NATIONAL BUREAU OF STANDARDS REPORT

1628

BIBLIOGRAPHICAL SURVEY OF

RUSSIAN MATHEMATICAL MONOGRAPHS, 1930 TO 1951

compiled by

George E. Forsythe

National Bureau of Standards, Los Angeles

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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1. ELECTRICITY. Resistance Measurements. Inductance and Capacitance. Electrical Instruments. Magnetic Measurements. Electrochemistry.

2. OPTICS AND METROLOGY. Photometry and Colorimetry. Optical Instruments. Photographic Technology. Length. Gage.

3. HEAT AND POWER. Temperature Measurements. Thermodynamics. Cryogenics. Engines and Lubrication. Engine Fuels.

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5. CHEMISTRY. Organic Coatings. Surface Chemistry. Organic Chemistry. Analytical Chemistry. Inorganic Chemistry. Electrodeposition. Gas Chemistry. Physical Chemistry. Thermochemistry. Spectrochemistry. Pure Substances.

6. MECHANICS. Sound. Mechanical Instruments. Aerodynamics. Engineering Mechanics. Hydraulics. Mass. Capacity, Density, and Fluid Meters.

7. ORGANIC AND FIBROUS MATERIALS. Rubber. Textiles. Paper. Leather. Testing and Specifications. Organic Plastics. Dental Research.

8. METALLURGY. Thermal Metallurgy. Chemical Metallurgy. Mechanical Metallurgy. Corrosion.

9. MINERAL PRODUCTS. Porcelain and Pottery. Glass. Refractories. Enameled Metals. Building Stone. Concreting Materials. Constitution and Microstructure. Chemistry of Mineral Products.

10. BUILDING TECHNOLOGY. Structural Engineering. Fire Protection. Heating and Air Conditioning. Exterior and Interior Coverings. Codes and Specifications.

11. APPLIED MATHEMATICS. Numerical Analysis. Computation. Statistical Engineering. Machine Development.

12. ELECTRONICS. Engineering Electronics. Electron Tubes. Electronic Computers. Electronic Instrumentation.

13. ORDNANCE DEVELOPMENT. Mechanical Research and Development. Electromechanical Fuzes. Technical Services. Missile Fuzing Research. Missile Fuzing Development. Projectile Fuzes. Ordnance Components. Ordnance Tests. Ordnance Research.

14. RADIO PROPAGATION. Upper Atmosphere Research. Ionospheric Research. Regular Propagation Services. Frequency Utilization Research. Tropospheric Propagation Research. High Frequency Standards. Microwave Standards.

15. MISSILE DEVELOPMENT. Missile Engineering. Missile Dynamics. Missile Intelligence. Missile Instrumentation. Technical Services. Combustion.

NBS PROJECT
1101-11-5100

March 25, 1952

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PREPRINT

*The preparation of this paper was sponsored (in part) by the Office of Naval Research, USN

Bibliographical Survey of Russian Mathematical Monographs, 1930 to 1951*

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I. ON RUSSIAN BOOKS IN MATHEMATICS

Perhaps even more than mathematicians in Europe generally, those in Russia have traditionally devoted much effort to the preparation of good expository monographs. Since World War II there has been a great increase in this work. The resulting mathematical literature is extensive in quantity and high in quality. Among others, some of the very best research men are engaged in this work. The writing is usually leisurely and full of examples -- especially suitable for self instruction. The size of the editions is large.

As an example of a recent book consider S. L. Sobolev, The Equations of Mathematical Physics. The first edition appeared in 1947 in 10,000 copies, and a second edition of 8000 copies was published in 1950. In the second edition, 440 pages contain an exposition of 30 lectures by M. V. Lomonosov at the University in Moscow. These cover partial differential equations, integral equations, and infinite expansions. Early in the book there is a fifty-page resumé of Lebesgue integration theory, which is used in what follows. Results are carefully summarized in theorems. At least two critics have liked the book very much.

While some sections of Sobolev's book have counterparts in the western monographs, L. V. Kantorovich & N. M. Krylov, Approximation Methods in Higher Analysis, is unparalleled. The third edition (1950) of 5000 copies contains 695 pages, numerous references to the world literature, and many numerical examples in great detail, elegantly explained. The seven chapters cover the following: 1. Solution of partial differential equations by infinite

series; 2. Approximate solution of Fredholm integral equations; 3. Difference methods; 4. Variational methods; 5. Conformal mapping of regions; 6. Application of conformal mapping to the solution of basic problems for canonical regions; 7. Schwarz's method.

It seems clear that the Russian mathematical books would be of the greatest value to a variety of mathematicians if only they were readily available. In illustration of this, I have recently been told that some mathematicians in a Los Angeles aircraft company are today struggling with an aerodynamical problem whose solution may be found in Russian monographs.

How can we make the literature available? While the language barrier is a large one, perhaps a more fundamental difficulty is ignorance even of the existence of this literature. Experience at the National Bureau of Standards, Los Angeles, indicates that mathematicians will start to learn a language just as soon as valuable books are available in that language. Moreover, translations can be made where they are needed badly enough.

Mathematical Reviews is, of course, doing an excellent job of collecting and reviewing books and articles, and the majority of the books listed below have been noted or reviewed in that publication. Because those reviews are spread through 13 volumes of Mathematical Reviews, the compiler feels that it will prove worthwhile to bring these titles together in a single list. It is hoped this will help keep this literature before western mathematicians, and thus contribute to its use. I know of no comparable

list; in the "New Publications" section of the Bulletin of the American Mathematical Society, for example, Russian entries have appeared only since September 1950.

I do not believe Russian mathematical creativeness to be generally better than ours. There are fields where we excel, and some where Russians excel. But, as is obvious from the journals, Russian workers are reading the western literature much more closely than most of us follow their work, and they are translating a large number of the best western books and articles into Russian. It seems to me inevitable that this net one-way diffusion of mathematics, if long sustained, will result in most Russians knowing more about the subject than most of us. I am not worried about pure mathematics in this regard, because even a small group of reviewers of Russian work will bring to our attention whatever important new ideas there are, and we can do without the rest. I am worried about applied mathematics, however, because by its nature it must be carefully followed to be understood, and it usually cannot be so easily transmitted through abstracts and reviews. Moreover, Russians have long had a better position in applied mathematics, relative to us, than in pure mathematics.

The present bibliography is an outgrowth of a want-list for the library of the National Bureau of Standards, Los Angeles, but now has grown to include many titles not suitable for that library. The rules for admitting a book to the list are detailed in Section II. It is intended to confine the list to Russian books which a practising mathematician might wish to consult, if he could read them.

Although the list comes to some 430 titles, there is no claim of completeness. The following sources have been fairly well covered:

(1) The two excellent bibliographical books, Matematika v SSSR za tridtsat let 1917-1947 (see list under Kurosh), and Mekhanika v SSSR za tridtsat let 1917-1947 (see list under V. Z. Vlasov).

(2) The book-lists in the numbers of Uspekhi matematicheskikh nauk (new series, 1946 ff.) available in Los Angeles and Pasadena.

(3) Some volumes of Mathematical Reviews.

(4) Bibliographies in several recent Russian books and articles.

(5) Professor I. S. Sokolnikoff's personal books.

(6) Proof sheets of the Library of Congress cards listing new acquisitions since around 1948.

(7) Some book catalogues.

If readers will send additions and corrections to the compiler at the National Bureau of Standards, 405 Hilgard Avenue, Los Angeles 24, California, they can be included in any future reprinting.

I want to thank Professor Sokolnikoff for his helpful reading of the book list. His article, "Organized research in the USSR," Scientific Monthly, vol 72 (1951), pp. 164-168, gives a clear picture of what lies behind Russian scientific publications.

Acknowledgment is due to Mrs. Gertrude Reider for her careful editing and typing of the manuscript and especially the file of book-cards. The attained accuracy would not have been possible without her; the remaining errors are almost certainly mine.

II. BIBLIOGRAPHY, ARRANGED BY AUTHOR

The subject matter of the listed books is mathematics, pure and applied, including tables beyond the most elementary, but excluding elementary nomography and descriptive geometry. There are a few titles on Quantum Mechanics and other modern branches of mathematical physics, and more on mechanics and mathematical machines, but these topics are far from completely covered.

The list is confined to books, excluding dissertations. Because of their mathematical interest, most of the periodical monographs (Trudy) of the Steklov mathematical institute have also been included. The books in the list have been published (or reprinted) in Russian since 1930. For textbooks, the subject matter is more advanced than calculus. "Popular lectures" are excluded, even when these cover advanced topics. Translations into the Russian are omitted.

These rules, however, have not been followed to the letter — especially where a book looked like a good one. With one or two exceptions, the compiler has seen only the books in our library, and books have been judged on whatever evidence was available.

An asterisk (*) before a title indicates that the book is in the library of the National Bureau of Standards, Los Angeles.

The letter (w) before a title indicates that, in the compiler's opinion, our library should try to acquire it. (Of course out of print Russian books are exceedingly hard to find!)

The Library of Congress system of Russian transliteration is used, because librarians seem to be the principal persons who use such references without knowing Russian.

ABBREVIATIONS

M. = Moscow

L. = Leningrad

G. = Gosudarstvennoe izdatel'stvo tekhniko-teoreticheskoĭ literatury, abbreviated "Gostekhizdat" (State publisher of technical-theoretical literature), Moscow or Leningrad or both.

Izd. AN SSSR = Publication of the Akademiîa nauk (Academy of sciences) of the USSR.

p. = pages

( ) cop. = (number of) copies (printed), according to information in the book or in Russian bibliographical material.

15r 50k = 15 rubles 50 kopeks = 12.50 rubles, the price. The ruble is worth between about 12 and 25 U.S. cents, depending on the type of transaction.

MR = Mathematical Reviews

Trudy mat. inst. Steklova = Akademiîa nauk SSSR., Leningrad, Matematicheskiĭ institut imeni V. A. Steklova., Trudy. (This institute is analogous to the Institute for Numerical Analysis of the National Bureau of Standards.)

Izd. univ. = Izdatel'stvo universiteta? (Publishing house of the university?)

AKADEMIÎA NAUK SSSR, ÎUbileĭnyĭ sbornik ··· (Jubilee collection celebrating the 30th anniversary of the October socialist revolution), M., 1947, [in 2 vols.; vol. 1 has mathematics].

w AKHIEZER, N. I., a Vvedenie v teoriîu lineĭnykh operatorov v prostranstve Gilberta (Introduction to the theory of linear operators in Hilbert space). Vols. 1 and 2, lithographed course of lectures, Kharkov, 1940.

w AKHIEZER, N. I., b Lektsii po teorii approksimatsii (Lectures on the theory of approximation), G., 1947, 323 p., 5000 cop., 15r 50k.

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* ALEKSANDROV, A. D., a Vnutrenniaîa geometriîa vypuklykh poverkhnosteĭ (Interior geometry of convex surfaces), G., 1948, 387 p., 6000 cop.

* ALEKSANDROV, A. D., b Vypuklye mnogogranniki (Convex polyhedra), G., 1950, 428 p., 4000 cop., 21r 80k, [MR 12, 732].

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ALEKSANDROV, P. S. and EFREMOVICH, V. A., Ocherk osnovnykh poniatiĭ topologii (Sketch of the basic concepts of topology), M. - L., ONTI, 1936, 94 p.

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w ANAN'EV, I. V., Spravochnik po raschetu sobstvennykh kolebaniĭ uprugikh sistem (Handbook on the calculation of proper oscillations of elastic systems), G., 1946, 223 p.

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ARKHANGEL'SKIĬ, V. A., Raschety neustanovivshegosîà dvizheniîà v otkrytykh vodotokakh (The calculation of unsteady motion in open channels), M. - L., Izd. AN SSSR, 1947, 136 p., [MR 13, 82].

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CHAPLYGIN, S. A., b Sobranie sochineniĭ (Collected works), G.,

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III. AUTHOR NAMES, ARRANGED BY SUBJECT

The following outline of subjects is borrowed from that of Mathematical Reviews, except that we have subdivided 1) and 8), and have added 12). Books have usually been placed in the outline from an inspection of their titles. The + sign connects joint authors.

1) History

Chebyshev a, Kagan a, d, Kotel'nikov, Nestorovich.

a) Bibliography

Aleksandrov + Markushevich + Khinchin, Anonymous b, Golubev + Leĭbenzon, Kurosh c, Kurosh + Markushevich + Rashevskiĭ, Vlasov + Golubev + Moiseev.

b) Collected papers

Akademiâ nauk SSSR, Anonymous a, Chaplygin b, N. G. Chebotarëv e, Chebyshev b, Goluzin, Kochin a, Kovalevskaâ, A. N. Krylov c, P. N. Lebedev, Lâpunov c, Lobachevskiĭ, Ostrogradskiĭ, Zhukovskiĭ a.

2) Foundations

(None)

3) Algebra

Aleksandrov + Markushevich + Khinchin, N. G. Chebotarëv c, d, e, Dubnov, Faddeev + Sominskiĭ, Faddeeva, Gantmakher + Kreĭn, Gel'fand, Grave b?, Gurevich, Khinchin h, Kreĭn + Naĭmark, Kryzhanovskiĭ, Kurosh c, Lappo-Danilevskiĭ, Malʹtsev, Markov c, Minorskiĭ + Uranovskiĭ, Perelman a, Shirokov, Sushkevich c, S. P. Vinogradov.

a) Abstract algebra

Chebotarëv a, Kurosh b, Markov b, Okunev a, b, G. E. Shilov, Shmidt a, Sushkevich c.

3) Algebra (cont.)

b) Theory of groups

P. S Aleksandrov a, N. G. Chebotarëv b, Gel'fand + Naĭmark, Kurosh a, Pontriagin a, Raĭkov, Shmidt b, Sushkevich b.

4) Number theory

Arnol'd, Chebyshev b, c, Chudakov, Delone, Delone + Faddeev, Khinchin a, g, Khua-Lo-Ken, Shnirel'man, Sulakvelidze, Sushkevich a, I. M. Vinogradov a, b, c.

5) Analysis

Akhiezer + Kreĭn, Chaplygin b, Chebyshev a, b, Gantmakher + Kreĭn, Khinchin f, Kryzhanovskiĭ, Mitropol'skiĭ, Nemytskiĭ + Sludskaia, Okunev c, E. P. Popov a, V. I. Smirnov, Tarasov.

a) Calculus

Fikhtengol'ts, Fikhtengol'ts + Natanson, Glivenko a, Kochin b, Ryshik b, Timofeev, Tolstov a.

b) Theory of sets, theory of functions of a real variable

P. S. Aleksandrov c, Aleksandrov + Kolmogorov, Keldysh, Kharadze, Luzin a, b, c, Mergelian, Natanson a, b.

c) Theory of functions of complex variables

Chebotarëv + Meĭman, Fuks a, b, Fuks + Shabat, Goluzin a, b, IAnchevskiĭ, Markushevich, Privalov d, e, Shaginian, Volkovyskiĭ.

d) Theory of series

Bari (?).

5) Analysis (cont.)

e) Fourier series and generalizations, integral transforms

Bari, Danilevskiĭ + Ėfros, Ditkin + Kuznetsov, Kantorovich a, Kontorovich, Lopshits, Lur'e b, Men'shov, Moiseev a, Nikol'skiĭ, Privalov a, Raĭkov, Tolstov b, I. M. Vinogradov c.

f) Polynomials, polynomial approximations

Akhiezer b, S. N. Bernshteĭn a, c, Geronimus b, Goncharov a, Kharadze, Nemchinov, Remez, V. G. Vlasov.

g) Special functions

Akhiezer c, Faddeeva + Gavurin, Kheĭfets, Liusternik + Akushskiĭ + Ditkin, Ryshik a, Samoĭlova-Iakhontova, Sergeev, Shpil'raĭn, Shtaerman a, Zhuravskiĭ.

h) Harmonic functions, potential theory

N. I. Idel'son, Landau + Lifshits b, Liapunov b, Privalov c, Serebrennikov, Sretenskiĭ b.

i) Differential equations

Artem'ev, Chaplygin a, Egorov a, Ėl'sgol'ts, Erugin ?, Giunter b, Golubev b, Goluzin + others, Kantorovich + Krylov, Kravchuk, A. N. Krylov b, Kupradze a, Lappo-Danilevskiĭ, Lavrent'ev, Levin + Grosberg, Levitan, Malkin a, b, Mikeladze a, b, Moiseev b, Myshkis (Supplementary list), Nemytskiĭ + Stepanov, Oppokov a, Panov, Petrovskiĭ a, b, Rashevskiĭ b, Romanovskiĭ c, Sikorskiĭ, Sobolev a, Stepanov, I. N. Vekua.

j) Difference equations, special functional equations

Bezikovich a, Gel'fond, Myshkis (Supplementary list), Petrovskiĭ b.

5) Analysis (cont.)

k) Integral equations

Kantorovich + Krylov, Kravchuk, Kupradze b, Mikhlin d, Miuntts, Muskhelishvili b, Petrovskiĭ c, Privalov b, N. S. Smirnov, Sobolev a, N. P. Vekua.

l) Functional analysis

Akhiezer a, Akhiezer + Glazman, Banakh, Kantorovich + Vulikh + Pinsker, Khalilov a, b, R. O. Kuz'min, G. E. Shilov, Sobolev b.

m) Calculus of variations

Bukreev, Egorov b, Giunter c, Lavrent'ev + Liusternik a, b, Liusternik b, Liusternik + Shnirel'man, Smirnov + Kantorovich + Krylov, N. V. Smirnov.

n) Theory of probability

S. N. Bernshteĭn b, Boev, Bukhman + Podgorodetskiĭ + Ostroukhov, A. S. Chebotarëv, Glivenko b, c, Gnedenko, Gnedenko + Khinchin, Gnedenko + Kolmogorov, Goncharov b, Kantorovich b, Khinchin b, c, d, e, Landau + Lifshits c, Markov a, Romanovskiĭ b, f, Slutskiĭ, N. V. Smirnov, Unikovskiĭ.

o) Mathematical statistics

Boiarskiĭ, Boiarskiĭ + Stavrovskiĭ + Khotimskiĭ + IAstremskiĭ, IAkovlev, N. M. Idel'son, B. S. Kuz'min, Nemchinov, Romanovskiĭ a, d, e, P. F. Shilov.

6) Topology

P. S. Aleksandrov b, Aleksandrov + Efremovich, Aleksandrov + Uryson, Liusternik b, Liusternik + Shnirel'man, Markov b, Pontriagin a, b, Shanin.

7) Geometry

Bogomolov, Dubnov, Efimov a, Finikov b, Fuks b, Glagolev a, Gradshteĭn, ÎAglom + Boltîanskiĭ (Supplementary list), Kagan a, d, Nestorovich, Perelman b, Rashevskiĭ b, Shirokov + Kagan, Smogorzhevskiĭ, Volkovyskiĭ.

a) Convex domains, extremal problems, integral geometry

A. D. Aleksandrov a, b, Kagan b, Lîusternik a, Pogorelov a, b (Supplementary list).

b) Algebraic geometry

Finikov e, Grave b?, Zeĭliger.

c) Differential geometry

Bîushgens b, Efimov b, Finikov a, c, d, Gokhman, Kagan c, Kochin b, Norden a, b, Pogorelov a, Rashevskiĭ a, c, Rumer, Shirokov, Vygodskiĭ.

8) Numerical and graphical methods

Akhiezer b, Bezikovich b, Braginskiĭ, Chaplygin a, Faddeeva, Gersevanov, Goncharov a, Kantorovich c, Kantorovich + Krylov, Kitaĭgorodskiĭ, A. N. Krylov a, N. M. Krylov, Latysheva, Levkovich, Lîusternik c, Lopshits, Melent'ev, Oppokov a, b, Panov, Remez, Skarboro, Vetchinkin + Kogan, V. G. Vlasov.

a) Tables

Andreev (Supplementary list), Chudov, Ėĭdel'nant, Faddeeva + Gavurin, Filonenko + Bashkov, Gauss, ÎAkovnin, Ivanov, Kheĭfets, Khrenov, Lîusternik + Akushskiĭ + Ditkin, Neĭshuler a, b, c, Osipov, Samoĭlova-ÎAkhontova, Segal + Semendîaev, Shpil'raĭn, Shumîagskiĭ, Slutskiĭ.

8) Numerical and graphical methods (cont.)

b) Machines

Bruk, Dobrogurskiĭ, Gavrilov, Gutenmakher.

c) Nomography

Gavra, Glagolev b, Pentkovskiĭ, Varsanovich.

9) Relativity

(None)

10) Mechanics

Akimov, Andronov + Khaĭkin, Anonymous c, Artobolevskiĭ, S. A. Bernshteĭn b, Bîushgens a, Bukhgol'tŝ, Bukhgol'tŝ + Voronkov + Minakov, Bulgakov a, b, Chaplygin b, d, Chebyshev a, b, c, Chetaev, Dimentberg, Dinnik a, Dobrovol'skiĭ, Dobrovol'skiĭ + Artobolevskiĭ, Eĭkhenvald't, Frenkel b, Gantmakher + Kreĭn, Geronimus a, Golubev + Leĭbenzon, Grave a, N. I. Idel'son, Îûdin, Kharkevich, Koshlîakov, Kotel'nikov, Kozhevnikov, Krylov + Bogolîubov a, b, Kudrevich, Kupradze b, Landau + Pîatigorskiĭ, Lebinson, Lîapunov a, Loĭtsîanskiĭ + Lur'e, Malkin a, b, Meshcherskiĭ, Mikhlin d, Moiseev b, Neĭman, Nekrasov a, Nikolai, Ostrogradskiĭ, Papkovich b, Protusevich, Rzhanitŝyn, Sedov c, A. F. Smirnov, Strelkov, Suslov, Teodorchik, Umanskiĭ, Vedrov, Veselovskiĭ, Veselovskiĭ + Timakov, Umanskiĭ, V. Z. Vlasov c, Vlasov + Golubev + Moiseev, Voronkov, Zhukovskiĭ a, b.

10) Mechanics (cont.)

a) Hydrodynamics, aerodynamics, acoustics

Arkhangel'skiĭ, Belinskiĭ, Blokhintsev b, Chaplygin b, c, Fabrikant, Frenkel c, Fridman, Golubev a, Khristianovich, Kochin a, Kochin + Kibel' + Roze, Landau + Lifshits a, Levinson, Loĭtsianskiĭ a, b, Nekrasov b, M. Popov, Povalo-Shveĭkovskiĭ, Sedov a, b, Sretenskiĭ a, Velikanov, Vetchinkin + Poliakhov, Zel'dovich a, b.

b) Elasticity, plasticity

Anan'ev, S. A. Bernshteĭn a, Bezhukov, Dinnik b, c, d, Filonenko-Borodich, Galërkin, Golushkevich, Gorbunov-Posadov, Il'iushin, Kachanov a, b, Khachatrian, Khristianovich + Mikhlin + Devison, Kolosev, Kupradze a, Kutilin, N. N. Lebedev, Leĭbenzon a, b, c, Lekhnitskiĭ a, b, c, Lenskiĭ, Lur'e a, Malinin, Mikeladze b, Mikhlin a, b, c, Muskelishvili a, Novozhilov, Papkovich a, E. P. Popov b, Rabotnov a, b, Rubinin, Savin, Shtaerman b, V. S. Smirnov, Sokolovskiĭ a, b, Timoshenko, Ulfland, V. Z. Vlasov a, b.

11) Mathematical physics

Bogoliubov, Bridzhmen, Gïunter a, Khinchin i, Kitaĭgorodskiĭ, Kotel'nikov, A. N. Krylov b, N. M. Krylov, Landau + Lifshits b, c, Mikhlin e.

a) Optics, electromagnetic theory

Frenkel' a, Grinberg.

b) Quantum mechanics

Blokhintsev a, Khinchin e, j(Supplementary list), Landau + Lifshits c, Rumer.

12) Handbooks of general formulas

Bronshteĭn + Semendîaev, Ryshik a, b.

April 23, 1952

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