lasting for 3 min, performed 2 hr prior to irradiation sharply increased the level of serotonin and ceruloplasmin activity for 2—7 days after irradiation, in contrast to the reaction to radiation alone. Acceleration 1 day prior to irradiation had the same effect as radiation alone. Vibration 2 hr prior to irradiation did not alter the normal dynamics of ceruloplasmin and serotonin in irradiated animals. In analyzing the results of these tests, it was not possible to establish a dependence between the magnitude of vibration

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L 38514-65
ACCESSION NR: AP5009650

and radiation dose in the dynamics of changes in serotonin content and ceruloplasmin activity. In general, lowered serotonin content in response to various stimulants depended upon the species of animal and its individual peculiarities. The authors conclude that it is hard to speculate on the mechanisms leading to the lowering of serotonin content in animals because of the paucity of other studies of this kind. However, it is felt that the serotonin-ceruloplasmin probe is the most sensitive means for determining the biological effects of various space-flight factors. Orig. art. has: 2 tables and 4 figures. [CD]

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: PH, LS

NO REF SOV: 028 OTHER: 015 ATD PRESS: 3227

Card 4/4

L 38550-65 EWG(j)/EWG(r)/EWT(l)/EWT(m)/FS(v)-3/EWG(v)/FCC/EEC-4/EEC(t)/T/EWG(a)-2/EWG(c)/EWA(h) Pc-4/Pe-5/Pq-4/Jae-2/Pab/Pi-4 IJP(c) DD/RD/GW-2

ACCESSION NR: AP5009651 UR/0293/65/003/002/0325/0329

73

AUTHOR: Morozov, V. S.; Antipov, V. V.; Davydov, F. I.; Dobrov, N. N.; Saksonov, P. P.; Shushkov, V. S.

B

TITLE: The biological effect of cosmic radiation under conditions of onset of solar flares on the Earth-Moon route in model experiments

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 2, 1965, 325-329

TOPIC TAGS: cosmic radiation, biological effect, solar flare, solar flare model, gamma ray, Co^{60}, mouse, radioprotector, radiation drug, lunar trajectory

ABSTRACT: The possibility of modeling the biological effect of ionizing radiation during short solar flare on a lunar spaceflight (7—10 days) is demonstrated in preliminary experiments. Co^{60} is used as the radiation source because it has an equivalent RBE to a flow of protons, which cannot at present be simulated in the laboratory. Male white mice in a compartmented biological unit were supplied with special food concentrate and water for 5 days prior to irradiation by a dose of 900 r distributed to simulate solar flare in space flight. A second group on the same diet were exposed to an acute dose of 900 r in plexiglas cages. The number of deaths in 30 days was the same in both cases (75%). A third group, fed a normal

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L 38560-65

ACCESSION NR: AP5009651

diet and also irradiated in plexiglas cages, had a 90% mortality rate in the same period of time. Pharmacologic and chemical defenses from the effect of radiation did not differ in principle in the model of simulated solar flare and under normal (i.e., acute) conditions of irradiation. Results of the experiment will be the subject of a further report. Orig. art. has: 3 figures and 2 tables. [JS]

ASSOCIATION: none

SUBMITTED: 01Dec64 ENCL: 00 SUB CODE: LS, AM

NO REF SOV: 004 OTHER: 006 ATD PRESS: 3225

Card 2/2

MOROZOV, V.S.; SHASHKOV, V.S.; DAVYDOV, B.I.; ANTIPOV, V.V.; SAKSONOV, P.P.; DOBROV, N.N.

Modeling radiation conditions during solar flares on the trajectory of the flight around the moon. Probl. kosm. biol. 4:701-708 '65. (MIRA 18:9)

L 44100-66 EWT(1)/EWT(m)/FS(v)-3 DD/RD

ACC NR: AP5026059 SOURCE CODE: UR/0293/65/003/005/0789/0795

AUTHOR: Davydov, B. I.; Antipov, V. V.; Komnova, N. I.; Saksonov, P. P.

44
B

ORG: none

TITLE: Radiobiological effects in animals after the preliminary action of acceleration

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 5, 1965, 789-795

TOPIC TAGS: radiation biologic effect, biologic acceleration effect, combined space flight effect, animal physiology, gamma ray, 660 Mev proton

ABSTRACT: The following indices of the combined effect on the animal organism of acceleration and irradiation were examined: survival percentage, the reaction of radiosensitive organs (spleen and thymus), and some blood component levels. Male white mice were centrifuged (8—10 g for 15—30 min) 30 min, 4 hr, and 1 day prior to irradiation. One group of animals was irradiated with Co^{60} gamma rays in a dose of 700 rad (dose power 9.5 rad/min) and the other with 660-Mev protons in a dose of 1300 rad. Experimental results showed that under the combined influence of acceleration and irradiation, the $DL_{50/30}$ was approximately 100 rad higher than with irradiation only. However, the average lifetime of the animals which died during the 30-day period after irradiation (with a dose of 750 rad) was shortened by previous acceleration. Statistically reliable differences were not observed in the average weights of the spleen and thymus of animals centrifuged and then irradiated. Radiation leukopenia

Card 1/2 UDC: 629.198.621+629.198.61 (59)

L 44100-66
ACC NR: AP5026059

with acceleration and ionizing radiation effects combined was less severe than with radiation alone. Several possible mechanisms of the modifying effect of acceleration on radiation injury are discussed. Experimental data still do not permit a complete evaluation of the acceleration effect on radiation injury depending on the time between these two influences. It should be noted that the weakening of the radiation effect observed with the preliminary influence of acceleration only concerns the period of acute radiation sickness and does not apply to all indices of radiation damage. Orig. art. has: 4 figures and 4 tables. [JS]

SUB CODE: LS/ SUBM DATE: 03Jun65/ ORIG REF: 007/ OTH REF: 007/ ATD PRESS: 4126

Card 2/2

L 14252-66 FSS-2/EWT(l)/FS(s)/EWP(m)/FS(v)-3/EEC(k)-2/FCC/EWA(h) SCTB TT/DD/RD/GW

ACC NR: AT6003911 SOURCE CODE: UR/2865/65/004/000/0701/0708

AUTHOR: Morosov, V. S.; Shashkov, V. S.; Davydov, B. I.; Antipov, V. V.; Saksonov, P. P.; Dobrov, N. N. 84 82

ORG: none

TITLE: Modeling of radiation conditions on a circumlunar trajectory during a solar flare

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 701-708

TOPIC TAGS: space flight simulation, mouse, radiation protection, lunar flight, radiation biologic effect, biologic acceleration effect, solar flare, gamma irradiation, lunar trajectory, radiation belt, antiradiation drug

ABSTRACT: The possibility of modeling the biological effect of radiation on a lunar flight which includes a short solar flare was demonstrated. White mice fed a special food concentration and kept in a biological unit were subjected to gamma-irradiation. Acute irradiation of other animals was conducted in plexiglas cages. In all cases the radiation dose was

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2

900--920 r. Dose power during acute irradiation was 18 r/min and during "solar flare" a maximum of 2.5 r/min (duration of flare, 24 hr). On the simulated lunar trajectory, the animals received a dose of 60--80 r while passing through the "radiation belts." Before the solar flare, the mice were injected with the following radioprotective agents: cystamine dihydrochloride, AET, and 5-methoxytryptamine hydrochloride.44

The experimental results showed that the effects of this pharmacological protection were slight as compared with unprotected animals. AET was the most effective radioprotective agent during both "lunar flight" and acute irradiation. On the lunar flight the animals were subjected to an acceleration of 20 g for 5 min before irradiation and at the end of the flight. It is suggested that the observed lowering of the biological effect of radiation during lunar flight (only 33% of the mice died, as against 90% after acute irradiation) is due not only to the lowered dose power, but also to acceleration. It is known that acceleration can alter the reactivity of an animal to subsequent irradiation. Previous experiments also suggest that preliminary irradiation of 60 r (in the radiation

L 14252-66
ACC NR: AT6003911 O

bolts) reduced the effectiveness of the subsequent high dose during solar flare. It was concluded that modeling of radiation conditions for any spaceflight trajectory should be possible. Orig. art. has: 2 figures and 3 tables.
[ATD PRESS: 4091-F]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 006 / OTH REF: 006

FW
Card 3/3

L 23976-66 EWT(l)/EWT(m)/FCC/EWA(h) SCTB DD/HD/GW

ACC NR: AT6003847 SOURCE CODE: UR/2865/65/004/000/0119/0126

AUTHOR: Saksonov, P. P.; Antipov, V. V.; Dobrov, N. N.; Shashkov, V. S.; Kozlov, V. A.; Pershin, V. S.; Davydov, B. I.; Razgovorov, B. L.; Morozov, V. S.; Nikitin, M. D.

68

ORG: none

B+1

TITLE: Perspectives of pharmacochemical protection from radioactive damage during cosmic flights

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 119-126

TOPIC TAGS: astronaut, space medicine, radiation biologic effect, antiradiation drug, biologic acceleration effect, mouse, experimental animal, space physiology, closed ecology system, space flight

ABSTRACT: The authors consider cosmic radiation a real danger for astronauts, particularly during long flights. The work is a survey on existing radioprotectors and a general discussion of biologic conditions in cosmic flight, future research, and requirements for radioprotectors. The present chemical compounds, Mercamine HCL, its salicylate and disulfide, and AET appear sufficiently effective for clinical use against

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L 23976-66
ACC NR: AT6003847

X or gamma rays. Laboratory tests on mice showed that some compounds of the aminothiol series (cystamine, cysteamine, serotonin, AET) exerted significant protective effect in proton irradiation of 600 and 120 Mev. In the search for radioprotectors, other factors affecting the astronaut must also be taken into account, such as weightlessness, vibration, acceleration and changes in pressure. Tests on laboratory animals subjected to such conditions prior to irradiation showed no effect on radiation sickness, but vibration after irradiation was apt to prolong the sickness. Some of the radioprotectors tested in mice and dogs had an adverse effect on stability of the organism under vibration and acceleration. The authors call for studies to establish a stable ecologic system in the cabin which can accompany the astronaut on long trips, for models simulating cosmic flight conditions particularly in regard to radiation dose, and for radioprotective compounds to be compatible with all these conditions. Orig. art. has: none.

SUB CODE: 06, 22/ SUBM DATE: none/ ORIG REF: 040/ OTH REF: 028

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L 08280-67 -- EWT(1) SCTB DD/GD

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AUTHOR: Antipov, V. V.; Kozlov, V. A.; Davydov, B. I. Dobrov, N. N.; Razgovorov, B. L.; Saksonov, P. P. 31 B+1

ORG: none

TITLE: New data on changes in the reactivity of the organism under the effect of several spaceflight factors [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24-27 May 1966]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 30-31

TOPIC TAGS: space physiology, combined stress, biologic vibration effect, biologic acceleration effect, ionizing radiation biologic effect, rat, cystamine, strychnine, proton radiation biologic effect

ABSTRACT:

Experiments were performed to test changes in the reactivity of the organism which result from spaceflight factors (vibration, acceleration, ionizing radiation) and their combinations. The functional condition of the organism was evaluated using pharmacological and physical methods.

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It was found that vibration (70 cps at 10 G, for 1 hr) did not affect the stamina of the animal to physical exercise (swimming). The administration of cystamine (225 mg/kg) either before or after vibration caused a marked decrease in the duration of the swimming by the animal. Cystamine alone decreased the stamina of the organism during exercise, but to a significantly smaller degree than in combination with vibration. Vibration had the effect of moderately increasing the sensitivity of the organism to cystamine (400 mg/kg) and strychnine (1.5 mg/kg).

Four hours after exposure to acceleration (8 G, chest-back, for 20 min), a statistically significant drop in the physical stability of the animals was observed. On the seventh day after exposure stability increased. Changes in the reactivity of centrifuged animals with respect to physical exercise corresponded to shifts in the ceruloplasmin in the blood.

Forty days after exposure to protons (energy 120 Mev, doses from 700--1770 rad), the stability of animals to physical loads was lowered. Preliminary centrifugation (8 G for 15 min four hours prior to irradiation with doses of 400 and 700 rad) increased somewhat the resistance of animals to radiation. [W. A. No. 22; ATD Report 66-116]

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