

ACCESSION NR: AP4007806

S/0049/63/000/012/1833/1836

AUTHOR: Gal'perin, Ye. I.; Zayonchkovskiy, M. A.

TITLE: Methods and techniques of deep seismic sounding at sea from submarines

SOURCE: AN SSSR. Izvestiya. Seriya geofizicheskaya, no. 12, 1963, 1833-1836

TOPIC TAGS: seismology, deep seismic sounding, submarine seismic sounding, hydrophone, underwater seismic sounding, suboceanic structure, earth crust study

ABSTRACT: Soviet submarines have been used since 1958 as underwater seismic stations in deep seismic soundings in the Pacific Ocean. The equipment used differed little from that on surface vessels, consisting of hydrophones mounted outside the hull connected to amplifiers and filters to receive seismic waves at 3-12 and 30-300 cps. The data were recorded on photooptical and magnetic tape recorders. The submarines also carried chronometers to synchronize operations with the

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surface vessels. During the survey the submarines remained submerged and stationary while the surface vessel moved along a predetermined course setting off 150-kg charges programmed at 7.5—15 min intervals with an accuracy of  $\pm 1-2$  sec. About 2000 shots [presumably depth charges] were fired covering a profile more than 8500 km long. Though the results were satisfactory, and at a depth of 70—100 m the readings were not affected by wave action even in a rough sea, submarines were found to be too expensive for ordinary use. Orig. art. has: 1 figure.

ASSOCIATION: Akademiya nauk SSSR. Institut fiziki Zemli (Academy of Sciences SSSR. Institute of Physics of the Earth)

SUBMITTED: 21Dec62

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OTHER: 001

Card 2/2

L 39555-66 EWT(1)/EEC(k)-2/T IJP(c) GE

ACC NR: AT6008785

SOURCE CODE: UR/2657/65/000/014/0095/0130

AUTHOR: Agapova, M. G.; Gal'perin, Ye. I.

ORG: none

TITLE: Principles of thermal design of radiator-type semiconductor devices

SOURCE: Poluprovodnikovyye pribory i ikh primeneniye; sbornik statey, no. 14, 1965, 95-130

TOPIC TAGS: semiconductor device, heat transfer, transistor/P201A transistor

ABSTRACT: Three parts are discernible in the present article: (1) Well-known generalities of heat transfer (heat conduction, convection, radiation; simulation of heat transfer by electric circuits; relations between maximum temperature, mean temperature, and the duty factor of pulses passing the junction); (2) Types and functioning of semiconductor-device radiators (a compilation based on 1956-63

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UDC: 621.382.017.72

Card 2/2 <sup>15</sup>

GAL'PERIN, Ye.I.; GORDONOV, A.Yu.; FOMCHENKOV, V.M.

Designing trigger circuits for point contact crystal triodes with  
consideration of interchangeability. Poluprov. prib. i ikh prim.  
no.2:340-352 '57. (MIRA 11:6)  
(Transistors) (Electronic circuits)

GALPERIN, YE I.

9(4) 24(6)

p. 2, 3

PHASE I BOOK EXPLOITATION

SOV/1765

Vsesoyuznoye nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi

Poluprovodnikovaya elektronika (Semiconductor Electronics) Moscow, Gosenergoizdat, 1959. 222 p. 13,950 copies printed.

Ed.: V.I. Shamshur; Tech. Ed.: K.P. Voronin.

**PURPOSE:** The book is intended for engineering and technical personnel working with semiconductor devices.

**COVERAGE:** The book is a collection of lectures delivered at the All-Union Seminar on Semiconductor Electronics in March 1957. The seminar was organized by the Scientific and Technical Society of Radio Engineering and Electrical Communications imeni A.S. Popov. The authors of the lectures have attempted to systematize the basic information on the operation of semiconductor devices. The articles describe the operation and characteristics of crystal diodes and transistors and discuss their application in various low-frequency, high-frequency and pulse circuits. No personalities are mentioned. References appear at the end of each article.

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TABLE OF CONTENTS:

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<u>Ye.I. Gal'perin.</u> Basic Physical Concepts	5
The author discusses the physical aspects of semiconductor materials. He describes the atomic structure of the various elements and presents a discussion of energy levels in metals and dielectrics. There are 13 Soviet references (including 4 translations).	
N.A. Penin. Electrical Properties of Semiconductors	25
The author gives a brief description of semiconductors, such as selenium, tellurium, and germanium. Particular attention is paid to the atomic structure of germanium crystals and to conduction in crystals with and without impurities.	
N.Ye. Skvortsova. Semiconductor Crystal Diodes	32
The author discusses the construction and operation of point-contact and junction-type crystal diodes. She also presents methods of making rectifying contacts and describes the effect	
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of temperature on diode operation. There are 2 Soviet references (including 1 translation).

**Ya.A. Fedotov. Triode Transistors**

42

The author briefly discusses the theory of junction-type and point-contact transistors. Chief attention is given to the theoretical and operational aspects of junction-type transistors. The author discusses the characteristics of junction-type triode transistors and describes the effect of frequency on transistor parameters. He also describes transistor power amplification and discusses methods of obtaining high operating frequencies. A brief description of junction-type tetrode transistors is also presented. There are 7 Soviet references (including 5 translations).

**Ye.I. Gal'perin. Triode Transistor as an Amplification Circuit Element**

87

The author discusses the construction, operation and application of triode transistors. He describes various methods of transistor connection and gives expressions for equivalent circuits and transistor parameters. There are 6 Soviet references

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(including 1 translation).

V.I. Gevorkyan. Stabilization of Power Supply Circuits of Triode Transistor Amplifiers 105

The author discusses methods of stabilizing the operation of bias circuits and describes an analytical method of calculating transistor performance. He also presents a graphical method of determining the quiescent point and discusses transistor circuits with automatic bias. There are no references.

A.G. Fillipov. Direct-coupled Amplifiers 117

The author describes the operation of d-c transistor amplifiers and discusses their operating characteristics. He also describes methods of stabilizing transistor operation by using negative feedback, balanced and bridge circuits. There are 10 references of which 1 is Soviet and 9 English.

Yu.I. Konev. Triode Transistors in Amplification Circuits of Servomechanism Systems 132

The author discusses the application and operation of transistors in servomechanism circuits. Emphasis is placed on a dis-  
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cussion of servomechanism transistor components, such as a-c amplifiers, modulators, and phase-sensitive amplifiers. There are 7 references of which 6 are Soviet (including 1 translation), and 1 English.

A.A. Kulikovskiy. High-frequency Transistor Amplifiers 151

The author discusses equivalent circuits of high-frequency transistor amplifiers and describes methods of calculating their parameters. He describes the operation of interstage resonant circuits and examines the effect of feedback in transistor circuits. He also discusses transistor stability, stabilizing networks for the internal feedback in transistor circuits and the noise factor. There are 15 references of which 3 are Soviet, 1 German and 11 English.

T.M. Agakhanyan. Transient and Frequency-Phase Characteristics of a Junction-type Triode Transistor 173

The author discusses transient, frequency and phase characteristics of junction-type triode transistors. He also derives expressions for transfer functions for various types of transistor connections and describes the equivalent circuit for high

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Semiconductor Electronics

SOV/1765

frequencies for a junction-type triode transistor. There are 8 references of which 2 are Soviet (including 1 translation), and 6 English.

T.M. Agakhanyan. Triode Transistor Video Amplifiers 187

The author discusses linear and nonlinear distortions in transistor video amplifiers and describes circuits with complex feedback and current distributing networks. A brief discussion of multistage amplifiers is also presented. There are 2 references, both Soviet.

B.N. Kononov. Trigger and Relaxation Circuits Using Junction-type Triode Transistors 197

The author describes the operation and characteristics of symmetrical triggers and multivibrators using junction-type transistors. He also discusses their stability and derives expressions for calculating transistor circuit performance. There are 4 references of which 3 are Soviet and 1 English.

G.S. Tsykin. Transistor Inverter of D-C Voltages 208

The author discusses the operation and characteristics of in-Card 6/7

PHASE I BOOK EXPLOITATION

SOV/4675

Gal'perin, Ye. I., and Yu. N. Sulitskiy

Poluprovodnikovyye logicheskiye pereklyuchayushchiye skhemy  
(Semiconductor Logical Switching Circuits) Moscow, Gosenergoizdat, 1960. 243 p.  
Errata slip inserted. No. of copies printed not given.

Ed.: V. G. Masharova; Tech. Ed.: B. V. Smurov.

**PURPOSE:** This survey is intended for specialists working in the field of semiconductor pulse devices and digital computers. It may also be used by students taking advanced courses in related fields at schools of higher technical education.

**COVERAGE:** The survey deals with problems of design and calculation of various semiconductor logical switching circuits and assemblies used in digital computers. Characteristic features of semiconductor switching devices are described, and basic circuit diagrams applied in semiconductor logical systems are analyzed. The basic sources of this survey are 5 English books and 5 articles in periodicals, published in the USA, and the Proceedings of a

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Semiconductor Logical Switching (Cont.)

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Symposium held in 1959 in Philadelphia. A list of these sources is given at the end of the foreword. No personalities are mentioned. References and a bibliography accompany each chapter.

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1. Remarks on the operation of point-contact diodes under switching conditions	7
1.1 Recovery time	7
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Card 2/11

FEDOTOV, Ya.A., *otv.red.*; BARKANOV, N.A., *red.*; BERGEL'SON, I.G., *red.*;  
BROYDE, A.M., *red.*; GAL'PERIN, Ye.I., *red.*; KAMENETSKIY, Yu.A.,  
*red.*; KAUSOV, S.F., *red.*; KONEV, Yu.I., *red.*; KRASILOV, A.V.,  
*red.*; KULIKOVSKIY, A.A., *red.*; NIKOLAYEVSKIY, I.F., *red.*;  
STEPANENKO, I.P., *red.*; VOLKOVA, I.M., *red.*; SMUROV, B.V.,  
*tekhn.red.*

[Semiconductor devices and their applications] Poluprovodni-  
kovye pribory i ikh primeneniye; sbornik statei. Moskva, Izd-vo  
"Sovetskoe radio". No.6. 1960. 333 p. (MIRA 13:12)  
(Semiconductors) (Transistors)

FEDOTOV, Ya.A., otv.red.; GAL'PERIN, Ye.I., zamestitel' otv.red.; BARKANOV,  
N.A., red.; BERGEL'SON, I.G., red.; BROJDE, A.M., red.; KAMENETSKIY,  
Yu.A., red.; KAUSOV, S.F., red.; KRASILOV, A.V., red.; KULIKOVSKIY,  
A.A., red.; NIKOLAYEVSKIY, I.P., red.; PENIN, N.A., red.; STEPA-  
NENKO, I.P., red.; VOLKOVA, I.M., red.; SVESHNIKOV, A.A., tekhn.red.

[Transistor devices and their applications; collection of articles]  
Poluprovodnikovye pribory i ikh primeneniye; sbornik statei. Moskva,  
Izd-vo "Sovetskoe radio." No.4. 1960. 423 p. (MIRA 13:5)  
(Transistors) (Electronic circuits)

GAL'PERIN, Ye.I. (g.Moskva)

Remarks on the terminology in the field of transistor electronics.  
Izv. vys. ucheb. zav.; radiotekh. 4 no.1:104 Ja-F '61.

(Transistors—Terminology)

(MIRA 14:4)

AVER'YANOV, A.G.; VAYTSMAN, P.S.; GAL'PERIN, Ye.I.; ZVEREV, S.M.;  
ZAYONCHKOVSKIY, M.A.; KOSMINSKAYA, I.P.; KRAKSHINA, R.M.;  
MIKIOTA, G.G.; TULINA, Yu.V.

Deep seismic sounding in the transition zone between the  
continent of Asia and the Pacific Ocean during the International  
Geophysical Year. Izv. AN SSSR. Ser. geofiz. no. 2:169-184. 1961.  
(MIRA 14:2)

1. Institut fiziki Zemli AN SSSR.  
(Soviet Far East--Seismometry)  
(Earth--Surface)



GAL'PERIN, Ye.I.

Changes in the direction of particle displacement during the passage of seismic waves through the low velocity zone. Izv. AN SSSR. Ser.geofiz. no.5:585-594 My '62. (MIRA 15:8)

1. Institut fiziki Zemli AN SSSR.  
(Seismology)

GAL'PERIN, Ye.I.; FROLOVA, A.V.

Study of seismic waves by combined vertical and horizontal  
profiling. Izv. AN SSSR. Ser. geofiz. no.9:1307-1323 S '63.  
(MIRA 16:10)

1. Institut fiziki Zemli AN SSSR.

GAL'PERIN, Ye. I.

Experience gained in detailed study of a velocity model for the upper part of the cross section under conditions of slight velocity differentiation. Izv. AN SSSR, Ser. geofiz. no. 4:456-474 Ap '64. (MIRA 17:5)

1. Institut fiziki Zemli AN SSSR.

GAL'PERIN, Ye. I.

Study of multiply reflected waves in vertical seismic profiling.  
Izv. AN SSSR. Fiz. zem. no.12:1-12 '65. (MIRA 19:1)

1. Institut fiziki zemli AN SSSR. Submitted June 11, 1964.

GAL'PERIN, Ye. L. Cand Phys-Math Sci -- (diss) "Change of the crystalline  
~~structure of steel during cold and~~ <sup>heat</sup> ~~heat~~ treatments." Len, 1957. 11 pp (Len State  
Ped Inst im A. I. Gertsen. Chair of General Physics), 100 copies (KL, 4-57,80)

GALPERIN, Y. E. L. and TERMINASOV, YU. S.

The National Committee for Crystallography of the USSR

"Crystal Structure Changes of Steel During Hot and cold Treatment"  
Section 5-10 : a paper submitted at the General Assembly and International Congress  
of Crystallography, 10-19 Jul 57, Montreal, Canada.

C-3,800,189

Gal'perin, Ye. L.

70-4-12/16

AUTHOR: Gal'perin, Ye.L, and Terminasov, Yu.S.

TITLE: Crystal structure changes in steel caused by heat treatment and cold working. (Izmeneniye kristallicheskoy struktury stali pri kholodnoy i termicheskoy obrabotkakh)

PERIODICAL: "Kristallografiya" (Crystallography), 1957, Vol.2, No.4, pp. 519 - 525 (U.S.S.R.)

ABSTRACT: Changes of different structural characteristics, such as dispersion, elastic and static distortions of the  $\alpha$ -phase lattice, characteristic temperature and carbide-phase state, were examined during plastic deformation and heat treatment of silicon steel 55C<sub>2</sub>.

Steel samples were statically compressed, and a part of them was filed (after annealing) in order to obtain powder. The roentgenographic part included photographic and ionisation measurements of the diffraction maxima produced by Fe K $\alpha$  and Mo K $\alpha$  radiations.

Effects of fragmentation and elastic distortions, responsible for the diffraction-line widening, were separated analytically and by means of harmonic analysis.

Both methods gave a satisfactory coincidence of the elastic distortion data. The calculated crystallite dimensions depended essentially on the choice of the analytic function.

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70-4-12/16.

Crystal structure changes in steel caused by heat treatment and cold working. (Cont.)

The function  $1/(1 + K^2x^2)^2$  was found to be the most suitable.

Static distortions of the atomic lattice were rated according to changes in the diffraction-line intensity for the lines (110) and (220) of Fe K $\alpha$  radiation and  $6 \leq \theta \leq 38$  of Mo K $\alpha$  radiation. The extinction effect was taken into account and it was found that this effect is practically unimportant for Mo radiation. The extinction effect provoked a 10-15% intensity change of the (110) line of Fe K $\alpha$  radiation.

No regular intensity changes were found in the course of plastic deformation, which apparently proves the absence of a direct connection between static distortions and  $\sqrt{Us^2t}$ .

An attempt was made to state a relationship between the structural characteristics of the samples examined and their mechanical properties, e.g. microhardness. It was found that the hardening of deformed steel is due essentially to sub-microscopic structural non-uniformities appearing in the course of the  $\alpha$ -phase fragmentation and the formation of severely distorted boundary regions.

An identical method was applied to the examination of oil-hardened steel samples tempered at 200-700 C for 1 hour. The carbide sediment from a part of the samples was obtained and

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70-4-12/16

Crystal structure changes in steel caused by heat treatment and cold working. (Cont.)

examined by means of Fe K $\alpha$  radiation.

Maximum changes of the steel 55C<sub>2</sub> characteristic temperature, caused by heat treatment, do not exceed 3-4%.

A regular diffraction intensity change is found in the course of tempering which allows static distortions to be rated according to  $\sqrt{U^2st}$ .

Tempering of hardened steel 55C<sub>2</sub> at less than 400 C causes the formation of an intermediate carbide with a hexagonal lattice (a = 2.72, c = 4.35 Å). At higher temperatures this carbide transforms actively to cementite.

The main effect on the tempered steel hardening has several factors: carbon state, different admixtures and their distribution, and static distortions of the  $\alpha$ -phase lattice.

There are 3 figures and 2 tables, and 21 references, 12 of which are Slavic.

SUBMITTED: February 22, 1957.

AVAILABLE: Library of Congress.

Card 3/3

*Gal'perin, Ye.L.*

AUTHORS: Gal'perin, Ye.L. and Terminasov, Yu.S.

70-5-24/31

TITLE: On the State of Carbon in Annealed Silicon Steel  
(O sostoyanii ugleroda v otpushchenoy kremnistoy stali)

PERIODICAL: Kristallografiya, 1957, Vol.2, No.5, pp. 693 - 695 (USSR)

ABSTRACT: Carbide deposits were extracted from annealed silicon steel  $55C_2$  (0.55% C, 1.84% Si) by an electrolytic method and

X-ray powder photographs were taken. The steel had been quenched and then annealed at temperatures between 300 and 700 ° for an hour. The powder photographs showed spacings of 2.35 m, 2.18 m, 2.07 s, 1.59 w, 1.37 w and 1.24 w which could be indexed on the basis of a hexagonal cell with  $a = 2.72$  and  $c = 4.35 \text{ \AA}$ . This compound occurred when the steel was annealed below 400 °C. Between 400 and 500 °C this presumed intermediate, metastable carbide transforms to platy cementite and above 500 °C intensive coagulation of the carbide phase takes place resulting in a transformation to three-dimensional crystals. There are 1 plate, 1 table and 8 references, 7 of which are Russian.

ASSOCIATION: A.I. Gertsen State Pedagogical Institute, Leningrad.  
(Leningradskiy Gosudarstvennyy Pedagogicheskiy  
Institut im. A.I. **Gertsena**)

1 of 2

On the State of Carbon in Annealed Silicon Steel. 70-5-24/31

SUBMITTED: January 3, 1957

AVAILABLE: Library of Congress

Doc 2/2

GAL'PERIN, Ye. L.

AUTHOR: GAL'PERIN, Ye. L., TERMINASOV, Yu. S. 57-6-32/36  
TITLE: The Effect of Extinction on X-Ray Interference Intensity in  
Steel Investigation. (O vliyanii ekstinktsii na intensivnost'  
rentgenovskikh interferentsiy pri issledovanii stali, Russian)  
PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol 27, Nr 6, pp 1379 - 1385  
(U.S.S.R.)

ABSTRACT: The experimental results of the heat-treated steels 55C<sub>2</sub> and 20 are given. Cylindrical samples with a diameter of 2 mm and a length of 20 mm were hardened: 55C<sub>2</sub> at 900°C in oil and steel 20 at 930° C in water. One part of the samples was tempered for one hour at 700° C, the other part was annealed for 4 hours at 850°C. Cylinders with a diameter of 0,5 mm were obtained from heat treated samples of both types of steel by means of etching in a phosphor-chrome electrolyte. The samples were photographed in a RKD chamber with a diameter of 57,3 mm under Mo-radiation. AGFA films were used. In order to eliminate the K<sub>β</sub> radiation from the spectrum and in order to decrease the intensity of the through-going bottom an Nb-filter of a thickness of 0,1 mm was used. The absorption of the secondary characteristic radiation was carried out by means of an aluminum foil of a thickness of 0,3 mm. The investigations showed that in con-

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57-6-32/36

The Effect of Extinction on X-Ray Interference Intensity in Steel Investigation.

sequence of the different treatments in the case of Mo-radiation the influence of extinction can be disregarded in those cases in which the maximum measurements of the blocks in the samples developing coherence are not more than  $1 \pm 2 \cdot 10^{-4}$  cm and where those reflexes are investigated which correspond to an angle of  $\delta > 15^\circ$ . If soft rays are used (Co, Fe, Cr) a size of block of the  $10^{-4}$  order can be sufficient to cause a remarkable decrease of the intensity of the interference lines of planes with a great reflexion capacity even if the angles are  $\delta > 15 \pm 25^\circ$ . (With 2 illustrations, 2 tables, and 6 Slavic references).

ASSOCIATION: A.I.GERZENS, Leningrad Pedagogic Institute, Faculty for General Physics. (Leningradskiy Gos. pedagogicheskiy institut in. A.Gertsena, Kafedra obshchey fiziki, Russian)

PRESENTED BY:

SUBMITTED: 29.12.1956

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Gal'perin, Ye.L., Terminasov, Yu.S. SOV/163-58-1-47/53

TITLE: On the Distortion of the Crystal Lattices of Thermally Treated Steels (Ob iskazheniyakh kristallicheskoy reshetki termicheski obrabotannoy stali)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 1, pp 252 - 255 (USSR)

ABSTRACT: In the present investigation the influence of the temperature on the tempered steel 5502 (0,55 % C and 1,84 % Si) as well as on the dimensions of the static distorted lattices of the  $\alpha$ -phase was determined. The results showed that with the increase in temperature the static distortion of the lattice of the  $\alpha$ -phase does not become so intense. In the annealing of hardened steel at 400° C, at which temperature the total amount of carbon is already driven off from the solid phase, the magnitude  $\sqrt{u_{st}^{-2}}$  was found to be greater than  $\sqrt{u_{\alpha}^{-2}}$ .

The dependence of  $\ln \frac{J^{hkl}}{J_{700^{\circ}}^{hkl}}$  thermally treated on  $\sum h_i^2$  ( $k_{\alpha} = 0$ )

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On the Distortion of the Crystal Lattices of Thermally Treated Steels

SOV/163-58-1-47/53

was determined for thermally treated steel samples 5502 and for the steel No.20.

The greatest decrease in the magnitude of static distortion was found within the temperature range of 300 - 700° C, at which temperature an intense increase in the  $\alpha$ -phase occurs.

The values for  $\sqrt{u_{st}^2}$  were calculated by the measuring of the intensity of the radiations due to the lines [110] and [220] according to the corrections introduced for the extinction of the line [110]. There are 2 figures, 1 table, and 13 references, 10 of which are Soviet.

ASSOCIATION: Leningradskiy Gosudarstvennyy pedagogicheskiy institut (Leningrad State Pedagogic Institute)

SUBMITTED: October 1, 1957

Card 2/2

GAL'PERIN, Ye.L, inzh.; TERMINASOV, Yu.S., doktor fiz.-mat.nauk, prof.

Radiographic examination of plastic deformations of steel.  
Trudy LIEI no.23:68-79 '58. (MIRA 12:5)

(Steel--Testing)

(X rays--Industrial applications)



GAL'PERIN, Ye.L. [translator]; UMANSKIY, Ya.S., red.; MARENKOV, Ye.A.,  
red.; EL'KIND, L.M., red. izd-va; ATTOPOVICH, M.K., tekhn. red.

[Theory of phases in alloys; collection of articles on reports read  
at a conference on the theory of phases in alloys. Translated from  
the English] Teoriia faz v splavakh; sbornik statei po dokladam, pro-  
chitannym na seminare po teorii faz v splavakh. Moskva, Gos.nauchno-  
tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 353 p.  
(MIRA 14:12)

(Phase rule and equilibrium) (Alloys--Metallography)

22962

18.1245

24,7300 (1153, 1482, 1136)

S/126/61/011/005/007/015  
E193/E183

AUTHORS: Beletskiy, M.S., and Gal'perin, Ye.L.

TITLE: The crystal structure of some phases in alloys of magnesium with cerium and neodymium

PERIODICAL: Fizika metallov i metallovedeniye, Vol.11, No.5, 1961, pp. 698-703 + 1 plate

TEXT: The object of the present investigation was to ascertain whether phases, present in alloys of magnesium with other rare earth metals of the cerium sub-group, are also present in the magnesium-neodymium system, and to determine the crystal structure of the phases. The experiments were conducted on magnesium-base alloys containing 2-45 wt.% Ce or Nd. All X-ray diffraction work was done on polycrystalline (massive and powder) specimens. The following conclusions were reached.

1. The Mg-Nd alloys with up to 45% Nd consist of phases similar to those present in alloys of Mg with other rare earth metals of the cerium group, namely  $Mg_9Nd$  and  $Mg_3Nd$ .
2. Depending on the Ce or Nd content in the alloy, the  $Mg_9Ce$  and  $Mg_9Nd$  phases can exist as one of two modifications:  $\beta$  and  $\beta'$

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22962  
S/126/61/011/005/007/015  
E193/E183

The crystal structure of some phases in alloys of magnesium with cerium and neodymium

in the former, and  $\beta$  and  $x$  in the latter case. The  $x$ -phase is also present in the Mg-Ce alloys containing more than 35% Ce and quenched from 600 °C.

3. The  $\beta$ -Mg<sub>9</sub>Ce and  $\beta$ -Mg<sub>9</sub>Nd phases appear to have an ordered cubic structure with the lattice parameters of 14.604 and 14.578 Å respectively.

There are 4 figures, 1 table and 7 references: 2 Soviet and 5 non-Soviet. The English language references read as follows: X

Ref.1: M. Hansen, Constitution of binary alloys. McCraw Hill Book Comp. 1958.

Ref.2: G.V. Raynor. The physical metallurgy of magnesium and its alloys, London, 1959.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy alyuminiyevo-magniyevyy institut g. Leningrad.

Card 2/2 (All-Union Aluminium-Magnesium Scientific Research Institute in Leningrad.

SUBMITTED: July 14, 1960

VYDREVICH, Ye.Z.; GAL'PERIN, Ye.L.

Some equilibrium phases in the system  $\text{Na}_2\text{O} - \text{Al}_2\text{O}_3 - \text{CaO} - \text{SiO}_2$   
-  $\text{H}_2\text{O}$ . Zhur.prikl.khim. 34 no.9:1971-1979 S '61. (MIRA 14:9)  
(Systems (Chemistry))

S/070/62/007/002/002/022  
E132/E160

AUTHORS: Gal'perin, Ye.L., and Sandler, R.A.

TITLE: On the crystal structure of  $TiCl_2$

PERIODICAL: Kristallografiya, v.7, no.2, 1962, 217-219

TEXT: From X-ray powder photographs the structure of  $TiCl_2$  has been confirmed as being of the  $CdI_2$  type with  $a = 3.50 \text{ \AA}$  and  $c = 5.88 \text{ \AA}$  ( $\pm 0.01 \text{ \AA}$ ) and with the single parameter near to 0.25. There were differences between the photographs obtained with Cu and with Mo radiation which were satisfactorily explained by differences between the textures of the material at the middle and at the outside of the specimen which produced differences for radiations of greater and lesser penetrating power. There are 2 tables.

ASSOCIATION: Vsesoyuznyy alyuminiyevo-magniyevyy institut  
(All-Union Institute for Aluminium and Magnesium)

SUBMITTED: Initially, July 13, 1960, and  
after revision, September 11, 1961.

Card 1/1

GAL'PERIN, Ye.L.; STROGALIN, Yu.V.

Polytetrafluoroethylene single crystals. Vysokem. soed. 5  
no.10:1589 0 '63. (MIFA 17:1)

STRUCTURE OF SOME DERIVATIVES OF UREA AND GUANIDINE. X-RAY

STUDY OF DIURETICS AND DIGUANYLS OF CYCLODIPHOSPHAZINE AND  
DIARYL UREA. Zhur. strukt. khim. 5 no.184t.619 Ag '64.  
(MIRA 1843)

ACCESSION NR: AP4012280

S/0070/64/009/00170102/0103

AUTHORS: Gal'perin, Ye. L.; Dubov, S. S.; Volkova, Ye. V.; Mlenik, M. P.

TITLE: The crystalline structure of polytrifluorochloroethylene

SOURCE: Kristallografiya, v. 9, no. 1, 1964, 102-103

TOPIC TAGS: chloroethylene, crystal structure, x ray diffraction, crystal pulling, polymer, camera RKV 86A

ABSTRACT: The authors undertook this work because of contradictions in the literature on the cell dimensions and chain configuration of this compound. They obtained precisely oriented samples of the polymer by pulling in glycerin at 150-160°. The samples were then heated in their extended state for 10 hours at 190-195°. X-ray patterns were obtained on cylindrical film in an RKV-86A camera. The pictures are characterized by lines of the first and second levels and by an absence of equatorial reflections. The lines of the second level correspond to hexagonal packing. The value of the lattice constant was determined to be  $a = 6.385 \pm 0.015 \text{ \AA}$ . Along the axis of the crystal fiber,  $c = 42 \pm 0.2 \text{ \AA}$ . Seventeen monomer units are packed along this line, indicating a crystal density of.

Card 1/2



ACCESSION NR: AP4012280

2.20 + 0.02 g/cm<sup>3</sup>, which is in good agreement with experimental density measurements. The absence of equatorial reflections and the presence of intense, almost point, reflections at lines of the first, second, and third layers indicates that the first reflection should be referred to (101), not to (100) as has been done in previous work. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 09Apr63

DATE ACQ: 19Feb64

ENCL: 00

SUB CODE: SS, 00

NO REF SOV: 003

OTHER: 005

Card 2/2

DAI-PERIN, T.S.; GAVISH, A.M.

Phase of variable composition in the system Zn - S,  
Zhur. neorg. khim. 9 no.7:1767-1768 JI '64.

(MIRA 10-9)

I. Gosudarstvennyy nauchno-issledovatel'skiy rentgeno-radiologicheskii institut.



L 10546-65

ACCESSION NR: AP4044812

$3\text{MoO}_3$  (monoclinic lattice,  $a = 7.85\text{\AA}$ ,  $b = 11.70\text{\AA}$ ,  $c = 12.25\text{\AA}$ ,  $\beta = 116^\circ 20'$ ). The molybdenum oxide did not form solid solutions at room temperature in the investigated portion of the  $\text{Bi}_2\text{O}_3\text{-MoO}_3$  system. Orig. art. has: 4 tables.

ASSOCIATION: None

SUBMITTED: 06Jun63

ENCL: 00

SUB CODE: GC, IC

NR REF SOV: 008

OTHER: 015

Card 2/2

KOLCHIN, I.K.; GALPERIN, Ye.I.; BOBROV, S.S.; MARGOLIS, L.Ye.

Catalytic oxidation and oxidative ammonolysis of propylene on  
bismuth tungstate. Neftekhimiia 5 no.1:111-117 Ja-F '65.  
(MIRA 18:5)

L 33512-65 EWI(m)/EPF(c)/EWG(m)/EPF/EWP(j)/T Pg-4/Pt-4/Ps-4 EPL RWH/WH/RM  
ACCESSION NR: AP5003822 S/O190/65/007/001/0016/0018

AUTHORS: Gal'perin, Ye. L.; Strogalin, Yu. V.

TITLE: Symmetry and dimensions of the elementary cell of polytrifluoroethylene 31  
B 15

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 1, 1965, 16-18

TOPIC TAGS: polytrifluoroethylene, electrographic analysis, polymer structure

ABSTRACT: Since the x-ray diffraction picture of polytrifluoroethylene (PTFE) obtained by H. S. Kaufman (J. Amer. Chem. Soc., 75, 1477, 1953) for a nonoriented specimen could not be duplicated for an oriented specimen, form and dimensions of the PTFE ( $M_n = 100\ 000-300\ 000$ ) elementary cell were studied electrographically. PTFE films were obtained by placing several drops of 0.2-0.5% PTFE solution in acetone on glycerine (heated to 40-50°C). After evaporation, the films were studied either in nonoriented form or after 400-500% elongation. Electrographs of oriented specimens (see Fig. 1 on the Enclosure) show that the structure corresponds to a hexagonal lattice with  $a = 5.59 \pm 0.02 \text{ \AA}$  and  $c = 2.50 \pm 0.02 \text{ \AA}$ . The calculated density was  $2.01 \pm 0.03 \text{ gm/cm}^3$ , the pycnometrically measured value was  $1.98 \pm 0.02 \text{ gm/cm}^3$ . The electrograms in conjunction with published data by C. W. Bunn and

Card 1/3

L 33512-65

ACCESSION NR: AP5003822

E. V. Garner (Proc. Roy. Soc., 189A, 39, 1947) indicate that the polymer is in the gas crystalline state. The small values of the C-C-zigzag projections on the molecular axis can be explained by assuming a helical structure of the polymer chains (C. W. Bunn and E. R. Hawells, Nature, 174, 549, 1954). Calculation of the order of the Bessel functions from  $\frac{l}{c} = \frac{n}{p} + \frac{m}{s}$  show that for any helix, Bessel

functions of the zero order correspond to the observed layer lines. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 05Feb64

NO REF SOV: 003

ENCL: 01

SUB CODE: 00

OTHER: 005

Card 2/3

L 33512-65  
ACCESSION NR: AP5003622

ENCLOSURE: 01

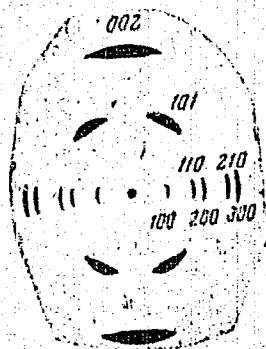


Fig. 1. Electrogram of oriented PTFE films

Card 3/3



GALPERIN, Ye.L.; STROGANIN, Yu.V.; MENIK, M.P.

Crystallization structure of polyvinylene fluoride. *Sov. Chem. Soc.*  
7 no.5:733-738 1965. (CIRA 18:9)

KOLCHIN, I.K.; GAL'PERIN, Ye.L.; BOBKOV, S.S.; MARGOLIS, L.Ya.

bismuth-molybdenum-phosphorus catalysts of oxidation and of  
oxidative ammonolysis of propylene. Kin.i kat. 6 no.5:878-  
883 S.O '65. (MIRA 18:11)

GALPERIN, B. I., KRICHEVORII, I. L.,

"Action of B. abortus," *Zhu. Microbiol. & Immunobiol.* 12: 294-300, 1934.

SMITHSONIAN, 1933

"Chemoflexion," Zentrbl. f. Bakt. I Abt. Orig. 128:320-6, 1933

Chemotherapeut. Dept., Chem.-Pharmaceut. Inst. Moscow.

GALPERIN, E. P.

"Acridine compounds as a source for remedies. V. The relation between antimalarial effect and changing substituents in position 2 and 6 as well as the amine in the side chain." Maghidson, O. J., Grigorovsky, A. M., and Galperin, E. P. (p. 66)

SO: Journal of General Chemistry (Zhurnal Obshchei Khimii) 1938, Volume 8, No. I

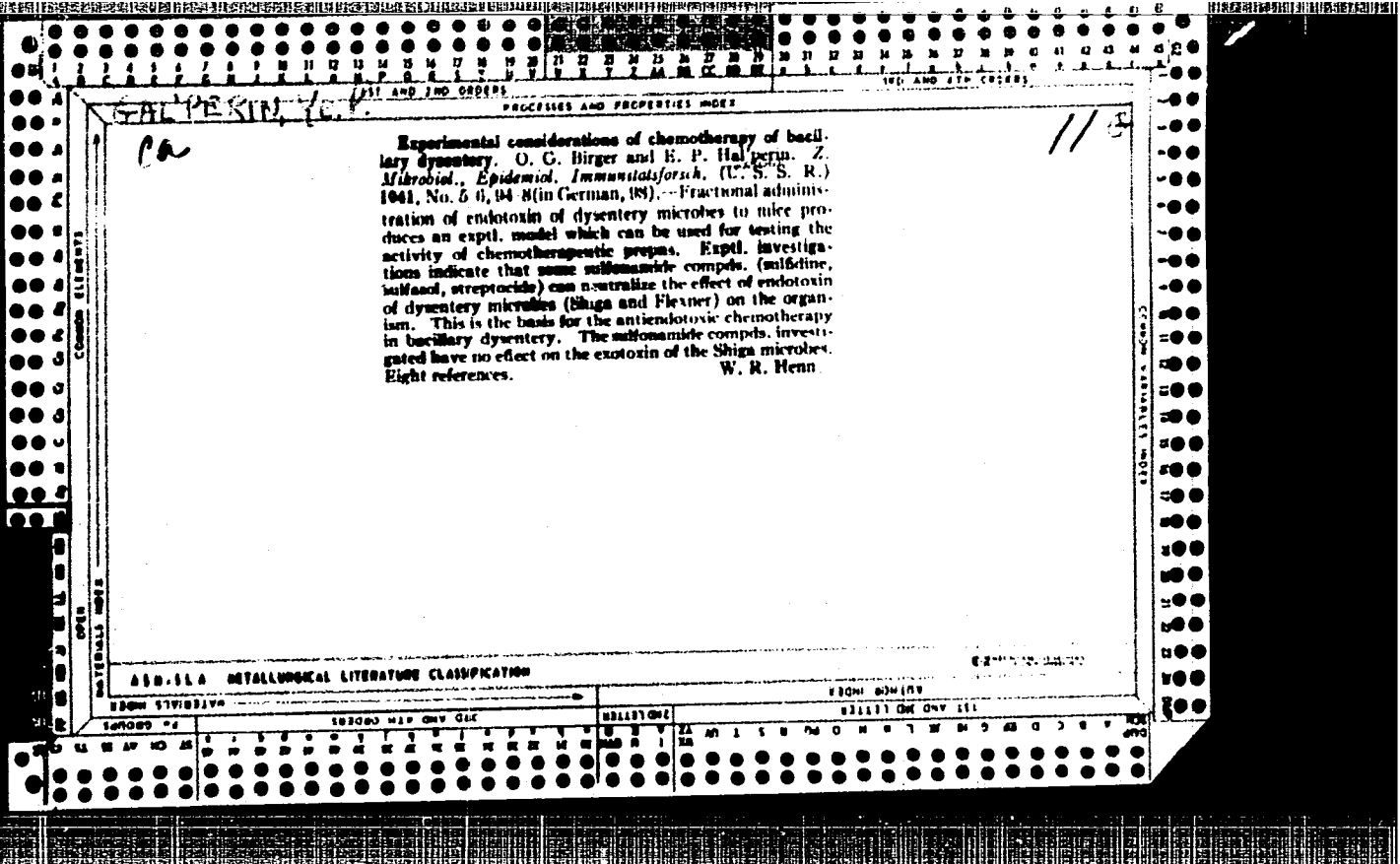
SALPERIN, J. C.  
CA

PROPERTIES AND PROPERTIES

The schizotropic and gametotropic character of anti-malarial synthetic chemotherapeutic drugs. II. The biological effect of antimalarial compounds of the quinoline series with a chain in position 4. K. P. Halperin, *Med. Parasitol. Parasitic Diseases* (U. S. S. R.) 9, No. 1-2, 44-53 (in French, 53) (1940).--The 4 compds. investigated were quinolines Nos. 45 (4-diethylaminoisopentylamino-6-methoxyquinoline), 50 (4-diethylaminobutylamino-6-methoxyquinoline), 52 (4-diethylamino- $\delta$ -hydroxypropylamino-6-methoxyquinoline) and 56 (4-diethylaminoisobutylamino-6-methoxyquinoline). They all contain the 6-methoxy group and a diethylaminoalkyl chain attached to the nucleus through an amino group in position 4. They had previously been shown to be schizotropic to bird malaria; they are without gametotropic properties. In their behavior with respect to bird malaria they are fully analogous to quinine. The isomers containing diethylaminoalkylamino in position 4 are both schizotropic and gametotropic. The *prepos.* of this group can be regarded as possible substitutes for quinine. Fourteen references. W. R. Henn

A 51-51A METALLURGICAL LITERATURE CLASSIFICATION

GROUP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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GAL'PERIN, Ye.R., redaktor; GODELEVICH, V.P.; YEVTYANOV, S.I., redaktor;  
KRIS, P.Zh.; KUNINA, S.L.; POPOV, I.A.; SHTEYN, B.B., redaktor;  
VOLKOVA, T.V., redaktor; VEYNTRAUB, L.B., tekhnicheskii redaktor.

[Problems on radiobroadcasting installations] Zadachnik po radio-  
peredaiushchim ustroistvam. Pod red. S.I.Evtianova i E.R.Gal'perina.  
Moskva, Gos. izd-vo lit-ry po voprosam svyazi i radio, 1951. 175 p.  
[Microfilm] (MLRA 7:12)  
(Radio--Problems, exercises, etc.)



GALPERIN, YE. R.

YEVTYANOV, S. I. and Ye. R. GALPERIN

Exercise Book for Formulae Used in the Construction of Radio Transmitters, State Publishing House on Questions Pertaining to Communications and Radio, Moscow, 1951.

Book-CS-G-EG-1205

MUNAYEV, N.A., inzhener-kontr-admiral; SMIRNOV, I.I., kontr-admiral;  
GAL'PERIN, Ye.S., kapital 1 ranga

Don't distort the truth ("Elusive monitor" by I.Vsevolozhskii.  
Reviewed by N.A.Munaev, I.I.Smirnov, E.S.Gal'perin). Mor.sbor.  
44 no.3:89-96 Mr '61. (MIRA 14:4)  
(Black Sea region—World War, 1939-1945—Naval operations)  
(Vsevolozhskii, I.)

GAL'PERIN, Yu., prepodavatel'

Combined study of kinematics. Prof.-tekh.obr. 18 no.6:18 Je '61.  
(MIRA 14:7)

1. Zheleznodorozhnoye uchilishche No.4, Moskva.  
(Kinematics--Study and teaching)

GAL'PERIN, Yu.; KHMEL'NITSKAYA, L., red.

[Miracles are created by people; guide] Chudesna tvoriat liudi;  
putevoditel'. Moskva, TSintiolektroprom, 1962. 78 p.

(MIRA 15:8)

(Moscow--Exhibitions) (Technological innovations)

GAL'PERIN, Yu., prepodavatel'

Solving the triangles and electrical engineering problems. Prof.-  
tekh.obr. 20 no.10:13-14 0 '63. (MIRA 16:12)

1. Professional'no-tekhnicheskoye uchilishche No.60, Moskva.

GAL'PERIN, Yu., prepodavatel'

Meeting with an author. Prof.-tekh. obr. 21 no.9:32 S '64.

(MIRA 17:11)

1. Professional'no-tekhnicheskoye uchilishche No.60 g. Moskvyy.

GAL'PERIN, Yu., prepodavatel'

Short test papers on mathematics. Prof.-tekh.obr. 22  
no.8:18 Ag '65. (MIRA 18:12)

1. Professional'no-tehnicheskoye uchilishche No.60,  
Moskva.

GAL'PERIN, Yu.B., podpolkovnik med. sluzhby, GLUZMAN, I.S., mayor med.sluzhby

Case of prolonged retention of a contrast medium in the nasolacrimal canal. Oft.zhur. 13 no.5:306-307 '58 (MIRA 11:10)

1. Iz Laringo-oto-rino kafedry im. prof. V.I. Voyacheka i kafedry oftal'mologii (nach. - prof. B.L. Polyak) Voenno-meditsinskoy ordena Lenina akademii im. S.M. Kirova.

(LACRIMAL ORGANS--RADIOGRAPHY)



GAL'PERIN, Yu.B.; BONDARENKO, L.P.; KVITASH, V.A., kand. med. nauk.

Otogenous abscess of the temporal lobe with atypical clinical course.  
Vest. otorin. 21 no.2:90-91 Mr-Apr '59. (MIRA 12:4)

1. Iz Solnechnogorskoy gorodskoy bol'nitsy (Moskovskaya oblast').  
(TEMPORAL LOBE, abscess,  
otogenous, atypical case (Rus))

KOROLEV, M.F., polkovnik meditsinskoy sluzhby; BOKSHTEYN, M.Ye., podpolkovnik meditsinskoy sluzhby, kand.med.nauk; GAL'PERIN, Yu.B., podpolkovnik meditsinskoy sluzhby

Some problems in the differential diagnosis of chronic highmoritis.  
Voen.-med.zhur. no.12:54-57 '59. (MIRA 14;1)  
(SINUSITIS)

KOZHEVNIKOV, P.A.; GAL'PERIN, Yu.B.

Case of emphysema of the eyelids of rhinogenic origin. Zhur.  
ush., nos. 1 gorl. bol. 20 no. 3:66 M<sup>4</sup>Je '60. (MIRA 14:4)

1. Iz Okružnogo voyennogo gospitalya.  
(EYELIDS--DISEASES) (EMPHYSEMA)

GAL'PERIN, Yu.B. (g.Solnechnogorsk, Moskovskoy oblasti); KUDRINA, A.Ye.  
(g.Solnechnogorsk, Moskovskoy oblasti)

Emphysema of the neck following tonsillectomy. Zhur. ush., nos. 1  
gorl.bol. 22 no.1:92 Ja-F '62. (MIRA 15:5)  
(TONSILS—SURGERY) (NECK—DISEASES)  
(EMPHYSEMA)

FISHZON-RYSS, Yu.I., kand.med. nauk (Moskva); GAL'PERIN, Yu.B. (Moskva)

Interrelations between chronic tonsillitis and chronic gastritis.  
Vest. otorin. no.1:70-74 '63. (MIRA 16:9)  
(TONSILS—DISEASES) (STOMACH—INFLAMMATION)

FISHZON-RYSS, Yu.I., kand. med. nauk (Moskovskaya oblast'); GAL'PZIN, Yu.B.  
(Moskovskaya oblast'); SHIPIK, N.I. (Moskovskaya oblast').

State of the stomach in chronic tonsillitis. Zhur. ush., nos.  
i gorl. bol. 23 no.5:34-38 S-0'63 (MIRA 17:3)

BAYKOV, S.D.; GAL'PERIN, Ya.F.; IOFFE, A.F.; SHLOKOV, G.N.

Ferrites with rectangular hysteresis loops for electronic-physical  
apparatus. *Mnogokan. izm. sist. v iad. fiz.* no.5:158-164 '63.

(MIRA 16:12)

GAL'PERIN, Yu.G., prepodavatel'.

Mastering technical terms in work classes. Politekh. obuch. no.1:  
81 Ja '58. (MIRA 10:12)

1. Shkola No.589, Moskva.  
(Technology--Terminology)



Gal'perin, Yu. I.

51-6-23/25

AUTHOR: Gal'perin, Yu. I.

TITLE: Remarks on the Paper of V. V. Shuleykin and P. F. Shakurov "The Sodium Line in the Absorption Spectrum of Air Above the Sea". (Po povodu stat'i V. V. Shuleykina i P. F. Shakurova "Liniya natriya v spektre pogloshcheniya vozdukha nad morem".)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol. III, Nr. 6, p.672. (USSR)

ABSTRACT: A letter. The present author criticizes the above paper of V. V. Shuleykin and P. F. Shakurov (Ref.1). Shuleykin and Shakurov photographed an emission spectrum of an incandescent lamp after passage through 10 km of air about 50 m above the sea surface. The beam from the lamp was not parallel and was not focused on the spectrograph slit. The D-doublet of Na was not resolved and it is hardly noticeable in Fig.1 of Ref.1. Shuleykin and Shakurov's paper does not give the essential experimental details such as the type of the spectrograph used, its resolving power, dispersion, parameters of the camera, etc. Their calculation of line intensity and derivation of the

Card 1/2

51-6-23/25

Remarks on the Paper of V. V. Shuleykin and P. F. Shakurov  
"The Sodium Line in the Absorption Spectrum of Air Above the Sea".

atomic absorption coefficient are both erroneous.  
The present author points out also that the purported  
estimate of the number of excited Na atoms can only  
apply to non-excited atoms in their ground state.  
There is 1 Russian reference.

ASSOCIATION: Institute of Atmospheric Physics, Academy of Sciences  
of the USSR. (Institut fiziki atmosfery, AN SSSR.)

SUBMITTED: July 22, 1957.

AVAILABLE: Library of Congress.

Card 2/2

GALPERIN, G. I.

Spectrographs to be used for investigations of atmospheric  
emission during the International Geophysical Year of 1957.  
G. I. Galperin, A. V. Mironov, and N. N. Shuflov.  
Mem. Soc. Roy. Sci. Lige 18, 68-9 (1957). — A short descrip-  
tion of 3 spectrographs which will be used for upper atmo-  
spheric investigations during the International Geophysical Year.  
These instruments will cover the spectral region from 8000 Å  
to 13,000 Å.  
Harry C. Allen, Jr.

GC  
abf

GR

GAL'PERIN, Yuriy.

"Aurora borealis; notes of a journalist" by IUrii Gal'perin. Geog. v  
shkole 20 no.3:79 My-Je '57. (MIRA 10:6)  
(Auroras)

AUTHOR: Gal'perin, Yu. I.

TITLE: Observations of hydrogen emission in aurora. (Nablyudeniya izlucheniya vodoroda v polyarnykh siyaniyakh).

PERIODICAL: Astronomicheskii Zhurnal, 1957, Vol.34, No.1, pp.131-134 (USSR)

Vegard (1) and Gartlein (2) have detected broadening of lines of the Balmer series of hydrogen in aurora. Spectrograms taken by them (and also by Meinel (3)) at the magnetic zenith and the magnetic horizon have shown that protons move down the Earth's magnetic lines of force with velocities of the order of 1000 km/sec.

The present work was carried out at the Northern Station of the Institute of Physics of the Atmosphere at Loparskoi ( $\varphi = 68^{\circ}38'$  and  $\lambda = 2^{\text{h}}13^{\text{m}}.3$ ). The apparatus was similar to that described in ref.(5). The spectrograph SP-48 GOI had the following characteristics:

Illumination - 1 : 0.8

Dispersion - 83.5 Å/mm at  $H_{\alpha}$

Resolving limit: 2 Å (Panchrom X)

17 spectrograms were obtained for  $H_{\alpha}$ , of which two were taken at the magnetic horizon and the remainder at the magnetic zenith (strictly,  $8^{\circ}$  north of the zenith).

Table 1 gives the K-index of magnetic disturbances during the experiments, averaged over all the observatories in the U.S.S.R. The K-index did not exceed 5.

Observations of hydrogen emission in aurora. (Cont.)

Fig.1 shows spectrograms Nos.14, 15, 16 (magnification x21; microphotometer slit width .65 mm; resolving limit  $3 \text{ \AA}$  approx.) The fourth spectrogram in Fig.1 is the background without the  $H_{\alpha}$ . For comparison, the spectrograms of Meinel and Gartlein are shown in Fig.2. The resolving limits in the latter cases were  $7 \text{ \AA}$  and  $15 \text{ \AA}$  respectively.

Fig.3 shows the contours of  $H_{\alpha}$  for the three best spectrograms taken at the zenith. These contours enable one to determine the velocities  $v_A$ ,  $v_B$ ,  $v_C$ , and  $v_D$  which correspond to the following points on the contours: A - maximum observed velocity of recession from the observer ("red shift"); B - maximum blackening; C - blackening corresponding to 0.1 of maximum; D - maximum observed velocity of approach towards the observer ("blue shift"). These velocities were found to be:

No	$v_A$	$v_B$	$v_C$	$v_D$	km/sec
14	+ 250	- 300	- 1700	- 1850	
15	+ 350	- 350	- 1700	- 1950	
16	+ 300	- 400	- 1950	- 2050	

The errors are:  $\pm 100$  km/sec in  $v_B$  and  $\pm 200$  km/sec for the other velocities. The most reliable of these is  $v_C$ .

Observations of hydrogen emission in aurora (Cont.).

The results for the two spectrograms taken at the magnetic horizon were less reliable. Their half-widths ( $H_{\alpha}$ ) were 14 and 17 Å respectively. This corresponds to speeds of  $\pm 300$  and  $\pm 400$  km/sec. Taking into account the instrumental contour these values reduce to  $\pm 250$  and  $\pm 300$  km/sec. Four figures, two tables. 9 references, 4 of which are Russian.

Physics of the Atmosphere Institute  
Ac.Sc. USSR.

Recd. Aug.11, 1956.

GAL'PERIN, Yu. I.: Master Phys-Math Sci (diss) -- "Hydrogen emission in the spectra of polar radiations". Moscow, 1958. 9 pp, (Acad Sci USSR, Inst of the Physics of the Atmosphere), 130 copies (KL, No 1, 1959, 113)



AUTHOR: Gal'perin, Yu.I. 33-35-3-8/27

TITLE: Hydrogen Line Profiles in the Auroral Spectra (O profilyakh vodorodnykh liniy v spektre polyarnykh siyaniy)

PERIODICAL: Astronomicheskii zhurnal, 1958, Vol 35, Nr 3, pp 382-389 (USSR)

ABSTRACT: The author analyzes older and modern results on the profiles of the H-lines in the auroral spectrum. His own results and those of Krasovskiy [Ref 12,13] on the  $H_{\alpha}$  - lines are particularly considered (on these results it was already reported at the Geodetic - Geophysical Meeting in Toronto in 1957). From these results which were obtained, however, in Loparskaya with the high degree of latitude  $\varphi = 64^{\circ}$ , the author concludes the penetration of a considerable number of protons with initial velocities of 1000 - 2000 km/sec. It is assumed that such particles cause the luminescence of auroras in high altitudes.

There are 1 table, 6 figures, and 23 references, 6 of which are Soviet, 11 American, 3 Norwegian, 1 French, and 2 English.

ASSOCIATION: Institut fiziki atmosfery Akademii nauk SSSR (Institute for Atmospheric Physics of the Academy of Sciences, of the USSR)

~~Card 1/2~~

GAL'PERIN, Yu. I.

HYDROGEN EMISSION AND TWO TYPES OF AURORAE SPECTRA

by  
Yu. I. Gal'perin

ABSTRACT

The following are some results of the studies of auroral hydrogen emission obtained at the Northern Research Station at Loperakiya for the last three years.

The division of auroral spectra into two types is shown. The first one is high altitude luminescence of which permitted atomic lines with high excitation potentials are characteristic. The second one is natural to lower greenish aurorae and includes strong molecular bands.

It is shown that hydrogen emission begins sometimes before any visible aurorae forms appear and its intensity variation often precedes that of auroral luminisence by 1-2 hours. A typical example of the 1st type (a "smile") appears together with hydrogen emission before auroral commencement.

Smoothed typical hydrogen profiles for different angular distances from the magnetic horizon are given.

It is pointed out that these profiles, a detailed analysis of which is given in a special article, testify that most auroral protons have initial velocities considerably less than 2000 km/sec.

Examples of H $\beta$  and H $\gamma$  profiles obtained in the magnetic zenith are shown.

Considerable correlation between hydrogen emission appearance and radio reflections from aurorae at L $\omega$  wave length is established. The connection between hydrogen emission and the simultaneous variations of the Earth magnetic field can hardly be observed.

Spectral, Electrophotometric and Radar Research on Aurorae and Night Airglow, edited

by V. I. Ersovskiy, Moscow, Izdatel'stvo Akad. Nauk SSSR, 1979.

GALPERIN, YU. I.

ON THE NATURE OF HARD CORPUSCLES IN THE UPPER ATMOSPHERE

I.S. Shklovsky, V.I. Krasovsky, Yu.I. Galperin, Svetitsky, Ye. M.

1. Investigations conducted by Soviet and American artificial earth satellites have led to the detection of a region of intensive corpuscular radiation commencing at an altitude of several hundreds of kilometres and consisting of two "belts".

2. An analysis of the spatial distribution of these belts permits drawing certain conclusions concerning the mechanisms of generation and "escape" of hard corpuscles.

3. An analysis is given on the relationship between aurorae and streams of solar corpuscles, on the one hand, and the energy spectrum and concentration of hard corpuscles in the outer "belt", on the other.

4. Calculations are made on the generation of hard corpuscles in the inner "belt" on the basis of the mechanism of decay of albedo neutrons.

5. There is given an analysis of other possibilities of generation of hard corpuscles in the upper atmosphere. Investigations of High-Energy Heavy Nuclei in the Primary Cosmic Radiation Close to the Geomagnetic Equator (Guam, Marianas Islands) D. M. Haskin, P. L. Jain, E. Lohmann, Marcel Schein and M. Teucher.

In a large stack of nuclear emulsion exposed to the cosmic radiation at 102,000 feet near the geomagnetic equator, 540 tracks of high-energy heavy nuclei were located in a systematic scan and followed along the track.

Report presented at the International Cosmic Ray Conference, Moscow, 6-11 July 1959

SOV/49-59-8-7/27

**AUTHORS:** Krasovskiy, V. I., Shklovskiy, I. S., Gal'perin, Yu.I.  
and Svetlitskiy, Ye. M.

**TITLE:** Detection of Electrons in the Upper Atmosphere<sup>12</sup>  
Energies of About 10 keV on the Third Satellite<sup>17</sup>

**PERIODICAL:** Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya,  
1959, Nr 8, pp 1157-1163 (USSR)

**ABSTRACT:** An account is given of the results of measurements of electron streams<sup>21</sup> with energies of 10 to 40 keV. The measurements were carried out by means of two fluorescent screens covered with thin pieces of absorbing aluminium foil placed on the satellite. Their radiation was recorded by photoelectron multiplier. It was found that the stream intensity decreased sharply with a decrease of energy. The stream of energy at high latitudgs during the night was observed several tens of ergs/cm<sup>2</sup>.sec.str. Fig 1 gives an examples of the relationship of the intensity of a stream of electrons and its equivalent energy a measured on May 15, 1958 at -42 to -54° magnetic latitude  
Card 1/2 in the region 1720-1880 km high over the South Pacific. ✓

SOV/49-59-8-7/27

Detection of Electrons in the Upper Atmosphere with Energies of  
About 10 keV on the Third Satellite

The concentric circles represent repeated values.  
There are 1 figure and 26 references, 9 of which are  
Soviet and 17 English.

ASSOCIATION: Akademiya nauk SSSR Institut fiziki atmosfery  
(Institute of Physics of the Atmosphere, Ac.Sc., USSR)

SUBMITTED: April 3, 1959 ✓

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3.9000

AUTHOR: Shklovskiy, I.S., Krasovskiy, V.I. and Yu.I. Gal'perin

TITLE: On the Nature of Corpuscular Radiation in the Upper Atmosphere

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1959, Nr 12, pp 1799-1806

ABSTRACT: Soviet and American investigations carried out with the aid of artificial Earth satellites have led to the discovery of an intense belt of corpuscular radiation which begins at an altitude of 400-600 km (Refs 1-4). Recent results obtained with the aid of cosmic rockets have given the spatial distribution of the intensity of the hard corpuscular radiation surrounding the Earth (Refs 5 and 6). It transpired that there are two belts of corpuscular radiation. The first belt (the inner belt) forms an equatorial ring bounded (approximately) by the geomagnetic latitudes  $\pm 40^\circ$ . According to Ref 6, the width of this belt is somewhat smaller. The belt has a concentration maximum at an altitude of about 3000 km (above the geomagnetic equator). The second (outer) belt extends up to 6-8 terrestrial radii and its concentration maximum is at a distance of

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On the Nature of Corpuscular Radiation in the Upper Atmosphere

3.5-4 terrestrial radii. In order to explain the origin of the belt of fast charged particles surrounding the Earth, a number of authors have put forward the neutron decay hypothesis (Refs 7-9). This is the so-called trapped albedo theory of the radiation belt. However, an analysis of the spatial distribution of the particles in the two belts excludes, in the opinion of the present authors, the albedo theory. In fact, the presence of an equatorial belt means that the particles forming this belt "avoid" moderate and high geomagnetic latitudes. Apparently this is a result of the fact that geomagnetic disturbances and polar auroras at higher latitudes remove particles from the inner belt and prevent their accumulation. This means that the equatorial belt is supplied with particles only from below, i.e. from the lower layers of the terrestrial atmosphere. On the other hand, the spatial distribution of particles in the outer belt clearly indicates an extra-terrestrial source. Again, the particles in the outer belt, once they appear in the magnetic trap at the distance of 3.5-4 terrestrial

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On the Nature of Corpuscular Radiation in the Upper Atmosphere

radii, will accumulate in this region over a longer interval of time than at the distance of 5-6 terrestrial radii since the frequency and amplitude of geomagnetic disturbances at latitudes of 50-60° are greater by a factor of several tens than in the zone of maximum repeatability of polar auroras. This explains the observed position of the maximum in the outer belt. The difference in the origin of the particles in the two belts leads also to a difference in their energies. Thus, an analysis of the spatial distribution of the particles in the two radiation belts leads to the conclusion that the main reason for the escape of particles in the outer (and apparently also in the inner) zone are geomagnetic disturbances and the associated auroras. Of course in the case of the inner belt the relevant auroras are the low-latitude auroras which are relatively rare. During geomagnetic disturbances, the normal field at high altitudes is disturbed and the particles confined in the trap can escape both into the inter-planetary space and

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C. The Nature of Corpuscular Radiation in the Upper Atmosphere

downwards into the more dense layers of the terrestrial atmosphere, thus causing polar auroras. The escape of the particles from the trap in the downward direction is suggested to be due to the ionospheric mechanism. If during the entry of solar particles into the terrestrial atmosphere, the corpuscular energy density in the upper layers of the atmosphere is of the order of the energy density of the solar wind, then the concept of a "corpuscular trap" is a pre-determined given field. The escape of the particles in a downward direction occurs in the case of a "corpuscular trap" in magnetic field. Under these conditions the adiabatic equation of state is valid. Using recent data (1961-62) on the energy density of the dynamic equilibrium of the upper atmosphere, the interaction of solar corpuscular radiation with the frozen-in magnetic field, the nature of the magnetic field. The solar particles are trapped in this interaction a certain amount of time. At the same time, a fraction of the particles is directed

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On the Nature of Conduction in Solids

energies considerably greater than those of the electrons in the original solid state. The energy of the electrons in the particles loss some of which is due to the scattering of the particles from the atoms of the solid. The energy of the particles is then transferred to the atoms of the solid and the atoms are set in motion. The motion of the atoms is then transferred to the other atoms and the motion spreads through the solid. This is the nature of conduction in solids. The energy of the particles is transferred to the atoms of the solid and the atoms are set in motion. The motion of the atoms is then transferred to the other atoms and the motion spreads through the solid. This is the nature of conduction in solids.

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On the Nature of Corpuscular Radiation in the Upper Atmosphere

charged particles as a result of the interaction of cosmic rays with the atmosphere, leading to the formation of neutrons (other than those formed in stars). Meson decays are also a source of unstable neutral particles. Another more powerful source are nuclear explosions. There are thus two sources for the inner belt, the first of which is the trapped cosmic ray albedo which can supply approximately  $2 \times 10^{22}$  -  $2 \times 10^{23}$  electrons with energy up to 780 keV and  $10^{20}$  -  $10^{21}$  protons with energy up to 30 MeV during a time interval of  $10^6$  -  $10^7$  sec. The second source is the nuclear explosion source, which at times can considerably increase the intensity of the hard corpuscular radiation in the equatorial belt. It is pointed out that it would be very desirable to have further data on the identification and the energy spectrum in the equatorial belt. There are 1 table and 25 references, 11 of which are Soviet, 11 English and 1 French.

ASSOCIATION: Akademiya nauk SSSR Institut fiziki Atmosfery  
Card6/6 (Ac.Sc., USSR, Institute of Physics of the Atmosphere)

SUBMITTED: April 22, 1959

3(1)

AUTHORS: Bagaryatskiy, B.A., and Gal'perin, Yu.I. SOV/33-36-1-28/31

TITLE: On Hydrogen Line Profiles in the Spectra of Aurorae

PERIODICAL: Astronomicheskiy zhurnal, 1959, Vol 36, Nr 1, pp 192-193 (USSR)

ABSTRACT: In the present short note the authors compare their theoretical calculations with the averaged hydrogen emission profile observed in aurorae.

There are 7 references, 3 of which are Soviet, and 4 American.

ASSOCIATION: Institut fiziki atmosfery Akademii nauk SSSR (Institute of Atmospheric Physics of the AS USSR)

SUBMITTED: September 12, 1958

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3 (7), 29 (2), 29 (5)

AUTHORS: Krasovskiy, V. I., Shklovskiy, I. S., SOV/20-127-1-20/65  
Gal'perin, Yu. I., Svetlitskiy, Ye. M.

TITLE: The Discovery in the Upper Atmosphere by Means of the Third  
Sputnik of Electrons Having an Energy of About 10 kev  
(Obnaruzheniye v verkhney atmosfere s pomoshch'yu tret'yego  
sputnika elektronov s energiyey okolo 10 kev)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 1, pp 78 - 81  
(USSR)

ABSTRACT: In the third Soviet sputnik (which was launched on May 15, 1958)  
an experiment concerning the direct discovery of electrons of  
not very high energy was carried out in the upper atmosphere  
(Refs 1,2,3). It is characteristic of this experiment that  
practically only electrons of some dozens of kev were recorded.  
The indicators used did not react to the X-ray radiation gene-  
rated by these electrons in the atmosphere and in the shell of  
the sputnik. Therefore, thin fluorescence screens (ZnS, acti-  
vated Ag) with 2 mg matter per 1 cm<sup>2</sup> were used. As the authors  
used aluminum foils of various thicknesses as absorbers, it was  
possible, besides the intensity of fluxes of electrons of not  
particularly high energies, to evaluate also the "equivalent"

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The Discovery in the Upper Atmosphere by Means of the Third Sputnik of Electrons Having an Energy of About 10 kev 30V/20-127-1-20/67

energy of the electrons. The limiting diaphragms fitted before the indicators warranted the recording of corpuscles within a solid angle of  $1/4$  steradian. The radiotelemetric material determined furnished several results of great geophysical interest: Electrons of  $\sim 10$  kev were detected in altitudes of from 470 to 1880 km above sea level. The lowest intensity was found over the geomagnetic equator in an altitude of  $\sim 1300$  km above sea level. At the "equivalent" energy of  $\sim 20$  kev its minimum amperage was estimated at  $10^{-14}$  a. cm $^{-2}$  steradian $^{-1}$ . In medium and polar latitudes (up to  $60^{\circ}$  geomagnetic latitude) an amperage of  $5 \cdot 10^{-11}$  a. cm $^{-2}$  steradian $^{-1}$  and sometimes also of more than  $10^{-10}$  a. cm $^{-2}$  steradian $^{-1}$  is usual for electrons with an equivalent energy of 12 kev by night. With the construction of the measuring apparatus, such high intensities were not expected. Therefore, the intensities exceeded the apparatus scale, and the intensity and "equivalent" energy of the electrons recorded could not be evaluated. A diagram shows the dependence

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The Discovery in the Upper Atmosphere by Means of the Third Sputnik of Electrons Having an Energy of About 10 kev SOV/20-127-1-20/65

of the electron fluxes on their "equivalent" energy within the range of from  $-42$  to  $-54^{\circ}$  geomagnetic latitude in altitudes of from 1720 to 1880 km in the night of May 15, 1958 above the southern part of the Pacific. When the sputnik rotated round its two axes, the intensity of the electron fluxes changed considerably. The electron fluxes are probably the cause of the heating and expansion of the upper atmosphere (which was deduced from the slowing-down of the sputnik). There are 1 figure and 17 references, 9 of which are Soviet.

ASSOCIATION: Institut fiziki atmosfery Akademii nauk SSSR (Institute for the Physics of the Atmosphere of the Academy of Sciences, USSR)

PRESENTED: April 14, 1959, by A. I. Berg, Academician

SUBMITTED: April 14, 1959

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AUTHOR: Gal'perin, Yu.I., Candidate of Physico-Mathematical Sciences

TITLE: "Hot" Electrons in the Earth Atmosphere

PERIODICAL: Znaniye-Sila, 1960, No. 3, pp. 36 - 37

TEXT: The author describes the research carried out by Professor V.I. Krasovskiy to establish the origin of the corona of the earth. Based on results obtained, Professor Krasovskiy and his assistants concluded that the electro-magnetic corona of the earth is caused by sun corpuscles "caught" in the magnetic field of the earth.

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**AUTHORS:** Krasovskiy, V.I., Shklovskiy, I.S., Gal'perin, Yu.I.,  
Svetlitskiy, Ye.M., Kushnir, Yu.M. and  
Bordovskiy, G.A.

**TITLE:** Discovery of Approximately 10 keV Electrons in the  
Upper Atmosphere

**PERIODICAL:** Akademiya SSSR. Iskusstvennyye sputniki Zemli.  
No. 6. Moscow, 1961, pp. 113 - 126

**TEXT:** Prior to experiments carried out with the aid of  
artificial Earth satellites, it was assumed that the natural  
glow, heating, and ionization of the upper atmosphere was largely  
due to hard electromagnetic radiation of solar origin. It was  
considered that corpuscular radiation (protons,  $\alpha$ -particles and  
electrons) could only penetrate the atmosphere in the polar  
regions and thereby give rise to geomagnetic disturbances and  
aurorae. It was found that aurorae were frequently initiated  
by protons with a considerable velocity spread. However, in  
many cases, hydrogen-emission was not observed and the appearance  
of aurorae was provisionally associated with electrons having  
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Discovery of ....

energies up to a few hundreds or thousands of eV. An attempt was then made by Krasovskiy et al (Ref. 3 - UFN, 64, 425, 1958) to detect these electrons from the third Soviet artificial Earth satellite. The apparatus employed consisted of two very thin phosphors covered by aluminium foils. The scintillations were recorded by photomultipliers and the amplified photomultiplier signal was stored and later telemetered to Earth. Owing to the presence of the aluminium foils (which were of differing thicknesses) it was possible to estimate both the intensity and the energy of the electrons which were most effective in exciting the phosphors. A particular feature of this apparatus was that it was sensitive only to electrons and did not respond to protons and photons of comparable energy. The apparatus indicated the presence of large electron currents at altitudes up to 900 km in the region of the southern part of the Pacific Ocean, the energy of these electrons being of the order of 10 keV. These currents were often so large that the apparatus gave off-scale readings since such high currents were not expected. In the case of these off-scale readings the energy

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Discovery of ....

flux exceeded  $100 \text{ erg cm}^{-2} \text{ sec}^{-1}$  at altitudes up to 1 900 km from the Earth's surface. Fig. 2 shows the calibration curves for the two detectors employed in this experiment. The dashed lines correspond to aluminium foil of  $0.8 \times 10^{-3} \text{ g/cm}^2$  and the continuous lines correspond to aluminium foil of  $0.4 \times 10^{-3} \text{ g/cm}^2$ . The numbers on these lines indicate the energy of the electrons in keV. These calibration curves were obtained in laboratory experiments using parallel beams of mono-energetic electrons. The current density of monochromatic electrons ( $\text{A/cm}^2$ ) is plotted along the vertical axis and the telemetric channel number, which is proportional to the logarithm of the photomultiplier current, along the horizontal axis. Fig. 3 shows the difference  $\Delta K$  between the logarithmic-scale divisions of the two detectors as a function of the energy of the electrons used in the calibration. The ratio of the photo-currents of the two detectors depends on the energy of the electrons or, more precisely, on the form of the energy spectrum. This relation was determined in Card 3/7



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Discovery of ....

preliminary laboratory experiments with mono-energetic electrons. The form of the energy spectrum recorded by the satellite is unknown and comparison of the readings produced by the two detectors can only be used to estimate an equivalent energy. This equivalent energy  $E_{equiv}$  is defined as the energy of a

monochromatic beam which gives the same photo-current ratio for the two detectors as the observed value. Proceeding along these lines one can also define an equivalent current and an equivalent energy flux. It can easily be shown that these equivalent quantities give, in fact, the lower limits of the measured quantities. Consideration of the telemetric records, a number of which are reproduced in the present paper, showed that the most frequently recorded energies occurred in the neighbourhood of 14 keV. Since the sensitivity of the apparatus is considerably higher for high-energy electrons, it follows that in the case of non-monochromatic electrons the maximum flux corresponds to an energy below 14 keV. This maximum can be determined if some energy-distribution function

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