the article]. The air, which has been compressed in the turbo-compressor 1, enters the regenerators 2, where the moisture and the carbonic acid are frozen out. Then the air is separated into two flows: flow D enters the third regenerator, which has already been cooled by the reverse flow, and after being heated up in the regenerator expands to a pressure of 1.45 At. in the turbo-pressure-reducer-valve 3. Flow R goes through the liquifier 5, where it is partially liquified, and enters column condenser 4; then it is sprayed, passing through recooler 6 and throttle 7. Some of the air D1 is divided in the column. The remainder mixes with flow A, which is leaving the column, and flows into the recoolers 6 and 8. The liquid oxygen K passing through recooler 8 is ready for the consumer, while flow A1 leaves the regenerator and passes into the atmosphere. The experiments were carried out within an air pressure range of 6.5 to 14 At. Variant (2) differs from variant (1) in the following: the compressed air is divided into three flows: one flow is directed into one turbo-pressure-reducer valve where it is expanded to 1.45 At., the second flow is directed into the other turbo-pressure-reducer-valve where it is expanded to 4-4.5 At., and the third flow goes through a liquifier where it is fully liquified. In variant (3), where the system also has two turbo-reducer-valves, the air is separated into two flows only. One flow is directed back into the regenerator and passes

S/184/61/000/004/003/004
D041/D112

Investigation of the corrosive .....

mium and 15-28% of nickel, it is not more than 1 mA/cm^2, and for steel containing 5% of chromium and 15-23% of nickel, it is not more than 0.2 mA/cm^2. It is concluded that the temperature factor considerably affects the stability limits of the passive state; the higher the temperature, the narrower is the passive state range and the higher the critical current value. Nevertheless, the depassivation effect of the temperature can be decreased by increasing the chromium and nickel content of the steel. The influence of nickel on the variation of the value of the critical passivation current is considerably lower than the influence of chromium. High corrosive properties in 12 N. sulfuric acid solution should be possessed by XH73D3 (KhN73D3) steels containing 9-15% of chromium and 19-28% of nickel at 20° C., 15-19% of chromium and 9-28% of nickel at 40°C., 15-19% of chromium and 15-23% of nickel at 60°C., 19% of chromium and 15-23% of nickel at 80°C., and 23% of chromium and 27-28% of nickel at 100°C. The abovementioned data correspond with the gravimetric data obtained by Ye.V. Zolotova (Ref.4: "Stal'", no.6, 1958), and Ye.V. Zolotova and A.A. Babakov (Ref.5: "Zhurnal prikladnoy khimii", t. 30, no.12, 1957). There are 6 figures and 5 Soviet-bloc references.

Card 3/4

ARKHAROV, Aleksey Mikhaylovich; OVSYANNIKOVA, Z.G., red.; MURASHOVA, V.A., tekhn. red.

[The thermodynamic method and some problems in low-temperature technology] Termodinamicheskii metod i nekotorye zadachi tekhniki nizkikh temperatur. Moskva, Gos.izd-vo "Vysshaia shkola," 1962. 181 p. (MIRA 15:7)

(Thermodynamics) (Low temperature research)

S/184/62/000/005/001/003
D040/D113

AUTHORS: Golovintsov, A.G. (Deceased), Professor, Doctor of Technical Sciences, Stolper, M.B., Engineer, and Arkharov, A.M., Candidate of Technical Sciences

TITLE: Production of liquid oxygen in a medium-pressure system with circulating nitrogen

PERIODICAL: Khimicheskoye mashinostroyeniye, no. 5, 1962, 17-20

TEXT: Experiments conducted at the Problemnaya laboratoriya glubokogo kholoda (Deep Freeze Problem Laboratory) of the MVTU im. Baumana (MVTU im. Bauman) resulted in the development of an air separation system (Fig. 1) with turbocompressors from 20 to 40 atm pressure, turbine-type expansion engines and circulating nitrogen. The system is designed for the industrial production of liquid oxygen. Complete air separation is achieved in this system with one rectification column, without special CO_2 separation and scrubbing. The operation of the system is described in detail and calculation data and graphs are included.

Card 1/3

S/184/62/000/005/001/003
D040/D113

Production of liquid oxygen .....

The system is considered economical; however, a high-pressure of 200 atm is advisable only for small deep-freeze systems where turbine-type machines cannot be used. There are 5 figures.

Card 2/3

Production of liquid oxygen .....

S/184/62/000/005/001/003
D040/D113

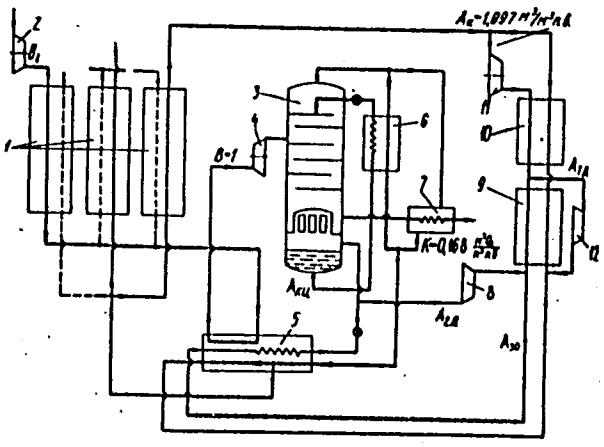


Fig. 1

Fig. 1. Diagram of the system. (1) regenerators; (2) turbocompressor; (3) rectification column; (4) turbine-type expansion engine; (5) heat-exchanger liquefier; (6) phlegma aftercooler; (7) oxygen aftercooler; (8) nitrogen expansion engine for partial expansion; (9) main nitrogen heat-exchanger; (10) nitrogen forecooler; (11) nitrogen turbocompressor, compressing gas to 30 atm·pressure; (12) turbine expansion engine expanding gas from 29.5 to 1.4 atm. Liquid oxygen leaves the system through the aftercooler (7).

Card 3/3

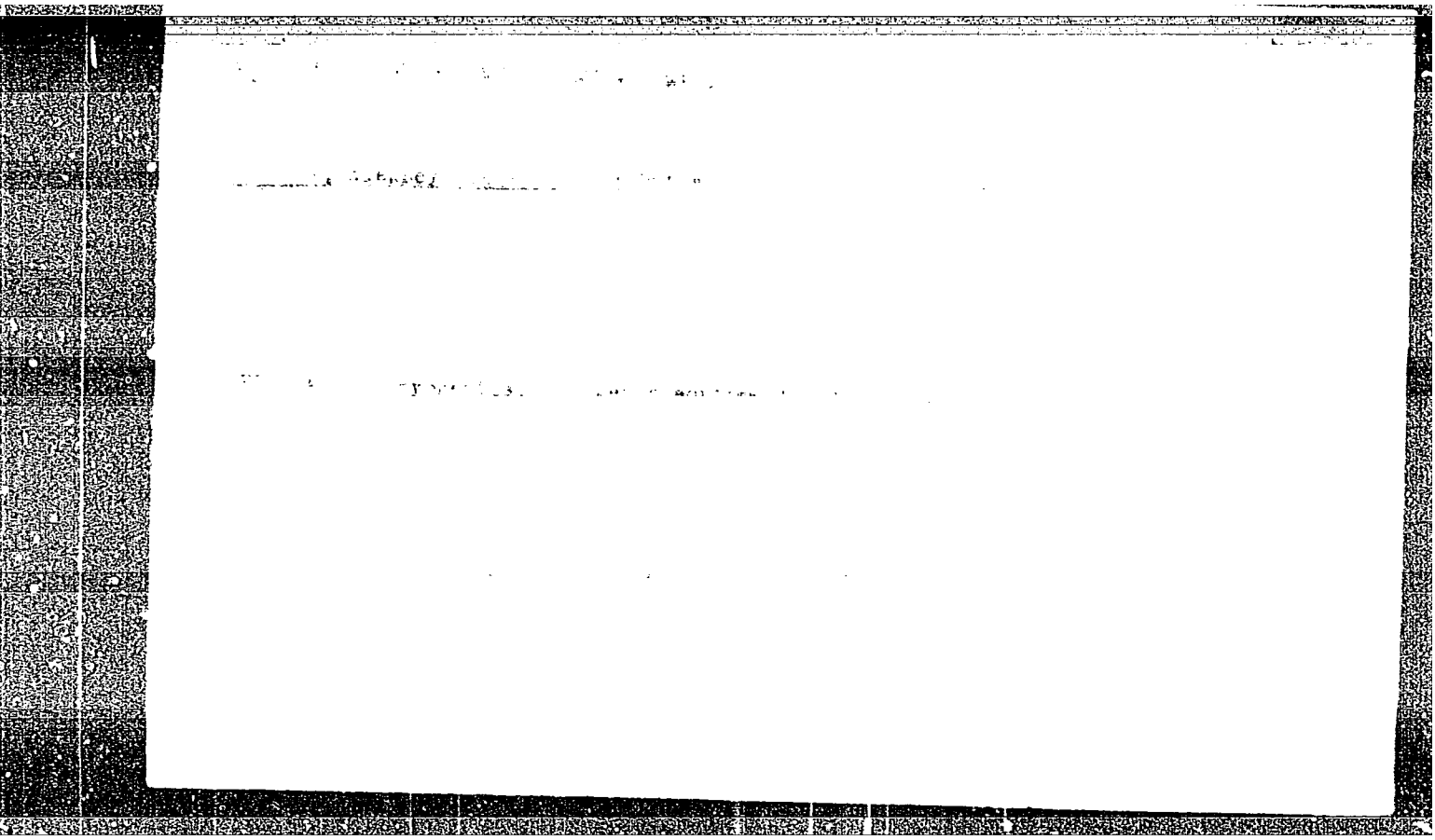
GEYNRIKHS, Georgiy Karlovich; YANKEVICH, I.P., kand. tekhn. nauk, retsenzent; ARKHAROV, A.M., kand. tekhn.nauk, retsenzent; VASIL'YEV, L.G., nauchn. red.; NIKITINA, R.D., red.; KRYAKOVA, D.M., tekhn. red.

[Ship and coastal oxygen plants] Sudovye i beregovye kislorodnye ustanovki. Leningrad, Sudpromgiz, 1963. 341 p. (MIRA 16:12)

(Oxygen) (Gases--Separation)

ARKHAROV, Aleksey Mikhaylovich; BUTKEVICH, Konstantin Stefanovich; GOLOVINTSOV, Andrey Grigor'yevich [deceased]; KULAKOV, Viktor Mikhaylovich; MARFENINA, Irina Vasil'yevna; MIKULIN, Yevgeniy Ivanovich; STOLPER, Mikhail Borisovich; Prinimali uchastiye: BAKLANOVA, V.G.; GRIDIN, V.B.; PETROVSKIY, Yu.V., red.

[Low-temperature equipment] Tekhnika nizkikh temperatur. Moskva, Energiia, 1964. 447 p. (MIRA 17:12)



L 45?30-65
ACCESSION NR AM5003777

aid for researchers and engineers and as a guide for students and graduate students specializing in cryogenic engineering.

TABLE OF CONTENTS [abridged]:

SUBMITTED: 15Oct64 SUB CODE: GP, TD

NO REF SOV: 200 OTHER: 113

Card 2/2

ACC NR: AP6029076 (A, N) SOURCE CODE: UR/0413/66/000/015/0033/0033

INVENTORS: Voronin, G. I.; Arkharov, A. M.; Lomakina, O. A.; Syrovets, K. N. 37

ORG: none

TITLE: A low-pressure apparatus for obtaining liquid oxygen from the air. Class 17, No. 184274

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 33

TOPIC TAGS: oxygen, liquid oxygen, gas liquefier, liquefaction technique

ABSTRACT: This Author Certificate presents a low-pressure apparatus for obtaining liquid oxygen from the air by low temperature rectification (see Fig. 1). The apparatus consists of an air compressor and of heat exchangers placed consecutively behind the compressor and serving for cleaning and cooling the compressed air, a rectifier with an evaporator for dividing the air into its components, and an external cooler. To increase the efficiency and to lower the cost of the apparatus, the external cooler is placed in front of the rectifier in the stream of the air being

Card 1/2 UDC: 621.593.05:661.93

L 09258-67
ACC NR: AP6029876

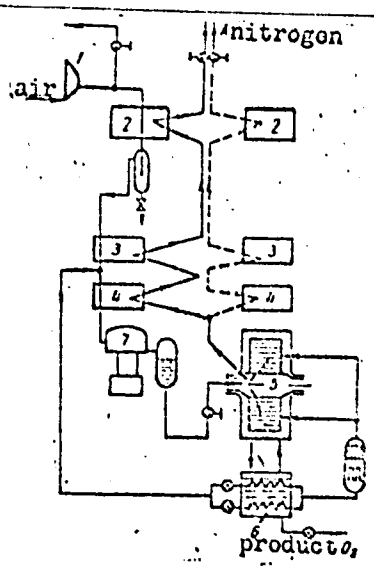


Fig. 1. 1 - compressor; 2 - heat exchanger-liquefier; 3 - preliminary heat exchanger; 4 - main heat exchanger; 5 - rectifier; 6 - evaporator; 7 - external cooler

processed. Orig. art. has: 1 figure.

SUB CODE: 07/13 SUBM DATE: 20Nov64/

PANASYUK, V.D.; ARKHAROV, A.V.

Effect of the dielectric constant on the kinetics of hydration of cobalt (III) complex compounds. Dop. AN URSR no.2:211-214 '65. (MIRA 18:2)

1. Kiyevskiy gosudarstvennyy universitet.

PANASYUK, V.D.; ARKHAROV, A.V.

Effect of the medium on the kinetics of aquation reactions of cobalt (III) complexes. Zhur. neorg. khim. 10 no.7:1562-1565 Jl '65. (MIRA 18:8)

1. Kiyevskiy gosudarstvennyy universitet imeni T.G. Shevchenko, Kafedra redkikh elementov.

PANASYUK, V.D.; ARKHAROV, A.V.

Aquation reaction of cobalt (III) complex compounds in mixed aqueous-organic solutions. Ukr. khim. zhur. 31 no.4:338-342 '65. (MIRA 18:5)

1. Kiyevskiy gosudarstvennyy universitet imeni Shevchenko.

ARKHAROV, I.M., inzh.

Technical and economic effectiveness of lowering the height of stories and using efficient interior vertical bearing construction elements in public buildings. Trudy MIEI no.14: 157-166 '59. (MIRA 13:1)

(Precast concrete construction)
(Universities and colleges--Buildings)

Moscow Engineering Economics Inst im. S. Ordzhonikidze

AUTHOR: Arkharov, I.M.

3-58-7-30/36

TITLE: Friendly Meeting of Architects (Druzheskaya vstrecha arkhitektorov)

PERIODICAL: Vestnik vysshey shkoly, 1958, Nr 7, p 82 (USSR)

ABSTRACT: In connection with the impending extension of the Czech Technical School in Prague and the Slovak Technical School in Bratislava, a delegation of the Ministry of Schools and Culture of the Czechoslovakian Republic, headed by vice-**Rector** of the Czech Technical School F.Brabets, met in Moscow with the representatives of the State Institute for Projecting Higher Schools - GIPROVUZ-of the Ministry of Higher Education of the USSR. The guests visited various schools and institutes of Moscow.

ASSOCIATION: Gosudarstvennyy institut po proyektirovaniyu vysshikh uchebnykh zavedeniy (The State Institute for Projecting Higher Schools)

Card 1/1

ARKHAROV, I. M.

25(5)130(5) PHASE I BOOK EXPLOITATION SOV/2355

Moscow. Inzhenerno-ekonomicheskiy institut imeni Sergo Ordzhonikidze

Voprosy povysheniya ekonomicheskoy effektivnosti kapital'nykh vlozheniy za schet ulushcheniya ekonomiki i organizatsii stroitel'nogo proizvodstva, a takzhe stroitel'nogo proyektirovaniya (Problems of Increasing Economic Benefits of Capital Investments by Improving the Economy and Organization of Construction Work and Planning) Moscow, Gosstroyizdat, 1959. 673 p. (Series: Its: Trudy, vyp. 14) Errata slip inserted. 2,000 copies printed.

Additional Sponsoring Agencies: USSR. Gosudarstvennyy komitet po delam stroitel'stva. Otdel ekonomiki stroitel'stva, Akademiya stroitel'stva i arkhitektury SSSR. Nauchno-issledovatel'skiy institut ekonomiki stroitel'stva, and Nauchno-tekhnicheskoye obshchestvo stroitel'noy promyshlennosti SSSR. Sektsiya ekonomiki i organizatsii.

Eds.: D. I. Bakshteyn, G. A. Dovzhik, A. S. Ginzburg, S. A. Yefremov, I. A. Kanterovich, A. G. Rotshteyn, V. V. Uspenskiy, N. A. Maslov, V. N. Shafranskiy, and A. N. Shkinev; Tech. Ed.: P. G. Ulianson; Editorial Board of the Institute: G. V. Kozlova (Resp. Ed.) Docent; Ye. I. Varvnik, Professor, V. I. Veyts, Professor, S. P. Vostrokutov, Professor, V. G. Davidovich, Professor, N. I. Denayevskiy, Professor, S. P. Zhebrovskiy, Professor, S. Ya. Karmazin, Professor, P. V. Kamlovskiy, Professor, N. N. Nekrasov, Professor, L. I. Onishchik, Professor, N. Ye. Pestov, Professor, L. N. Roytburd, Professor, K. A. Satel', Professor, G. V. Teplov, Professor, B. A. Teleshov, Professor; Editorial Commission of this volume: V. F. Girovskiy (Chairman) Docent, Ye. I. Varvnik, Professor, M. S. Gurevich, I. Ya. Ivanin, Docent, G. N. Reynin, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for staff members of construction organizations, design bureaus, and scientific research establishments as well as for faculty members and students of institutions of higher education.

COVERAGE: This collection of reports on construction problems was originally presented and discussed at a scientific-technical conference held in Moscow in February 1958 under the auspices of the Moscow Engineering and Economic Institute and other government and scientific organizations. Possibilities of increasing economic benefits from capital investments by improving methods of organizing and planning construction projects are reviewed. Results of efforts by construction and design organizations to reduce the costs of construction and building operations, to introduce economic accountability and planning in lower level construction units, to increase the productivity of labor, and to boost work and planning efficiency are analyzed. Problems in preparing estimates, making financial forecasts, and financing construction projects are discussed. No references are given.

Card 4/11

ARKHAROV, L.V.

LITVINOV, S.Ya.; ARKHAROV, L.V.; KOMAROV, S.G., doktor geologo-mineralogicheskikh nauk, retsenzent; PERSHINA, Ye.G., redaktor; POLOSINA, A.S., tekhnicheskiy redaktor

[Technical geophysics] Promyslovaia geofizika. Moskva, Gos. nauchno-tekhn. izd-vo neftianoi i gorno-toplivnoi lit-ry, 1954. 184 p.
(Geophysics)
(Petroleum geology) (MLRA 7:10)

ARKHAROV, L.V.; AGAMALIYEV, G.M.

Relationship between the factor of porosity and oil content of a layer and its specific electric resistance. Izv. vys. ucheb. zav.; neft' i gaz 2 no.4:7-9 '59. (MIRA 12:10)

1.Azerbaydzhanskiy industrial'nyy institut im. M. Azizbekova.
(Oil well logging, Electric)

ARKHIPOV, R.G.

Inequality describing the effective mass in metals with a low concentration of current carriers. Zhur. eksp. i teor. fiz. 43 no.1:349-351 Jl '62. (MIRA 15:9)

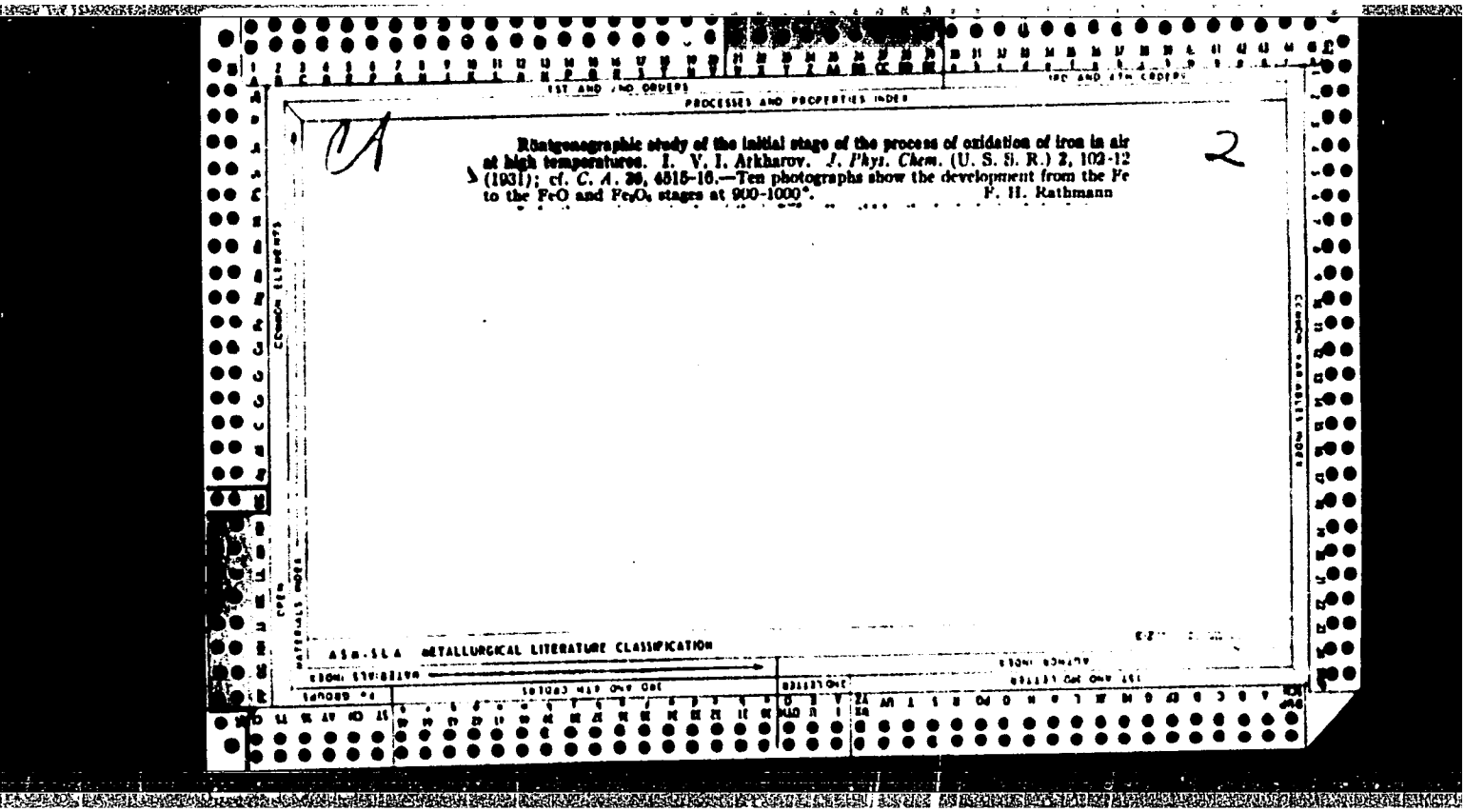
1. Institut fiziki vysokikh davleniy AN SSSR.
(Inequalities (Mathematics)) (Metals—Electric properties)
(Quantum theory)

EARLIER PUBLICATIONS FOR THIS AUTHOR ARE AVAILABLE IN THE INACTIVE FILE -- WE WILL PULL THEM UPON REQUEST.

ARKHAROV, V. I.; NEMNONOV, S. A.

"The Nature of Electrolytic Chromium Hardness"

ZhTF 8, 1089, 1930;
Techn. Phys. 5, 651, 1938.



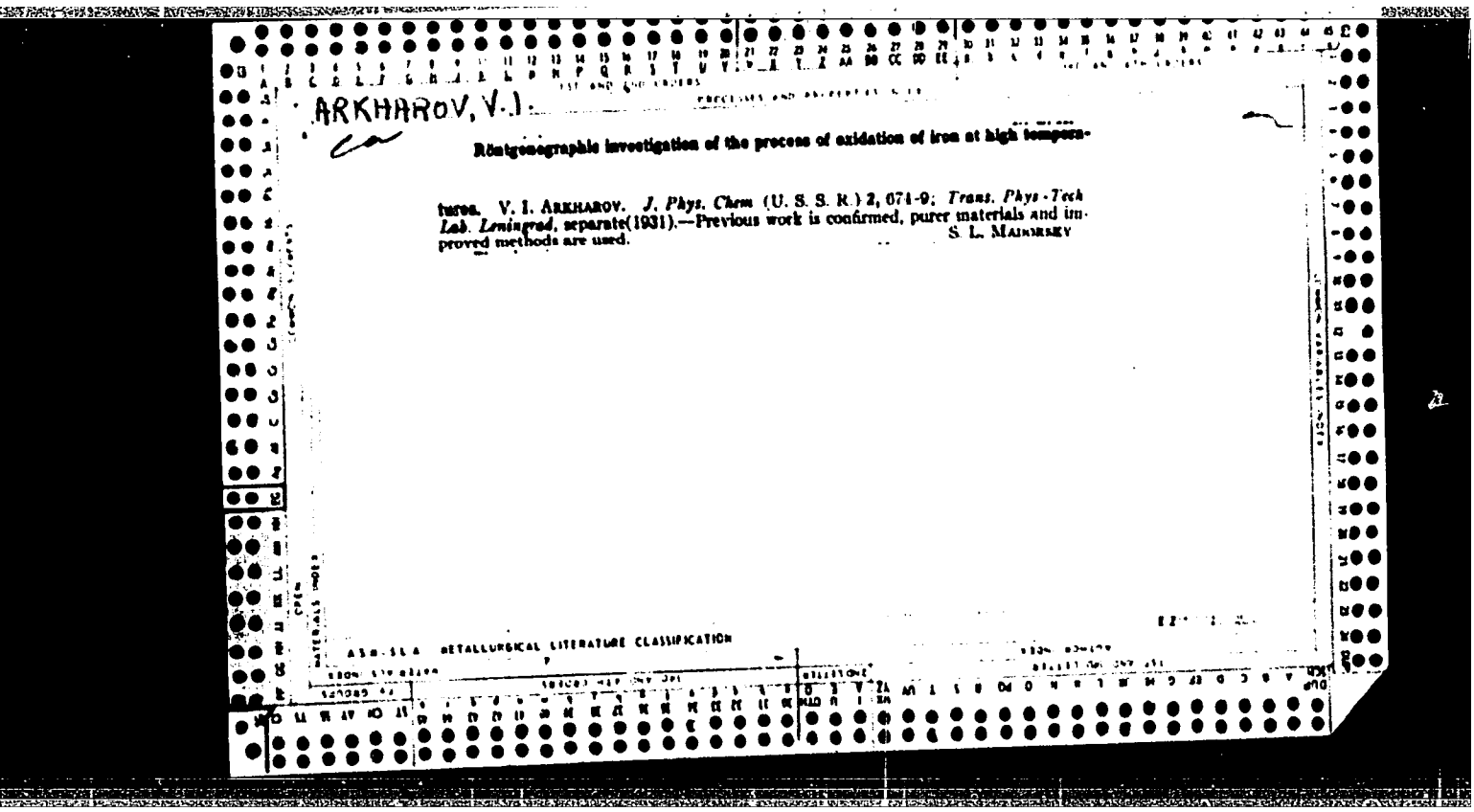
PROCESSES AND PROPERTIES INDEX

CA

Röntgenographic study of the initial stage of the process of oxidation of iron in air at high temperatures. I. V. I. Arkharov. *J. Phys. Chem.* (U. S. S. R.) 2, 102-12 (1931); cf. *C. A.* 26, 4515-16.—Ten photographs show the development from the Fe to the FeO and Fe_2O_3 stages at 900-1000°. P. H. Rathmann

2

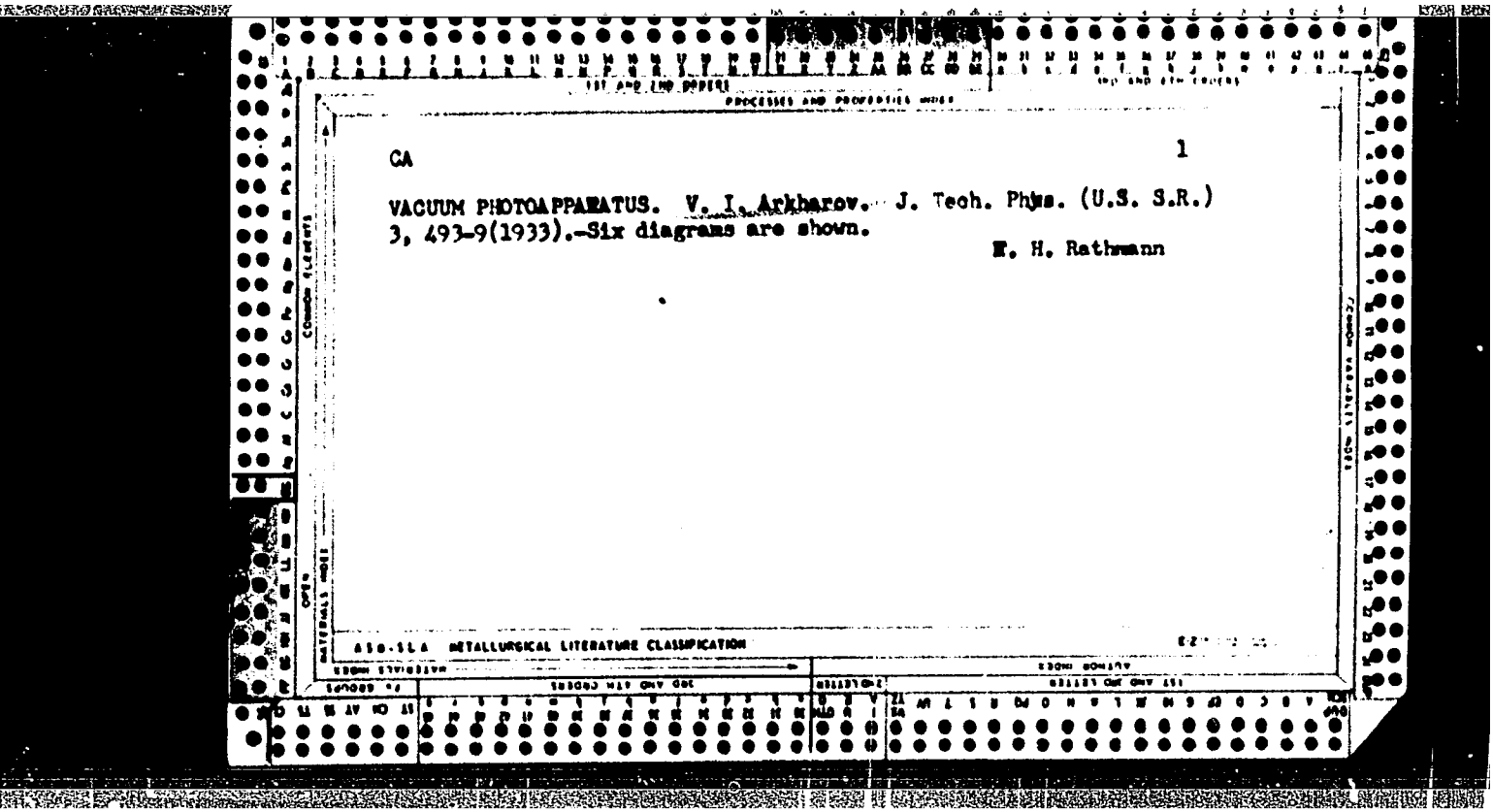
A5a-5L4 METALLURGICAL LITERATURE CLASSIFICATION



ARKHAROV, V. I.

Röntgenographic investigation of the process of oxidation of iron at high temperatures. V. I. ARKHAROV. *J. Phys. Chem* (U. S. S. R.) 2, 671-9; *Trans. Phys.-Tech Lab. Leningrad*, separate(1931).—Previous work is confirmed, purer materials and improved methods are used. S. L. MADORSKY

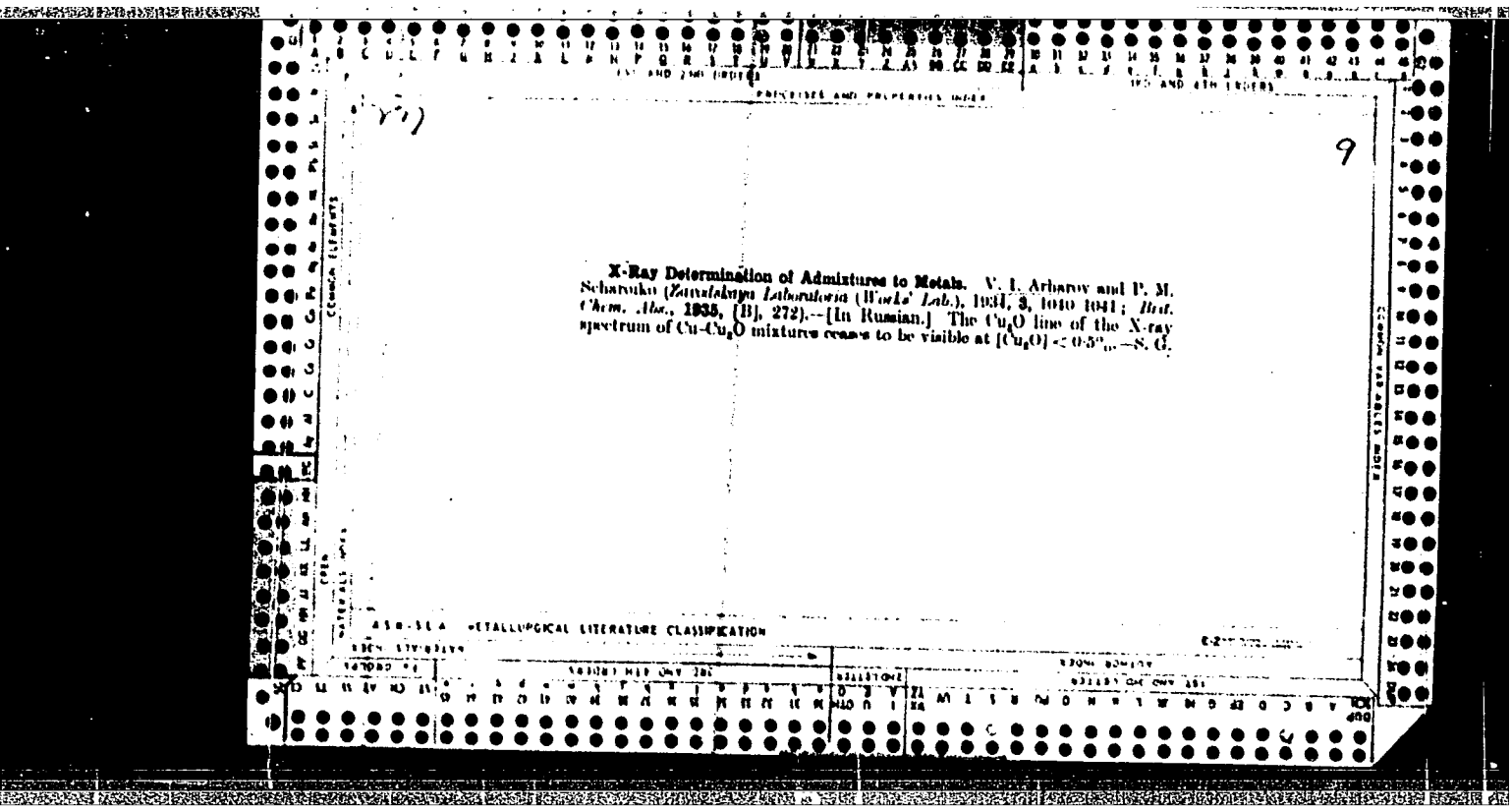
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA 1

VACUUM PHOTOAPPARATUS. V. I. Arkharov. J. Tech. Phys. (U.S. S.R.) 3, 493-9(1933).-Six diagrams are shown.

M. H. Rathmann



X-Ray Determination of Admixtures to Metals. V. I. Arbuzov and P. M. Scharovko (*Zavodskaya Laboratoria* (*Works' Lab.*), 1937, **3**, 1040–1041; *Brit. Chem. Abs.*, **1938**, (B), 272).—[In Russian.] The Cu_2O line of the X-ray spectrum of Cu-Cu_2O mixtures ceases to be visible at $[Cu_2O] < 0{\cdot}5\%$.—S. G.

ARKHAROV, V. I. ; BUGAKOV, V. S. ; OKNOV, M. G.; FEDOROV, Yu. B.

Increasing the Stability of the Surface Layer of Cast Iron Rollers.

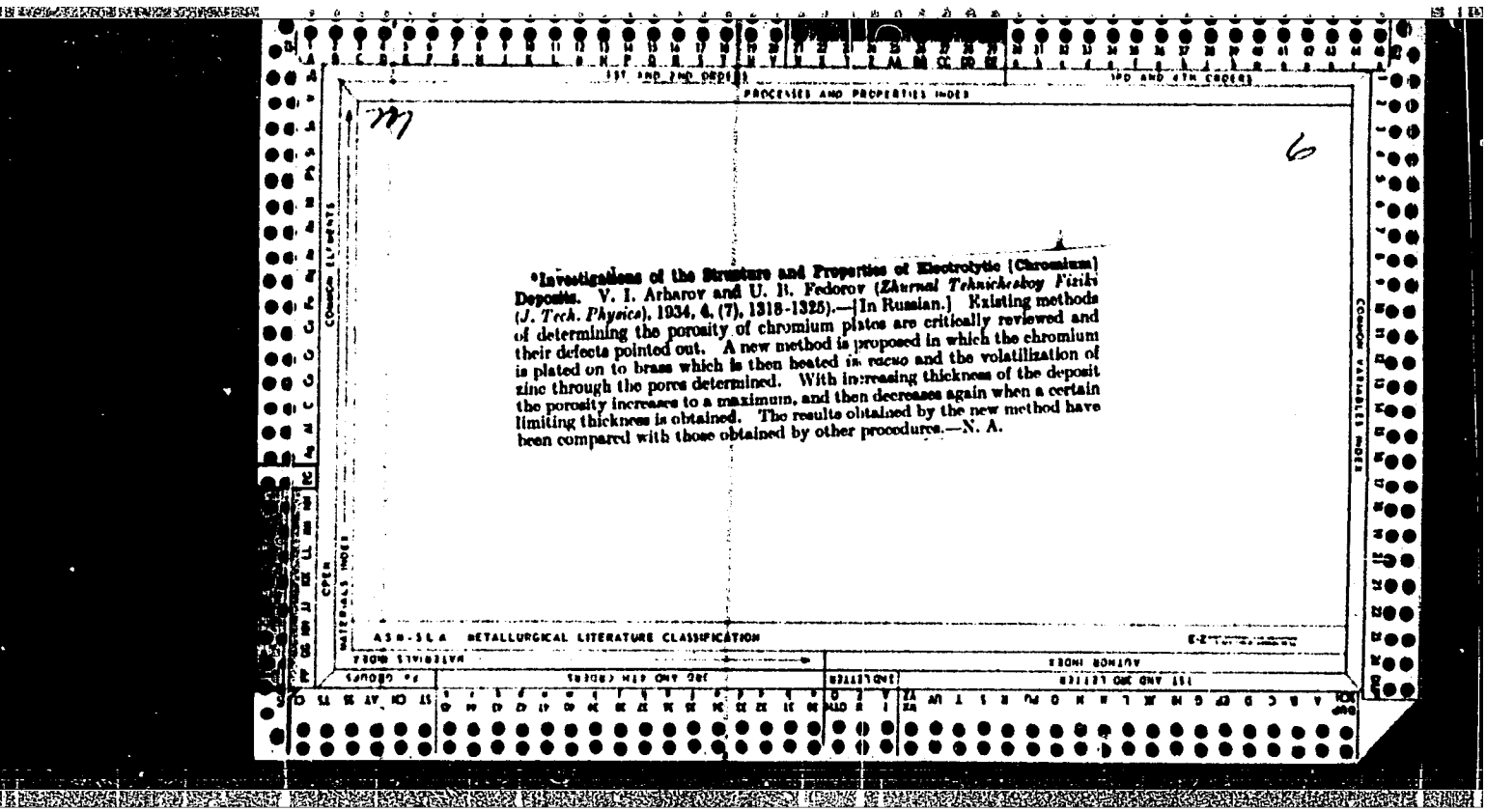
Steel No. 4, 31, 1934. Sb. Ural. NIS "For The Technology of Socialism," Sverdlovsk, 1934, p. 71

ARKHAROV, V.I.

ARKHAROV, V.I.

C.A. Vol. 29, Nov-10 - Dec. 20, 1935

" The Relation Between the Structure of Scale and the Speed of Oxidation of Iron at High Temperatures". V. I. Arkharov. J. Tech. Phys. (U. S. S R.) 4, 372-5 (1934). The speed of oxidation increases discontinuously at a definite temp., varying for the different sorts of Fe studied A layer of FeO in the scale appears at a temp. corresponding to the begining of increase of oxidation speed. The explanation is advanced that at temps. below 570° there will be oxidation of FeO may take place only through the formation of Fe_3O_4 on the boundary scale-Fe, for which it is necessary that the oxide atoms should form groups of 4, while above 570° each O atom may by itself react with Fe. Thus at temps. below 570° there will always be a higher concn. of dissolved O. If it is assumed that on the boundary scale - Fe assocn. of oxides takes place, as a result of which freed Fe atoms diffuse outward through the scale and the O atoms react with the unoxidized Fe, then at temp. below 570° dissocn. of the higher oxide Fe_3O_4 must take place with a larger expenditure of energy than at temps. above 570°, at which the lower oxide FeO dissocs. with a low heat of reaction. A hypothesis is advanced on the mechanism of heat resistance of some steels. Complex



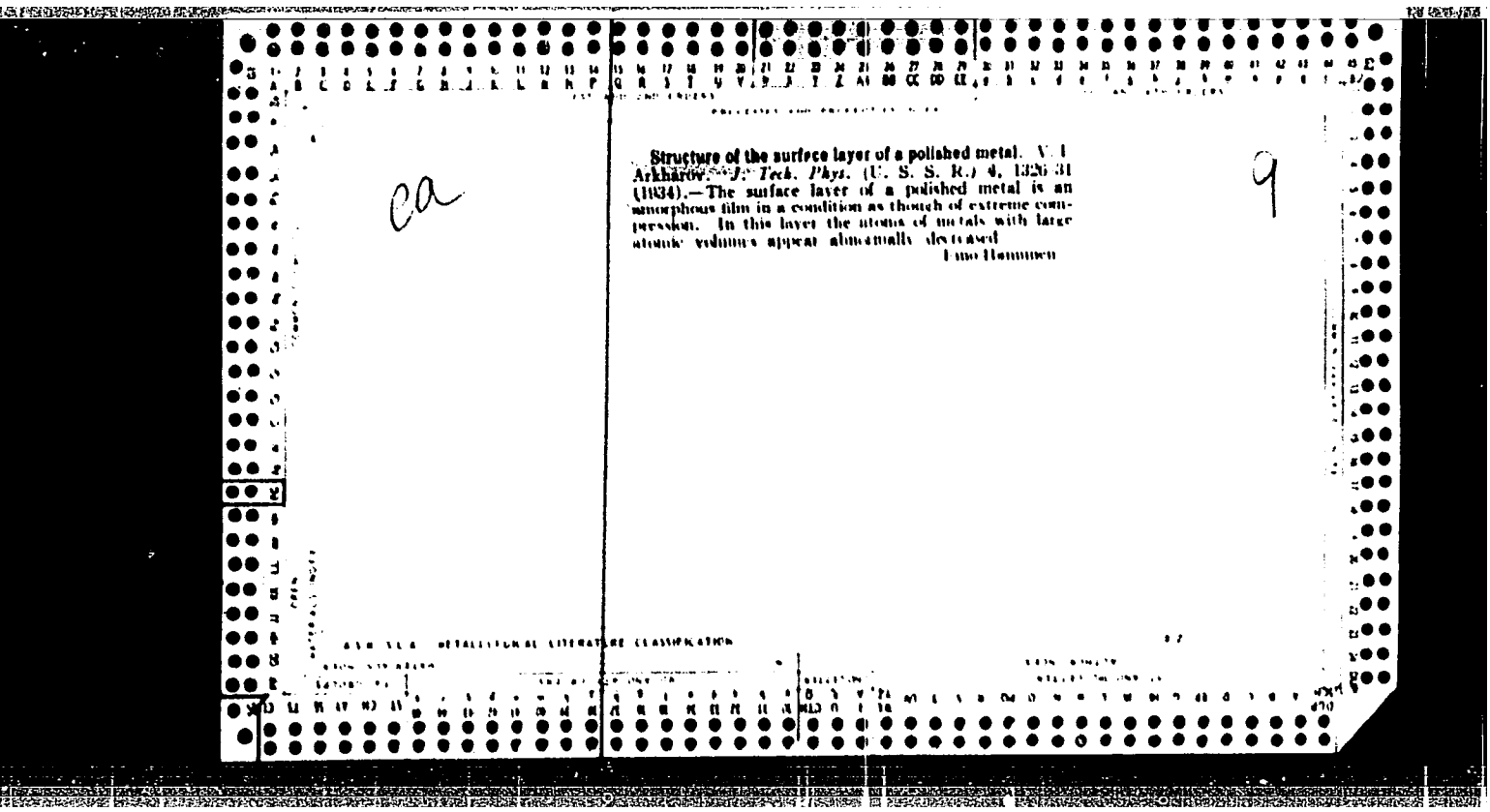
PROCESSES AND PROPERTIES INDEX

77

6

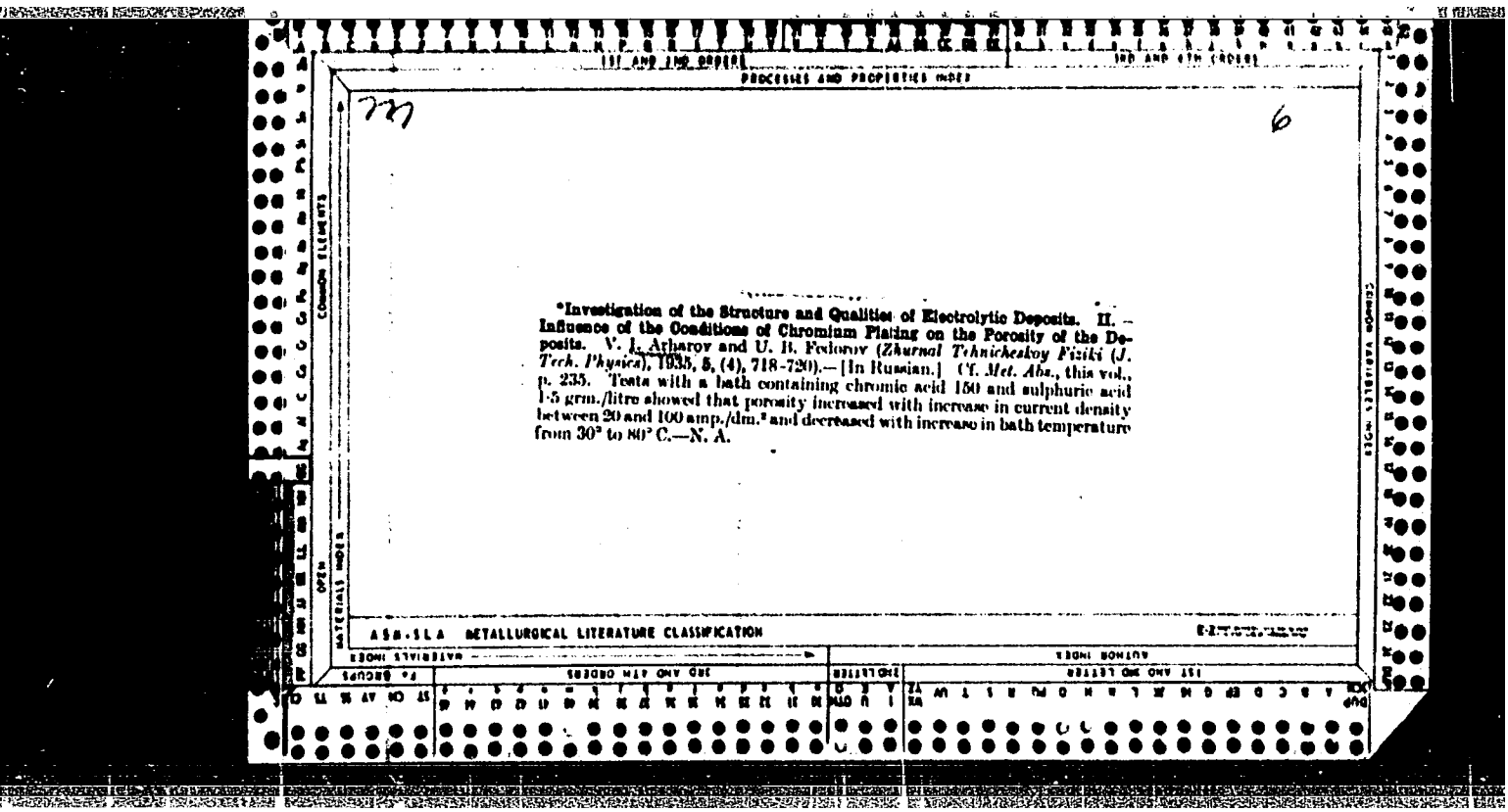
*Investigations of the Structure and Properties of Electrolytic [Chromium] Deposits. V. I. Arbarov and U. B. Fedorov (*Zhurnal Tekhicheskoy Fiziki* (*J. Tech. Physics*), 1934, 4, (7), 1318-1325).—[In Russian.] Existing methods of determining the porosity of chromium plates are critically reviewed and their defects pointed out. A new method is proposed in which the chromium is plated on to brass which is then heated in vacuo and the volatilization of zinc through the pores determined. With increasing thickness of the deposit the porosity increases to a maximum, and then decreases again when a certain limiting thickness is obtained. The results obtained by the new method have been compared with those obtained by other procedures.—N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

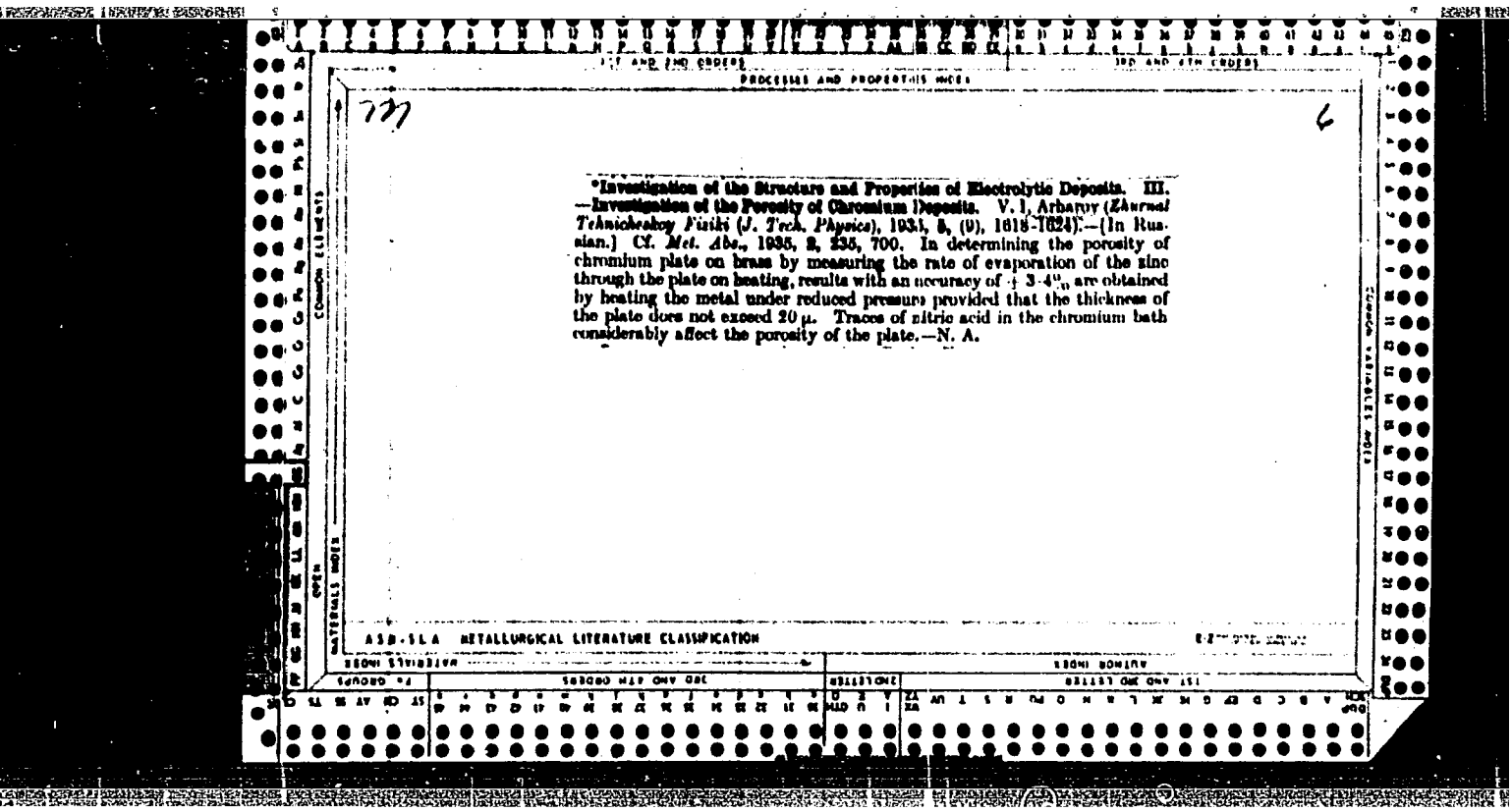


Structure of the surface layer of a polished metal. V. I Arkharov. *J. Tech. Phys.* (U. S. S. R.) 4, 1325-31 (1934).—The surface layer of a polished metal is an amorphous film in a condition as though of extreme compression. In this layer the atoms of metals with large atomic volumes appear abnormally decreased.

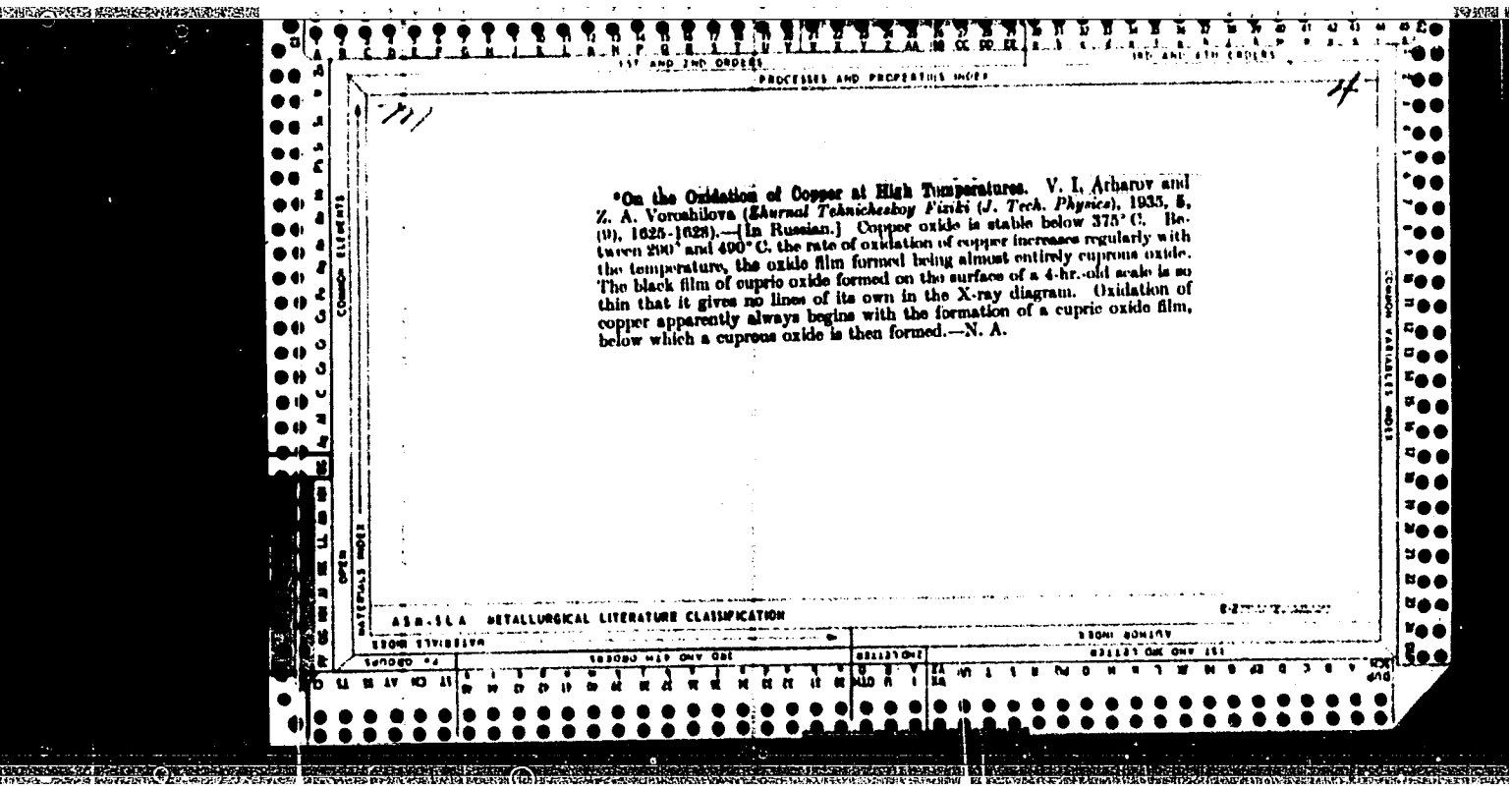
Emo Hammen



"Investigation of the Structure and Qualities of Electrolytic Deposits. II. – Influence of the Conditions of Chromium Plating on the Porosity of the Deposits. V. I. Arharov and U. B. Fedorov (*Zhurnal Tekhicheskoy Fiziki* (*J. Tech. Physica*), 1935, 5, (4), 718-720).—[In Russian.] Cf. *Met. Abs.*, this vol., p. 235. Tests with a bath containing chromic acid 150 and sulphuric acid 1·5 grm./litre showed that porosity increased with increase in current density between 20 and 100 amp./dm.² and decreased with increase in bath temperature from 30° to 80° C.—N. A.



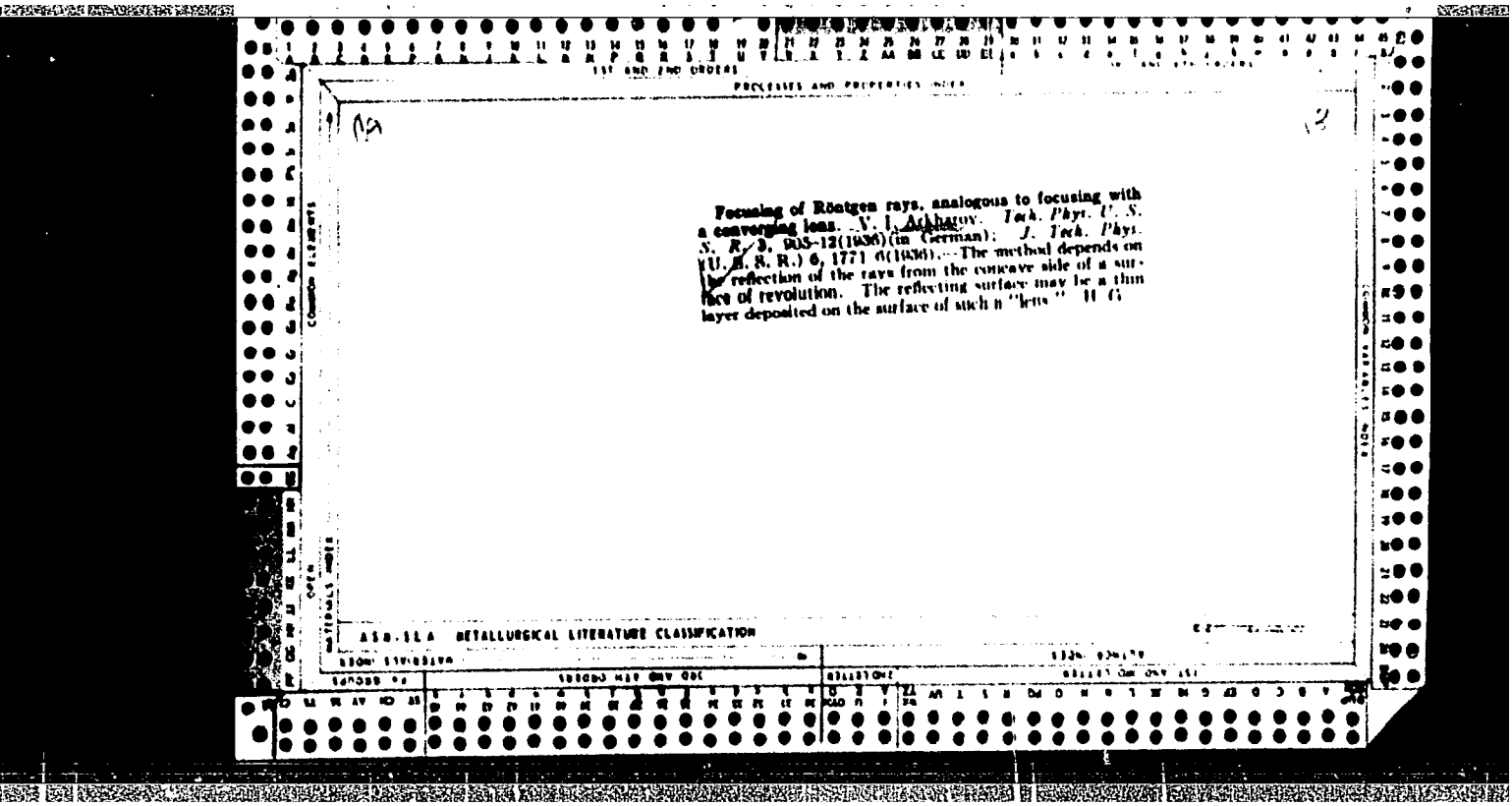
"Investigation of the Structure and Properties of Electrolytic Deposits. III. —Investigation of the Porosity of Chromium Deposits. V. I. Arbatov (*Zhurnal Tekhnicheskoy Fiziki* (*J. Tech. Physics*), 1935, 5, (9), 1618-1624).—[In Russian.] Cf. *Met. Abs.*, 1935, 2, 235, 700. In determining the porosity of chromium plate on brass by measuring the rate of evaporation of the zinc through the plate on heating, results with an accuracy of ± 3-4% are obtained by heating the metal under reduced pressure provided that the thickness of the plate does not exceed 20 μ. Traces of nitric acid in the chromium bath considerably affect the porosity of the plate.—N. A.



PROCESSES AND PROPERTIES INDEX

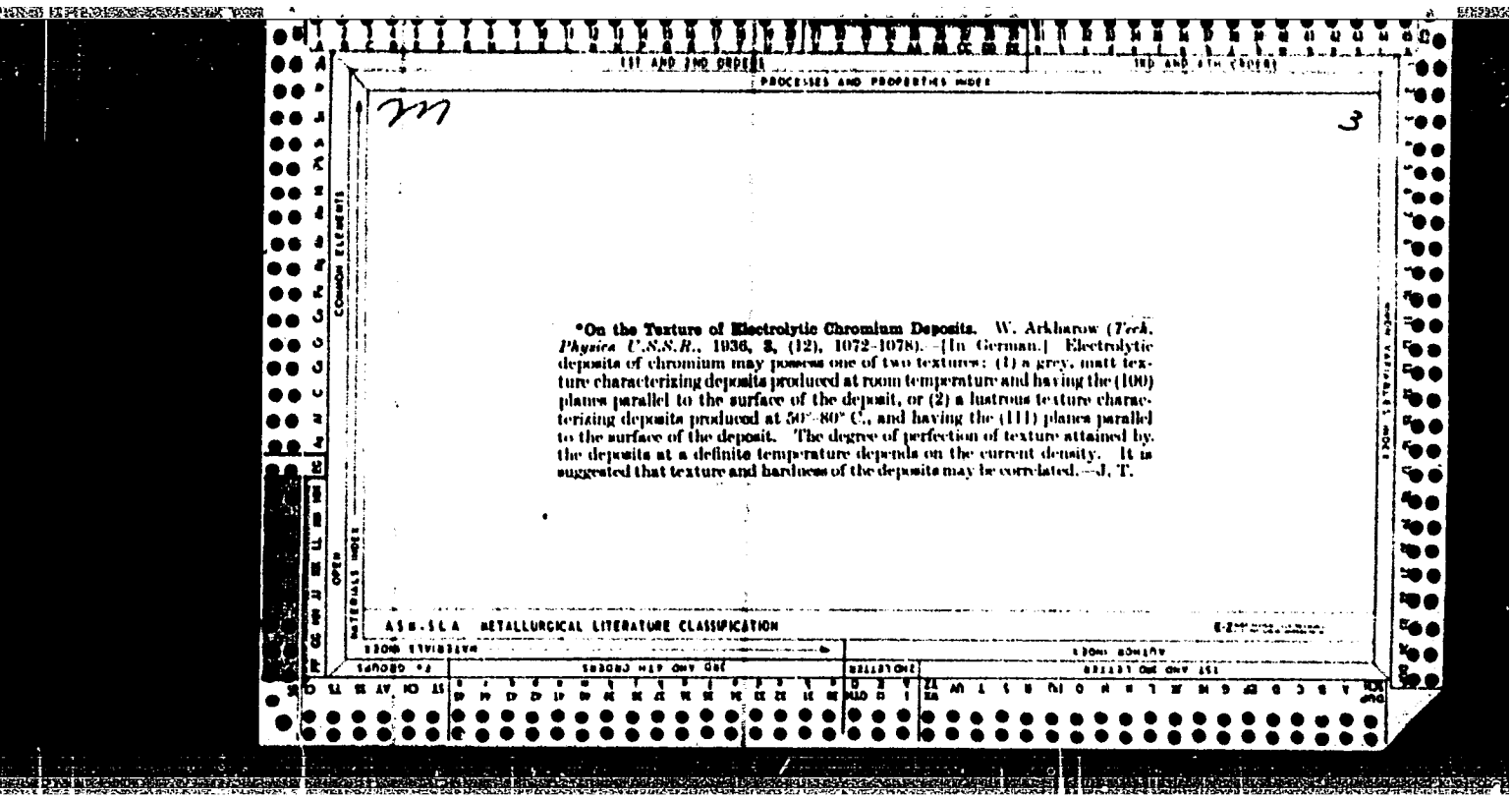
On the Oxidation of Copper at High Temperatures. V. I. Arbarov and Z. A. Voroshilova (*Zhurnal Tekhicheskoy Fiziki* (*J. Tech. Physics*), 1935, 5, (9), 1625-1628).—[In Russian.] Copper oxide is stable below 375° C. Between 200° and 400° C. the rate of oxidation of copper increases regularly with the temperature, the oxide film formed being almost entirely cuprous oxide. The black film of cupric oxide formed on the surface of a 4-hr.-old scale is so thin that it gives no lines of its own in the X-ray diagram. Oxidation of copper apparently always begins with the formation of a cupric oxide film, below which a cuprous oxide is then formed.—N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

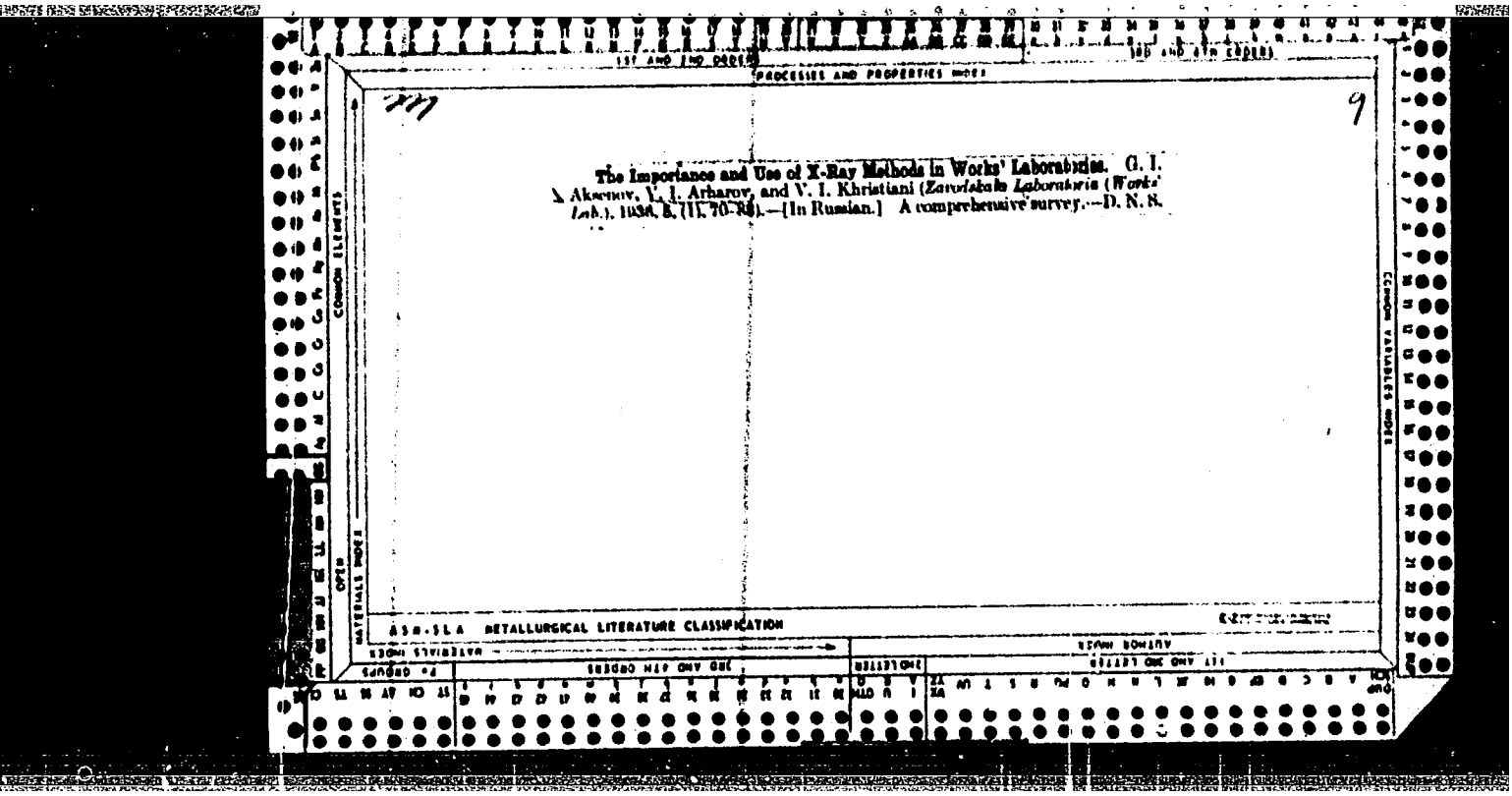


Focusing of Röntgen rays, analogous to focusing with a converging lens. V. I. Arkharov. *Tech. Phys. U. S. S. R.* 3, 805-12(1936)(in German); *J. Tech. Phys. (U. S. S. R.)* 6, 1771-6(1936).—The method depends on the reflection of the rays from the concave side of a surface of revolution. The reflecting surface may be a thin layer deposited on the surface of such a "lens." H. G.

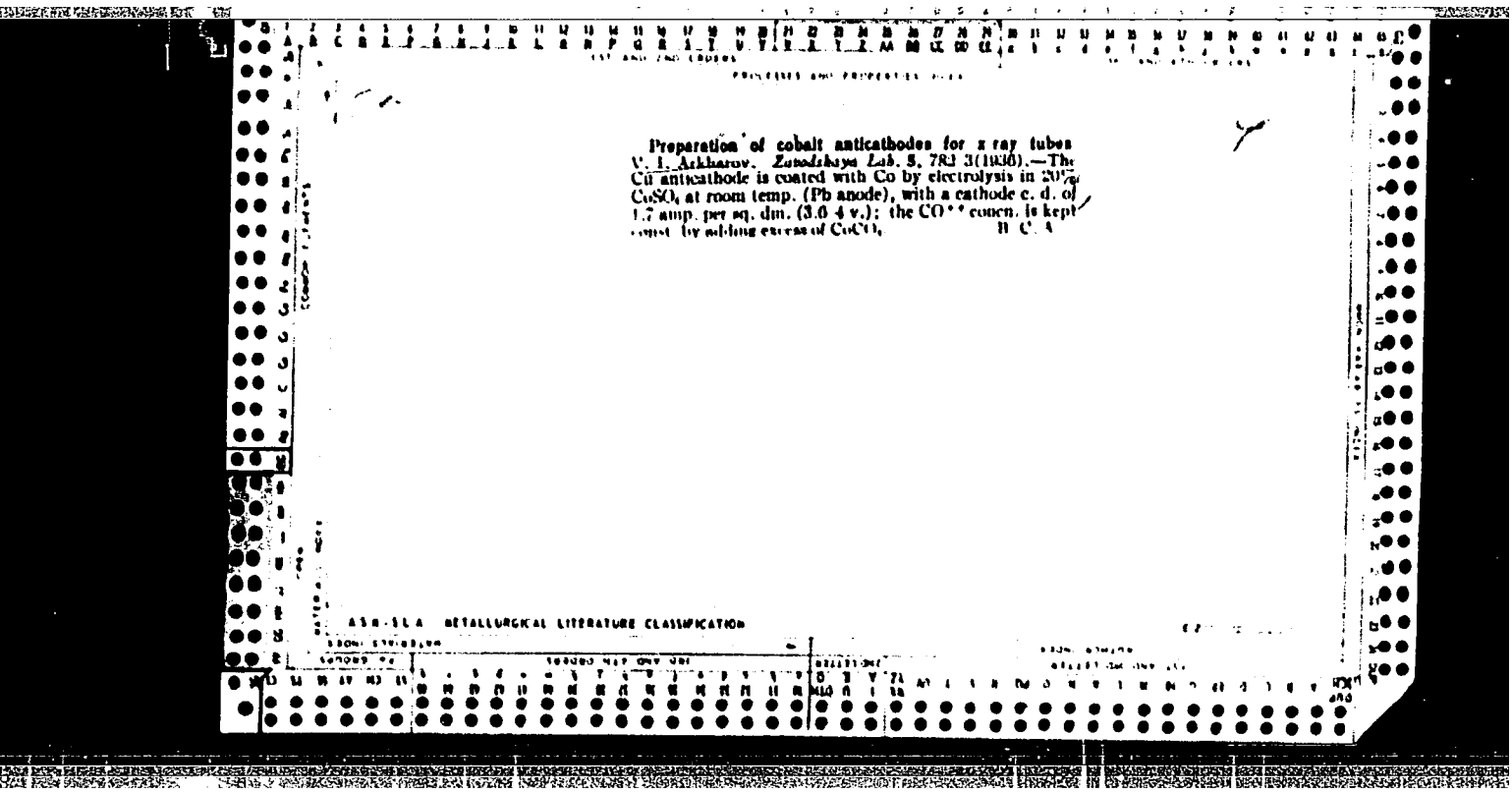
A 5 8 - 1 1 A METALLURGICAL LITERATURE CLASSIFICATION



*On the Texture of Electrolytic Chromium Deposits. W. Arkharow (*Zeit. Physica U.S.S.R.*, 1936, **3**, (12), 1072–1078). —[In German.] Electrolytic deposits of chromium may possess one of two textures: (1) a grey, matt texture characterizing deposits produced at room temperature and having the (100) planes parallel to the surface of the deposit, or (2) a lustrous texture characterizing deposits produced at 50°–80° C., and having the (111) planes parallel to the surface of the deposit. The degree of perfection of texture attained by the deposits at a definite temperature depends on the current density. It is suggested that texture and hardness of the deposits may be correlated.—J. T.

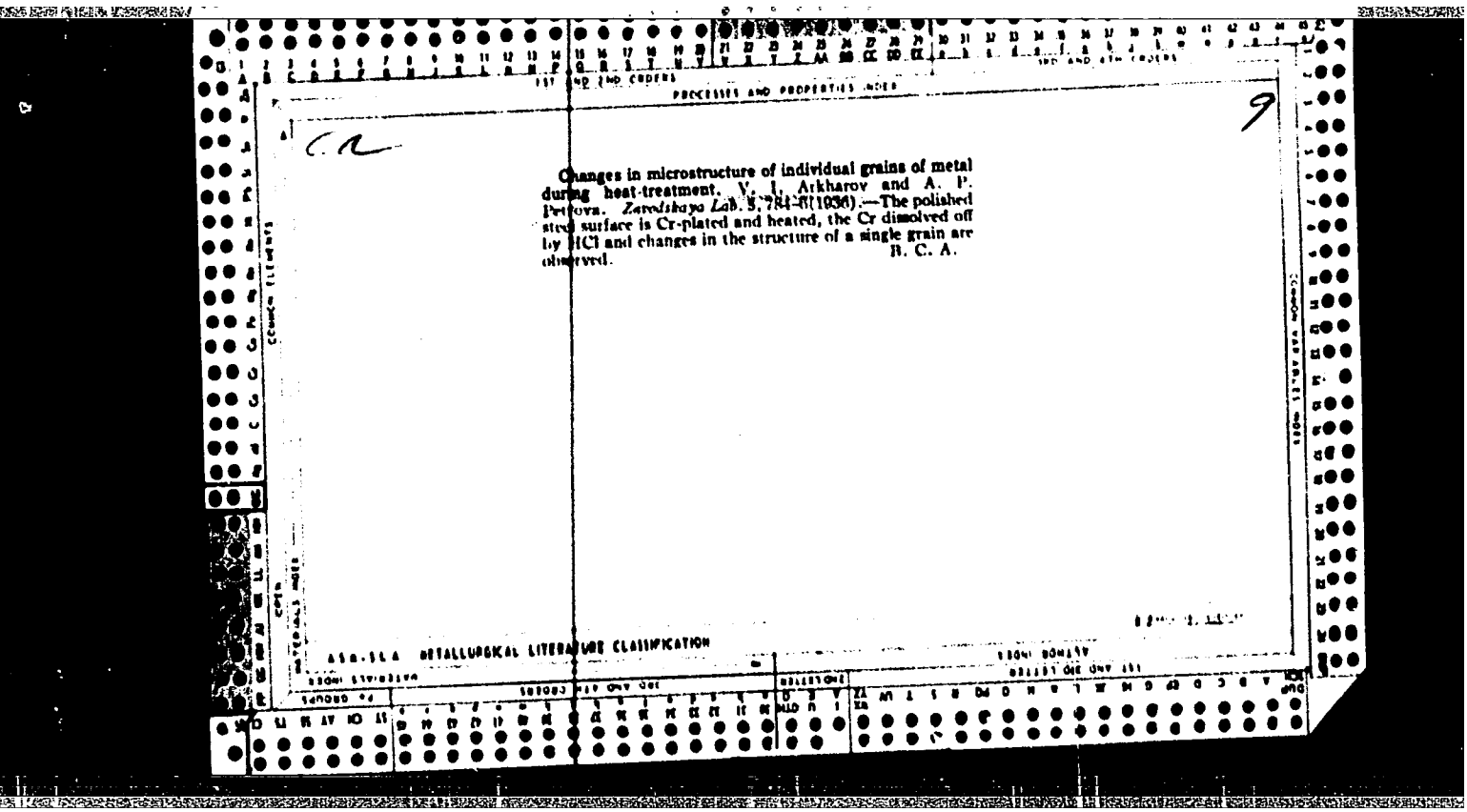


The Importance and Use of X-Ray Methods in Works' Laboratories. G. I. Akseniv, V. I. Arbarov, and V. I. Khristiani (*Zavodskaia Laboratoria* (*Works' Lab.*), 1936, 5, (11), 70–88).—[In Russian.] A comprehensive survey.—D. N. S.



Preparation of cobalt anticathodes for x ray tubes
V. I. Arkharov. *Zavodskaya Lab.* 5, 783 3(1936).—The Cu anticathode is coated with Co by electrolysis in 20% $CoSO_4$ at room temp. (Pb anode), with a cathode c. d. of 1.7 amp. per sq. dm. (3.0 4 v.); the CO^{++} concn. is kept [illegible] by adding excess of $CoCO_3$. B. C. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

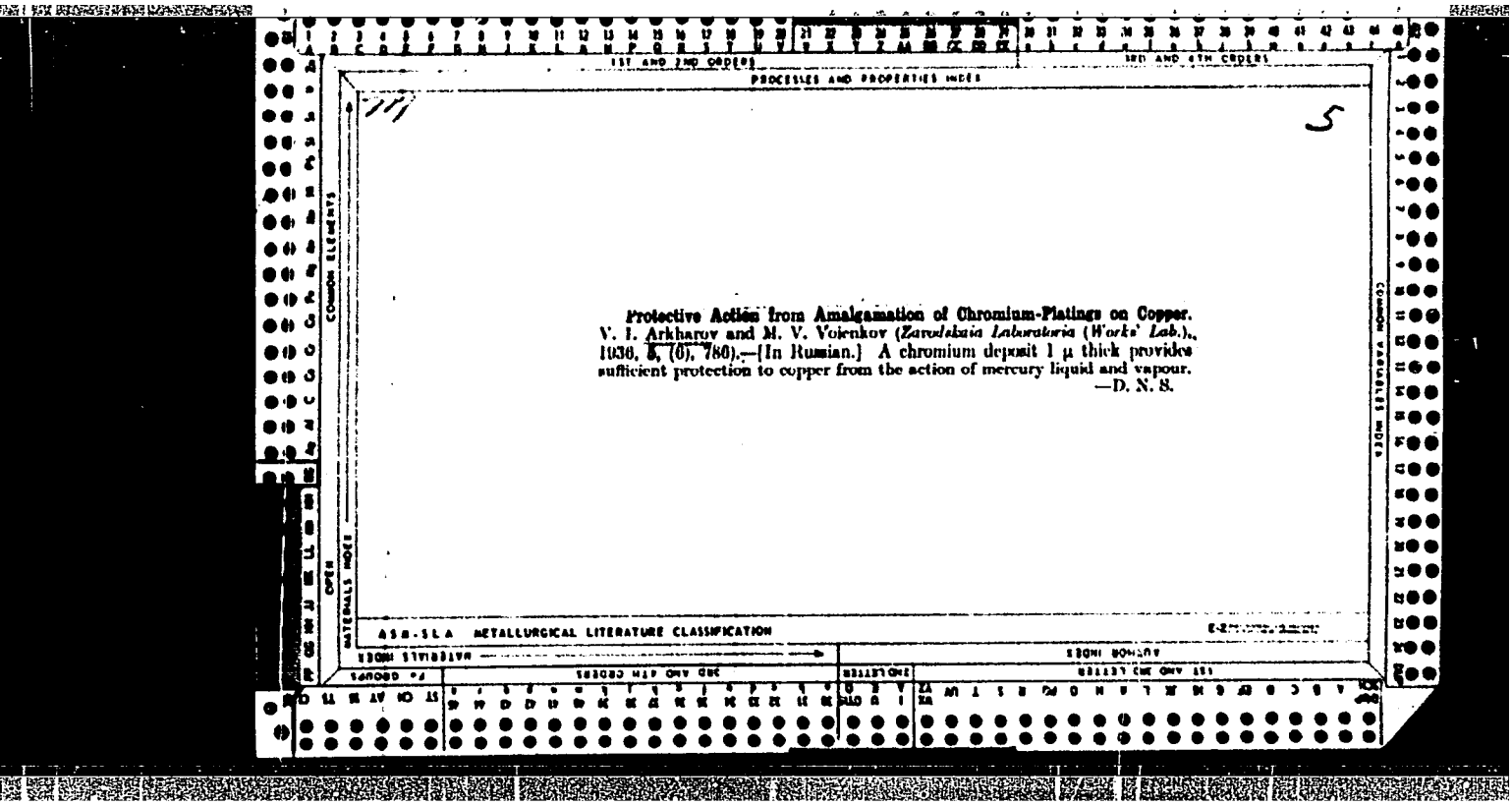


PROCESSES AND PROPERTIES INDEX

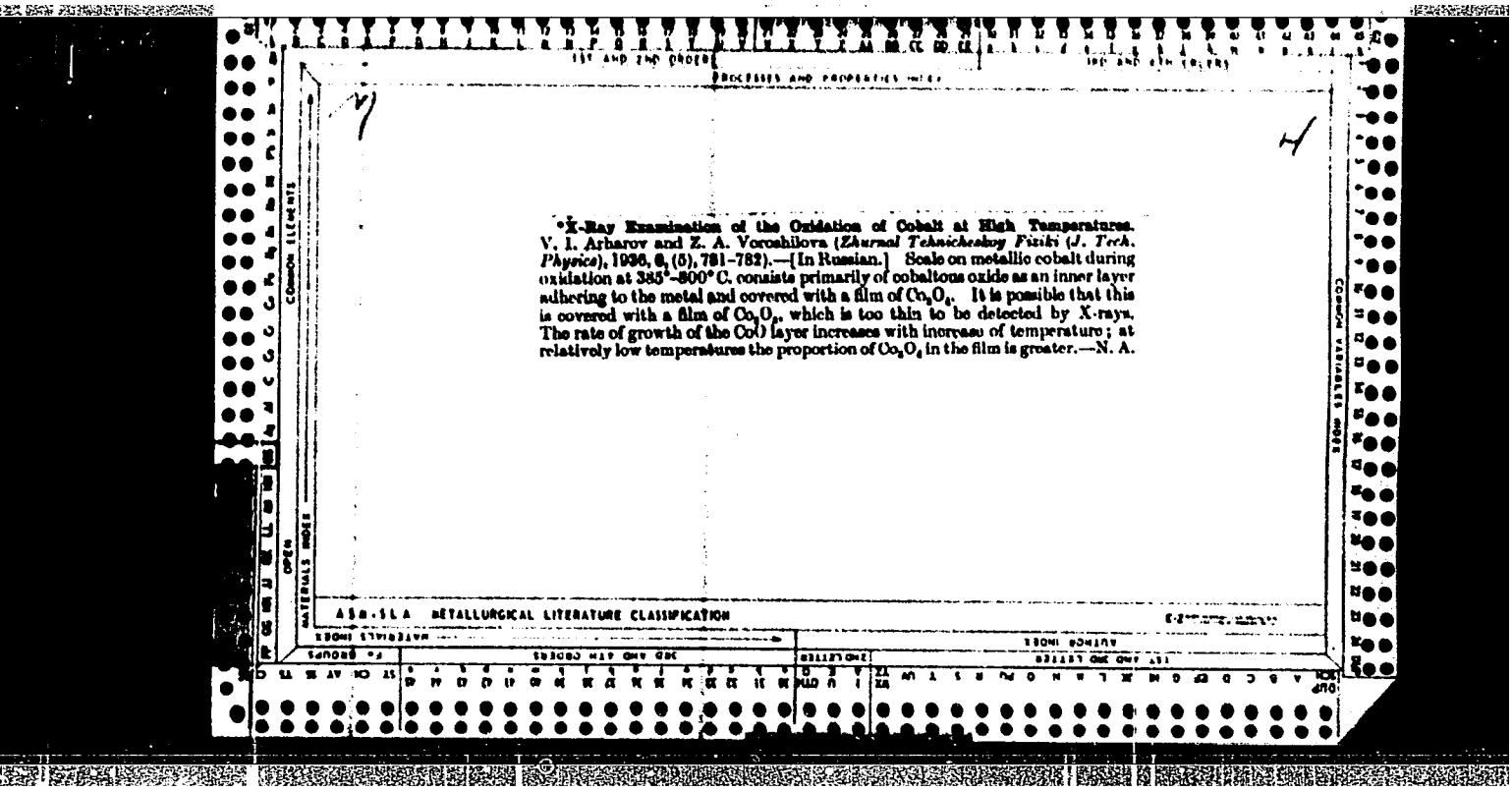
9

Changes in microstructure of individual grains of metal during heat-treatment. V. I. Arkharov and A. P. Petrova. *Zavodskaya Lab.* 5, 784–8(1936).—The polished steel surface is Cr-plated and heated, the Cr dissolved off by HCl and changes in the structure of a single grain are observed. B. C. A.

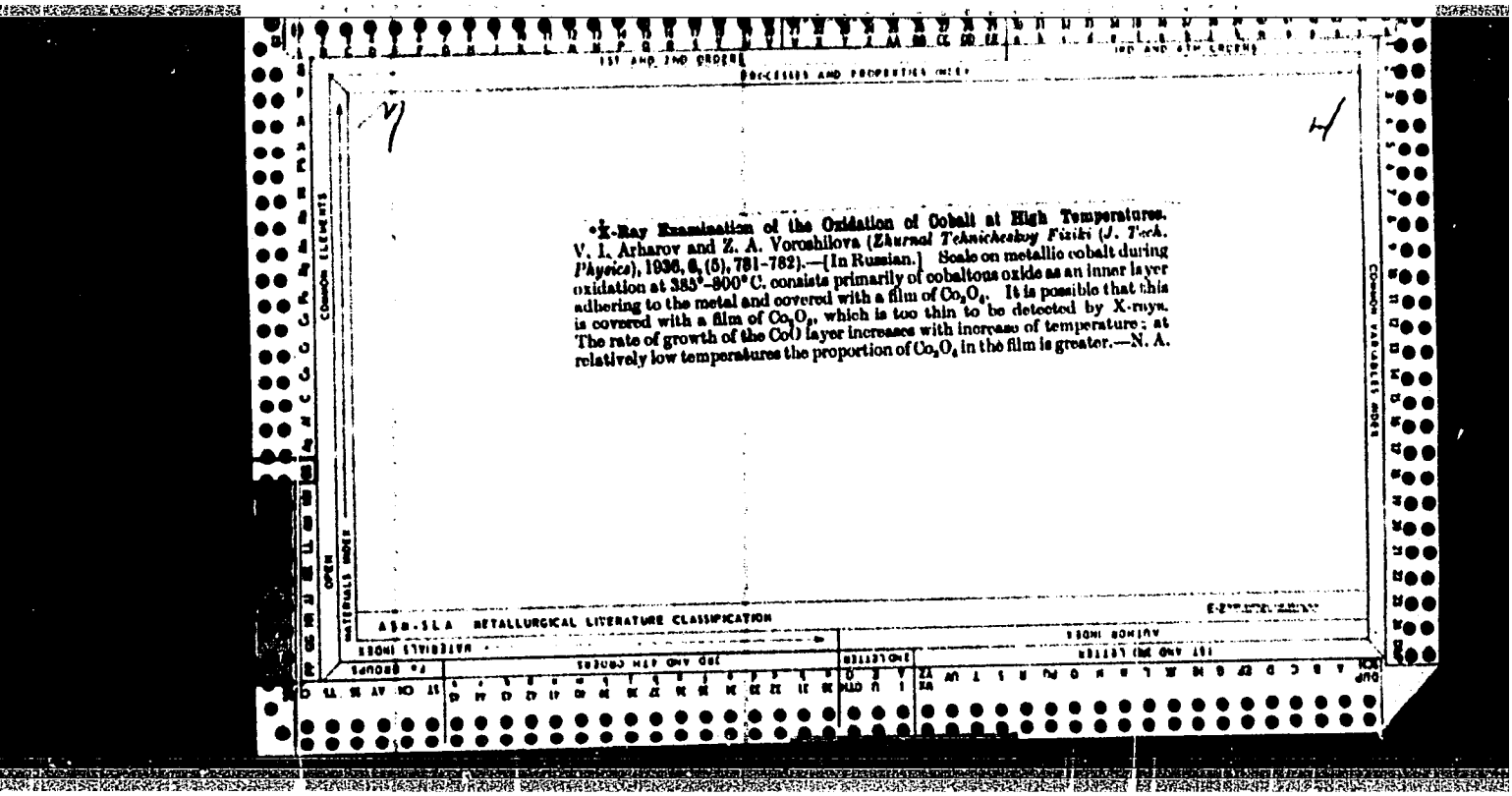
ASM METALLURGICAL LITERATURE CLASSIFICATION



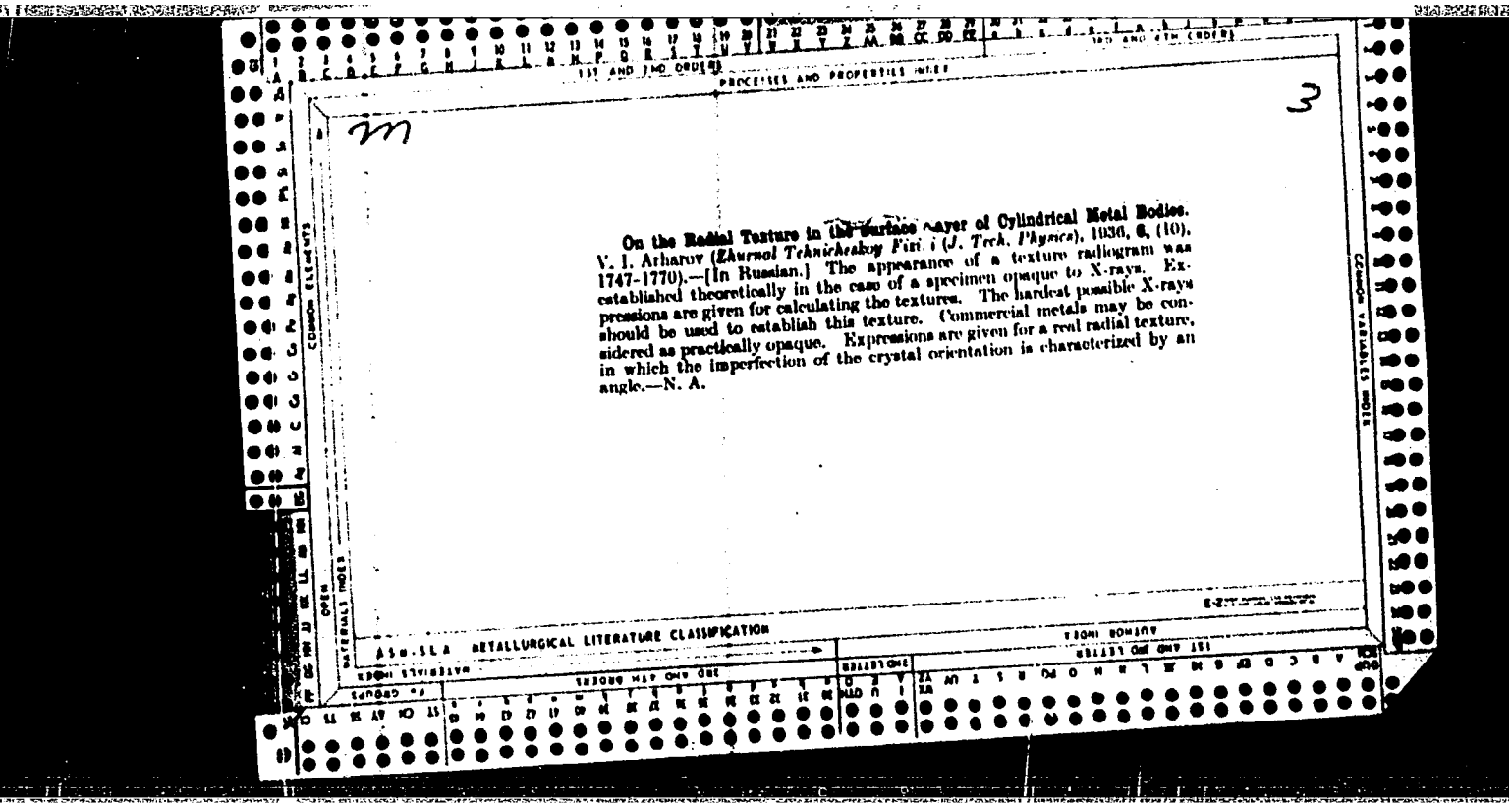
Protective Action from Amalgamation of Chromium-Platings on Copper. V. I. Arkharov and M. V. Voienkov (*Zavodskaia Laboratoria* (*Works' Lab.*), 1936, **5**, (6), 780).—[In Russian.] A chromium deposit 1 μ thick provides sufficient protection to copper from the action of mercury liquid and vapour.
—D. N. S.



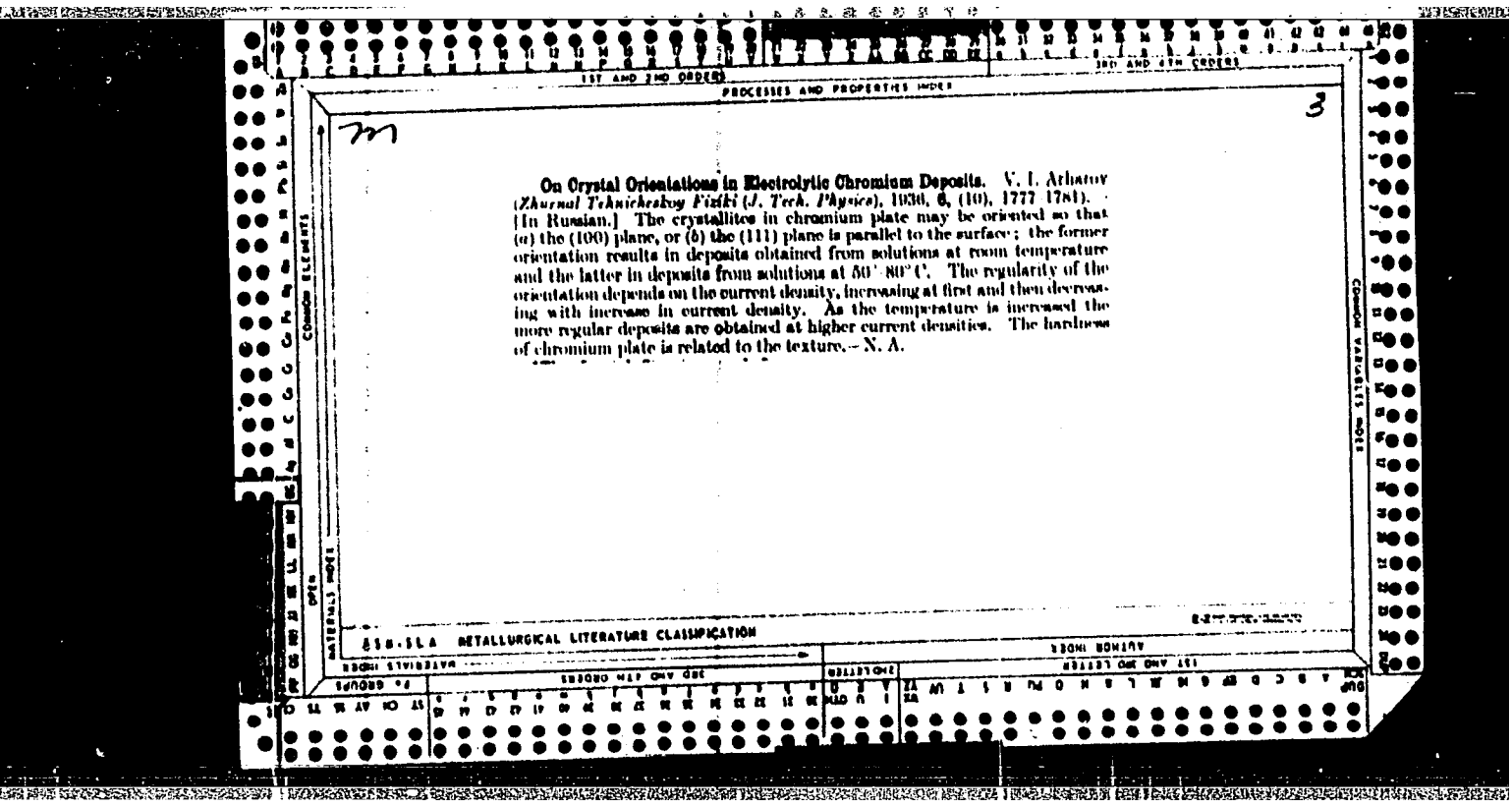
*X-Ray Examination of the Oxidation of Cobalt at High Temperatures. V. I. Arbarov and Z. A. Voroshilova (*Zhurnal Tekhicheskoy Fiziki* (*J. Tech. Physics*), 1936, 6, (5), 781–782).—[In Russian.] Scale on metallic cobalt during oxidation at 385°–800° C. consists primarily of cobaltous oxide as an inner layer adhering to the metal and covered with a film of Co_3O_4. It is possible that this is covered with a film of Co_2O_3, which is too thin to be detected by X-rays. The rate of growth of the CoO layer increases with increase of temperature; at relatively low temperatures the proportion of Co_3O_4 in the film is greater.—N. A.



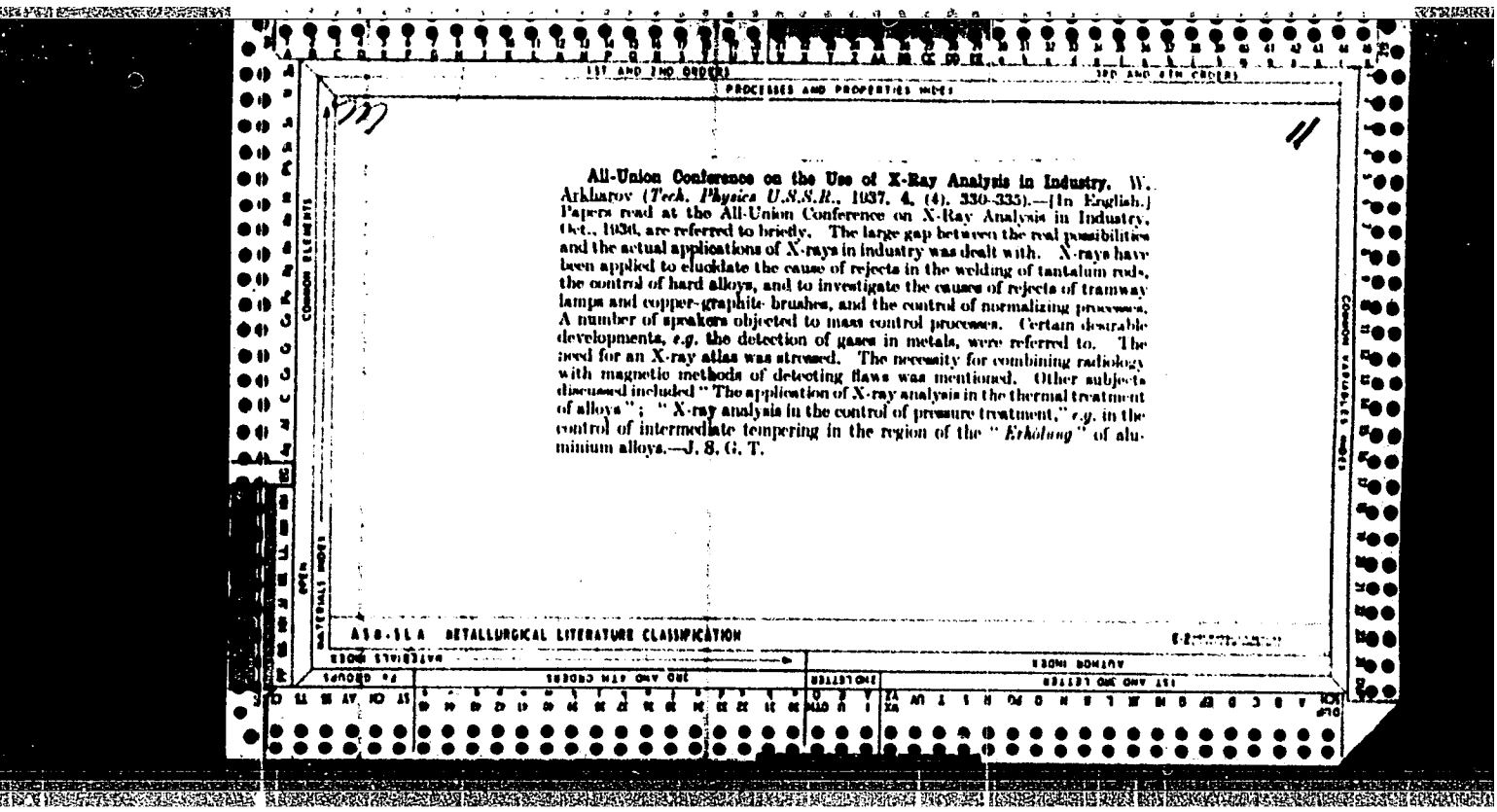
*X-Ray Examination of the Oxidation of Cobalt at High Temperatures. V. I. Arkharov and Z. A. Voroshilova (*Zhurnal Tekhnicheskoy Fiziki* (*J. Tech. Physics*), 1936, **6**, (5), 781–782).—[In Russian.] Scale on metallic cobalt during oxidation at 385°–900° C. consists primarily of cobaltous oxide as an inner layer adhering to the metal and covered with a film of Co_2O_3. It is possible that this is covered with a film of Co_3O_4, which is too thin to be detected by X-rays. The rate of growth of the CoO layer increases with increase of temperature; at relatively low temperatures the proportion of Co_3O_4 in the film is greater.—N. A.



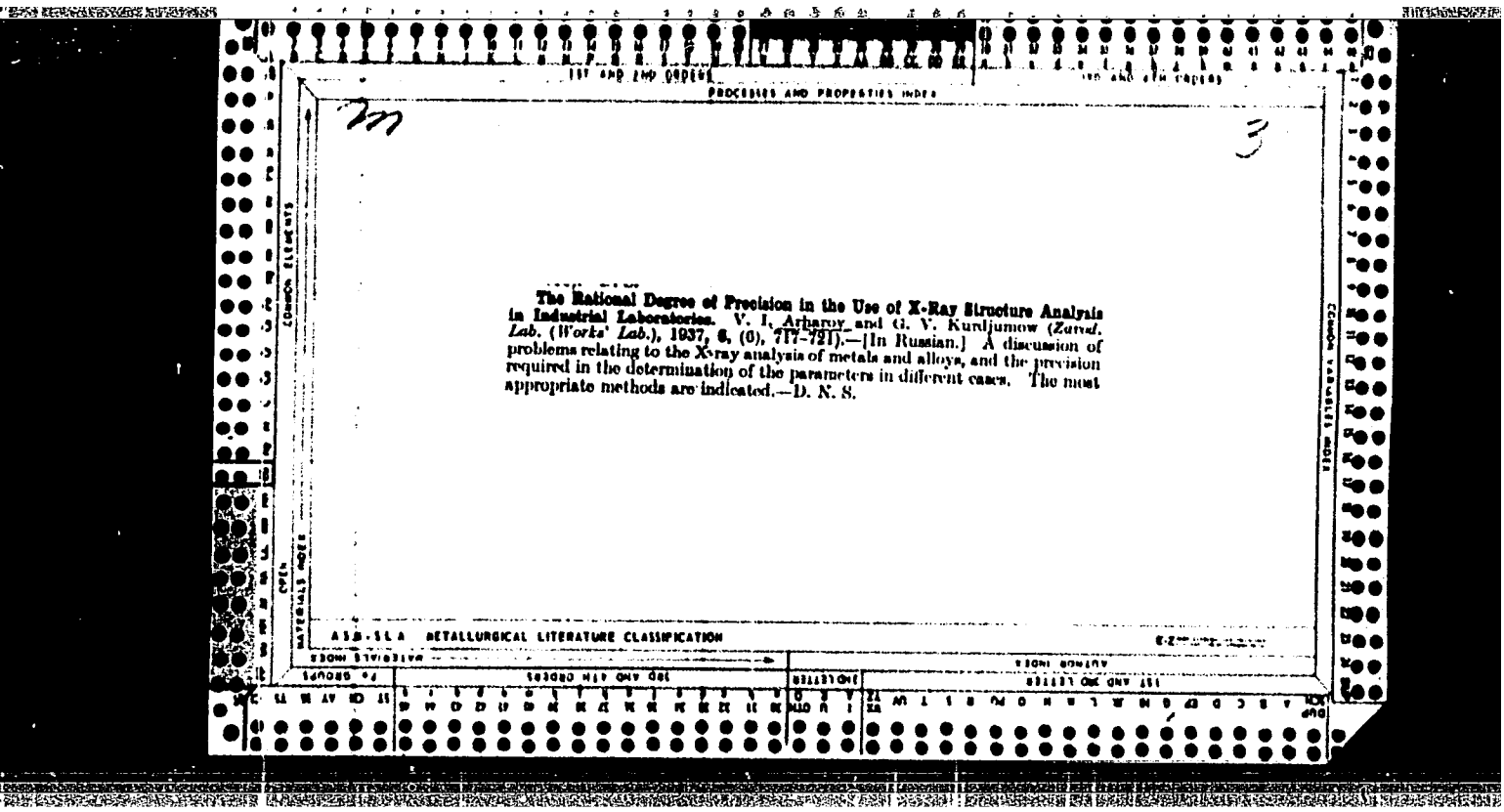
On the Radial Texture in the Surface Layer of Cylindrical Metal Bodies. V. I. Arharov (*Zhurnal Tekhnicheskoy Fiz.*) (*J. Tech. Physics*), 1936, **6**, (10), 1747-1770).—[In Russian.] The appearance of a texture radiogram was established theoretically in the case of a specimen opaque to X-rays. Expressions are given for calculating the textures. The hardest possible X-rays should be used to establish this texture. Commercial metals may be considered as practically opaque. Expressions are given for a real radial texture, in which the imperfection of the crystal orientation is characterized by an angle.—N. A.



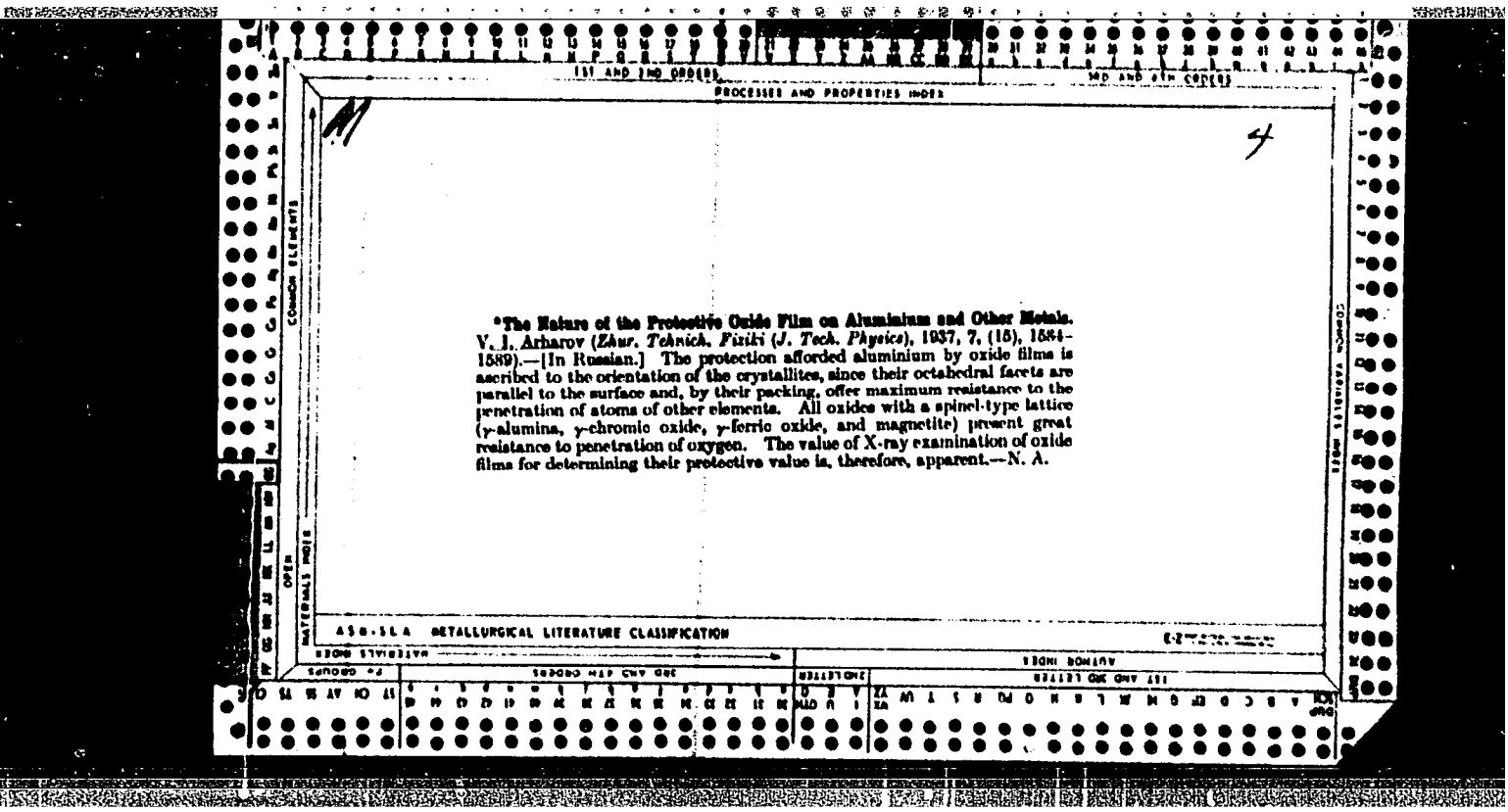
On Crystal Orientations in Electrolytic Chromium Deposits. V. I. Arbatov (*Zhurnal Tekhicheskoy Fiziki* (*J. Tech. Physics*), 1936, **6**, (10), 1777–1781). [In Russian.] The crystallites in chromium plate may be oriented so that (*a*) the (100) plane, or (*b*) the (111) plane is parallel to the surface; the former orientation results in deposits obtained from solutions at room temperature and the latter in deposits from solutions at 50°–80° C. The regularity of the orientation depends on the current density, increasing at first and then decreasing with increase in current density. As the temperature is increased the more regular deposits are obtained at higher current densities. The hardness of chromium plate is related to the texture.—N. A.



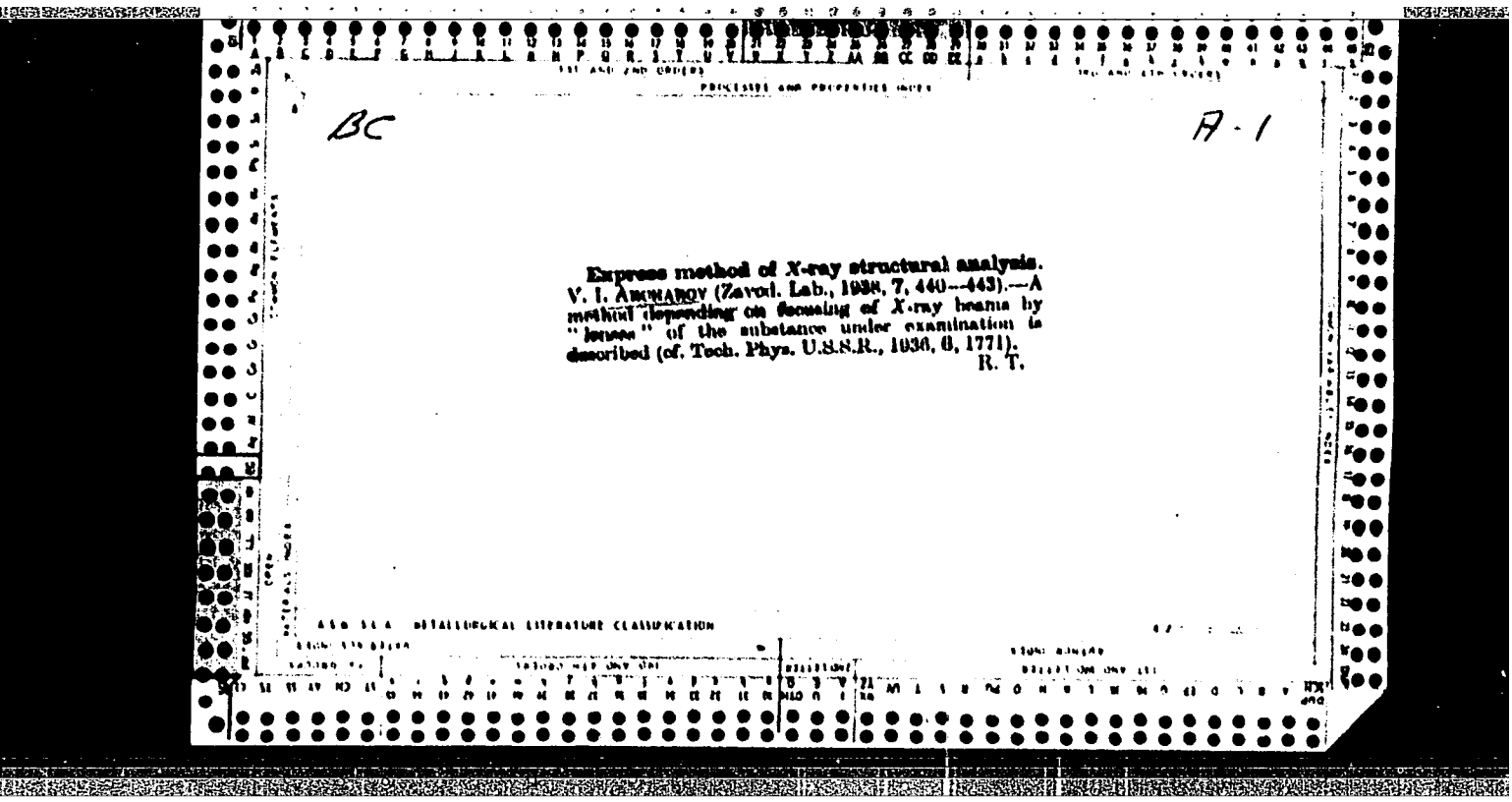
All-Union Conference on the Use of X-Ray Analysis in Industry. W. Arkharov (*Tech. Physics U.S.S.R.*, 1937, 4, (4), 330-335).—[In English.] Papers read at the All-Union Conference on X-Ray Analysis in Industry, Oct., 1936, are referred to briefly. The large gap between the real possibilities and the actual applications of X-rays in industry was dealt with. X-rays have been applied to elucidate the cause of rejects in the welding of tantalum rods, the control of hard alloys, and to investigate the causes of rejects of tramway lamps and copper-graphite brushes, and the control of normalizing processes. A number of speakers objected to mass control processes. Certain desirable developments, *e.g.* the detection of gases in metals, were referred to. The need for an X-ray atlas was stressed. The necessity for combining radiology with magnetic methods of detecting flaws was mentioned. Other subjects discussed included "The application of X-ray analysis in the thermal treatment of alloys"; "X-ray analysis in the control of pressure treatment," *e.g.* in the control of intermediate tempering in the region of the "*Erhöhung*" of aluminium alloys.—J. S. G. T.



The Rational Degree of Precision in the Use of X-Ray Structure Analysis in Industrial Laboratories. V. I. Arbarov and G. V. Kurdjumow (*Zavod. Lab.* (*Works' Lab.*), 1937, **6**, (0), 717–721).—[In Russian.] A discussion of problems relating to the X-ray analysis of metals and alloys, and the precision required in the determination of the parameters in different cases. The most appropriate methods are indicated.—D. N. S.



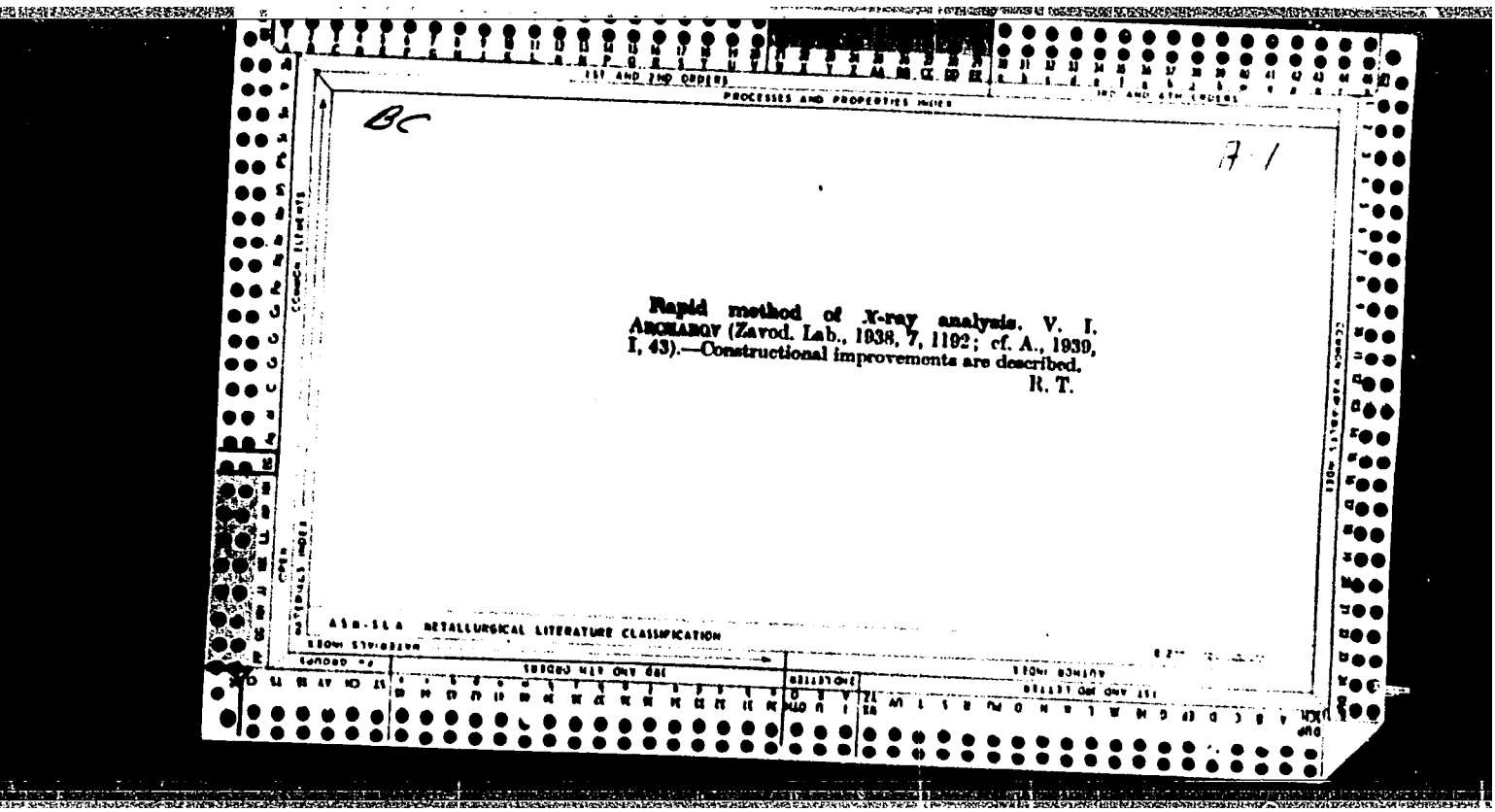
*The Nature of the Protective Oxide Film on Aluminium and Other Metals. V. I. Arharov (*Zhur. Tekhnich. Fiziki* (*J. Tech. Physics*), 1937, 7, (15), 1584–1589).—[In Russian.] The protection afforded aluminium by oxide films is ascribed to the orientation of the crystallites, since their octahedral facets are parallel to the surface and, by their packing, offer maximum resistance to the penetration of atoms of other elements. All oxides with a spinel-type lattice (γ-alumina, γ-chromic oxide, γ-ferric oxide, and magnetite) present great resistance to penetration of oxygen. The value of X-ray examination of oxide films for determining their protective value is, therefore, apparent.—N. A.



BC

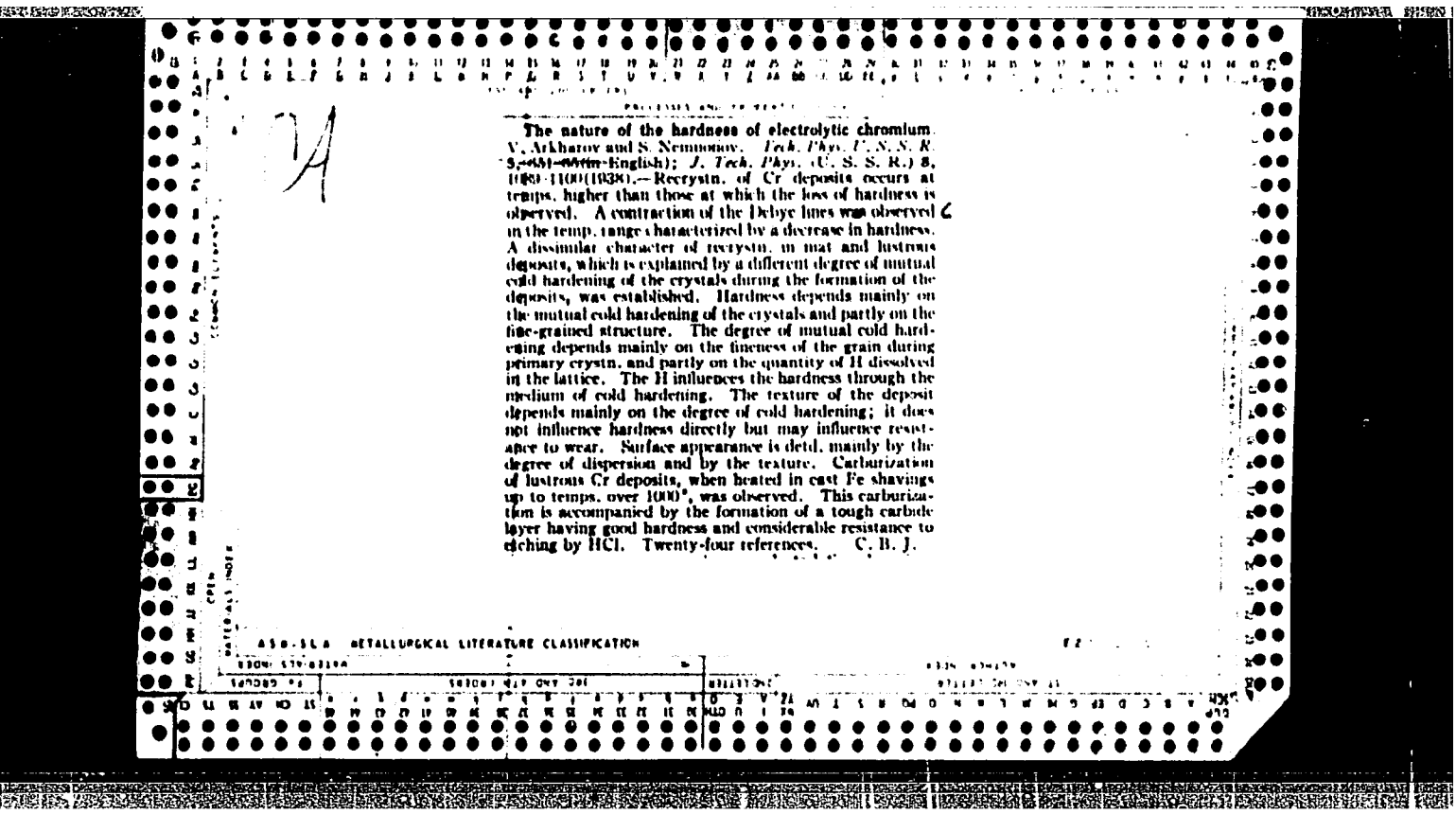
A-1

Express method of X-ray structural analysis. V. I. ARCHAROV (Zavod. Lab., 1938, 7, 440—443).—A method depending on focusing of X-ray beams by "lenses" of the substance under examination is described (cf. Tech. Phys. U.S.S.R., 1936, 3, 1771).
R. T.



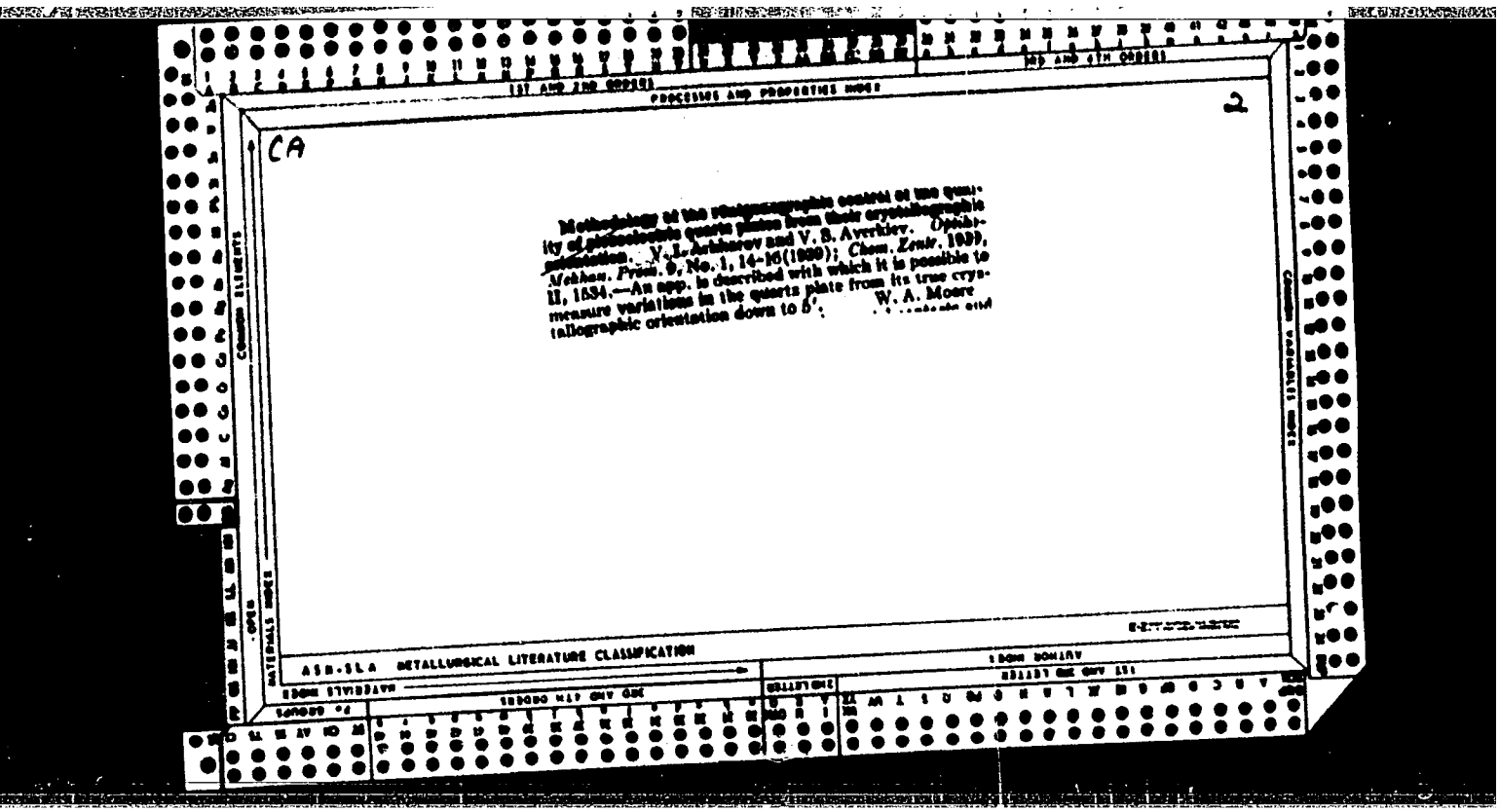
Rapid method of X-ray analysis. V. I. ARCHAROV (Zavod. Lab., 1938, 7, 1192; cf. A., 1939, I, 43).—Constructional improvements are described.

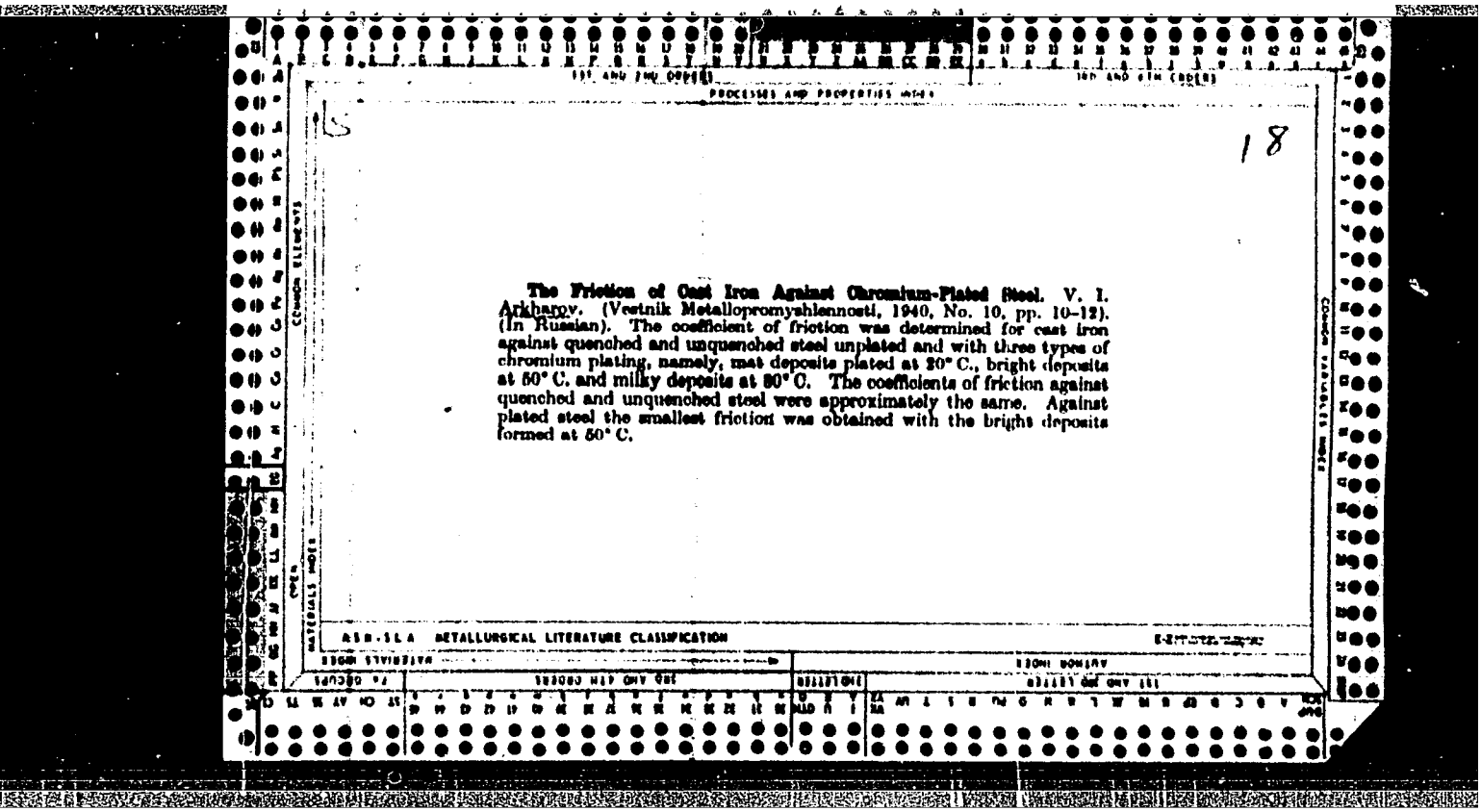
R. T.



The nature of the hardness of electrolytic chromium. V. Arkharov and S. Nemnonov. *Tech. Phys. U. S. S. R.* 5, 651–66(in English); *J. Tech. Phys.* (U. S. S. R.) 8, 1083–1100(1938).—Recrystn. of Cr deposits occurs at temps. higher than those at which the loss of hardness is observed. A contraction of the Debye lines was observed in the temp. range characterized by a decrease in hardness. A dissimilar character of recrystn. in mat and lustrous deposits, which is explained by a different degree of mutual cold hardening of the crystals during the formation of the deposits, was established. Hardness depends mainly on the mutual cold hardening of the crystals and partly on the fine-grained structure. The degree of mutual cold hardening depends mainly on the fineness of the grain during primary crystn. and partly on the quantity of H dissolved in the lattice. The H influences the hardness through the medium of cold hardening. The texture of the deposit depends mainly on the degree of cold hardening; it does not influence hardness directly but may influence resistance to wear. Surface appearance is detd. mainly by the degree of dispersion and by the texture. Carburization of lustrous Cr deposits, when heated in cast Fe shavings up to temps. over 1000°, was observed. This carburization is accompanied by the formation of a tough carbide layer having good hardness and considerable resistance to etching by HCl. Twenty-four references. C. B. J.

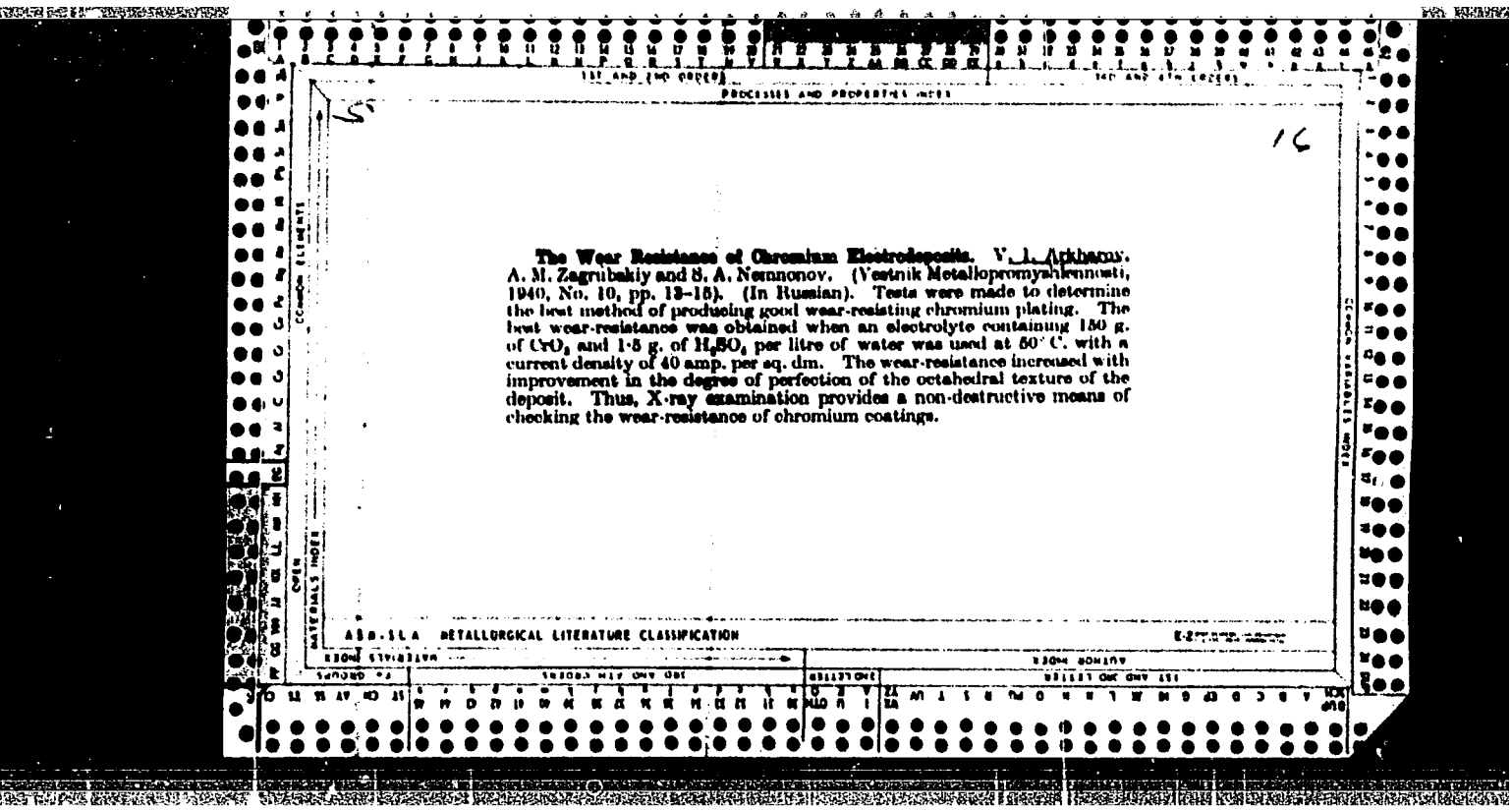
A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION



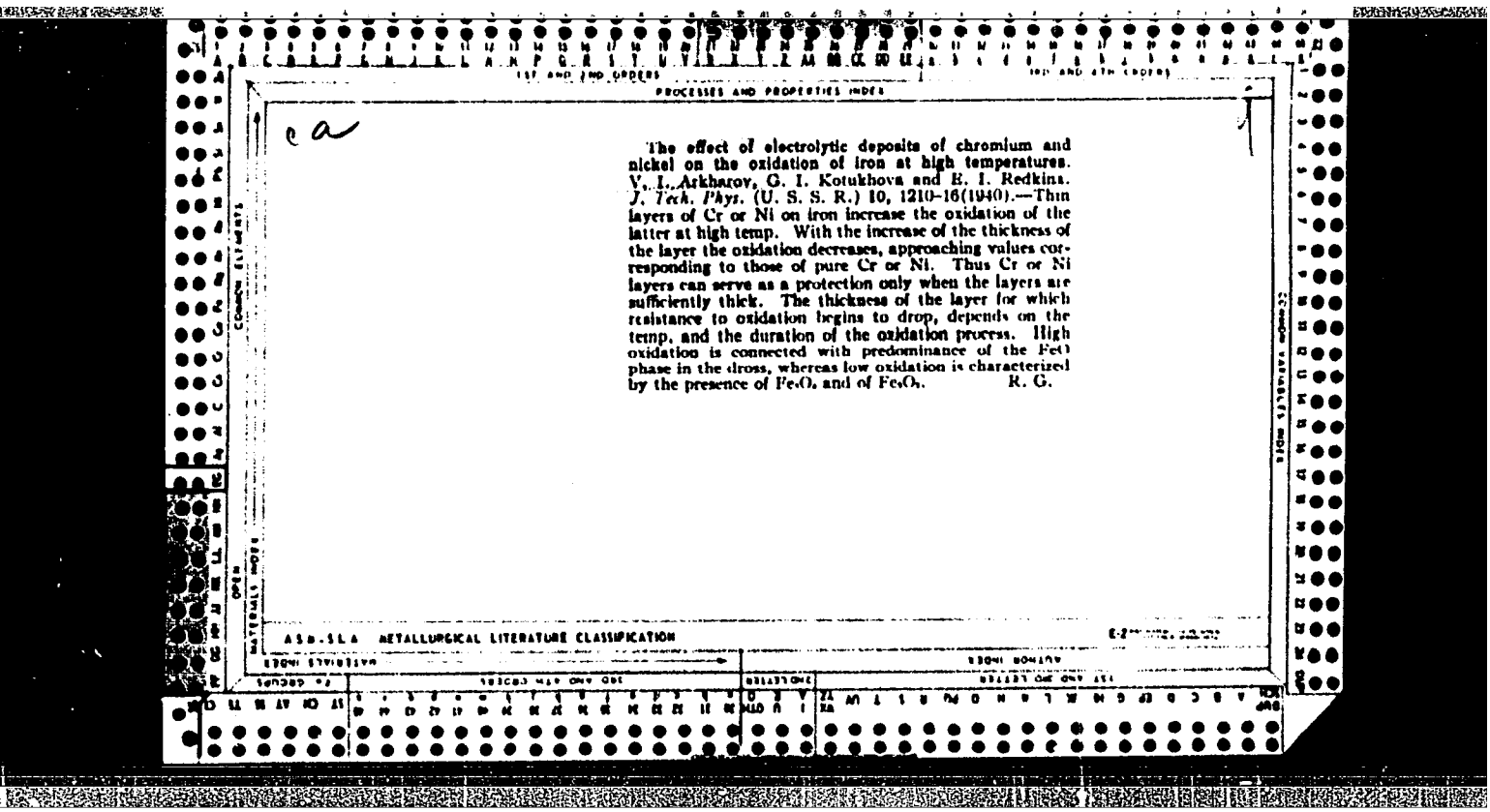


18

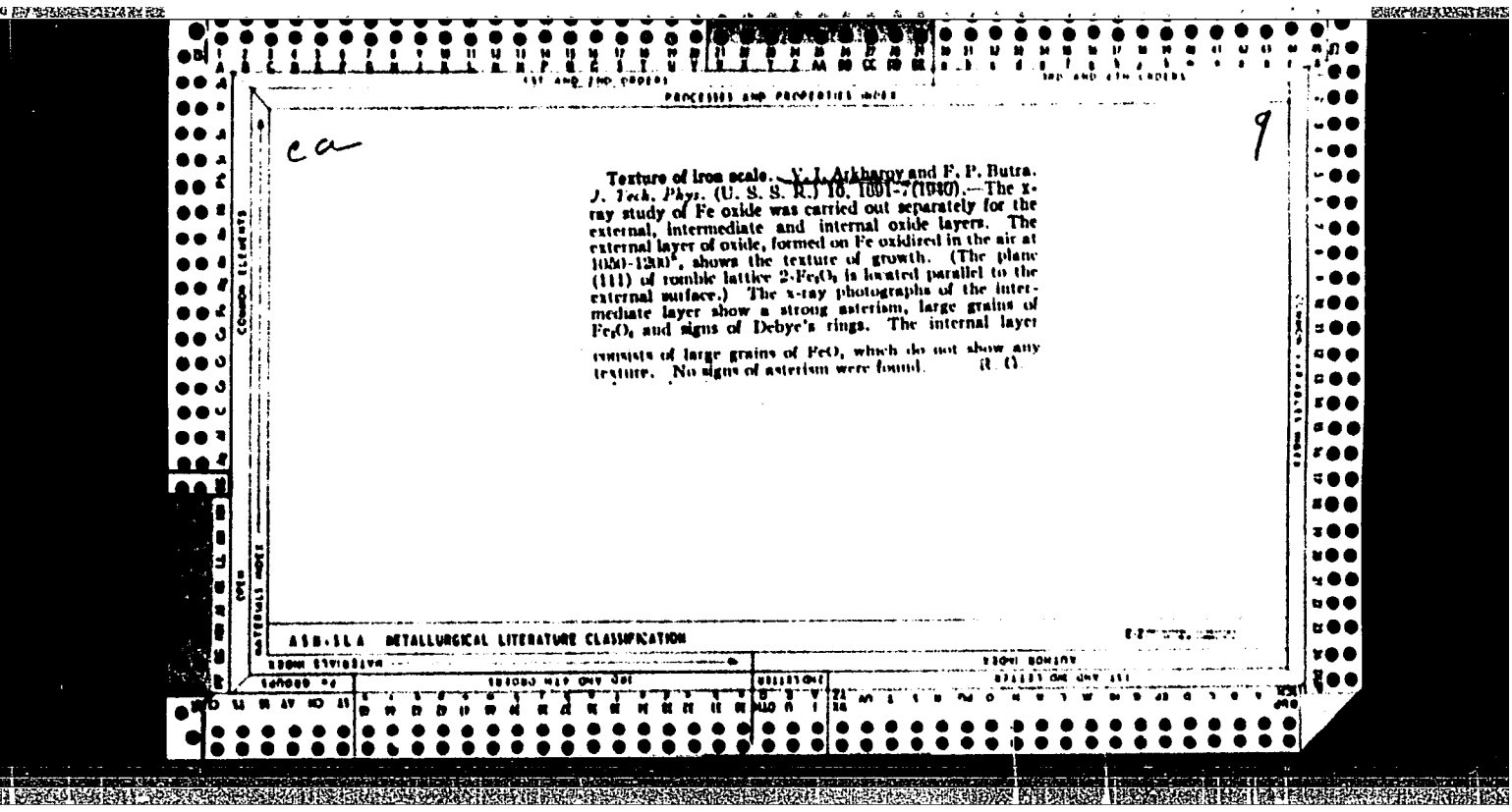
The Friction of Cast Iron Against Chromium-Plated Steel. V. I. Arkharov. (Vestnik Metallopromyshlennosti, 1940, No. 10, pp. 10–12). (In Russian). The coefficient of friction was determined for cast iron against quenched and unquenched steel unplated and with three types of chromium plating, namely, mat deposits plated at 20° C., bright deposits at 50° C. and milky deposits at 80° C. The coefficients of friction against quenched and unquenched steel were approximately the same. Against plated steel the smallest friction was obtained with the bright deposits formed at 50° C.



The Wear Resistance of Chromium Electrodeposits. V. I. Arkharov, A. M. Zagrubskiy and S. A. Nemnonov. (Vestnik Metalloprom yshlennosti, 1940, No. 10, pp. 13–18). (In Russian). Tests were made to determine the best method of producing good wear-resisting chromium plating. The best wear-resistance was obtained when an electrolyte containing 150 g. of CrO_3 and 1·5 g. of H_2SO_4 per litre of water was used at 50° C. with a current density of 40 amp. per sq. dm. The wear-resistance increased with improvement in the degree of perfection of the octahedral texture of the deposit. Thus, X-ray examination provides a non-destructive means of checking the wear-resistance of chromium coatings.



The effect of electrolytic deposits of chromium and nickel on the oxidation of iron at high temperatures. V. I. Arkharov, G. I. Kotukhova and E. I. Redkina. *J. Tech. Phys.* (U. S. S. R.) 10, 1210-16(1940).—Thin layers of Cr or Ni on iron increase the oxidation of the latter at high temp. With the increase of the thickness of the layer the oxidation decreases, approaching values corresponding to those of pure Cr or Ni. Thus Cr or Ni layers can serve as a protection only when the layers are sufficiently thick. The thickness of the layer for which resistance to oxidation begins to drop, depends on the temp. and the duration of the oxidation process. High oxidation is connected with predominance of the FeO phase in the dross, whereas low oxidation is characterized by the presence of Fe_2O_3 and of Fe_3O_4. R. G.

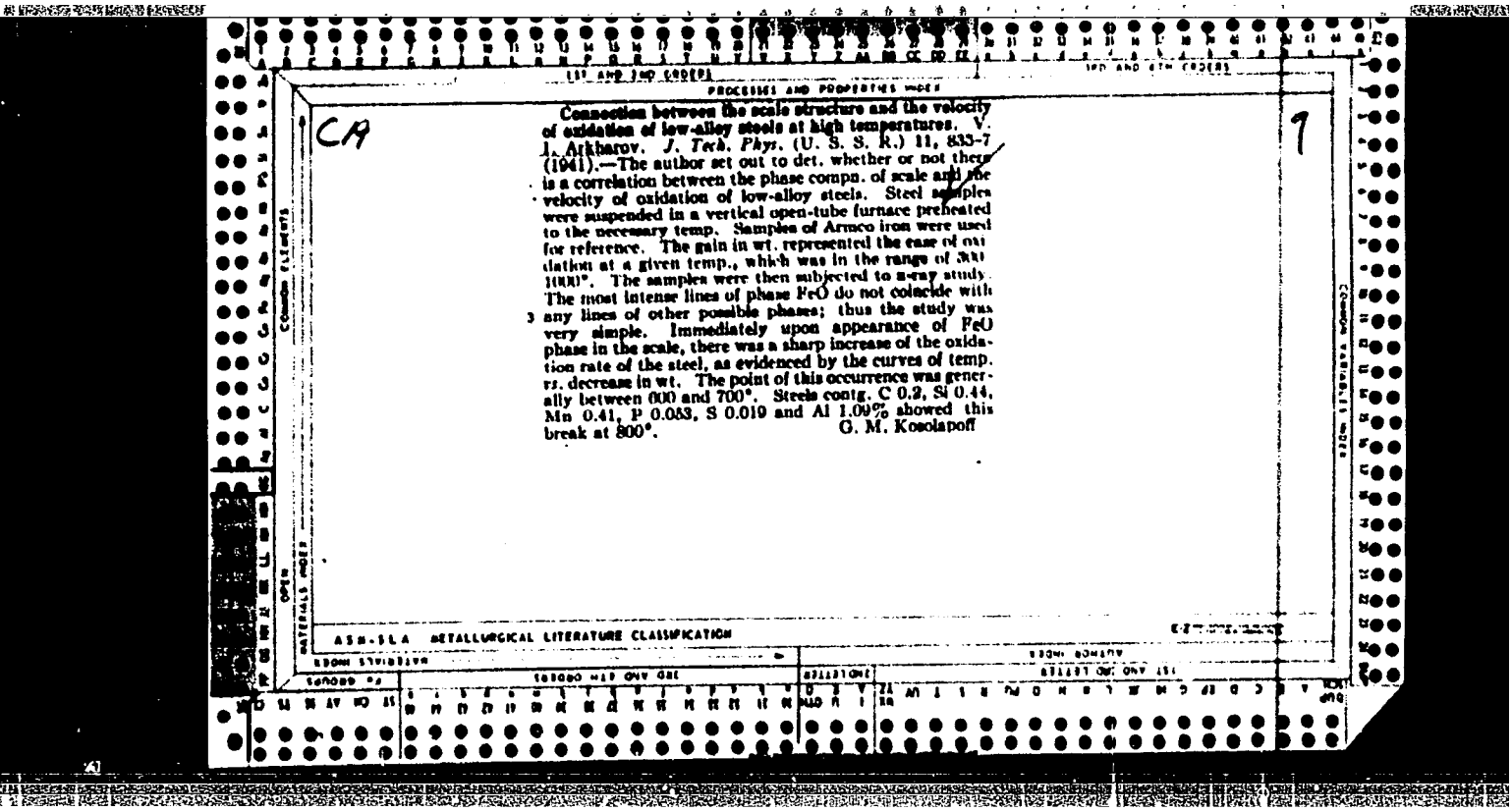


ca

9

Texture of iron scale.—V. I. Arkharov and F. P. Butra. *J. Tech. Phys.* (U. S. S. R.) 10, 1091–7 (1940).—The x-ray study of Fe oxide was carried out separately for the external, intermediate and internal oxide layers. The external layer of oxide, formed on Fe oxidized in the air at 1000–1200°, shows the texture of growth. (The plane (111) of rombic lattice 2-Fe_2O_3 is located parallel to the external surface.) The x-ray photographs of the intermediate layer show a strong asterism, large grains of Fe_2O_3 and signs of Debye's rings. The internal layer consists of large grains of FeO, which do not show any texture. No signs of asterism were found. R. O.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION



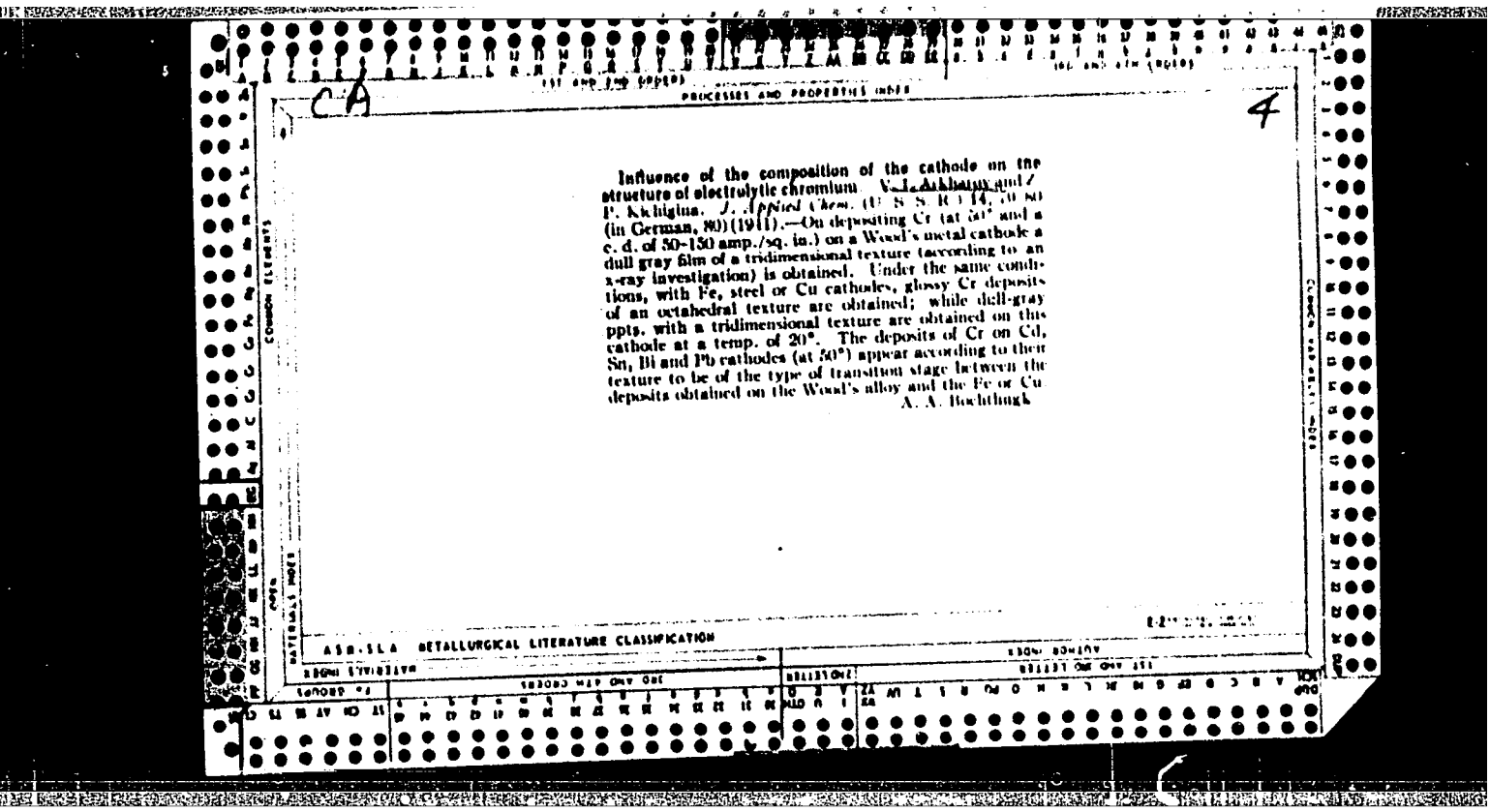
CA

Connection between the scale structure and the velocity of oxidation of low-alloy steels at high temperatures. V. I. Arkharov. *J. Tech. Phys.* (U. S. S. R.) 11, 833-7 (1941).—The author set out to det. whether or not there is a correlation between the phase compn. of scale and the velocity of oxidation of low-alloy steels. Steel samples were suspended in a vertical open-tube furnace preheated to the necessary temp. Samples of Armco iron were used for reference. The gain in wt. represented the rate of oxidation at a given temp., which was in the range of 500-1000°. The samples were then subjected to x-ray study. The most intense lines of phase FeO do not coincide with any lines of other possible phases; thus the study was very simple. Immediately upon appearance of FeO phase in the scale, there was a sharp increase of the oxidation rate of the steel, as evidenced by the curves of temp. vs. decrease in wt. The point of this occurrence was generally between 600 and 700°. Steels contg. C 0.2, Si 0.44, Mn 0.41, P 0.083, S 0.019 and Al 1.09% showed this break at 800°.

G. M. Kosolapoff

9

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



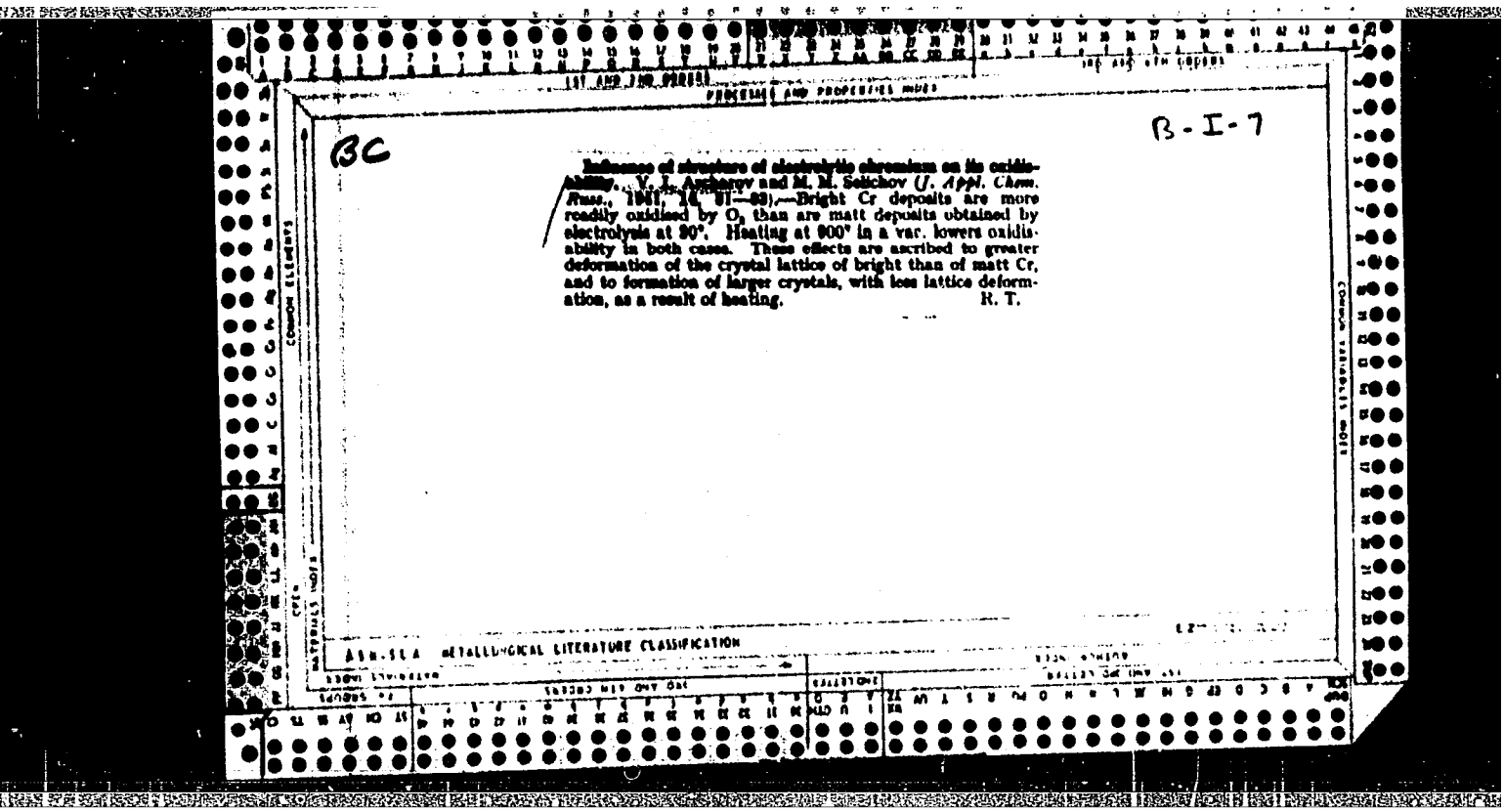
CA

4

Influence of the composition of the cathode on the structure of electrolytic chromium. V. I. Ashkinasy and P. Kichigina. *J. Applied Chem.* (U. S. S. R.) 14, 70-80 (in German, 80) (1941).—On depositing Cr (at 50° and a c. d. of 50–150 amp./sq. in.) on a Wood's metal cathode a dull gray film of a tridimensional texture (according to an x-ray investigation) is obtained. Under the same conditions, with Fe, steel or Cu cathodes, glossy Cr deposits of an octahedral texture are obtained; while dull-gray ppts. with a tridimensional texture are obtained on this cathode at a temp. of 20°. The deposits of Cr on Cd, Sn, Bi and Pb cathodes (at 50°) appear according to their texture to be of the type of transition stage between the deposits obtained on the Wood's alloy and the Fe or Cu.

A. A. Bochkhugk

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

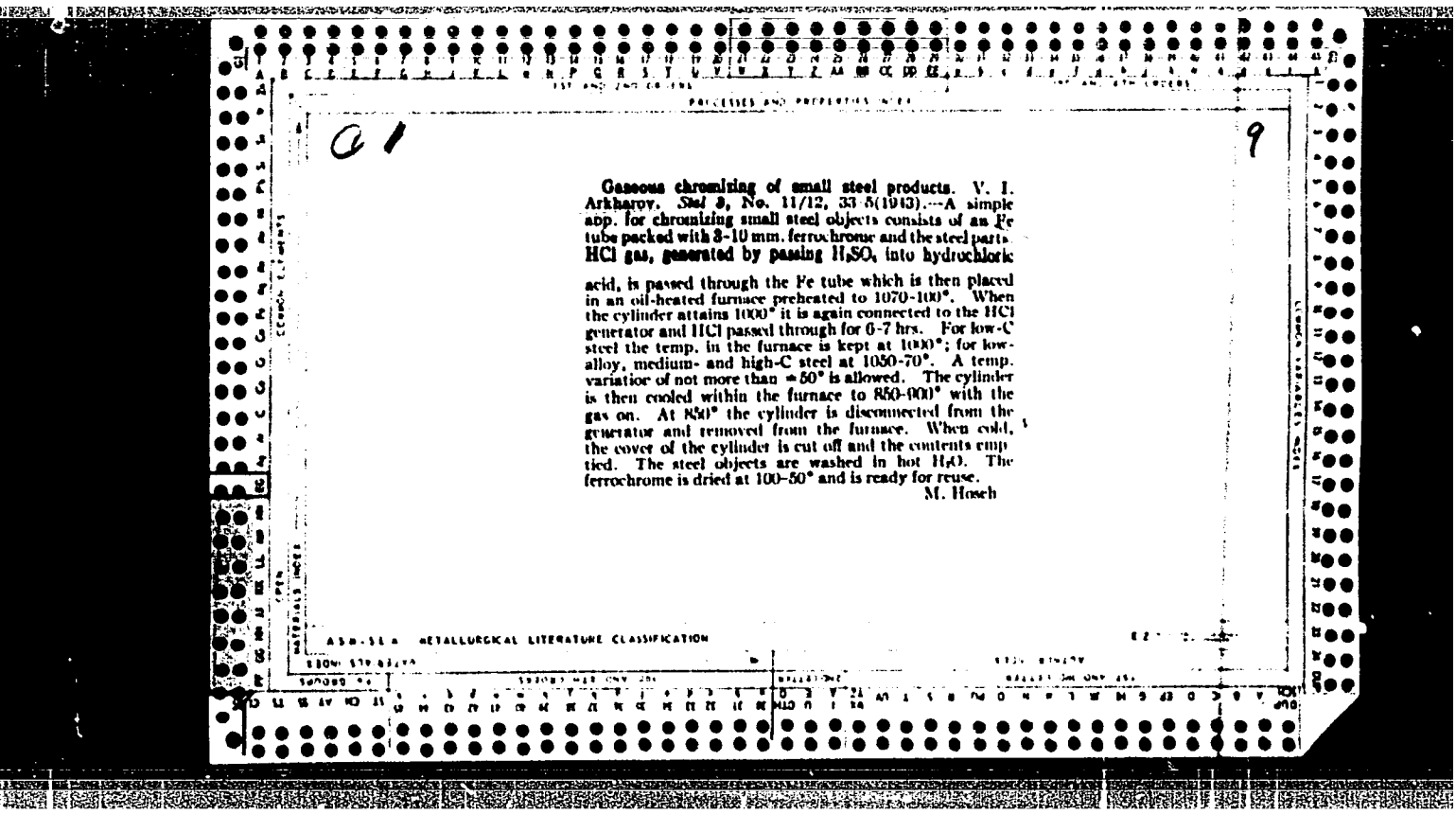


BC

B-I-7

Influence of structure of electrolytic chromium on its oxidisability. V. I. Archarov and M. M. Selichov *J. Appl. Chem. Russ.*, 1941, 14, 91—93).—Bright Cr deposits are more readily oxidised by O_2 than are matt deposits obtained by electrolysis at 90°. Heating at 900° in a vac. lowers oxidisability in both cases. These effects are ascribed to greater deformation of the crystal lattice of bright than of matt Cr, and to formation of larger crystals, with less lattice deformation, as a result of heating. R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Gaseous chromizing of small steel products. V. I. Arkharov. *Stal* 3, No. 11/12, 33-5(1943).—A simple app. for chromizing small steel objects consists of an Fe tube packed with 8–10 mm. ferrochrome and the steel parts. HCl gas, generated by passing H_2SO_4 into hydrochloric acid, is passed through the Fe tube which is then placed in an oil-heated furnace preheated to 1070–100°. When the cylinder attains 1000° it is again connected to the HCl generator and HCl passed through for 6–7 hrs. For low-C steel the temp. in the furnace is kept at 1000°; for low-alloy, medium- and high-C steel at 1050–70°. A temp. variation of not more than ±50° is allowed. The cylinder is then cooled within the furnace to 850–900° with the gas on. At 850° the cylinder is disconnected from the generator and removed from the furnace. When cold, the cover of the cylinder is cut off and the contents emptied. The steel objects are washed in hot H_2O. The ferrochrome is dried at 100–50° and is ready for reuse.

M. Hosch

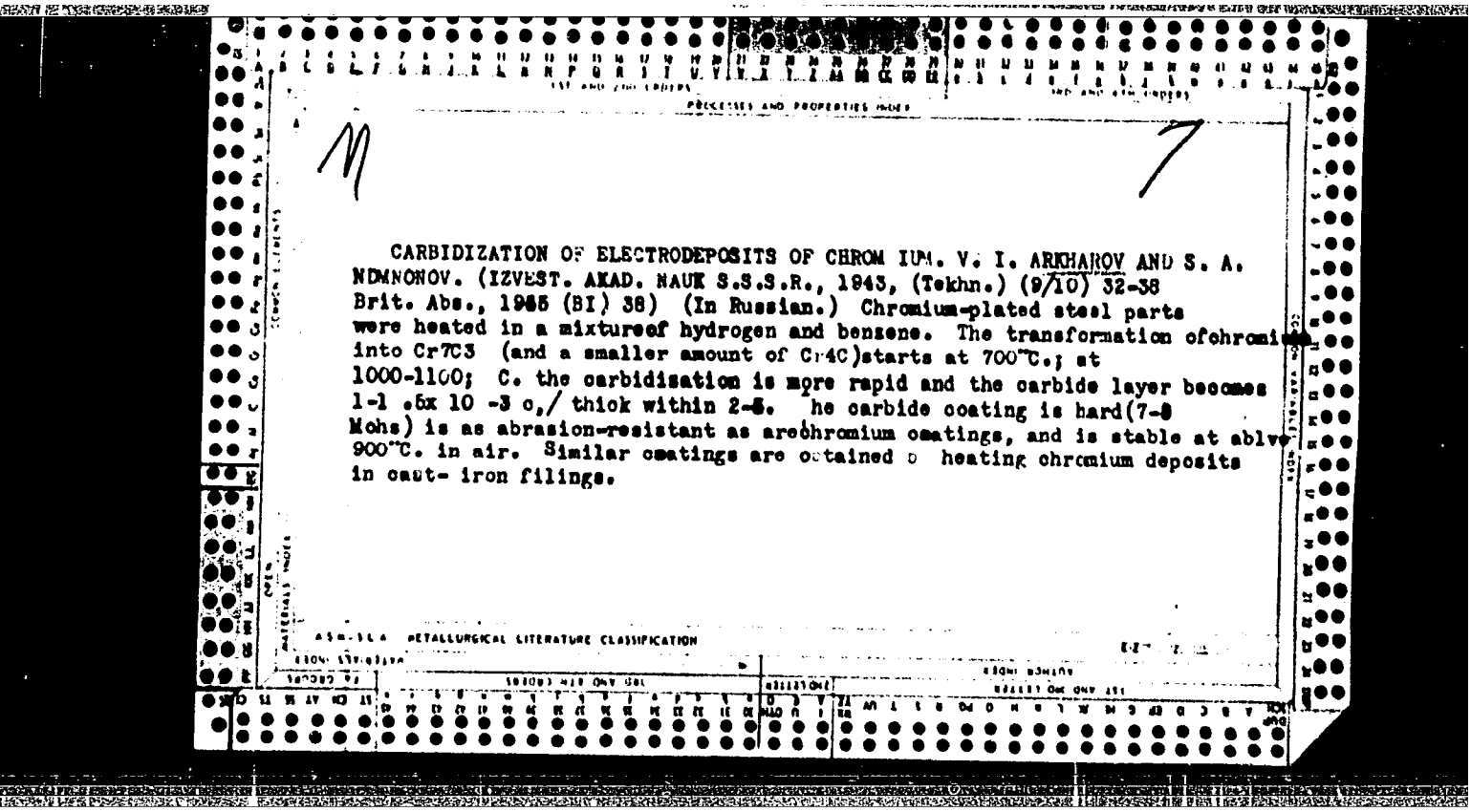
ARKHAROV, V. I.

ARKHAROV, V.I.

C.A. Vol. 39 Jul. 10-Nov.10, 1945

"Chromium-Coating of Steel and Range of Application of Gaseous Chromizing". Bull. acad. sci. U.R.S.S., Classe sci. tech. 1943, No. 8, 62-7.

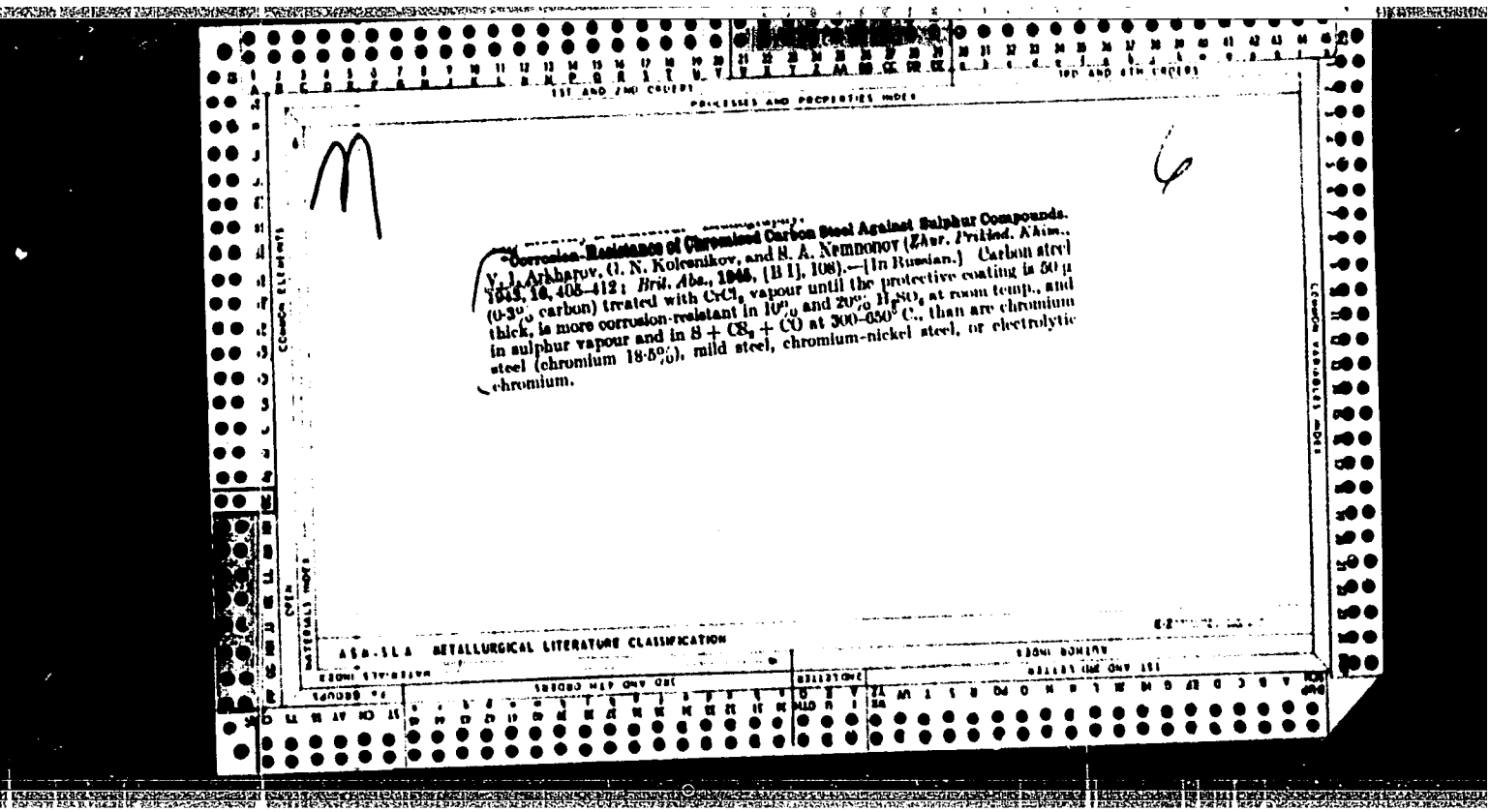
Cr-coating of steel from the gas phase is discussed. The film obtained consists either of a Cr carbide or of a solid soln. of Cr in Fe. The type of work for which this coating is recommended is defined.



M 7

CARBIDIZATION OF ELECTRODEPOSITS OF CHROM IUM. V. I. ARKHAROV AND S. A. NOMNONOV. (IZVEST. AKAD. NAUK S.S.S.R., 1943, (Tekhn.) (9/10) 32-38 Brit. Abs., 1945 (BI) 38) (In Russian.) Chromium-plated steel parts were heated in a mixtureof hydrogen and benzene. The transformation ofchromi into Cr_7C_3 (and a smaller amount of Cr_4C)starts at 700°C.; at 1000-1100; C. the carbidisation is more rapid and the carbide layer becomes 1-1 .5x 10 -3 c,/ thick within 2-8. he carbide coating is hard(7-8 Mohs) is as abrasion-resistant as arehromium coatings, and is stable at ablve 900°C. in air. Similar coatings are obtained b heating chromium deposits in cast- iron filings.

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

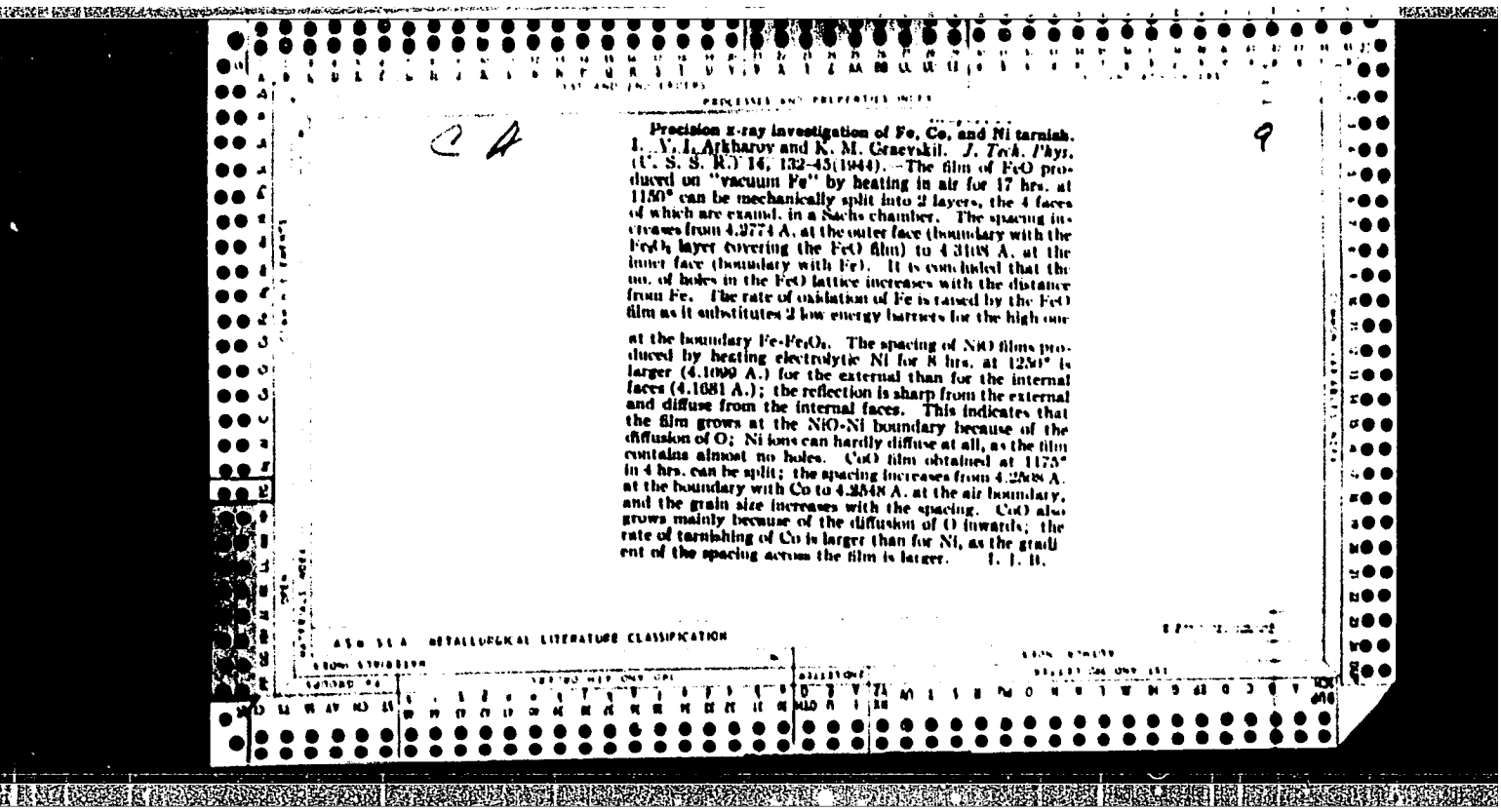


Corrosion-Resistance of Chromised Carbon Steel Against Sulphur Compounds.
V. I. Arkharov, G. N. Kolesnikov, and S. A. Nemnonov (*Zhur. Prikhnd. Khim.*, 1943, **16**, 408–412; *Brit. Abs.*, **1945**, [B I], 108).—[In Russian.] Carbon steel (0·3% carbon) treated with $CrCl_3$ vapour until the protective coating is 50 μ thick, is more corrosion-resistant in 10% and 20% H_2SO_4 at room temp., and in sulphur vapour and in $S + CS_2 + CO$ at 300–350° C., than are chromium steel (chromium 18·5%), mild steel, chromium-nickel steel, or electrolytic chromium.

A Sa.-S L A METALLURGICAL LITERATURE CLASSIFICATION

ARKHAROV, V. I.

Application of the X-Ray Sturctural Analysis to the Research in Metal Oxidation at High Temperatures (Report at the Conference on Heat-Resistant Steel at the AN SSSR Metallurgical Institute, Moscow, October 1940). Trudy IFM UFAN Second and Third Edition, 1944.

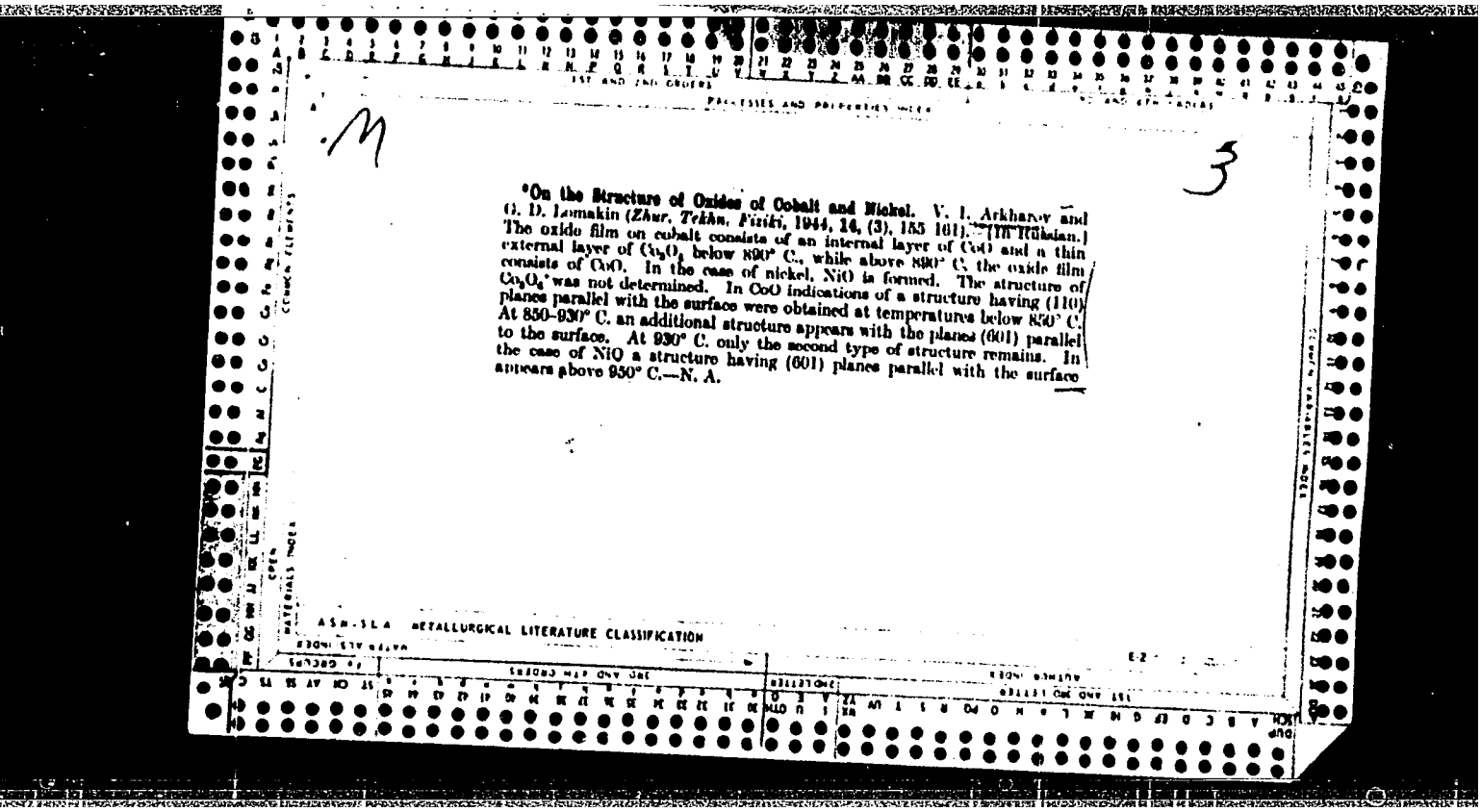


Precision x-ray investigation of Fe, Co, and Ni tarnish. I. V. I. Arkharov and K. M. Gracvskii. *J. Tech. Phys.* (U. S. S. R.) 14, 132-45(1944). —The film of FeO produced on "vacuum Fe" by heating in air for 17 hrs. at 1150° can be mechanically split into 2 layers, the 4 faces of which are examd. in a Sachs chamber. The spacing increases from 4.2774 A. at the outer face (boundary with the Fe$_3$O$_4$ layer covering the FeO film) to 4.3108 A. at the inner face (boundary with Fe). It is concluded that the no. of holes in the FeO lattice increases with the distance from Fe. The rate of oxidation of Fe is raised by the FeO film as it substitutes 2 low energy barriers for the high one at the boundary Fe-FeO$_x$. The spacing of NiO films produced by heating electrolytic Ni for 8 hrs. at 1250° is larger (4.1099 A.) for the external than for the internal faces (4.1681 A.); the reflection is sharp from the external and diffuse from the internal faces. This indicates that the film grows at the NiO-Ni boundary because of the diffusion of O; Ni ions can hardly diffuse at all, as the film contains almost no holes. CoO film obtained at 1175° in 4 hrs. can be split; the spacing increases from 4.2508 A. at the boundary with Co to 4.2548 A. at the air boundary, and the grain size increases with the spacing. CoO also grows mainly because of the diffusion of O inwards; the rate of tarnishing of Co is larger than for Ni, as the gradient of the spacing across the film is larger. I. I. B.

ARKHAROV, V. I.; KONTOROVICH, M. M.

Texture of Iron Scale.
III Study of the Scale Formed during the Oxidation of Iron by Water Vapor.

ZhTF 14, 151, 1944



M

3

On the Structure of Oxides of Cobalt and Nickel. V. I. Arkharov and G. D. Lomakin (*Zhur. Tekhn. Fiziki*, 1944, 14, (3), 155-161). (In Russian.) The oxide film on cobalt consists of an internal layer of CoO and a thin external layer of Co_3O_4 below 890° C., while above 890° C. the oxide film consists of CoO. In the case of nickel, NiO is formed. The structure of Co_3O_4 was not determined. In CoO indications of a structure having (110) planes parallel with the surface were obtained at temperatures below 850° C. At 850-930° C. an additional structure appears with the planes (001) parallel to the surface. At 930° C. only the second type of structure remains. In the case of NiO a structure having (001) planes parallel with the surface appears above 930° C.—N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

ARKHAROV, V. I.; KICHIGINA, Z. P.

Obtaining Hydrogen Chloride for Gas Chrome Plating

Trudy IMM UFAN, 2nd Edition 23, 1944

ARKHAROV, V. I.; KICHIGINA, Z. P.; POPEV, A. I.

The Possibility of Chrome Plating Low-Alloy Steel

Trudy IMM UGAN, 2nd ed. 27, 1944

ARKHAROV, V. I.; GORINA, A. I.; USYSKINA, S. L.

Application of Gas Chrome Plating to the Anti-Corrosion Protection of Equipment for Souprene Production

Trudy IMM UFAN, 2nd Edition, 49, 1944

ARKHANOV, V.I.; PISARE, N. A.

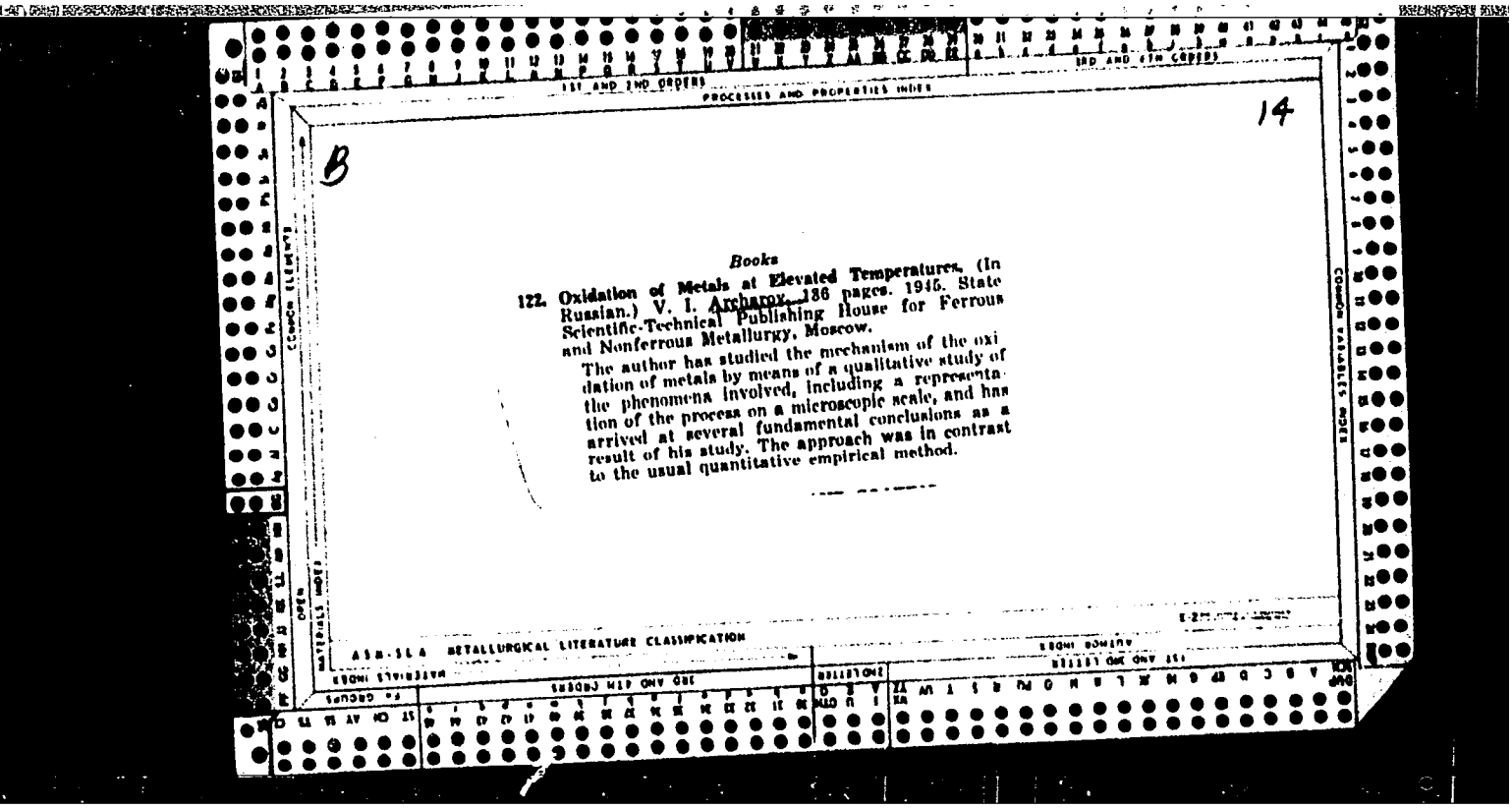
Possible Mechanics of the Evolution of Stable Large Granularity in Certain Steels

Collection for the Exchange of Technical Experience of the Uralmashzavod, No.4-5, 27, 1944.

ARKHAROV, V. I.; KOLESNIKOV, G. N.

Mechanical Properties of Gas Chrome Plating.

Trudy IMM UFAN, Second Edition, 51, 1944



PROCESSES AND PROPERTIES INDEX

14

B

Books

122. **Oxidation of Metals at Elevated Temperatures.** (In Russian.) V. I. Archakov. 186 pages. 1945. State Scientific-Technical Publishing House for Ferrous and Nonferrous Metallurgy, Moscow.

The author has studied the mechanism of the oxidation of metals by means of a qualitative study of the phenomena involved, including a representation of the process on a microscopic scale, and has arrived at several fundamental conclusions as a result of his study. The approach was in contrast to the usual quantitative empirical method.

METALLURGICAL LITERATURE CLASSIFICATION

ARKHAROV, V. I.

"Structural Theory of High-Temperature Oxidation of Iron, Steel and Some Other Metals"

Metallurgy Inst AN SSSR, Moscow, 1945.

Formation and structure of iron oxide films. V. I
[illegible] *Phys. Tekh. Fiz.*, No 14, pp. 132-61 (1945).
translated in *Iron Age*, 156 [3] 53,138 (1945). F.F.H.

ARKHAROV, V. I.; CHUKINA, T. P.; SHLYAKHIN, P. N.

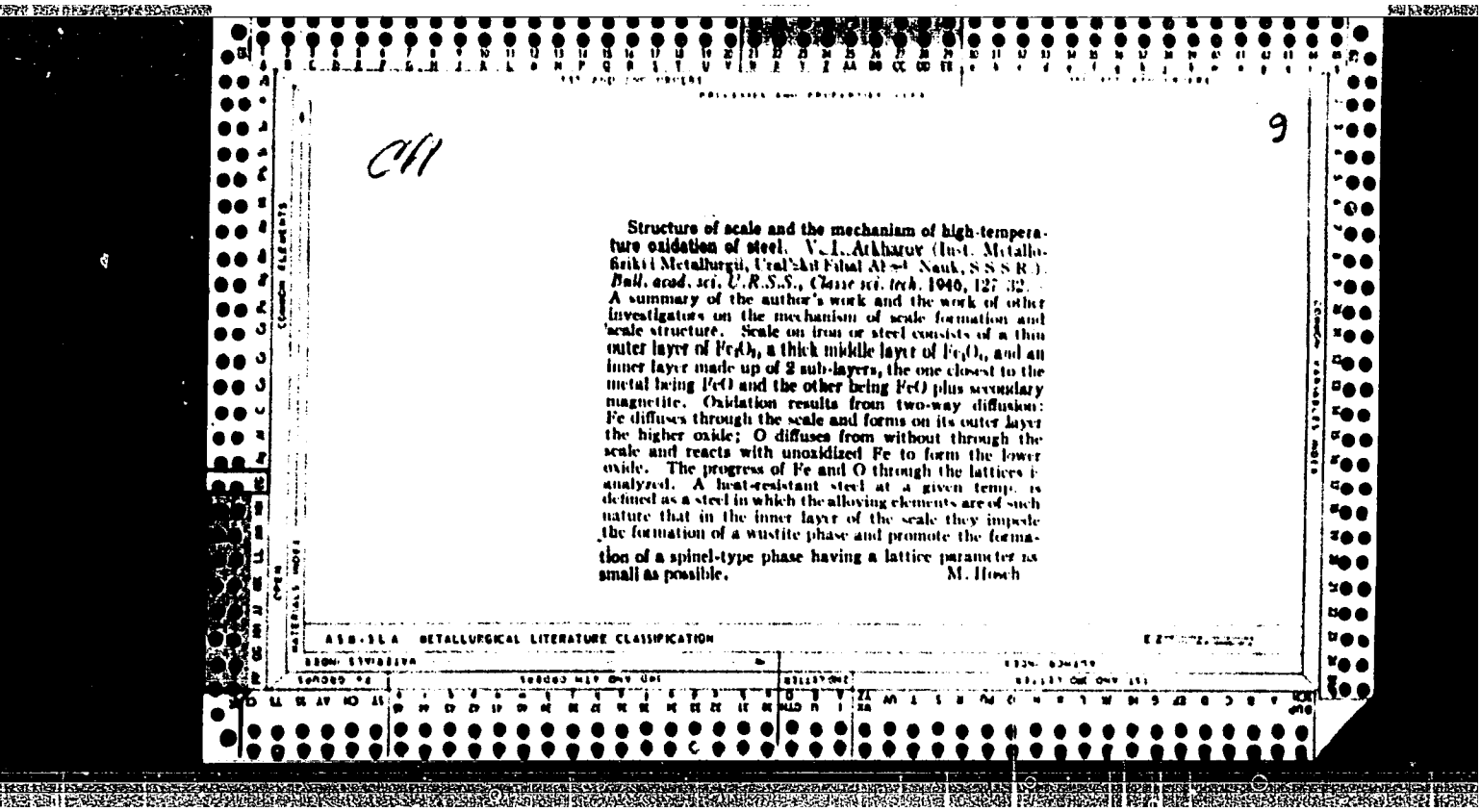
Application of Gas Chrome Plating for Longer Serviceability of Machine Parts

Elektrostants 16, No. 3, 12, 1945

CA

Nature of temper brittleness of steel. V. I. Arkharov (Ural Branch Acad. Sci. U.S.S.R.). *Doklady Akad. Nauk S.S.S.R.* 50, 203–4(1945).—A possible mechanism of temper brittleness is proposed that accounts for: (1) the importance of the prior austenite grain boundaries along which fracture occurs, (2) the disappearance of temper brittleness on repeated or prolonged tempering, and (3) the constancy of the lattice parameter of the α solid soln. on successive tempering at 600° and at 500 to 550°. This mechanism involves a monout. impurity layer at the grain boundaries whose av. compn. varies with temp. in the same manner as the soly. curve of the impurities. The grain boundary impurity concn. produced at the austenitizing temp. corresponds to the max. soly. value at about 550°. On tempering below 550° the impurity ppts. at the grain boundary and embrittles the steel. Prolonged tempering permits the ppt. slowly to diffuse into the grains.

A. G. Guy



9

Structure of scale and the mechanism of high-temperature oxidation of steel. V. I. Arkharov (Inst. Metallofiziki Metallurgii, Ural'skii Filial Akad. Nauk, S.S.S.R.). *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1940, 127–32. A summary of the author's work and the work of other investigators on the mechanism of scale formation and scale structure. Scale on iron or steel consists of a thin outer layer of Fe_2O_3, a thick middle layer of Fe_3O_4, and an inner layer made up of 2 sub-layers, the one closest to the metal being FeO and the other being FeO plus secondary magnetite. Oxidation results from two-way diffusion: Fe diffuses through the scale and forms on its outer layer the higher oxide; O diffuses from without through the scale and reacts with unoxidized Fe to form the lower oxide. The progress of Fe and O through the lattices is analyzed. A heat-resistant steel at a given temp. is defined as a steel in which the alloying elements are of such nature that in the inner layer of the scale they impede the formation of a wustite phase and promote the formation of a spinel-type phase having a lattice parameter as small as possible. M. Hosch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

ARKHAROV, V. I.

"New Treatment of the Effect of Crystallite Surface on the Phenomena Occurring in Polycrystallic Metals."

Trudy TsNII Transp. Mashimestr. Vi, No 5, (26), 23, 1946.

ARKHAROV, V. I.; PITADE, N. A.

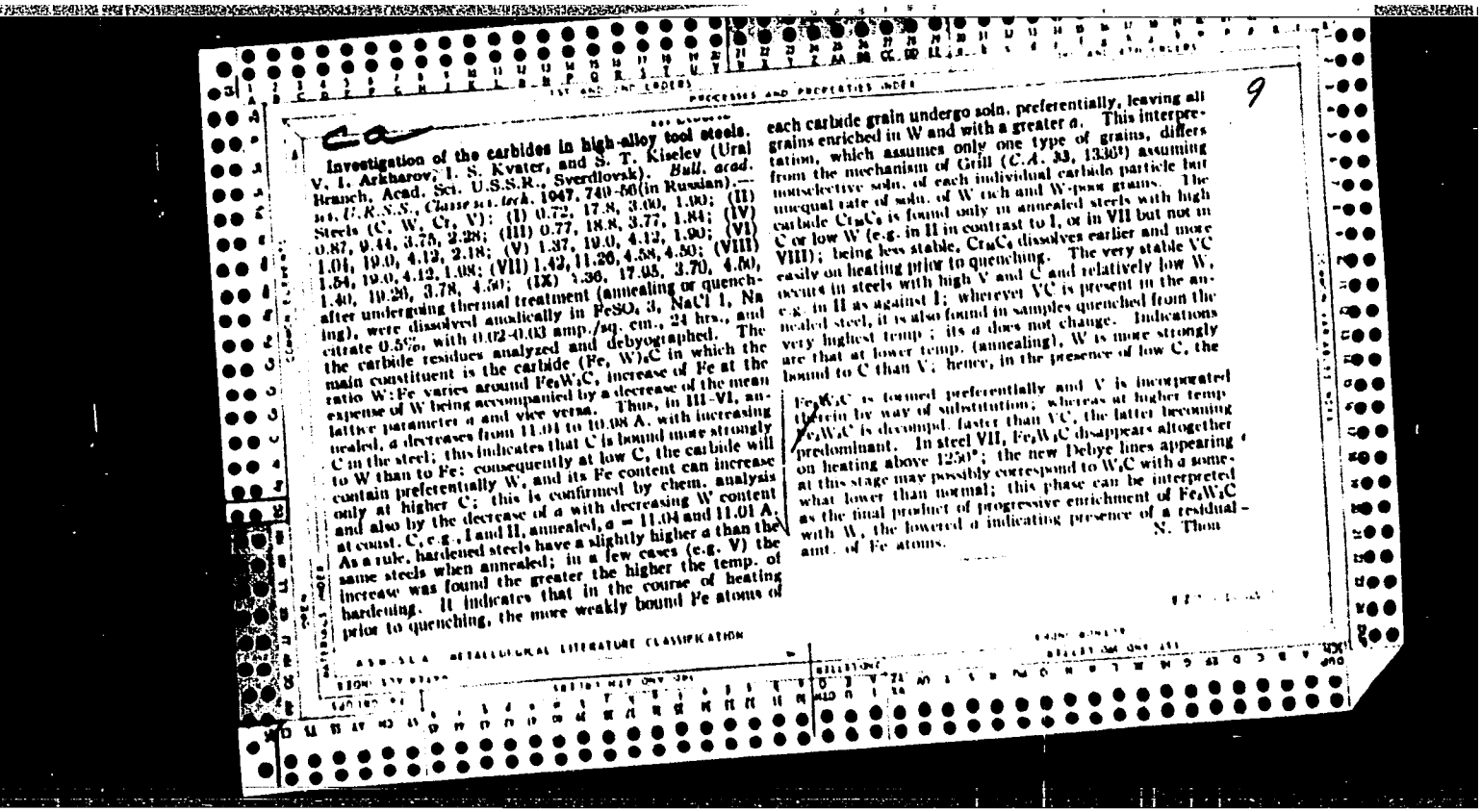
Structure of Overheated Steel

Trudy IFM UFAN 8, 37, 1946.

ARKHAROV, V. I.; KISELEV, S. T.; PITADE, N. A.

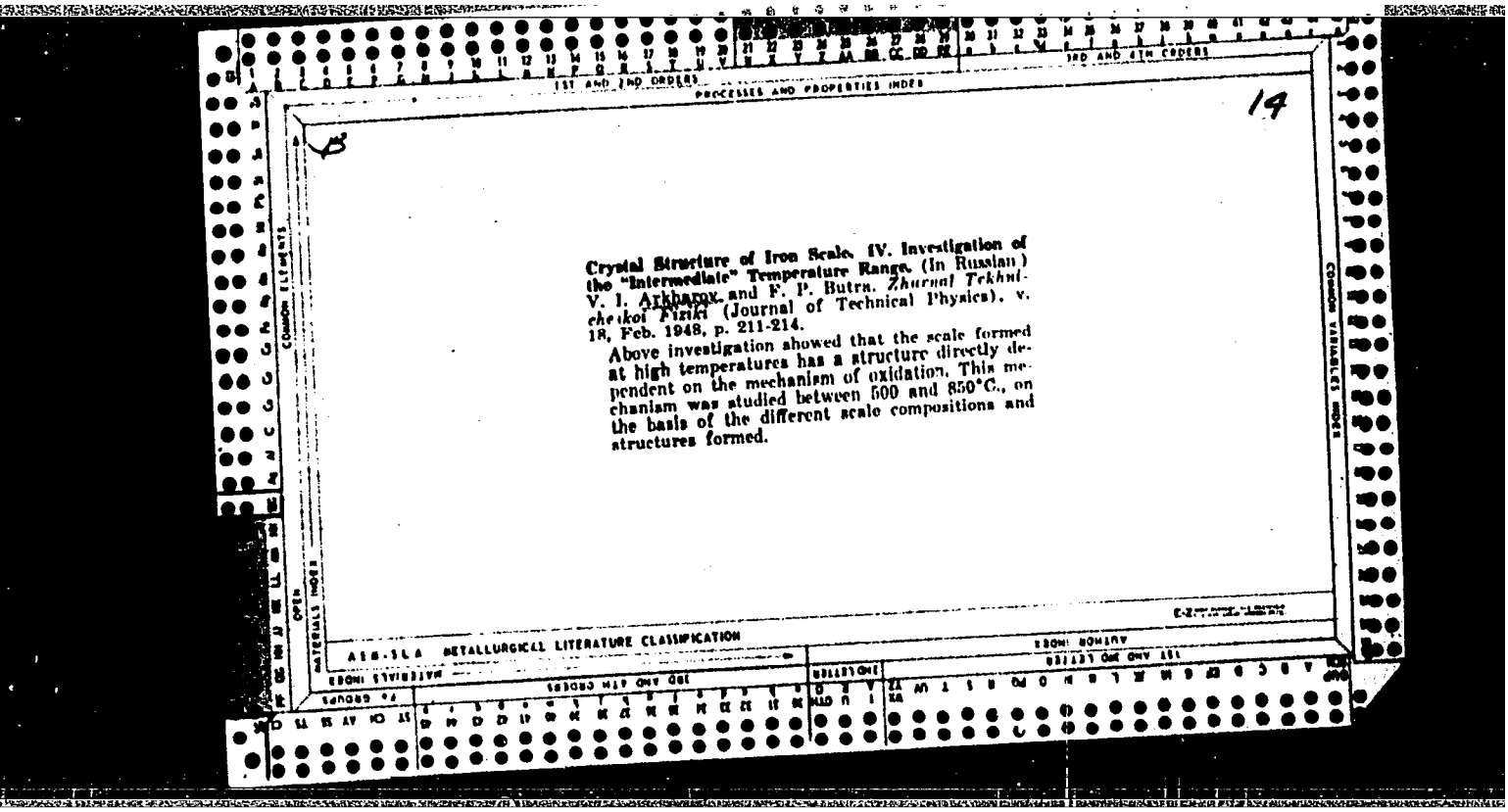
The Conditions for the Evolution of Lithoidal Fracture in Steel

Trudy IFM UFAN, 8th Edition, 50, 1946



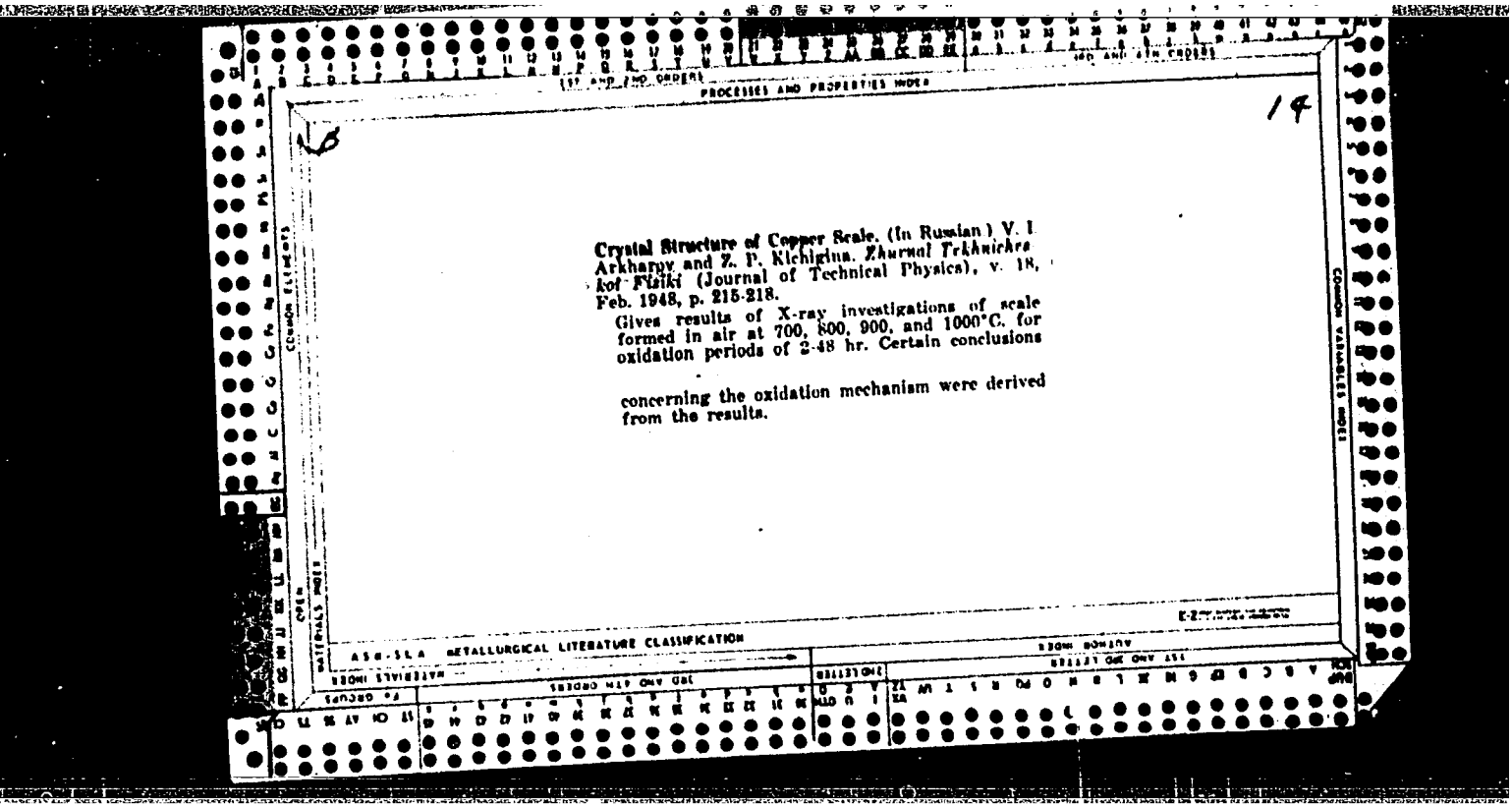
Investigation of the carbides in high-alloy tool steels. V. I. Arkharov, I. S. Kvater, and S. T. Kiselev (Ural Branch, Acad. Sci. U.S.S.R., Sverdlovsk). *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1947, 749-50 (in Russian).—Steels (C, W, Cr, V): (I) 0.72, 17.8, 3.00, 1.00; (II) 0.87, 9.44, 3.75, 2.28; (III) 0.77, 18.8, 3.77, 1.84; (IV) 1.01, 19.0, 4.12, 2.18; (V) 1.37, 19.0, 4.12, 1.90; (VI) 1.84, 19.0, 4.12, 1.08; (VII) 1.42, 11.20, 4.58, 4.50; (VIII) 1.40, 19.20, 3.78, 4.50; (IX) 3.36, 17.05, 3.70, 4.80, after undergoing thermal treatment (annealing or quenching), were dissolved anodically in $FeSO_4$ 3, NaCl 1, Na citrate 0.5%, with 0.02-0.03 amp./sq. cm., 24 hrs., and the carbide residues analyzed and debyographed. The main constituent is the carbide (Fe, W)$_3$C in which the ratio W:Fe varies around Fe_4W_2C, increase of Fe at the expense of W being accompanied by a decrease of the mean lattice parameter a and vice versa. Thus, in III-VI, annealed, a decreases from 11.01 to 10.98 A. with increasing C in the steel; this indicates that C is bound more strongly to W than to Fe; consequently at low C, the carbide will contain preferentially W, and its Fe content can increase only at higher C; this is confirmed by chem. analysis and also by the decrease of a with decreasing W content at const. C, e.g., I and II, annealed, a = 11.04 and 11.01 A. As a rule, hardened steels have a slightly higher a than the same steels when annealed; in a few cases (e.g. V) the increase was found the greater the higher the temp. of hardening. It indicates that in the course of heating prior to quenching, the more weakly bound Fe atoms of each carbide grain undergo soln. preferentially, leaving all grains enriched in W and with a greater a. This interpretation, which assumes only one type of grains, differs from the mechanism of Grill (*C.A.* 33, 1330[8]) assuming monoselective soln. of each individual carbide particle but unequal rate of soln. of W rich and W-poor grains. The carbide $Cr_{23}C_6$ is found only in annealed steels with high C or low W (e.g. in II in contrast to I, or in VII but not in VIII); being less stable, $Cr_{23}C_6$ dissolves earlier and more easily on heating prior to quenching. The very stable VC occurs in steels with high V and C and relatively low W, e.g. in II as against I; wherever VC is present in the annealed steel, it is also found in samples quenched from the very highest temp.; its a does not change. Indications are that at lower temp. (annealing), W is more strongly bound to C than V; hence, in the presence of low C, the Fe_4W_2C is formed preferentially and V is incorporated therein by way of substitution; whereas at higher temp. Fe_4W_2C is decompd. faster than VC, the latter becoming predominant. In steel VII, Fe_4W_2C disappears altogether on heating above 1250°; the new Debye lines appearing at this stage may possibly correspond to W_2C with a somewhat lower than normal; this phase can be interpreted as the final product of progressive enrichment of Fe_4W_2C with W, the lowered a indicating presence of a residual amt. of Fe atoms.

N. Thon



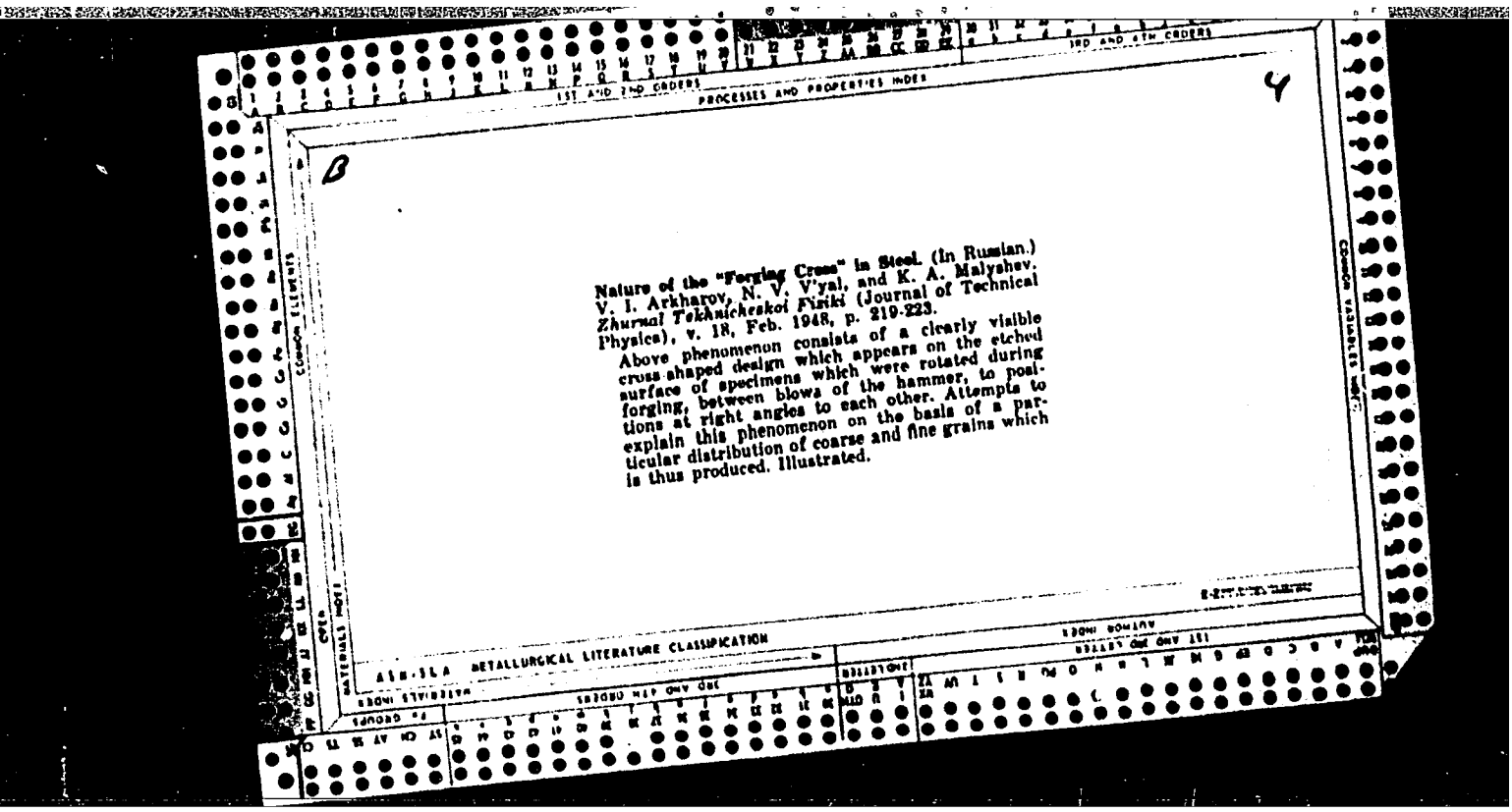
Crystal Structure of Iron Scale. IV. Investigation of the "Intermediate" Temperature Range. (In Russian) V. I. Arkharov and F. P. Butra. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 18, Feb. 1948, p. 211-214.

Above investigation showed that the scale formed at high temperatures has a structure directly dependent on the mechanism of oxidation. This mechanism was studied between 500 and 850°C., on the basis of the different scale compositions and structures formed.



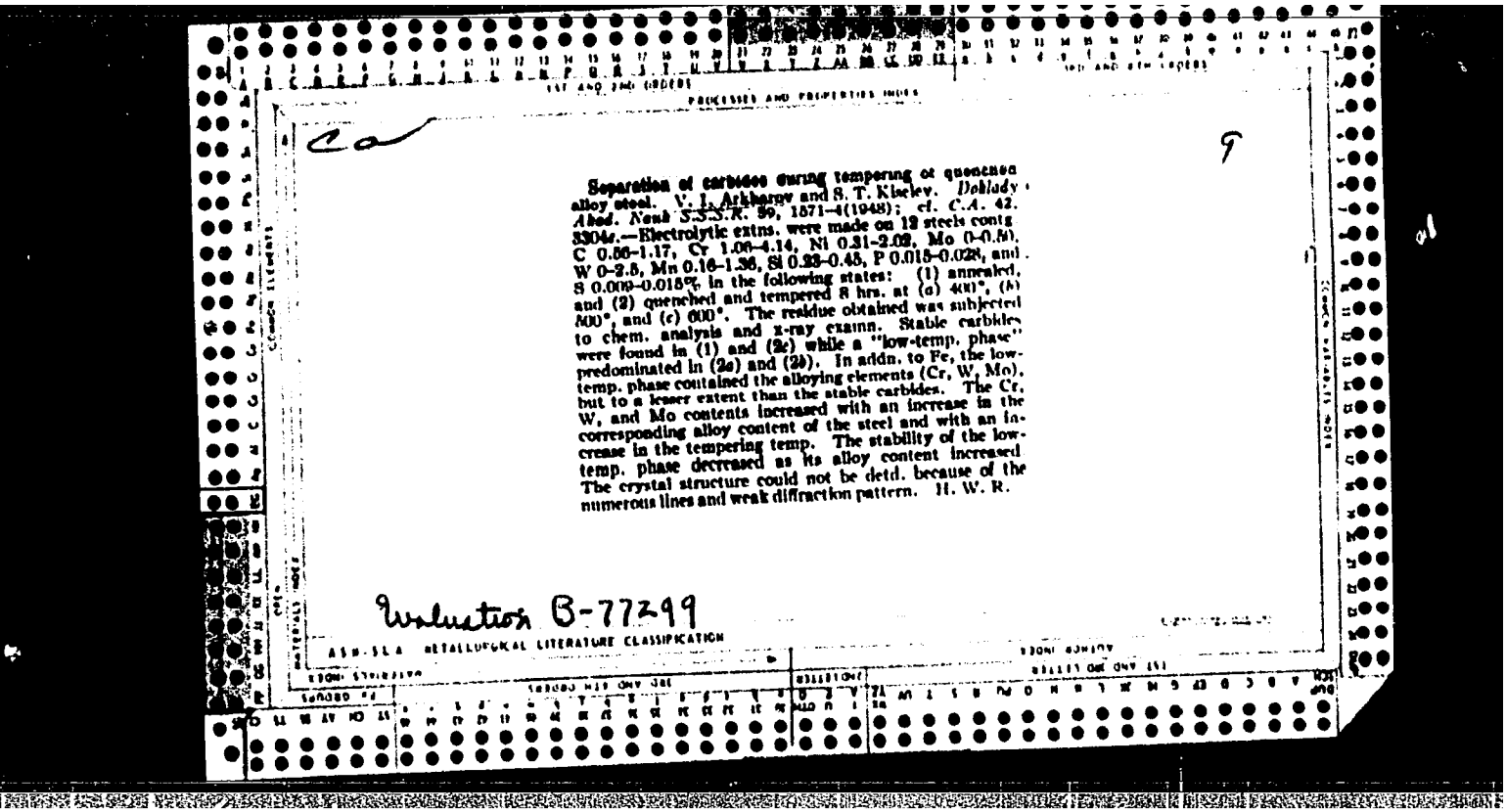
Crystal Structure of Copper Scale. (In Russian.) V. I. Arkharov and Z. P. Klchigina. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 18, Feb. 1948, p. 215-218.

Gives results of X-ray investigations of scale formed in air at 700, 800, 900, and 1000°C. for oxidation periods of 2-48 hr. Certain conclusions concerning the oxidation mechanism were derived from the results.



Nature of the "Forging Cross" in Steel. (In Russian.) V. I. Arkharov, N. V. V'yal, and K. A. Malyshev. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 18, Feb. 1948, p. 219-223.

Above phenomenon consists of a clearly visible cruss-shaped design which appears on the etched surface of specimens which were rotated during forging, between blows of the hammer, to positions at right angles to each other. Attempts to explain this phenomenon on the basis of a particular distribution of coarse and fine grains which is thus produced. Illustrated.



Separation of carbides during tempering of quenched alloy steel. V. I. Arkharov and S. T. Kishkev. *Doklady Akad. Nauk S.S.S.R.* 59, 1671–4(1948); cf. *C.A.* 42, 3304*e*.—Electrolytic extns. were made on 12 steels contg. C 0.56–1.17, Cr 1.06–4.14, Ni 0.31–2.02, Mo 0–0.50, W 0–2.5, Mn 0.16–1.36, Si 0.23–0.45, P 0.015–0.028, and S 0.009–0.015%, in the following states: (1) annealed, and (2) quenched and tempered 8 hrs. at (a) 400°, (b) 500°, and (c) 600°. The residue obtained was subjected to chem. analysis and x-ray examn. Stable carbides were found in (1) and (2c) while a "low-temp. phase" predominated in (2a) and (2b). In addn. to Fe, the low-temp. phase contained the alloying elements (Cr, W, Mo), but to a lesser extent than the stable carbides. The Cr, W, and Mo contents increased with an increase in the corresponding alloy content of the steel and with an increase in the tempering temp. The stability of the low-temp. phase decreased as its alloy content increased. The crystal structure could not be detd. because of the numerous lines and weak diffraction pattern. H. W. R.

Reduction B-77299

ARKHAROV, V. I ; KOSMANOV, Yu. D.

"Changes in the Grain Size of Steel as a Result of Recrystallization," Published by Doklady Akademii Nauk SSSR 69 (1948) No 1, pp 33/35.

Evaluation
B-77299, 29 Jul 1954

ARKHAROV, V.I.

URAL'SKII MASHINOSTROITEL'NYI ZAVOD, Sverdlovsk. Tsentral'naia laboratoria.

Metallovedenie i termicheskaia obrabotka, Moskva, Mashgiz, 1949. 2 v. illus.

At head of title, v. 2: V. I. Arkharov (i dr.)

Includes bibliographies.

(Metallography and heat treatment.)

DLC: TN690.U7

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

ARKHAROV, V. I.

Author: Arkharov, V. I.

Title: The Metallography and Heat Treating. (Metallovedenie i termicheskaia obrabotka.) 263 p.

City: Sverdlovsk

Publisher: State Scientific and Technical Publication of the Machine Construction Literature.

Date: 1949

Available: Library of Congress

Source: Monthly List of Russian Accessions, Vol. 3, No. 12, P. 836

CA

9

Mechanism of the solution of carbides in austenite.

V. I. Arkharov and S. T. Kiselev (Acad. Sci., U.S.S.R.). *Izvest. Akad. Nauk. S.S.S.R., Otdel. Tekh. Nauk* 1949, 136-7.—Lattice-parameter measurements and chem. analysis showed that the W content of the carbide Fe_3W_3C increases as the soly. of the carbide in austenite is increased by increasing the soln. temp. This result had previously been obtained on high alloy steels, and in this paper low alloy steels were studied: (1) 0.98% C, 2.5 W, 1.08 Ni, 4.14 Cr, 0.24 Si, 0.16 Mn, 0.018 P, 0.012 S; (2) 1.05 C, 1.4 W, 1.87 Ni, 3.98 Cr, 0.23 Si, 0.23 Mn, 0.016 P, 0.012 S. These alloys were soln.-treated for 0.5 hr. at the given temps. and oil-quenched. The lattice parameter of Fe_3W_3C and the W content of the carbide residue of the two steels after various treatments were: after annealing (1) 10.618 A., 9.81% W (2) 10.611, 5.82; quenched from 800° (1) 10.628, 10.06 (2) 10.616, 7.20; quenched from 850° (1) 10.632, 10.81 (2) 10.621, 8.14; quenched from 900° (1) 10.634, 11.48 (2) 10.624, 9.53; quenched from 950° (1) 10.636, 11.78 (2) 10.628, 9.31. The enrichment of the carbide in the alloying element probably occurs generally in alloy steels. A. G. Guy

USSR/Metals
X-Ray Analysis
Austenite

Jan 49

"The Mechanism of Dissolving Carbides in Austenite," V. I. Arkharov, S. T. Kiselev, Inst Phys of Metals, Ural Affiliate, Acad Sci USSR, Ural Mach Plant, 2 pp

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 1

Investigates, through X-ray analysis, low-alloy steels, close to structural steel in composition. Found that the carbide lattice parameter increased continuously with temperature increase during tempering. This is explained in that the content of tungsten, which has a considerably greater atomic radius than iron, increases in the carbide composition.

24/49T95

ARKHAROV, V. I.

(2) Rup

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
General and Physical Chemistry

Progress and perspectives of the research work on problems of mass diffusion in solid bodies. V. I. Arkharov. *Trudy Inst. Fiz. Metal. Ural. Filial. Akad. Nauk S.S.S.R.* No. 12, 94–120(1949).—The published research in the field of diffusion in metals, including oxidation, is reviewed. More than half of the 70 papers referred to were by A.

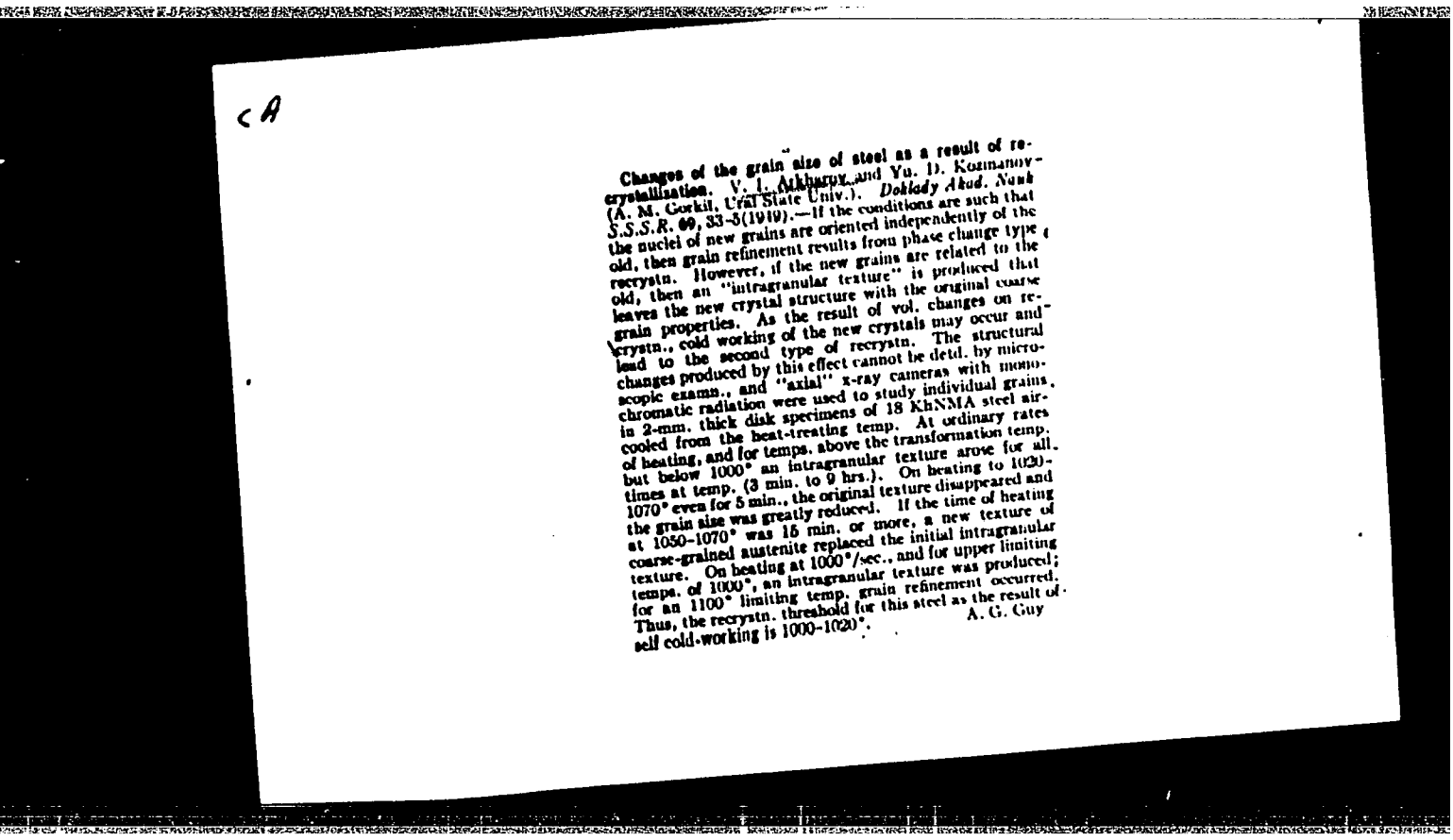
A. G. Guy

1

"The Influence of Small Additions of Antimony on the Diffusion Front of Silver in Polycrystalline Copper. V. I. Arkharov and T. Ya Gol'dshtein (*Doklady Akad. Nauk S.S.S.R.*, 1949, 68, (6), 1113–1115).—[In Russian]. The microstructure of diffusion zones formed by diffusion across the surface of contact of two metals was studied and the width of diffusion zones was measured. Alloys contg. 0·003, 0·03, 0·35, 2·3, and 4·7% Sb in Cu were prepared, the purity of the initial materials and of the products being checked by chem. and spectroscopic methods. Specimens 6 × 6 × 20 mm. were prepared, the size of the crystals in each being controlled by suitable mech. and thermal treatments. After the grain-size and structure of each specimen had been determined, a hole was drilled in it. The deformed parts were etched away and a cylinder of Ag of suitable dia. was inserted. Diffusion of Ag was studied at 640°–700° C. and annealing times from 70 to 100 hr. The specimens were covered with a thick layer of fine charcoal to minimize oxidation during annealing; they were water-quenched. Microsections from the region of max. dia. were prepared, a soln. of 10% $(NH_4)_2S_2O_8$, 20% NH_4OH, 70% H_2O being used as etching reagent. The diffusion zone of Ag into pure Cu has a relatively straight front; that of Ag into alloys of Cu and Sb varies with the compn. and grain-size of the alloy. In the alloys the diffusion front forms wedges extending down the intercryst. boundaries. With increasing grain-size the ratio of the length of the wedge to the average depth of the diffusion zone through the grain increases. With increasing Sb content. the diffusion front straightens, causing the wedges to become shorter and the average depth of the diffusion zone between the wedges to become greater. At 4·7% Sb the depth of the diffusion zone is approx. 20 times that in pure Cu. For Ag diffusing into Cu–Sb alloys, the zone depth for a given compn. increases with decreasing grain-size; in the case of diffusion into pure Cu, grain-size has comparatively small effect on the zone depth. The appearance of the diffusion front shows that in the alloys of low Sb concentration, the velocity of diffusion is several times greater at the grain boundary than through the body of the grain. Thus, there is a higher concentration of Sb at the surface of the grain than in the inner regions, especially at the lower overall concentrations of Sb. This argument is supported by the increasing depth of the diffusion zone with decreasing grain-size in alloys of the same compn. The shape of the diffusion zones in the alloys investigated shows that at higher Sb concentrations, the ratio of concentration at the surface to that at the centre of the grain is nearer unity than in low-Sb alloys. These results are in accord with earlier ideas on the enrichment of surface layers of crystals.—Z. S. B.

Met. Abs.

Evaluation B-80363



CA

Changes of the grain size of steel as a result of recrystallization. V. I. Arkharov and Yu. D. Kozmanov (A. M. Gorkii, Ural State Univ.). *Doklady Akad. Nauk S.S.S.R.* 69, 33–5(1949).—If the conditions are such that the nuclei of new grains are oriented independently of the old, then grain refinement results from phase change type recrystn. However, if the new grains are related to the old, then an "intragranular texture" is produced that leaves the new crystal structure with the original coarse grain properties. As the result of vol. changes on recrystn., cold working of the new crystals may occur and lead to the second type of recrystn. The structural changes produced by this effect cannot be detd. by microscopic exams., and "axial" x-ray cameras with monochromatic radiation were used to study individual grains in 2-mm. thick disk specimens of 18 KhNMA steel air-cooled from the heat-treating temp. At ordinary rates of heating, and for temps. above the transformation temp. but below 1000° an intragranular texture arose for all times at temp. (3 min. to 9 hrs.). On heating to 1020–1070° even for 5 min., the original texture disappeared and the grain size was greatly reduced. If the time of heating at 1050–1070° was 15 min. or more, a new texture of coarse-grained austenite replaced the initial intragranular texture. On heating at 1000°/sec., and for upper limiting temps. of 1000°, an intragranular texture was produced; for an 1100° limiting temp. grain refinement occurred. Thus, the recrystn. threshold for this steel as the result of self cold-working is 1000–1020°.

A. G. Guy

ARKHAROV, V. I.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 335 - I

BOOK Call No.: TN672.V8

Author: ARKHAROV, V. I.
Full Title: PROBLEMS OF ORIENTATIONAL AND DIMENSIONAL CORRELATIONS OF MARTENSITE TRANSFORMATION OF AUSTENITE
Transliterated Title: Nekotoryye voprosy oriyentatsionnogo i razmernogo sootvetstviya pri martensitnom prevrashchenii austenita v stali

Publishing Data
Originating Agency: All-Union Scientific Engineering and Technical Society of Machine Builders. Urals Branch
Publishing House: State Scientific and Technical Publishing House of Machine Building Literature ("Mashgiz")
Date: 1950 No. pp.: 9 No. of copies: 3,000

Text Data
This is an article from the book: VSESOYUZNOYE NAUCHNOYE INZHENERNO-TEKHNICHESKOYE OBSHCHESTVO MASHINOSTROITELEY. URAL'SKOYE OTDELENIYE, THERMAL TREATMENT OF METALS - Symposium of Conference (Termicheskaya obrabotka metallov, materialy konferentsii), (p. 7-15), see AID 223 - II

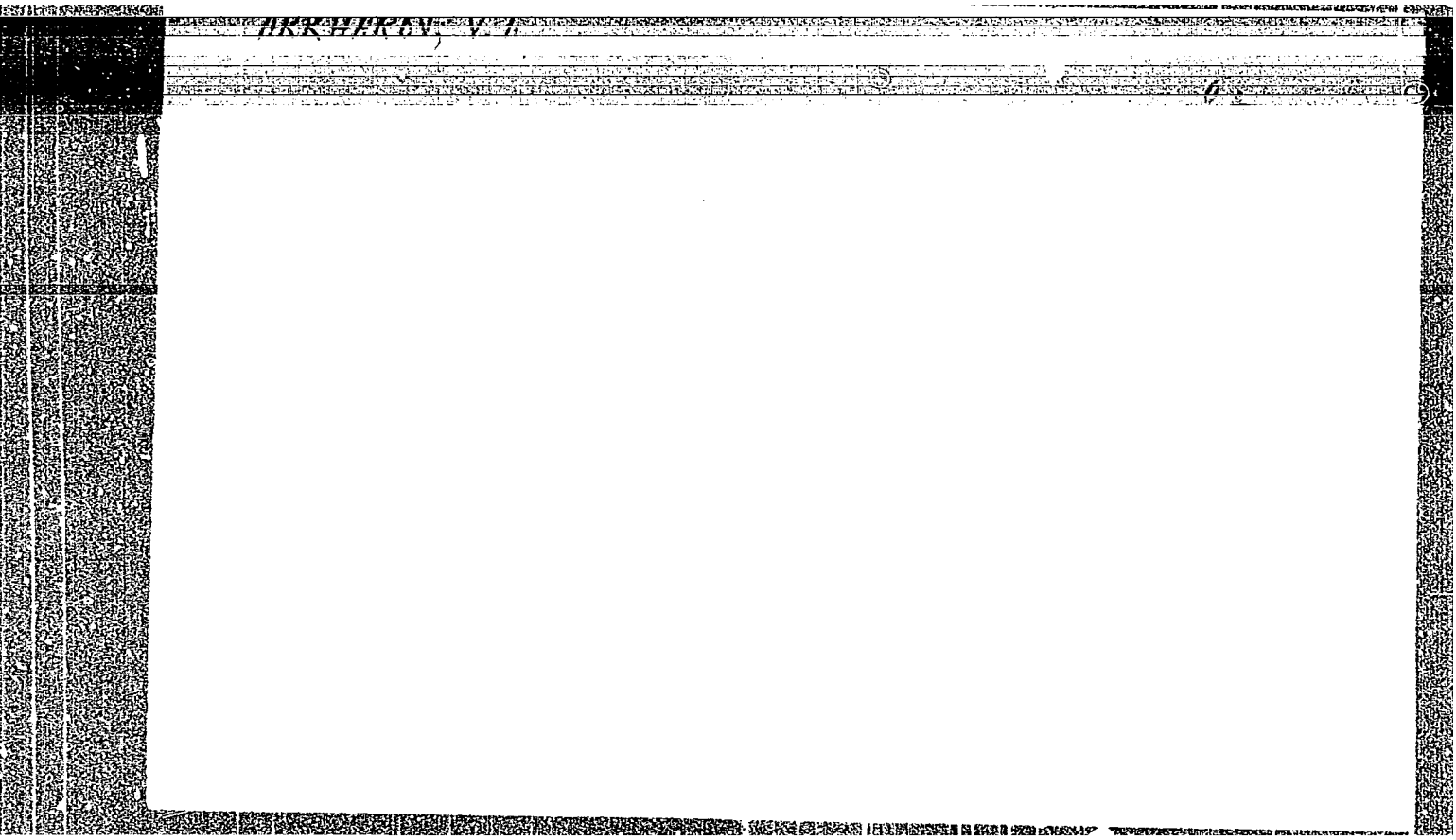
Coverage: The first correlation between austenite and martensite determines the position of the martensite point, its shift on the temperature scale with change of chemical composition, and

Nekotornyye voprosy oriyentatsionnogo i razmernogo sootvetstviya pri martensitnom prevrashchenii austenita v stali

AID 335 - I

the kinetics of the transformation. The second correlation determines the forms and dimensions of primary martensite formations, i.e., the microstructure.

The author presents a geometric picture of interlinking of crystalline lattice patterns of austenite and martensite at non-diffusional orderly rearrangement. The character and magnitude of the atom shift on rearrangement of the lattice are illustrated on an axanometric projection and on a three-dimensional model. The crystallogeometrical correlation, essential for the initiation of the martensite transformation, is discussed with consideration of thermal expansion of austenite, carbon concentration, and dimensions of elementary nuclei. The last part of the paper is related to the crystallogeometrical correlation, indicating the rupture of coherence between the interlinked lattices of austenite and martensite and the configuration of the martensite formations. The discussion is illustrated with three-dimensional crystallographic model of the interlinking of elementary nuclei of alpha-phase with the octahedral lattice of austenite. Three drawings and one table.



ARKHAROV, V.I.; KICHIGINA, Z.P.

X-ray analysis of manganese scale. Trudy Inst. fiz. met. no.11: 14-25 '50. (MLRA 10:8)

(Manganese—Corrosion) (X-ray spectroscopy)

ARKHAROV, V.I., KICHIGINA, Z.P.

Investigating the texture of nitride-treated layers on iron.
Trudy Inst. fiz. met. no.11:26-30 '50. (MLRA 10:8)
(Case hardening) (Iron--Metallography) (Diffusion)

ARKHAROV, V.I.

X-ray investigation of properties of black spots on stainless steel products. Trudy Inst.fiz. met. no.11:31-43 '50. (MLRA 10:8)
(Steel, Stainless--Metallography) (Metals at high temperature)

ARKHAROV, V. I.

UMRIKHIN, P.V.; ARKHAROV, V.I.; KICHIGINA, Z.P.

X-ray investigation of the scale on pig iron contained in open-hearth furnace burdens at the initial stage of steel smelting. Trudy Inst. fiz. met. no.11:44-46 '50. (MLRA 10:8)
(Cast iron--Metallography) (Metals at high temperature)
(Oxidation)