L 39763-66 EWT(m)/T GD-2

ACC NR: AP6014821 SOURCE CODE: UR/0367/65/001/004/0730/0732

AUTHOR: Dolgov, A. D.; Okun', L. B.; Pomeranchuk, I. Ya.; Solov'yev, V. V.

ORG: none

TITLE: Electromagnetic mass differences of barions and SU sub 6 symmetry

SOURCE: Yadernaya fizika, v. 1, no. 4, 1965, 730-732

TOPIC TAGS: baryon, Coulomb interaction, particle interaction

ABSTRACT: The results are presented from a calculation of the electromagnetic mass differences of barions. The authors began with a model of "non-relativistic" quarks, assuming that they are located in a state with full orbital momentum equal to zero and that the electromagnetic mass differences of the barions result from differences in electromagnetic quark masses, coulomb interactions between quarks, and interactions between magnetic quark moments. The authors thank V. Singh for sending a preprint of his works; and Ya. B. Zel'dovich and I. Yu. Kobzarev for their valuable critique. Orig. art. has: 1 table. [JPRS]

SUB CODE: 20 / SUBM DATE: 23Jan65 / OTH REF: 013

Card 1/1

L 20952-66 EWT(m)/T

ACC NR: AP6005875 SOURCE CODE: UR/0367/65/002/004/0768/0776

AUTHORS: Gribov, V. N.; Ioffe, B. L.; Pomeranchuk, I. Ya. 37 B

ORG: Institute of Theoretical and Experimental Physics GKIAE (Institut teoreticheskoy i eksperimental'noy fiziki GKIAE); Physicotechnical Institute im. A. F. Ioffe, Academy of Sciences SSSR (Fiziko-tekhnicheskiy institut Akademii nauk SSSR)

TITLE: What is the range of interactions at high energies? 14,44

SOURCE: Yadernaya fizika, v. 2, no. 4, 1965, 768-776

TOPIC TAGS: strong nuclear interaction, high energy interaction, pion scattering, pion proton interaction, proton scattering, energy scattering, differential cross section

ABSTRACT: The authors analyze the behavior of a nuclear interaction, such as the scattering of pions by nucleons, when the distance in which the interaction occurs approaches zero. It is shown first that the distance can approach zero in different ways, and depending on the manner in which the particles approach, and that the forward scat-

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tering amplitude may or may not depend on the mass of the scattered particle at high energies. Although no theoretical arguments can be advanced in favor of either possibility, the second possibility leads to highly interesting physical conclusions, and the authors show that it can be checked experimentally at energies achievable with present accelerators. Specifically, it can be ascertained whether or not the scattering amplitude at high energies depends on the masses of scattered particles by studying the differential cross section for the production of soft γ quanta accompanying a given scattering process. In fact, the emission of soft quanta occurs mainly before and after the scattering process, and the cross sections for the emission of such quanta can be expressed in terms of the scattering amplitudes. If experiment shows that the region of applicability of the usual formulas for this emission of γ quanta decreases with increasing energy of the incident particle, this proves that the effective longitudinal distance at which interaction occurs at high energy increases with increasing energy. If the experimental data do not agree with the theoretical predictions, then it can be concluded that either the effective distance for elastic scattering or the effective region for

L 20952-66
ACC NR: AP6005875

which the emission of γ quanta occurs increases rapidly with increasing energy. Reasons why experiments with protons would be less effective than experiments with pions are advanced. Orig. art. has: 1 figure and 22 formulas.

SUB CODE: 20/ SUBM DATE: 28May65/ ORIG REF: 001/ OTH REF: 002

Card 3/3

GRIBOV, V.N.; IOFFE, B.L.; POMERANCHUK, I.Ya.

Range of high-energy interaction. IAd. fiz. 2 no.4:762-776 O '65. (MIRA 18:11)

1. Institut teoreticheskoy i eksperimental'noy fiziki Gosudarstvennogo komiteta po ispol'zovaniyu atomnoy energii SSSR i Fiziko-tekhnicheskiy institut im. A.F. Ioffe AN SSSR.

L 1140-66 EWT(m)/T/EWA(m)-2

ACCESSION NR: AP5019593 UR/0386/65/001/006/0028/0033

AUTHOR: Okun', L. B.; Pomeranchuk, I. Ya. 44,55 44,55 28

TITLE: The "shadow universe" and neutrino experiments 44,55

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 1, no. 6, 1965, 28-33

TOPIC TAGS: neutrino, nuclear particle, meson

ABSTRACT: It is pointed out that the "shadow universe" hypothesis strongly contradicts the results of neutrino experiments. It is shown that the discrepancy between the "shadow universe" model and experimental data with regard to the number of θ-decays is about ten orders of magnitude. The considerations given in this paper do not pertain to hypotheses which allow strong interaction for long-lived θ_L-mesons. Recommendations are given for experimental verification of theories of this type. "The authors are grateful for useful consultation to V. N. Gribov, V. Kaftanov, I. D. Kobzarev, and B. M. Pontekorovo." Orig. art. has: 5 formulas.

ASSOCIATION: Otdeleniye yadernoy fiziki Akademii nauk SSSR (Department of Nuclear Physics, Academy of Sciences, SSSR)

SUBMITTED: 10May65 ENCL: 00 SUB CODE: NP

Card 1/1 NO REF SOV: 003 OTHER: 009

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001342030007-1"

L 58252-65 EWT(m)/T/EWA(m)-2

ACCESSION NR: AT5010454 UR/3138/64/000/271/0001/0006 14 11 B+1

AUTHORS: Ioffe, B. L.; Kobzarev, I. Yu.; Pomeranchuk, I. Ya.

TITLE: Some consequences of unitary symmetry for processes with participation of ω, ϕ, and f^0 mesons 19

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 271, 1964. Nekotoryye sledstviya iz unitarnoy simmetrii dlya protsessov s uchastiyem ω, ϕ i f^0 mezonov, 1-6

TOPIC TAGS: symmetry property, unitary symmetry, SU(3) symmetry, decay probability, production cross section

ABSTRACT: The authors consider, in the unitary-symmetry scheme, decays of a certain resonant state $A \to C + \phi$ and $A \to C + \omega$. It is assumed that these decays are allowed in the SU_3 scheme and that the states A and C pertain to representations of different dimensionality of the SU_3 group. An expression is derived for the ratio of

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ACCESSION NR: AT5010454

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the probabilities of these decays, which makes it possible to investigate the unitary symmetry scheme in various aspects. The decay of the B meson with mass 1220 MeV, $B \to \pi + \omega$, is considered by way of an example. Relations are also established for the cross sections of f^0 meson production and for the probabilities of f^0 meson decays. For an f^0-meson mass of 1260 MeV, the decay probability ratio $R = w(f^0 \to K_1^0 + \bar{K}_1^0)/w(f^0 \to \pi^+ + \pi^-)$ is found to be $R = 0.048$ if f^0 is a unitary singlet and $R = 0.012$ if f^0 is a member of a unitary octet. Since the experimental data indicates that $R = 0.022 \pm 0.01$, the latter assumption is more likely. The authors thank A. G. Meshkovskiy and V. A. Shebanov for preprint ITEF No. 233 prior to publication. Original article has: 9 formulas

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki GKAE (Institute of Theoretical and Experimental Physics, GKAE)

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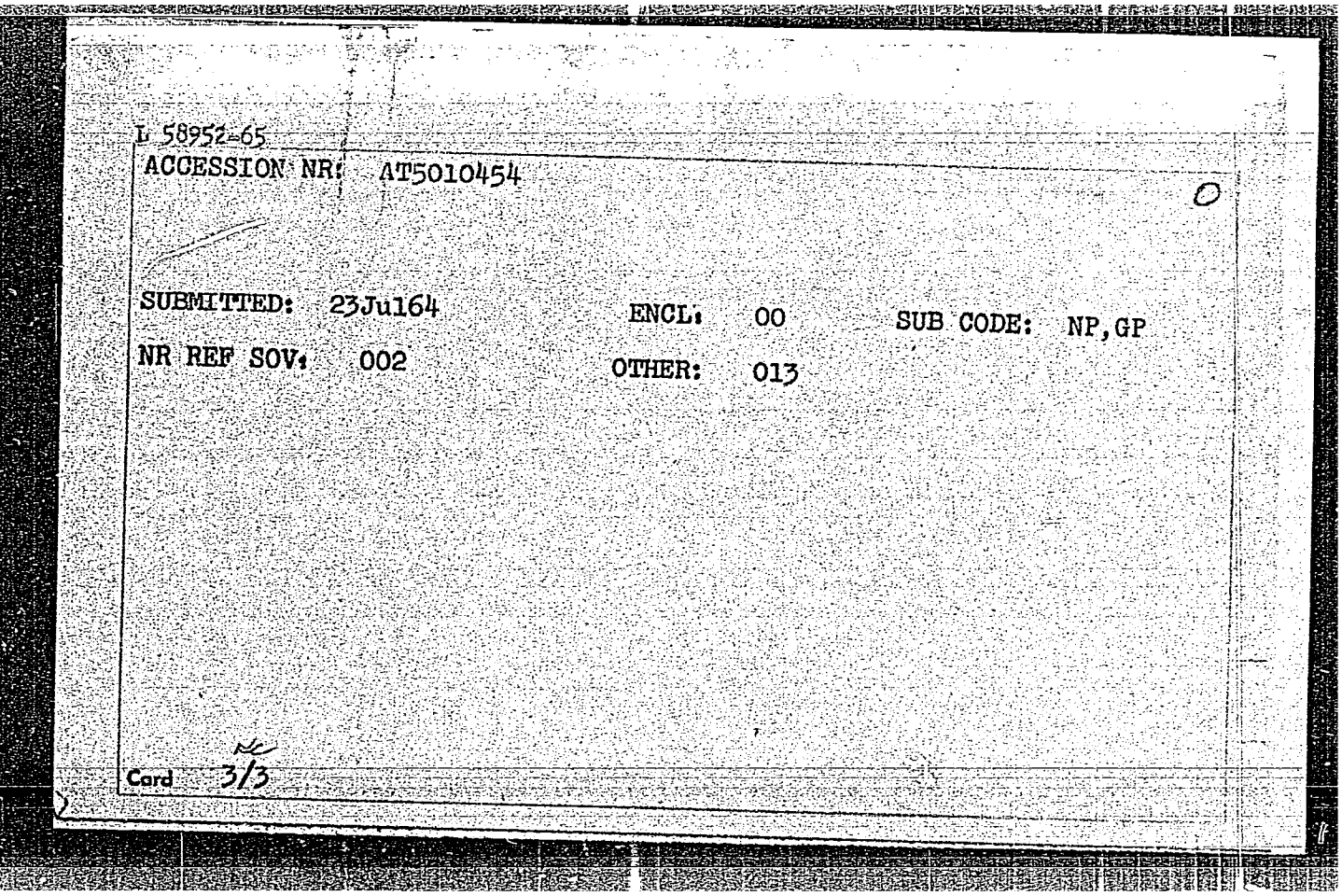

L 58952-65
ACCESSION NR: AT5010454

SUBMITTED: 23Jul64 ENCL: 00 SUB CODE: NP,GP

NR REF SOV: 002 OTHER: 013

Card 3/3

L 2745-66 EWT(1)

ACCESSION NR: AP5024352 UR/0367/65/002/002/0361/0391

AUTHOR: Gribov, V. N.; Pomeranchuk, I. Ya.; Ter-Martirosyan, K. A.

TITLE: Moving branch points in the j-plane and reggeon unitary conditions

SOURCE: Yadernaya fiziki. v. 2, no. 2, 1965, 361-391

TOPIC TAGS: particle physics, reggeon, elastic scattering, scattering amplitude

ABSTRACT: Many-particle terms of unitarity conditions in the t-channel are analyzed as a basis for studying moving branch points in the j-plane. A hypothesis is proposed for extrapolating these terms to complex j. It is found that in this case branch points of the partial amplitude $f_j(t)$ appear in the j-plane which correspond to production thresholds for two or more reggeons with an orbital moment of relative motion equal to -1. For two spin-zero particles in an intermediate state, the partial wave has singular points at orbital moments with negative integral values. As has been previously noted, these singularities move to the right when the particles in the intermediate state have a non-zero spin. The branch points in the j-plane are caused by propagation of this shift through the entire Regge trajectory. Mandelstam pointed out this mechanism for generation of branch points using one class of Feynman diagrams as an example. The existence of branch points $j=j_n(t)$,

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where $j_n(t) = n\alpha(t/n^2) - n + 1$, considerably alters the analytic properties of $f(t)$ in the t-plane, producing branch points in this plane at $t = t_n(j)$, where $t_n(j)$ is the solution to the equation $j=j_n(t)$. The discontinuity $\delta_t(n)f_j(t)$ of amplitude $f_j(t)$ is calculated for the singular point $t= t_n(j)$ which corresponds to the production threshold for n reggeons (reggeon unitarity conditions). It is shown that this discontinuity has a form similar to that for the ordinary unitarity condition, being determined by the product of amplitudes $N_{j,n}$ for the production of n reggeons defined above and below the cross section in the t-plane from the point $t=t_n(j)$. The discontinuity $\delta_t(n)f_j(t)$ of amplitude $f_j(t)$ on the cross section associated with the branch point for $t=t_n(j)$ is calculated for $t \to t_n(j)$. It is shown that this discontinuity has the form $[t-t_n(j)]^{n-2} \sim [j-j_n(t)]^{n-2}$. This means that the singularity $j= j_n(t)$ is logarithmic, i. e. close to this point

$$f_j(t) \simeq A_n + B_n [j-j_n(t)]^{n-2} \ln [j-j_n(t)],$$

where A_n and B_n have no singularities at $j=j_n(t)$. The results may be used for analyzing the asymptotic behavior of diffraction scattering amplitude in the vicinity of

21,44,55

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ACCESSION NR: AP5024352

small values of the quantity $q^2 = -t$ for transmitted momentum. "The authors are grateful to Ya. Azimov for calling their attention to one of the problems discussed in the paper. In conclusion, we would like to express our sincere gratitude to I. Ya. Azimov, A. A. Ansel'm, G. S. Danilov, I. T. Dyatlov and Yu. A. Simonov for interesting discussions and several important comments on problems considered in this work." Orig. art. has: 20 figures, 80 formulas.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki GKIAE (Institute of Theoretical and Experimental Physics, GKIAE); Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute, Academy of Sciences, SSSR)

SUBMITTED: 23Jan65 ENCL: 00 SUB CODE: NP, MA

NO REF SOV: 007 OTHER: 012

Card 3/3

DOLGOV, A.D.; OKUN', L.B.; POMERANCHUK, I.Ya.; SOLOV'YEV, V.V.

Electromagnetic differences of baryon masses, and the SU_6-symmetry. IAd. fiz. 1 no.4:730-732 Ap '65. (MIRA 18:5)

1. Institut teoreticheskoy i eksperimental'noy fiziki Gosudarstvennogo komiteta po ispol'zovaniyu atomnoy energii SSSR.

IOFFE, B.L.; KOBZAREV, I.Yu.; POMERANCHUK, I.Ya.

Some inferences from unitary symmetry for processes involving ω, φ, and f^0 mesons. Zhur. eksp. i teor. fiz. 48 no.1:375-378 Ja '65. (MIRA 18:4)

1. Institut teoreticheskoy i eksperimental'noy fiziki Gosudarstvennogo komiteta po ispol'zovaniyu atomnoy energii SSSR.

KUZNETSOV, B.G., prof.; POMERANCHUK, I.Ya., akademk; SMORODINSKIY, Ya.A., prof.; TAMM, I.Ye., akademik; SHAPIRO, I.S., prof.; CHERNOV, A.G.; FAYNBERG, I.B., red.

[Problems in the theory of elementary particles; fourth talk] Problemy teorii elementarnykh chastits, beseda chetvertaia. V besede uchastvuiut: B.G. Kuznetsov i dr. Moskva, Izd-vo "Znanie," 1964. 24 p. (Novoe v zhizni, nauke, tekhnike. IX Seriia: Fizika, matematika, astronomiia, no.20) (MIRA 17:10)

L 31971-65 EWT(m) DIAAP

ACCESSION NR: AP5004414 S/0056/65/048/001/0375/0378

AUTHOR: Ioffe, B. L.; Kobzarev, I. Yu.; Pomeranchuk, I. Ya.

TITLE: Some consequences of unitary symmetry for processes in which ω, φ, and f^0 mesons participate

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 1, 1965, 375-378

TOPIC TAGS: meson, meson decay, unitary symmetry, unitary singlet, unitary octet

ABSTRACT: Resonant-state decays that lead to the production of ω and φ mesons are considered, and an expression is derived for their probability ratio, which makes it possible to analyze various aspects of the unitary-symmetry scheme. If the dimensionalities of the representations to which the initial particles belong are known, then this ratio can serve as a test of the hypothesis that the φ and ω mesons are described by mixtures of a unitary singlet and an octet. If the dimensionalities of the representations are not known, then the experimentally-measured ratio can yield, when compared with the expression obtained, some information on these

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L 31971-65
ACCESSION NR: AP5004414

3

dimensionalities. The specific reaction analyzed is $B \rightarrow \pi + \omega$ at 1220 MeV. A similar analysis is applied to the decay of the f^0 meson at 1250 MeV, and it is shown that it is likely that the f^0 meson is not a unitary singlet, but may belong, for example, to a unitary octed. Experimental evidence for and against this assumption is discussed. "The authors thank A. G. Meshkovskiy and V. A. Shebanov for a copy of their paper prior to publication, and L. B. Okun' for useful discussions."
Orig. art. has: 10 formulas.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki GKAE (Institute of Theoretical and Experimental Physics, GKAE)

SUBMITTED: 05Nov64 ENCL: 00 SUB CODE: NP

NR REF SOV: 002 OTHER: 014

Card 2/2

L 14073-66 EWT(m)/T

ACC NR: AT6002499 SOURCE CODE: UR/3138/65/000/354/0001/0018

AUTHOR: Gribov, V. N.; Ioffe, B. L.; Pomeranchuk, I. Ya.

ORG: none

TITLE: Effective distances of high energy interactions

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 354, 1965. Na kakikh rasstoyaniyakh proiskhodit vzaimodeystviye pri vysokikh energiyakh?, 1-18

TOPIC TAGS: pion scattering, proton scattering, scattering cross section, pion proton interaction

ABSTRACT: The authors consider π-p scattering in an attempt to determine the distances necessary for elastic and inelastic scattering at high energies. The cross section for the production of soft quanta in a given interaction is studied to find out whether the scattering amplitude depends on the masses of the scattered particles. Theoretical formulas are given for scattering cross sections and experiments are proposed for verification of these formulas. Coincidence between experimental

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L 14073-66
ACC NR: AT6002499

and theoretical data would mean that scattering amplitude is independent of particle mass at high energies. A difference between experimental data and theoretical predictions could be interpreted in two ways: either the scattering amplitude at high energies is a function of particle mass, i. e. the effective distances for elastic scattering increases rapidly with an increase in energy, or else there is a rapid increase with energy in the effective region from which γ-quanta are emitted. Orig. art. has: 1 figure, 21 formulas.

SUB CODE: 20/ SUBM DATE: 12May65/ ORIG REF: 001/ OTH REF: 002

Card 2/2

L 01076-67 EWT(1)

ACC NR: AP6028207 SOURCE CODE: UR/0367/66/003/006/1154/1160

AUTHOR: Kobzarev, I. Yu.; Okun', L. B.; Pomeranchuk, I. Ya.

ORG: Institute of Theoretical and Experimental Physics of GKIAE (Institut Teoreticheskoy i Eksperimental'noy Fiziki GKIAE)

TITLE: The possibility of experimental detection of mirror particles

SOURCE: Yadernaya fizika, v. 3, no. 6, 1966, 1154-1160

TOPIC TAGS: mirror particles, particle interaction, electromagnetic interaction, decay, neutrino, gravitation

ABSTRACT: The possible existence of "mirror" particles (R) in the solar system in addition to the usual particles (L) is considered in connection with the observed violation of CP-invariance in the $K_2^0 \to 2\pi$ decay. Their introduction restores the left-right equivalency. It is shown that mirror particles cannot interact with usual particles strongly, semi--strongly or electromagnetically. Weak interactions between L and R particles, due to the exchange of neutrinos, are possible. The L and R particles must have a common gravitational interaction. The question of the existence of macroscopical bodies (stars) consisting of R-matter and their possible

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L 01076-67

ACC NR: AP6028207

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observation is discussed. The authors thank V. N. Gribov, V. I. Kogan, S. B. Pikel'ner, B. M. Pontekorvo, D. A. Frank-Kamenetskiy and I. S. Shapiro for interesting discussions. Orig. art. has: 7 formulas and 2 figures. [Authors' abstract] [AM]

SUB CODE: 20/ SUBM DATE: 29Dec65/ ORIG REF: 004/ OTH REF: 017/

Card 2/2 vlr

POMERANETS, A.A.

Refractory coatings with partial hydrolysis of ethyl silicates and some problems of the forming of efflorescence. Lit. proizv. no.1:38-39 Ja '63. (MIRA 16:3)
(Refractory materials--Defects)

NSAK IN, T.N.; POMERANETS, A.A.

Increasing the variety and improving the quality of canned vegetables and fruits at enterprises of the R.S.F.S.R. Konserv.prom. 15 no.10:1-4 O '60. (MIRA 13:10)

1. Gosplan RSFSR.
(Russia--Canning industry)

POMERANETS, A.A.

Increasing the assortment and improving the quality of canned foods. Kons. i ov. prom. 12 no.4:25-28 Ap '57. (MLRA 10:6)

1. Rosglavkonserv.

(Food, Canned)

POMERANETS, A.A.

Let us expand the manufacture of canned food for children. Kons.
i ov.prom. 12 no.7:20-22 Jl '57. (MIRA 12:4)
(Food, Canned) (Children--Nutrition)

VOMERANTS, K.S.

Heat budget of the Baltic Sea. Trudy GOIN no.82[illegible] 164
(MIRA 18:2)

POMERANETS, K.S.

Level fluctuations of the Kamchatka estuary in connection with the eruption of the Bezymyannyy volcano on March 30, 1956. Vest.LGU 14 no.6:143-144 '59. (MIRA 12:6)
(Kamchatka River)

KOCHETOV, S.V.; POMERANETS, K.S.

Calculation of the vertical temperature profile in the sea.
Trudy GOIN no.86:144-152 '65. (MIRA 18:9)

L 8240-66 EWT(m)
ACC NR: AT5024249 SOURCE CODE: UR/2670/65/000/032/0162/0176

AUTHOR: Pomeranseva, M. D.; Ramayya, L. K.

ORG: Institute of Genetics, Academy of Sciences SSSR (Institut genetiki, Akademiya nauk SSSR)

TITLE: The RBE of various types of ionizing radiation: Injury to the testes and incidence of dominant lethal mutations in the sexual cells of mice

SOURCE: AN SSSR. Institut genetiki. Trudy, no. 32, 1965. Deystviye ioniziruyushchikh izlucheniy na rastitel'nyy i zhivotnyy organizmy (Effect of ionizing radiation on plant and animal organisms), 162-176

TOPIC TAGS: radiation biologic effect, relative biologic efficiency, biologic mutation, animal genetics, biologic reproduction

ABSTRACT: A comparative study was made of the RBE of different types of radiation with respect to mutagenic and injurious effects on animal testes. White mice of both sexes, aged 2.5—4 months, were used in this series of experiments. Males only were subjected to neutron irradiation in doses of 17, 34, 57, 114, 171, and 228 rad. Irradiation with 660-Mev protons was conducted in the following dose range: 100, 200, 400, 600, 800, 1100, and 1300 rad (dose powers, 85—947 rad/min). with fas[illegible] of genetic effect[illegible] quoted value. In the range[illegible] causing embryo death prior to and [illegible]

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L 8240-66

ACC NR: AT5024249

the same with all types of irradiation. It is known that RBE values vary considerably, depending on the index. The RBE of fast neutrons, for instance, is higher when evaluated with the indices considered in this work than when evaluated by $LD_{50/30}$, while for protons and gamma rays the RBE values are approximately the same in both cases. Orig. art. has: 7 figures and 5 tables. [JS]

SUB CODE: LS/ SUBM DATE: none/ ORIG REF: 022/ OTH REF: 023

Card 3/3

POMERANSKIY, L. I.

POMERANSKIY, L. I. "Tuberculous Meningitis in Children Afflicted with Bone-Joint Tuberculosis." Crimean State Medical Inst imeni I. V. Stalin. Yevpatoriya, 1956. (Dissertation for the Degree of Candidate in Medical Science)

So: Knizhnaya Letopis', No. 19, 1956.

Kostin, N. N.

Torgovlya Konservami [Trade in Preserved Foods, By] N. N. Kostin [I] A. A. Pomeranets. Moskva, Gostorgizdat, 1952.
118 p. Illus., Tables.

POMERANETS, E. S. and SHLEIMOVICH, M. A.

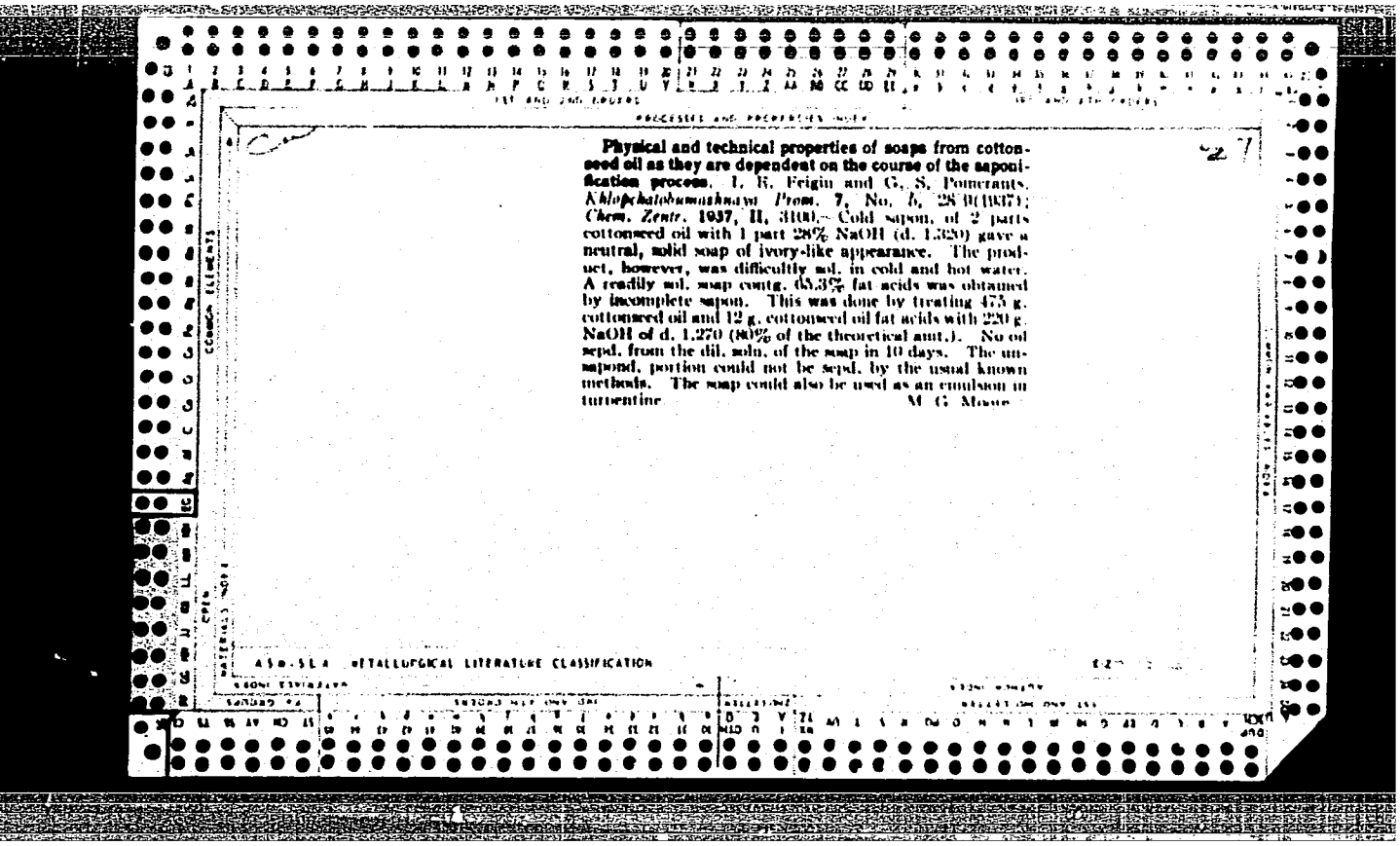
Tekhnologiia izgotovleniia zuboreznogo instrumenta. Moskva, Mashgiz, 1948. 268 p.

Technique of the manufacture of gear-cutting tools.

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

POMERANETS, K.S.

A new research ship. Probl. Arkt. i Antarkt. no.9:96-98 '61.
(Azimut (Ship)) (MIRA 15:1)



Physical and technical properties of soaps from cottonseed oil as they are dependent on the course of the saponification process. I. B. Feigin and G. S. Pomerants. *Khlopchatobumazhnaya Prom.* 7, No. 5, 28-9(1937); *Chem. Zentr.* 1937, II, 3100.—Cold sapon. of 2 parts cottonseed oil with 1 part 28% NaOH (d. 1.330) gave a neutral, solid soap of ivory-like appearance. The product, however, was difficultly sol. in cold and hot water. A readily sol. soap contg. 65.3% fat acids was obtained by incomplete sapon. This was done by treating 475 g. cottonseed oil and 12 g. cottonseed oil fat acids with 220 g. NaOH of d. 1.270 (80% of the theoretical amt.). No oil sepd. from the dil. soln. of the soap in 10 days. The unsapond. portion could not be sepd. by the usual known methods. The soap could also be used as an emulsion in turpentine. M. G. Mooro

AMOSOV, V.N.; POMERANTS, D.M.; GONCHAROV, Ya.P.

Selecting protective atmoshperes for the prevention of decarburization in annealing perlitic malleable cast iron. Avt.prom. no.12: 28 D '60. (MIRA 13:12)

1. Yaroslavskiy motornyy zavod.
(Cast iron--Heat treatment)
(Protective atmospheres)

ICMERKHANTS, D.M.

PHASE I BOOK EXPLOITATION SOV/1558

Moscow. Dom nauchno-tekhnicheskoy propagandy im. F.E. Dzerzhinskogo

Sovremennyye splavy i ikh termicheskaya obrabotka (Contemporary Alloys and Their Heat Treatment) Moscow, Mashgiz, 1958. 329 p. 12,000 copies printed.

Additional Sponsoring Agency: Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy RSFSR.

Ed. (Title page): Yu. A. Geller, Doctor of Technical Sciences; Ed. (Inside book): V.V. Zaborinskiy, Engineer; Tech. Ed.: B.I. Model'; Managing Ed. for Literature on Metal Working and Tool Making: R.D. Beyzel'man, Engineer.

PURPOSE: The book is intended for engineering and technical personnel of heat-treatment shops and test laboratories of machine-building plants.

COVERAGE: This collection of 28 articles, compiled by 33 authors, aims to acquaint the reader with modern practice in the heat treatment of steels. The authors are primarily concerned with the development of various types of structural, tool, and heat-resistant steels and with the use of their alloying elements. Materials-handling equipment is described at some length. The treatment of alloys, particularly those of titanium, also comes within the scope of the collection. The book is thoroughly diagrammed, and a good deal of the material is shown in graphical form. Among the problems dealt with are the minimization of deformations, the introduction of the automatic control of heat-treating equipment, together with fully mechanized tool manufacture, and the optimum proportions of different alloying elements. There are numerous tables and drawings. Bibliographic listings placed at the end of chapters are predominantly Soviet. The articles comprising this collection are reports delivered at a conference held in the Scientific and Technical Propaganda House imeni F.E. Dzerzhinskiy in Moscow.

Contemporary Alloys and Their Heat Treatment SOV/1558

AVAILABLE: Library of Congress

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Card 6/6

GIDON, Ye.D.; MALYSHEVSKIY, V.A.; PRUS, A.A.; SHUVALOVA, N.A.; POMERANTS, D.M.

Plastic deformation of structural steel. Metalloved. i term. obr. met. no. 2:35-37 F '65. (MIRA 18:12)

YALIZAROV, B.I.; POMERANTS, D.M.; SKOTNIKOV, V.V.

Scientific and technical conference on annealing in hot media and intermediate transformations of austenite. Metalloved. i obr. met. no.5:58-63 My '58. (MIRA 11:5)

(Steel--Heat treatment)

18.7100
18.7500

81522

SOV/137-59-5-10899

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, p 208 (USSR)

AUTHORS: Pomerants, D.M., Skotnikov, V.V.

TITLE: Peculiarities in the Manifestation of Irreversible Temper Brittleness in Intermediate Transformation Products of Structural Automobile Steels

PERIODICAL: V sb.: Materialy Nauchno-tekhn. konferentsii po probl. zakalki v goryachikh sredakh i promezhutochn. prevrashcheniyu austenita, Vol 1, Yaroslavl', 1957, pp 228 - 249

ABSTRACT: The authors investigated the effect of the decomposition temperature in isothermal quench-hardening on the development of irreversible brittleness in tempering of the following steel grades: 40Kh, 40KhN, 40KhNMA, 35KhGSA, 40KhGT, 0KhM, 45G2. The authors determined a_k and R_C after oil-quenching or isothermal quench-hardening and 1 hour holding at 200° - 400°C with subsequent tempering at 200° - 650°C. Furthermore, they carried out a magnetometric determination of the amount of residual austenite in 40Kh, 45G2, 40KhNMA, 35KhGSA steels. In steel subjected to

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POMERANTS, D. M.

129-58-5-16/17

AUTHORS: Yelizarov, B. I., Pomeranta, D. M. and Skotnikov, V.V.

TITLE: Scientific-Technical Conference on Hardening in Hot Media and Intermediate Transformation of Austenite (Yaroslavl') (Nauchno-tekhnicheskaya konferentsiya po zakalke v goryachikh sredakh i promezhutochnomu prevrashcheniyu austenita (Yaroslavl')

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 5, pp 58-63 (USSR)

ABSTRACT: A scientific-technical conference on hardening steels in hot media and intermediate austenite transformation was held in Yaroslavl', December 16-19, 1957, which was convened by the Yaroslavl' Regional Directorate of the NTO Mashprom jointly with the metals technology and heat treatment section of the Central Directorate of NTO Mashprom. 180 people participated who came from factories, research institutes and teaching establishments of Moscow, Leningrad, Novosibirsk and numerous other towns. The authors of this report state that it can be assumed that the following are established facts relating to intermediate transformation:

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1) Decomposition of the austenite in the intermediate range begins after a certain incubation period;

2) Intermediate transformation stops when a certain quantity of non-decomposed austenite still remains, whereby the completeness of the transformation increases with decreasing temperature;
3) Diffusion redistribution of carbon takes place during intermediate annealing;
4) Decomposition of austenite in the intermediate range as well as the penetration after completion of the transformation leads to a decrease of the martensitic point of the non-transformed austenite;
5) On changing over from the pearlitic to the intermediate range, a break occurs in the continuity of the change of the degree of dispersion, hardness and other properties of the decomposition products;
6) In the decomposition products of the lower part of the intermediate region existence of the tetragonal α-phase is detected;
7) The products of decomposition of the upper part of the intermediate range are most frequently "feather" shaped, whilst the decomposition products of the lower part are acicular;

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8) Intermediate transformation is accompanied by the formation of a relief on the polished surface of a cut;
9) In steels which are alloyed with carbide forming elements, the intermediate transformation is characterised by a separate branch of the C-shaped curve which is separated from the pearlitic range by a zone of relatively stable austenite;
10) Irrespective of the chemical composition of the steel the carbide in the intermediate transformations is a cementite type carbide and,as regards the contents of alloying elements,it does not differ from the average composition of the steel;
11) The static strength and the physical properties of the decomposition products of the lower part of the intermediate range does not differ materially from similar properties of the martensite products tempered to achieve the same hardness;
12) The decomposition products of the austenite in the intermediate range after high temperature tempering have less favourable mechanical properties than the structure obtained after hardening for obtaining martensite followed

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by high temperature tempering;
13) A full and even a partial decomposition of the austenite in the upper region of the intermediate range causes appearance of a particular variant of irreversible temper brittleness which is characterised by a trans-crystalline fracture.

Doctor of Technical Sciences R. I. Entin and L. I. Kogan in their paper "On the Theory of Intermediate Transformation of Austenite" communicated experimental data on the elementary reactions, structure and composition of transformation products of austenite in the medium range. They pointed out that transformation in this range is not due to redistribution of the alloying elements in the austenite but to diffusional redistribution of carbon in the austenite. Depending on the composition of the steel and the transformation temperature, an increase or a decrease of the carbon concentration in the residual austenite may take place, which is due to separating out of carbides. In some cases (for instance in nickel steels) the process of carbon enrichment of the residual austenite at a later stage of the transformation is followed by a

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separation of the carbon phase from the austenite and its impoverishment in carbon. Available data on the tetragonal structure of the α-phase which forms in the intermediate range, on the martensite character of the polymorphous $\gamma \rightarrow \alpha$ transformation in carbon-free alloyed iron in this range and on the formation of a micro-relief indicate that the α-phase during this transformation is formed according to the martensite type. Taking into consideration the obtained data, the authors consider that transformation of the austenite in the intermediate range is due to a redistribution of the carbon in the austenite and a formation of sections with increased and with reduced carbon concentrations. Sections of the austenite with reduced carbon concentration transform into martensite and those with increased carbon concentrations may possess a differing stability depending on the alloying and on the transformation temperature; under certain conditions carbides will start to separate out from the austenite. Transformations similar in character to the intermediate transformation of the austenite are specific features of

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the alloys containing elements with sharply differing speeds of diffusion (iron and carbon in steel). Candidate of Technical Sciences L. M. Pevzner, G. D. Kubyshkina, N. M. Popova, L. S. Zaslavskaya, G. M. Rovenskiy in their paper "On Intermediate Transformation" investigated in detail the phase composition of the products of intermediate transformation. Particularly valuable are the X-ray structural and the chemical analyses of the residual austenite which is precipitated electrolytically. The authors compared products of intermediate transformation in Cr and Si steels. They stated that in chromium steel clear lines of the carbide Fe_3C were observed by X-ray analysis from 280°C onwards, whilst in silicon steels this carbide is detected only from the 400°C isotherm onwards. They also investigated the problem of redistribution of alloying elements (Cr and Si) during intermediate transformation. It was established that in the non-decomposed austenite, the silicon content is approximately equal to its average content in the initial austenite. In chromium steels at 280-350°C, the chromium

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concentration in the carbide does not exceed the average concentration of chromium in the steel. At a higher temperature (400-420°C) an enrichment of the carbide with up to 7 to 8% Cr was observed for a steel containing 3-5% Cr. The authors express the following views on the mechanism of intermediate transformation:

1) Intermediate transformation takes place at lower temperatures than recrystallisation, i.e. at a temperature with a sharply impeded self-diffusion of the iron and diffusion of the alloying elements;

2) the fundamental difference of the intermediate transformation from the pearlitic one is the change in the mechanism of the $\gamma \rightarrow \alpha$ transformation, namely, a change from the ordinary diffusion kinetics to the martensitic one, which is confirmed by the presence of a relief on the surface of a cut and the existence of a relation between the crystallographic directions of the forming α-phase and the original austenite;

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3) the process of decomposition begins with a preliminary redistribution of the carbon in the austenite; it is assumed

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that two elementary processes take place, namely $\gamma \rightarrow \alpha$ transformation according to the martensitic kinetics in the impoverished section and carbide separation from the enriched section.

The authors found that in silicon steel an enrichment with carbon of the residual austenite takes place after ordinary hardening and tempering. The degree of enrichment of the austenite reaches the same values as in the case of iso-thermal intermediate transformation. Taking this fact into consideration, it is assumed that during low temperature tempering decomposition of the residual austenite takes place according to the laws governing the transformation of super-cooled austenite in the intermediate range. Therefore, the authors arrived at the conclusion that the favourable mechanical properties of silicon steels after isothermal hardening are due to a particular structural state: a disperse α-phase with a small quantity of carbide which is coherently linked to it and a considerable quantity of residual austenite.

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V. V. Skotnikov in his paper "On the Mechanism of Formation, Phase State and Structural Shapes of Products

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of Intermediate Transformation of the Austenite" investigated the structural shapes and the properties of the products of intermediate transformation in engineering alloy steels on the basis of micro-structural analysis and hardness measurement. He found that the initial products of intermediate transformation in low and medium carbon steels have a clearly pronounced lamellar structure which is similar to that of the eutectoidal structure, whereby the spacing between the lamellae decreases regularly with decreasing transformation temperatures. It was established that the phase which is redistributed in the products of intermediate transformation (which is usually assumed as being a carbide phase) has the following features: the quantity of this phase exceeds by far the quantity of the carbide phase which can form for a given carbon content and this is particularly pronounced in the case of low carbon steels; the speed of spheroidisation of this phase is incommensurably larger than that of the carbide phase in pearlite; with increasing duration of isothermal annealing, the dimensions of the particles of

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this phase will decrease appreciably, they "dry up". On the basis of his own and other results, the author concludes that the mechanism of intermediate transformation consists in a diffusion layering of the super-cooled austenite and has the character of a eutectoidal decomposition. Since one of the phases differs from the initial austenite only by the sharp difference in the carbon concentration, the intermediate transformation can be referred to as monotectoidal in analogy with monotectic transformations. Sub-division of the intermediate range into two regions is due to differences in the nature of the formed α-phase: in the upper region ferrite forms with carbon concentrations approaching the equilibrium one, whilst in the lower region the ferrite is saturated with carbon (low carbon martensite). The author disputes the phenomenon of self-braking of the process of intermediate transformation since one of the phases of the forming product consists of carbon enriched austenite. The formation of a carbide phase is due to secondary processes which take place after the basic process of layering of the initial austenite.

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P. V. Romanov read the paper "Nature of Intermediate Structures in the Light of Relations Governing the Thermo-Kinetic Transformation of the Austenite". On the basis of a large number of thermo-kinetic diagrams plotted by the author, relations were established governing the transformation of austenite during continuous cooling of binary alloys for iron with carbon, nickel, molybdenum and chromium and also for steels with 1, 2 or a larger number of alloying elements. The author expressed the view that the nature of intermediate transformation of austenite in alloy steels differs from that of isothermal transformation (in the intermediate temperature range) of carbon steel. He proposes to consider the first as a polymorphous transformation of the alloys iron-alloying element with a regular reconstruction of the lattice $\gamma \rightarrow \alpha$. The second is considered as decomposition of the austenite which is determined by the diffusion of the carbon during isothermal annealing. He proposed a differing terminology for designating the decomposition products of the austenite

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of alloy steel and of the products of isothermal transformation of carbon steels.

L. P. Ivanova in her paper "Features of Intermediate Transformation of Austenite in Silicon Steels" investigated the intermediate transformations in the steels 60S2 and 37KhS on the basis of the magnetometric and X-ray structural analysis, measurement of the electric resistance, determination of the mechanical properties and application of chemical and X-ray structural analysis of electrolytically produced sediments. On the basis of the experimental data, the author concludes that, during intermediate transformation, self-diffusion of iron occurs in silicon steels with a slow diffusion of carbon which is impeded owing to the presence of silicon.

V. T. Biryulin and Doctor of Technical Sciences V. D. Sadovskiy in their paper "On the Influence of Isothermal Hardening on the Mechanical Properties of Steel" investigated the impact strength and the hardness of the steels 40KhNMA, 35KhGSA and 38KhMYuA as a function of the hardening and tempering regimes. The magnetometric method was used for measuring the quantity of residual

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austenite and for plotting the thermal kinetic diagrams of the super-cooled austenite. The authors point out that long duration (100 hours and more) annealing in a hot medium leads to a decrease of the impact strength whereby in hot media with temperatures of 200 to 300°C, the impact strength increases at first, reaching a certain value with increasing annealing duration and, then, the impact strength begins to decrease. If the medium has a temperature of 350 - 400°C, a continuous drop is observed in the impact strength with increasing duration. Comparing this phenomenon with the irreversible temper brittleness, the authors point out that embrittlement of the steel after ordinary hardening and tempering develops rapidly (within a few minutes) for the temperature range 300 to 400°C and on isothermal hardening it develops after many hours. After hardening (300°C) the drop in impact strength is accompanied by an inter-crystalline fracture; for the isotherms 350 and 400°C the fracture is intra-crystalline. Occurrence of an intra-crystalline fracture is attributed by the authors to the features of the micro-

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structure of the transformation products in the upper part of the intermediate range. It was established that in steel hardened from 400°C the inter-crystalline fracture, which is characteristic for reversible temper brittleness, is obtained only after high temperature tempering (675°C) followed by rapid cooling and subsequent embrittlement at 550°C.

V. F. Senkevich and Professor I. N. Bogachev in their paper "Isothermal and Step-wise Hardening of Steel" analyse the mechanical properties of the engineering steels 45Kh, 45G2 and 37KhS after treatment in molten alkalies. On the basis of their results the authors arrive at the conclusion that isothermal hardening in molten alkalies is technologically favourable for a number of steels and ensures favourable mechanical properties. However, this is possible only within a narrow range of super-cooling temperatures and deviation from this range can be accompanied by a sharp deterioration in the properties, particularly of the impact strength. For Steel 45G2 and also 40Kh, the hot hardening is a more

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reliable method of heat treatment in molten alkalies and this is particularly suitable for components of small and medium sizes.

Candidate of Technical Sciences N. I. Popova in her paper "Influence of the Products of Intermediate Transformation on the Physical and Mechanical Properties of Engineering Steels" investigated the influence of various quantities of intermediate transformation products (at 300 to 450°C) on the mechanical properties and on the appearance of the fractures of specimens of the Steels 35KhNZM and 35KhNIM. The steel structure was investigated by optical and electron microscopes and also by chemical analysis of the carbide sediment of steels with differing initial structures. Studying the character of the changes in the mechanical properties of the steel, hardened according to various regimes, as a function of the tempering temperature, the author established that the influence of intermediate transformation products on the mechanical properties of the steel depends on the temperature at which these transformations take place. The quantity of

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the decomposition products of the austenite forming at 300°C has practically no influence on the yield point, the impact strength and the character of the fracture of the steel compared with the corresponding characteristics obtained after ordinary hardening and tempering at the same temperature. The decomposition products of the austenite forming at higher temperatures (350 and 400°C) bring about a reduction of the yield point and the impact strength and also a less favourable appearance of the fracture whereby the quantity of the products for which a deterioration of the mechanical properties is observed will be the smaller the higher the decomposition temperature. It was detected by means of the electron microscope that, after hardening, the steel (with products of intermediate transformation) has a non-uniform structure with a non-uniform distribution of the carbides which increase with increasing isothermal temperature. After tempering at 600°C the non-uniformity is conserved and the quantity of carbides remains the same as that after hardening. The structure obtained after tempering of the martensite is uniform and contains a uniform distribution

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of disperse carbides. Analysis of the carbide sediments showed that after ordinary hardening and tempering at 600°C the carbides contain Cr, Mo and Mn in quantities which are near to their respective contents in the carbides of residues of annealed steel. The compositions of the carbides will be the same in the products of transformation of austenite forming at 300°C and equally tempered at 600°C. The carbide deposits of the products of intermediate transformation formed at 350, 400 and 450°C (after tempering at 600°C) proved to have a lower content of Cr, Mn and Mo. On the basis of the obtained results, the author concludes that the physical and mechanical properties after tempering of steel hardened to obtain martensite differ from that of steel which contains in its structure products of intermediate transformation. Apparently, this is due to the differing shape, magnitude and character of the distribution of carbides and also to the distribution of Cr and Mo between the carbide and the metallic phases of these structures.

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B. I. Elizarov and V. V. Skotnikov in their paper "Influence of the Products of Intermediate Transformation on the Tendency to Cold Shortness of Engineering Steels

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After High Temperature Tempering" investigated the impact strength of the steels 40Kh, 40KhN, 40KhNMA, 45G2 and 35KhGSA at +20, -25 and -50°C. It was established that as regards cold shortness after high temperature tempering of steel following ordinary and isothermal hardening, the investigated steels can be classified in the following sequence: 40KhMA, 40KhN, 40Kh, 45G2, 35KhGSA. The products of isothermal decomposition of austenite in the upper part of the intermediate range, after high temperature tempering, show a more pronounced tendency to cold shortness than the tempering products of martensite and the products of isothermal decomposition of austenite in the lower part of the intermediate range. The authors explain this phenomenon on the basis of the mechanism of intermediate transformation proposed by V. V. Skotnikov.

D. M. Pomerants and V. V. Skotnikov in their paper "Features of Irreversible Temper Brittleness in the Products of Intermediate Transformation of Engineering Automobile Steels" investigated the dependence of the

 impact strength and the change in the quantity of the

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residual austenite of the steels 40Kh, 40KhN, 40KhNMA, 35KhGSA, 0KhM, 40KhGT and 45G2 on the temperature of the medium during isothermal hardening and the tempering temperature. They arrived at the following conclusions:
1) No definite relation was established between the irreversible temper brittleness and the change in the quantity of the residual austenite;
2) temper brittleness of the first type will be the less pronounced in isothermally hardened steel the higher the temperature of the isotherm and for the isotherms 350 and 400°C this type of brittleness does not occur;
3) the transformation products in the top part of the intermediate range tend to develop a particular type of irreversible brittleness (second type) which is characterised by intra-crystalline fracture. The authors attribute this type of fracture to the features of the structure of the products of intermediate transformation, which are considered as being a eutectoidal mixture of the α-phase and of the enriched austenite. The first type of

 brittleness (with an inter-crystallite fracture) is

associated with the process of carbide formation in the matrix α-phase which is over-saturated with carbon in the products of transformation of the lower part of the intermediate region. Brittleness of the second type develops as a result of the processes of tempering of the γ-phase which distributes in the ferrite within the limits of what was originally the austenite grain. In a number of cases, even before tempering, the presence of carbon enriched austenite-martensite can cause brittle fracture along the grain. This elucidates the observed intra-crystalline fracture of transformation products of the upper part of the intermediate region which manifests itself strongly after tempering.

Candidate of Technical Sciences N. V. Kazakova and N. V. Koroleva in their paper "On the Influence of the Decomposition Products of the Austenite in the Intermediate Range on the Tendency of the Steel to Develop Temper Brittleness" investigated the influence of the products of intermediate transformation on the tendency of the steel to develop reversible temper brittleness and to

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elucidate the nature of this phenomena in the steels 35KhN3, 35KhN3M, 35KhN3V and 35KhM after isothermal hardening at 250-450°C and tempering at 600-630°C with various cooling speeds. The impact strength was tested at temperatures between +200 and -180°C, studying also the character of the fracture and the micro-structure of the steel by means of optical and electron microscopes. Evaluation of the tendency to develop temper brittleness was carried out on the basis of the temperature of transition of the steel into the brittle state. The authors arrived at the following conclusions:
1) A partial transformation of austenite in the intermediate range during hardening has practically no influence on the character of separating out of the embritteling intergranular phase during slow cooling of the steel after tempering;
2) the intergranular phase which separates out during slow cooling of the steel after tempering shows less influence on the embrittlement than the orientated acicular carbides which form during the intermediate decomposition

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of the austenite. Therefore, if products of intermediate decomposition are present in the structure, the fracture of the steel in the case of impact tests will proceed along the grain even if the steel was cooled slowly after tempering and an embrittled phase separated out at the grain boundaries;

3) with increasing temperature of the partial intermediate transformation of austenite (during hardening) and increasing quantities of the products of this transformation, the critical temperatures of brittleness increase both in the case of rapid as well as in the case of slow cooling after tempering. In the first case the increase is more intensive than in the second and, as a result of that, the critical brittleness temperatures are close to each other.

Candidate of Technical Sciences B. N. Arzamasov in his paper "On the Hardenability and Through Hardenability of Engineering Steels During Isothermal Heat Treatment" studied these factors for the steel 30KhGSA by investigating the hardness of the micro-structure and also by

comparing the cooling curves of the core and of the surface of specimens of various diameters with a thermo-kinetic diagram. Furthermore, the cooling ability was investigated of various hot media based on nitrites and nitrates of sodium and kalium and also of soda lye and of potash lye. The author established that the cooling capacity of the investigated hot media depends on their temperature and does not depend on their composition; with decreasing temperature of the medium, its cooling capacity increases appreciably.

R. P. Radchenko in his paper "On the Selection of the Regime of Heat Treatment of Large Components by Means of Thermo-kinetic Diagrams" gave data on the investigation of the steel 35KhNM of various heats for which thermo-kinetic diagrams were plotted on the basis of dilatometric data for various austenisation temperatures from the inter-critical interval up to $Ac_3 + 100^{\circ}C$. He has shown that small quantities of aluminium as an alloying element do have an influence on the hardenability of steel. A comparative study was made of the mechanical properties

along a cross section of a blank of 130 mm dia. (after cooling in oil, in water and through water in oil) with the properties of specimens cooled with various speeds. The following conclusions were arrived at:
1) The products of transformation of the right part of the intermediate range on the thermo-kinetic diagram after high temperature tempering possesses a low impact strength and a low limit of proportionality and the fracture of the specimens has a crystalline structure;
2) if the thermo-kinetic diagram of austenite transformation is available, it is possible to establish the optimum regime of heat treatment (of hardening) of components without testing specimens treated according to various variants, provided that the properties of the structural components and the cooling curve of the core of the component are known;
3) the cooling curves of the component found experimentally for any grade of steel are applicable also for other similar grades of steel.

Card 24/29 Candidate of Technical Sciences B. N. Arzamasov in his paper "Dependence of the Fatigue Limit, the Strength and

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the Plasticity of the Steel 30KhGSA on the Regimes of Isothermal Hardening" investigated the mechanical properties for the purpose of establishing a relation between the fatigue limit and other mechanical characteristics on flat specimens of sheet made of the steel 30KhGSA of a thickness of 2 mm. The specimens were hardened in a hot medium of 250, 300, 350 and 400°C. The duration of heating at these temperatures was such as to obtain the fullest decomposition of the austenite (15 mins, 40 mins, 5 hours and 10 hours respectively). The author concluded that on increasing the temperature of the isothermal hardening from 250 to 450°C under conditions of an as complete as possible decomposition of the austenite, the fatigue limit of 30KhGSA steel increases, in spite of the decrease of the strength and the yield point and also of the breaking strength and the hardness.

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Professor I. N. Bogachev and R. I. Mints in their paper "Combination of Heat Treatment with Oxidation in Melts of Oxidising Agents" investigated the possibility of

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combining hardening or tempering in molten alkalies with oxidation (addition of nitrite and nitrate sodium salts). It was established that the process of oxidation in these media takes place in jumps whereby a transition is observed from the lower oxide types into higher types of oxides and, in addition to oxidation, partial dissolution of the metal takes place. An optimum composition of the medium has been worked out and the treatment time was determined which would ensure obtaining an oxide film which possesses the highest protective capacity. In this case, treatment at 400 to 500°C increases the resistance to corrosion six to sevenfold compared to untreated components and three to fourfold in the case of a treatment temperature of 300°C. Oxidation also increases the wear resistance of cutting tools. The currently applied treatment of tools in a vapour atmosphere can be substituted by treatment in molten oxiding agents.

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I. G. Rivkin in his paper "Influence of Isothermal Treatment on the Strength of Cast and Rolled High Speed

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Steel" drew attention to the fact that a considerable proportion of cutting tools are scrapped due to cracks and not due to natural wear. Therefore, the mechanical properties have been studied of the high speed steel R9 (static compression tests, bending and torsion tests, determination of the impact strength and of the fatigue limit) after various hardening regimes: current type hardening; step-wise hardening in a medium at a temperature of 560°C (15 minutes); isothermal hardening (Variant I) in a medium of a temperature of 250 to 260°C (four hours); isothermal hardening in a medium at 560°C (Variant II, three hours) and transfer into a medium at 250-260°C (three hours); combined isothermal hardening and cooling in a medium of 250-260°C (four hours) followed by transfer to a medium of 560°C (three hours) and cooling again in a medium of 250-260°C (three hours). For all these variants the above treatment was followed by treble tempering for one hour at 560°C. The author concluded that isothermal hardening improves appreciably the mechanical properties of cast and rolled high speed

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tool steels and the most effective proved to be the combined treatment and the treatment according to Variant I. It was established that isothermal hardening increases the service life of the cutting tool.

Main Results of the Conference. There was a discussion relating to the theory of intermediate transformation, the structure and the composition of the products of intermediate transformation as a result of which certain important problems were singled out for further investigation in this field:

a) Investigation of the structure and mechanism of the formation of the α-phase;
b) Investigation of the structure of the steel by electron microscopic and phase analysis;
c) Investigation of the fine structure of the γ-phase (distortion of the crystal lattice, of the size of blocks, etc.) in conjunction with incomplete transformation;
d) Study of the transformation of residual austenite during tempering in the intermediate range;
e) Study of brittleness phenomena.

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The delegates of the conference pointed out the practical value of thermo-kinetic diagrams for working out heat treatment regimes of various components and the necessity of more thorough investigations in various organisations. It was pointed out that isothermal hardening is successfully applied for increasing the structural strength of important components in engineering and also the strength and service life of tools made of high speed and other tool steels. It was also pointed out that hardening in hot media has certain technological advantages, e.g. reduction of the distortion and of the residual stresses, shortening of the heat treatment cycle, possibility of obtaining a bright and an oxidised surface. The necessity was stressed of wider utilisation of progressive methods of heat treatment.
(Note: This is a complete translation and not an abstract).

AVAILABLE: Library of Congress.

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3. Austenitic steels-Transformations

S/0286/64/000/004/0049/0050

ACCESSION NR: AP4021236

AUTHOR: Pomerants, F. S.

TITLE: A bolt with a countersunk head. Class 47, No. 160629

SOURCE: Byul. izobret. i tovarn. znakov, no. 4, 1964, 49-50

TOPIC TAGS: bolt, countersunk bolt, hardware, fastener

ABSTRACT: This authorship certificate introduces a bolt with a countersunk head for fastening the skin to hermetic sections of aircraft. In order to improve the reliability of drawing up multilayer packets in the hermetic sections, there is an auxiliary head for a wrench made as a single unit with the countersunk head and drilled out after drawing up the bolt.

ASSOCIATION: none

SUBMITTED: 15Aug62 DATE ACQ: 10Apr64 ENCL: 01

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AUTHORS: Golub, A. M., Pomerants, G. B. SOV/78-4-4-11/44

TITLE: Complex Silver Selenocyanates (Kompleksnyye selenotsianaty serebra)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 4, pp 769-774 (USSR)

ABSTRACT: The potentiometric method was used to investigate the conditions needed for preparing complex silver selenocyanates in aqueous and acetone-water solutions at 20°. The complexes $Ag(CNSe)_3^{2-}$ and $Ag(CNSe)_4^{3-}$ were determined. The disscciation constants of these compounds at 20° were determined: $Ag(CNSe)_3^{2-}$: $K = 1.61.10^{-14}$ (in aqueous solution) and $2.6.10^{-15}$ (in acetone-water solution). $Ag(CNSe)_4^{3-}$: $K = 1.57.10^{-15}$ (in acetone-water solution). At higher concentrations of the complex-former KCNSe in acetone-water solution the complex ion $Ag(CNSe)_4^{3-}$ forms. The solubility of AgCNSe in the presence of KCNSe ions in aqueous and alcoholic solution was

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investigated. Crystals form after some time in saturated solutions of silver selenocyanate in the presence of potassium selenocyanate. Fine crystals precipitate from acetone-water solutions with an excess of potassium selenocyanate. Analyses of these crystals indicated the composition $KAg_2(CNSe)_3$. The salt is stable in the air, is difficultly soluble in water, but easily soluble in aqueous solutions of sodium thiosulfate and potassium selenocyanate. Three tables summarize the results of the potentiometric measurements at a) constant silver concentration, b) constant concentration of selenocyanate ion, and c) constant acetone concentration. There are 4 figures, 3 tables, and 8 references, 5 of which are Soviet.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko Kafedra neorganicheskoy khimii (Kiyev State University imeni T. G. Shevchenko, Chair of Inorganic Chemistry)

SUBMITTED: July 10, 1957

GOLUB, A.M.; POMERANTS, G.B.

Thiocyanate and iodothiocyanate complexes of palladium. Zhur. neorg. khim. 9 no.7:1624-1629 Jl '64. (MIRA 17:9)

1. Kiyevskiy gosudarstvennyy universitet.

GOLUB, A.M.; SKOPENKO, V.V.; POMERANTS, G.B.

Mixed complexes based on silver selanocyanate. Zhur. neorg. khim. 10 no.2:344-348 F '65. (MIRA 18:11)

1. Kiyevskiy gosudarstvennyy universitet imeni Shevchenko. Submitted May 21, 1964.

GOLUB, A.M.; POMERANTS, G.V.

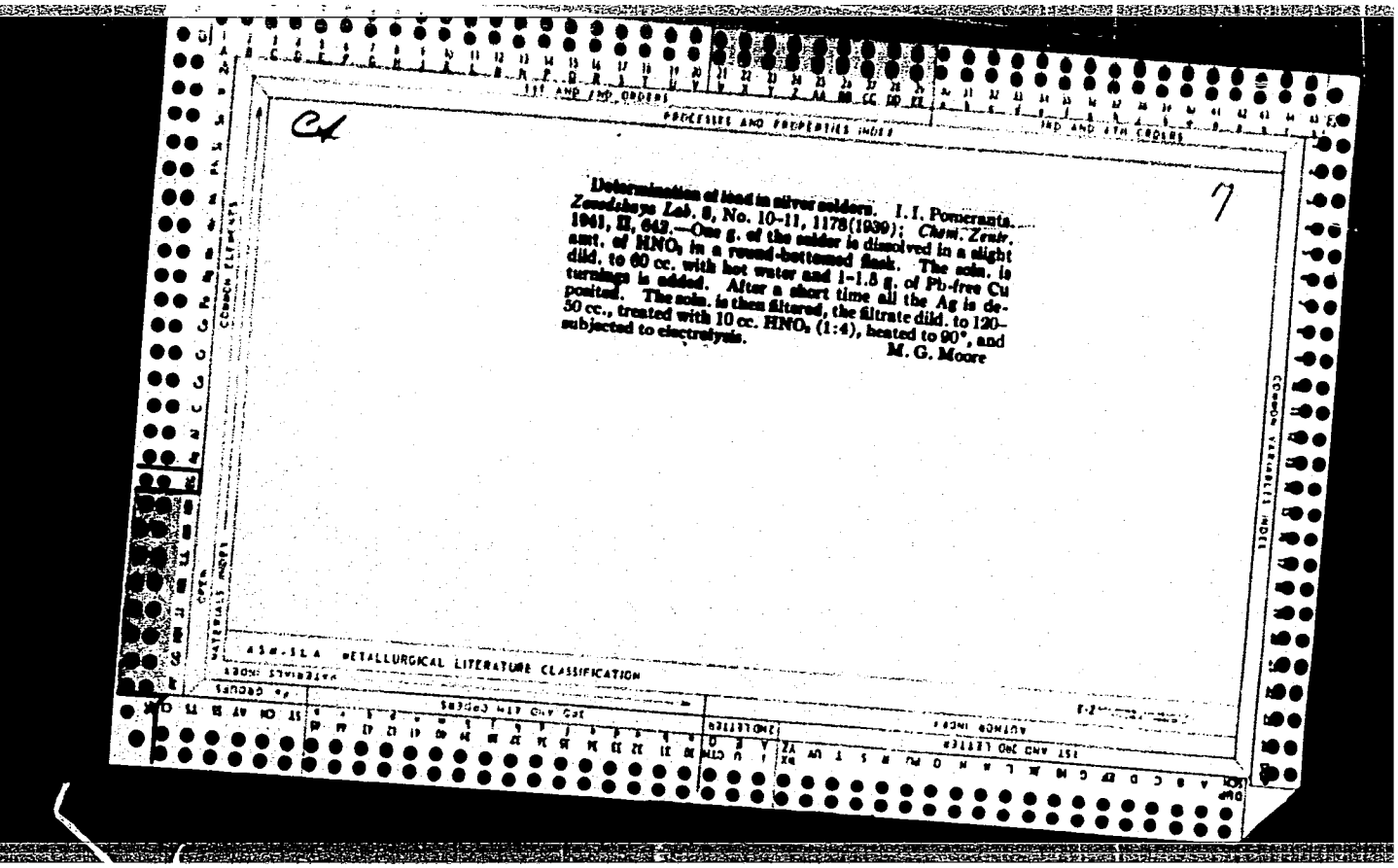
Extraction of thiocyanate and halide complexes of palladium and its use for separating palladium from silver. Ukr. khim. zhur. 31 no.1:104-112 '65. (MIRA 18:5)

1. Kiyevskiy gosudarstvennyy universitet imeni Shevchenko.

Analysis 9

Met. Gb
V.9

•**Determination of Lead in Silver Solders.** I. I. Pomerants (*Zurnal. Lab. (Works' Lab.)*, **1930**, (10/11), 1178; *Chem. Zentr.*, 1911, **112**, (II), 642; *C. Abs.*, 1912, **36**, 3116). [In Russian.] One grm. of the solder is dissolved in a small amount of HNO_3 in a round-bottomed flask. The solution is diluted to 60 c.c. with hot water, and 1·1·5 grm. of Pb-free Cu turnings is added. After a short time, all the Ag is deposited. The solution is then filtered, the filtrate diluted to 120–150 c.c., treated with 10 c.c. HNO_3 (1 : 4), heated to 80° C., and subjected to electrolysis.



Determination of lead in silver solders. I. I. Pomerants. *Zavodskaya Lab.* 8, No. 10–11, 1178(1939); *Chem. Zentr.* 1941, II, 642.—One g. of the solder is dissolved in a slight amt. of HNO_3 in a round-bottomed flask. The soln. is dild. to 60 cc. with hot water and 1–1.5 g. of Pb-free Cu turnings is added. After a short time all the Ag is deposited. The soln. is then filtered, the filtrate dild. to 120–50 cc., treated with 10 cc. HNO_3 (1:4), heated to 90°, and subjected to electrolysis.

M. G. Moore

AUTHORS: Pomerants, I.I. and Rivlina, A.I., Engineers 110-58-6-16/22

TITLE: Corrosion-testing in Simulated Tropical Climatic Conditions (Korrozionnyye ispytaniya, imitiruyushchiye usloviya tropicheskogo klimata)

PERIODICAL: Vestnik Elektropromyshlennosti, 1958, Nr 6, pp 62 - 65 (USSR).

ABSTRACT: Deliveries of electrical equipment to tropical countries have given rise to a number of problems and this article describes work that has been done at the Kharkov Electro-mechanical Works on tropical finishes for indoor equipment. The tests were carried out in a humidity cabinet with 95 - 98% relative humidity at 43 - 47 °C. The most severe conditions were imposed when the parts were maintained in the chamber for 7 days, then left under normal ambient conditions for 6 hours and then returned for a further 7 days in the humidity cabinet. The other test conditions that were used are also described. Smooth plated surfaces, for example, cadmium, were much better than rough ones; this factor is of even more importance than thickness of plating. It is proposed that the technical conditions for plating should include a number of categories of surface, ranging from cast

Card 1/3

Corrosion-testing in Simulated Tropical Climatic Conditions

and unworked to ground and polished; also, the surface condition should govern the kind and thickness of plating. Some, but not all, kinds of stainless steel are liable to corrode if the surface is rough and electro-polishing is recommended for such materials.
The formulation of the chromate passivating-solution affected the corrosion resistance of cadmium plating, the best solution being 25 g sodium dichromate, 20 g sodium sulphate and 20 ml nitric acid of s.g. 1.85. It was found beneficial to cover cadmium and zinc plating with lacquer or mineral oil. If flexible copper leads were plated with sufficient copper, silver or nickel to give protection, they became stiff. Passivation with chromium anhydride was useful but the best solution would be to plate the individual strands before laying-up. Cadmium-plated steel parts were not so corrosion-resistant as stainless steel Kh18N9T and were also

Corrosion-testing in Simulated Tropical Climatic Conditions 110-58-6-16/22

inferior to copper or copper-alloy parts plated with nickel, tin or chromium. On the basis of the above findings a number of recommendations are made about plating and surface finish.

ASSOCIATION: KhEMZ

SUBMITTED: January 11, 1958

Card 3/3 1. Electrical equipment--Corrosion

POMERANTS, I.I.

Preparation and application of insulating lacquers and ground coats. Lakokras.mat. i ikh prim. no.2:77-78 '60. (MIRA 14:4)

1. Iz opyta raboty Khar'kovskogo elektromekhanicheskogo zavoda imeni I.V.Stalina.
(Kharkov--Paint materials)

POMERANETS, K.S.

Practice in calculating the coefficient of the vertical temperature conductivity in the Gulf of Finland during the warm part of the year. Vest. LGU 17 no.12:105-108 '62. (MIRA 15:7)
(Finland, Gulf of--Water--Thermal properties)

KARAVAYKO, G.I.; IVANOV, M.V.; POMERANTS, L.B.

Microbiological studies in the Karakum sulfur deposit.
Izv. AN SSSR Ser. biol. no.2:249-260 Mr-Ap '63.
(MIRA 17:5)

1. Institut mikrobiologii AN SSSR.

POMERANTS, L.I.

Eliminating interferences in the well potential curve recorded simultaneously with the apparent resistivity curve in strata of high resistance. Razved.i prom.geofiz. no.10:39-44 '54. (MIRA 13:2)

(Oil well logging, Electric)

POMERANTS, L. [illegible]

KOMAROV, Sergey Grigor'yevich, doktor tekhnicheskikh nauk, redaktor; POMERANTS, Lev Izrailovich; BURSHTEYN, Iosif Moiseyevich; YARYSHEV, Boris Petrovich; PETROVA, Ye.A., redaktor; POLOSINA, A.S., tekhnicheskiy redaktor.

[Automatic equipment for geophysical examination of oil wells] Avtomaticheskaia appratura dlia geofizicheskikh issledovanii v skvazhinakh. Pod obshchey red. S.G.Komarova. Moskva, Gos.nauchno-tekhn.izd-vo neftianoi i gorno-toplivnoi lit-ry, 1955. 337 p. (MLRA 9:1)
[Microfilm]
(Petroleum industry--Equipment and supplies)

POMERANTS, L. I.

15-57-4-5335

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 4, pp 178-179 (USSR)

AUTHORS: Pomerants, L. I., Rogov, B. I.

TITLE: Demountable Apparatus for Radioactive Logging (Razbornaya apparatura dlya radioaktivnogo karottazha)

PERIODICAL: V sb: Razvedochnaya i promysl. geofizika. Nr 15, Moscow, Gostoptekhizdat, 1956, pp 10-28.

ABSTRACT: Apparatus of the type RARK, designed for the investigation of drill holes in extremely inaccessible places and of exploratory holes with small diameter, enables one to make the measurements both with automatic and with semiautomatic logging stations. Demounted logging installations may also be used. The single-channel apparatus permits one to make both gamma logs and neutron gamma logs with a three-core or a single-core cable. The depth instrument withstands pressures up to 200 kg/cm^2 and temperatures up to 60o. Its length with the neutron gamma logging sonde is 2810 mm; without

Card 1/3

Demountable Apparatus for Radioactive Logging (Cont.)

of dry cells with a voltage of 200 to 220. The depth apparatus requires 210 ma to 350 ma of direct current. The apparatus and its operation are described in detail. The authors give diagrams of the apparatus and point out the features of the different terminals of the behavior of the radio tubes.

Card 3/3

V. M. Z.

POMERANTS, L.I.; EPSHTEYN, G.I.

The GIS-3 gas logging station. Razved. i prom. geofiz. no.19:60-79 '57. (MIRA 10:11)
(Oil well logging--Equipment and supplies)

POMERANTS, L.I.; KAPLUNOV, A.I.

Laboratory OKS-56 for automatic logging stations working with single-core cables. Razved. i prom. geofiz. no.28:33-91 '59. (MIRA 13:1)

(Oil well logging, Electric)

POMERANTS, L.I.; KAPLUNOV, A.I.

MGGK-57 type apparatus for radioactive logging. Razved.i prom.geofiz. no.29:82-105 '59. (MIRA 13:1)
(Oil well logging, Radiation)

POMERANTS, L.I.; EPSHTEYN, G.I.

Automatic gas-logging station. Razved. i prom. geofiz. no.39: 72-110 '61. (MIRA 15:3)
(Gas well logging, Electric) (Automatic control)

S/035/61/000/009/019/036
A001/A101

AUTHORS: Pomerants, M.A., Agarval', S.P., Potnis, V.R.

TITLE: Investigation by means of balloons of primary cosmic rays during solar disturbances

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 9, 1961, 38, abstract 9A298 ("Tr. Mezhdunar. konferentsii po kosmich. lucham., 1959, v. 4", Moscow, AN SSSR, 1960, 61 - 70)

TEXT: The authors discuss the data of measuring cosmic ray intensity in the stratosphere at a latitude of 51°N during 1957-1958. The general intensity level in the stratosphere during IGY was considerably lower than the level measured during the preceding solar activity maximum (1947-1952). It is noted that no marked intensity changes were detected during chromospheric flares. A comparison of stratospheric measurement data with measurements of the neutron component at Ottawa shows that the amplitude of variations in the stratosphere is greater by 1.6± 0.3 times than on the Earth's surface. There are 9 references.

L. Dorman

[Abstracter's note: Complete translation]

Card 1/1

29494
S/035/61/000/009/022/036
A001/A101

3.2410 (1569)

AUTHORS: Pomerants, M.A., Sandstrem, A.Ye., Potnis, V.R., Roze, D.K.

TITLE: Solar disturbances and equator of cosmic rays

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 9, 1961, 38, abstract 9A303 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 4", Moscow, AN SSSR, 1960, 339 - 344)

TEXT: The intensity of the neutron component was measured with a neutron monitor mounted on a ship board in 1956-1958 in order to investigate the position of the cosmic ray equator near the western coast of Africa (14° western longitude). The average position of the cosmic ray equator pertains to (6°.7 ± ± 0°.8) northern latitude and, within the limits of measurement errors, coincides with the equator of magnetic inclination (7° northern latitude). It is possible that equator position depends on solar activity.

L. D.

[Abstracter's note: Complete translation]

Card 1/1

28826 S/169/61/000/004/001/026
A005/A130

3.2430 (1482, 1559)

AUTHORS: Pomerants, M.A.; Agarval', S.P.; Potnis, V.R.

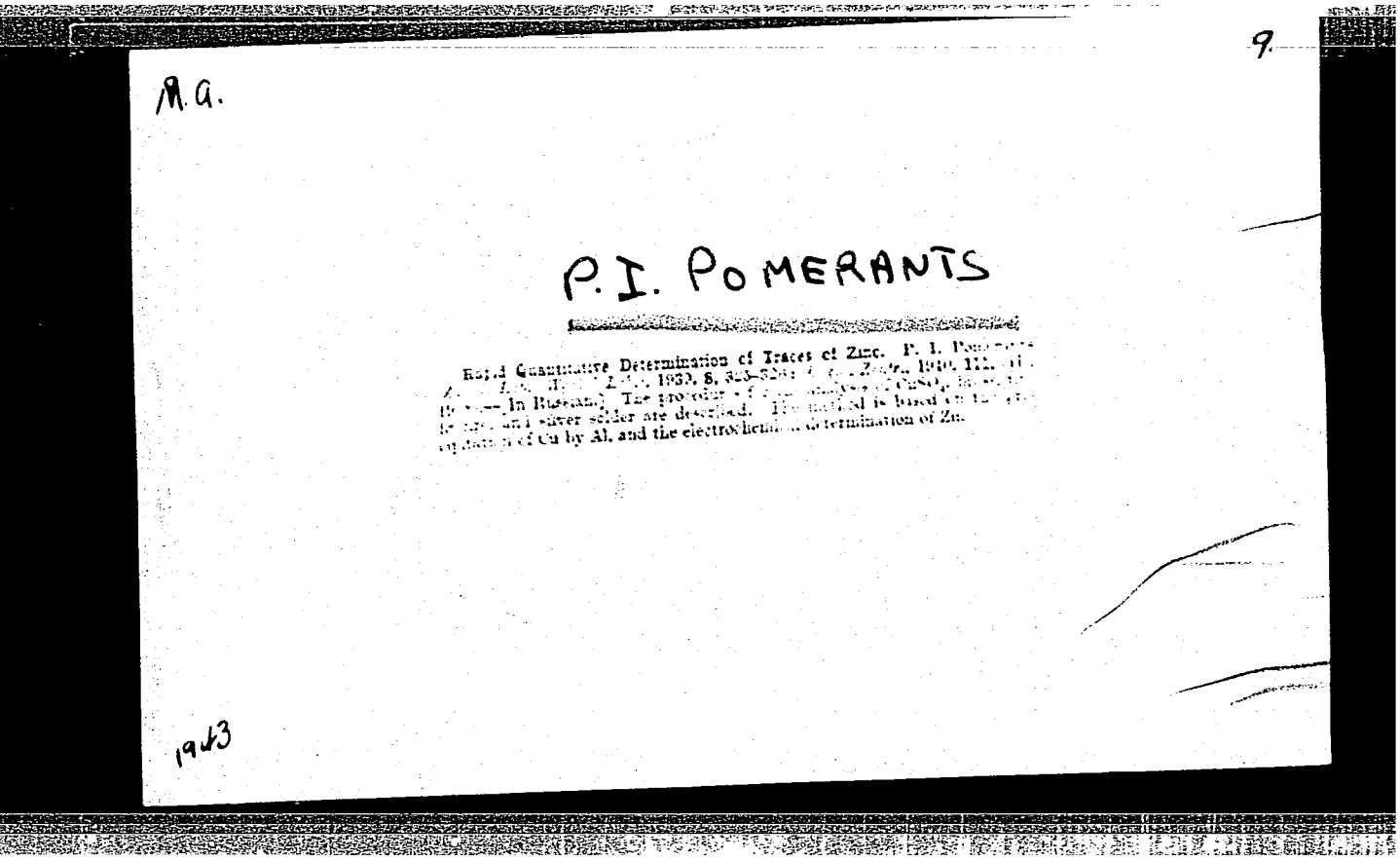
TITLE: Balloon investigation of primary cosmic rays during solar disturbances

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1961, 15, abstract 4 G 86. (Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 4, Moscow AN SSSR, 1960, 61 - 70)

TEXT: Data are given on measurements of cosmic ray intensity in the stratosphere at 51°N latitude during 1957 - 1958. The authors point out that no marked variation of intensity was detected during chromospheric flares. The general intensity level in the stratosphere during the IGY turned out to be considerably lower than the level determined during the previous maximum of solar activity (1947 - 1952). Comparison of stratospheric measurements with neutron component measurements at Ottawa shows that the amplitude of variations in the stratosphere is 1.6 ± 0.3 times greater that the the earth's surface.

[Abstracter's note: Complete translation]

Card 1/1



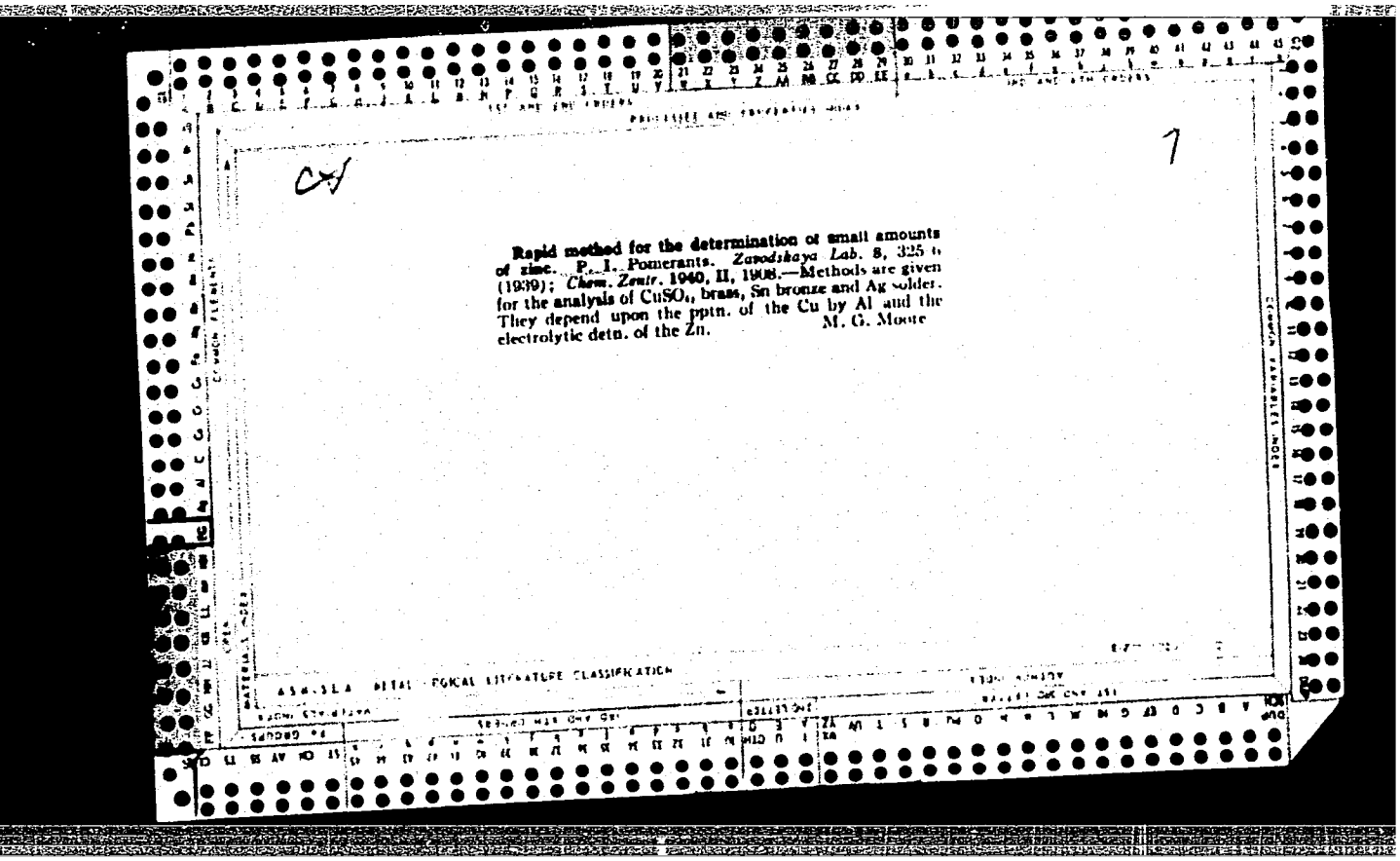
M.G.

9.

P. I. POMERANTS

Rapid Quantitative Determination of Traces of Zinc. P. I. Pomerants. [illegible] 1943, 8, 323–326 [illegible] Zinc, 1940, 112. [illegible] In Russian. The procedure of [illegible] is described. The method is based on the [illegible] silver solder are described. [illegible] of Cu by Al, and the electrolytic determination of Zn.

1943



Rapid method for the determination of small amounts of zinc. P. I. Pomerants. *Zavodskaya Lab.* 8, 325 (1939); *Chem. Zentr.* 1940, II, 1908.—Methods are given for the analysis of $CuSO_4$, brass, Sn bronze and Ag solder. They depend upon the pptn. of the Cu by Al and the electrolytic detn. of the Zn. M. G. Moore

GODERZIAN, K.K.; POMERANTS, M.I.; SHCHERBAKOV, S.A.; ZYKOVA, R.A.

Determination of internal stresses in BrKMts3-1 bronze rods and causes for the cracking of these rods in storage. Trudy Giprotsvetmetobrabotka no.20:167-186 '61. (MIRA 15:2)
(Drawing (Metalwork)) (Strains and stresses) (Bronze)

POMYALOV, N. (g. Omsk); BYKOVA, L. (G.Omsk)

Our masters have skillful hands. Prom.koop. 14 no.1:24 Ja '60.
(MIRA 13:5)

(Omsk--Service industries)

POMERANTS, S.

Twice as fast. Grazhd. av. 17 no.12:12-13 D '60. (MIRA 14:2)

1. Nachal'nik Lineyno-eksplautatsionnoy i remontnoy masterskoy, Baku.
(Airplanes--Maintenance and repair)

POMERANTS, Ye. D.; KRAUS, A.G.

Cases of poisoning connected with the redecoration of apartments. Gig. i san. 23 no.12:77-78 D '58. (MIRA 12:1)
(ANILINE--TOXICOLOGY)