Space INTELLIGENCE NOTES

SPACE SYSTEMS INFORMATION BRANCH, GEORGE C. MARSHALL SPACE FLIGHT CENTER

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AVAILABLE SOVIET SCIENTIFIC LITERATURE The following are excerpts from the booklet entitled Providing U. S. Scientists With Soviet Scientific Information prepared by the Office of Science Information Service, National Science Foundation.

With the increasing of freedom of flow of Soviet materials since about 1956, the acquisition of standard Soviet publications no longer poses a serious problem. A number of bibliographies are issued in the Soviet Union which are readily available to the U. S. Many such bibliographies are listed in the Monthly Index of Russian Accession, published by the Library of Congress and available on subscription from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. at $12.00 a year.

The following is a list of U. S. book dealers mentioned in the Soviet publication announcement Newspapers and Magazines of the USSR for 1959.

1. Victor Kamkin, Inc.
   2906 Fourteenth Street, N.W.
   Washington 9, D. C.

2. Imported Publications & Products
   4 West Sixteenth Street
   New York 11, New York

3. Four Continent Book Corporation
   822 Broadway
   New York 3, New York

4. Moore-Cattrell Subscription Agencies, Inc.
   North Coshocton, New York

5. Universal Distributors
   52-54 West Thirteenth St.
   New York 11, New York

6. Stechert-Hafner, Inc.
   31 East Tenth Street
   New York 11, New York

To insure prompt receipt of Soviet periodicals place order about two months before the beginning of the year.

AVAILABLE TRANSLATIONS The following table is a selection from the more than 70 journals now being published in the U. S. The selection is based on the applicability of the subject matter to the field of astronautics.

RUSSIAN SCIENTIFIC JOURNALS AVAILABLE IN ENGLISH

Sponsored by the National Science Foundation

Subject	Translation Beginning	Frequency	Agency	Subscription Price
ASTRONOMY				
Astronomicheskii Zhurnal (Astronomical Journal)	First 1957 issue	Bimonthly (1,100 pages per year)	American Institute of Physics 335 E. 45th Street New York 17, N. Y.	$25 per year $10 per year to libraries of academic institutions
Selected Translations of Russian Articles in the Field of Astronautics	May 1959	Quarterly (200 pages per year)	American Rocket Society 500 Fifth Avenue New York 36, N. Y.	To be distributed free of charge as a supplement to the American Rocket Society Journal
BIOLOGY				
Doklady Akademii Nauk SSSR (Biological Sciences Sections)	Vol. 112, Nos. 1-6, Jan.-Feb. 1957	Bimonthly (900 pages per year)	American Institute of Biological Sciences 2000 "P" St., N.W. Washington 6, D. C.	$20 per year
Doklady Akademii Nauk SSSR (Botanical Sciences Sections)	Vol. 112, Nos. 1-6, Jan.-Feb. 1957	Bimonthly (300 pages per year)	American Institute of Biological Sciences 2000 "P" St., N.W. Washington 6, D. C.	$7.50 per year

Doklady Akademii Nauk SSSR: Otdel Biokhimii (proceedings of the Academy of Sciences, USSR, Biochemistry)	Jan. 1958 (Trans. begun by Consultants Bureau, 1957)	Bimonthly (500 pages per year)	American Institute of Biological Sciences 2000 "P" St., N.W. Washington 6, D. C.	$15 per year $10 per year to libraries of academic institutions
Entomologicheskoe Obozrenie (Entomological Review)	First 1958 issue	Quarterly (1,000 pages per year)	American Institute of Biological Sciences 2000 "P" St., N.W. Washington 6, D. C.	$25 per year $12 per year to libraries of academic institutions
Fiziologiia Rastenii (Plant Physiology)	Vol. 4, no. 1 Jan.-Feb. 1957	Bimonthly (700 pages per year)	American Institute of Biological Sciences 2000 "P" St., N.W. Washington 6, D. C.	$15 per year
Mikrobiologiia (Microbiology)	Vol. 26, no. 1 Jan.-Feb. 1957	Bimonthly (900 pages per year)	American Institute of Biological Sciences 2000 "P" St., N.W. Washington 6, D. C.	$20 per year
CHEMISTRY				
Izvestiia Akademii Nauk SSSR: Otdelenie Khimicheskikh Nauk (Bulletin of Academy of Sciences, USSR, Chemical series)	Jan. 1957 (Trans. begun by Consultants Bureau, 1952)	Monthly (1,500 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.	$45 per year $15 Per year to libraries of academic institutions

Subject	Translation Beginning	Frequency	Agency	Subscription Price
Zhurnal Obshchei Khimii (Journal of General Chemistry)	Jan. 1957 (Trans. begun by Consultants Bureau, 1949)	Monthly (3,600 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.	$90 per year $30 per year to libraries of academic institutions
Zhurnal Prikladnoi Khimii (Journal of Applied Chemistry)	Jan. 1957 (Trans. begun by Consultants Bureau, 1950)	Monthly (1,900 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.	$60 per year $20 per year to libraries of academic institutions
EARTH SCIENCES				
Doklady Akademii Nauk SSSR: Otdel Geologii (Geological Sciences Section)	1957 volume	Bimonthly (750 pages per year)	National Acad. of Sciences (American Geological Inst.) 2101 Constitution Avenue Washington 25, D. C.	$40 per year $15 per year to libraries of academic institutions
Geodeziya i Kartografia (Geodesy and Cartography)	1959 issues	Monthly (1,152 pages per year)	American Geophysical Union 1515 Massachusetts Avenue Washington 25, D. C.	$20 per year
Geokhimii (Geochemistry)	1956 issues	8 issues per year (800 pages per year)	The Geochemical Society Dr. Earl Ingerson University of Texas Austin 12, Texas	$20 per year $10 per year to libraries of academic institutions

International Geological Review	Jan. 1959	Monthly (1,100 pages per year)	National Acad. of Sciences (American Geological Inst.) 2101 Constitution Avenue Washington 25, D. C.	$55 per year $15 per year to libraries of academic institutions
Izvestiia Akademii Nauk SSSR: Seriia Geofizicheskaia (Bulletin of the Academy of Sciences, USSR: Geophysics Series)	Jan. 1957	Monthly (1,200 pages per year)	American Geophysical Union 1530 "P" St., N.W. Washington 5, D. C.	$25 per year $20 per year to libraries of academic institutions
Izvestiia Akademii Nauk SSSR: Seriia Geologicheskaia (Bulletin of the Academy of Sciences, USSR: Geologic Series)	Jan. 1958	Monthly (1,500 pages per year)	National Acad. of Sciences (American Geological Inst.) 2101 Constitution Avenue Washington 25, D. C.	$45 per year $27 per year to libraries of academic institutions
ENGINEERING & TECHNOLOGY				
Avtomatika i Telemekhanika (Automation and Remote Control)	Jan. 1957, vol. 18, no. 1 (vol. 17, 1956 trans. by Consultants Bureau)	Monthly (1,200 pages per year)	Mass. Inst. of Technology Subscriptions handled by: Instrument Soc. of America 313 Sixth Avenue Pittsburgh 22, Penn.	$30 per year $15 per year to libraries of academic institutions

Subject	Translation Beginning	Frequency	Agency	Subscription Price
Elektrosviaz' (Telecommunications)	Jan. 1957	Monthly (1,000 pages per year	Mass. Inst. of Technology Subscriptions handled by: Pergamon Institute 122 East 55th St. New York 22, N. Y.	$30 per year $15 per year to libraries of academic institutions
Fizika Metallov i Metallovedenie (The Physics of Metals and Metallography)	Jan.-Feb. 1957	Bimonthly (1,162 pages per year)	Acta Metellurgica Subscriptions handled by: Pergamon Institute 122 East 55th St. New York 22, N. Y.	$40 per year $20 per year to libraries of academic institutions
Izmeritel'naia Tekhnika (Measurement Techniques)	Jan.-Feb. 1958	Bimonthly (750 pages per year)	Instrument Soc. of America 313 Sixth Avenue Pittsburgh 22, Penn.	$25 per year $12.50 per year to libraries of academic institutions
Metallovedenie i Obrabotka Metallov (Metal Science and Treatment)	Jan. 1958	Monthly (768 pages per year)	Acta Metallurgica Subscriptions handled by: Pergamon Institute	To be announced
Metallurg (Metallurgist)	1956 issues	Monthly	Acta Metallurgica Subscriptions handled by: Pergamon Institute	To be announced

Pribory i Tekhnika Eksperimenta (Instruments and Experimental Techniques)	Jan.-Feb. 1958	Bimonthly (930 pages per year)	Instrument Soc. of America 313 Sixth Avenue Pittsburgh 22, Penn.	$25 per year $12.50 per year to libraries of academic institutions
Radiotekhnika (Radio Engineering)	Jan. 1957	Monthly (1,000 pages per year)	Mass. Inst. of Technology Subscriptions handled by: Pergamon Institute	$30 per year $15 per year to libraries of academic institutions
Radiotekhnika i Elektronika (Radio Engineering and Electronics)	Jan. 1957	Monthly (2,500 pages per year)	Mass. Inst. of Technology Subscriptions handled by: Pergamon Institute	$60 per year $22.50 per year to libraries of academic institutions
Referativnyi Zhurnal Metallurgiia (The Journal of Abstracts - Metallurgy)	Jan. 1957	Monthly	Acta Metallurgica Subscriptions handled by: Pergamon Institute	$50 per year $25 per year to libraries of academic institutions
Steklo i Keramika (Glass and Ceramics)	1956 issues	Monthly (540 pages per year)	American Ceramic Soc., Inc. Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.	$80 per year
Zavodskaia Laboratoriia (Industrial Laboratory)	Jan. 1958	Monthly (1,500 pages per year)	Instrument Soc. of America 313 Sixth Avenue Pittsburgh 22, Penn.	$35 per year $17.50 per year to libraries of academic institutions

Subject	Translation Beginning	Frequency	Agency	Subscription Price
MATHEMATICS				
Doklady Akademii Nauk SSSR: (Proceedings of the Academy of Sciences, USSR, Soviet Mathematics)	1960 issues	6 issues per year (1,500 pages per year)	American Mathematical Soc. 190 Hope St. Providence, R. I.	$17.50 per year (domestic) $20 per year (foreign) $5 per year (single copy)
Prikladnaia Matematika i Mekhanika (Journal of Applied Mathematics and Mechanics)	Jan.-Feb. 1958	Bimonthly (1,500 pages per year)	American Society of Mechanical Engineers 29 West 39th Street New York 18, N. Y.	$35 per year
Selected Translations of Russian Mathematics Articles	1954 (May 1948-Feb. 1954, AMS sponsored by ONR)	3 volumes annually	American Mathematical Soc. 190 Hope Street Providence, R. I.	Approximately $5.00 per volume
Teoriia Veroiatnostei i ee Primenenie (Theory of Probability and its Applications	Vol. 1, no. 1, 1956	Quarterly (600 pages per year)	Society for Industrial and Applied Mathematics Box 7541 Philadelphia 1, Penn.	$18 per year $9.50 per year to libraries of academic institutions
PHYSICS				
Akusticheskii Zhurnal (Acoustics Journal)	Vol. 1, 1955	Quarterly (400 pages per year)	American Inst. of Physics 335 East 45th St. New York 17, N. Y.	$12 per year

Doklady Akademii Nauk SSSR: (Proceedings of the USSR Academy of Sciences: Physics Papers)	Vol. 106, nos. 1-6, 1956	Bimonthly (1,400 pages per year	American Inst. of Physics 335 East 45th St. New York 17, N. Y.	$35 per year $15 per year to libraries of academic institutions
Fizika Tverdogo Tela (Solid State Physics	Jan. 1959	Monthly (2,200 pages per year	American Inst. of Physics 335 East 45th St. New York 17, N. Y.	$55 per year $25 per year to libraries of academic institutions
Kristallografiia (Crystallography)	1957	Bimonthly (1,000 pages per year)	American Inst. of Physics 335 East 45th St. New York 17, N. Y.	$25 per year $10 per year to libraries of academic institutions
Optika i Spektroskopiia (Optics and Spectroscopy)	Jan. 1959	Monthly	Optical Society of America 1155 - 16th St., N.W. Washington, D. C.	$25 per year to nonmembers; free first year to members
Uspekhi Fizicheskikh Nauk (Advances in the Physical Sciences)	Vol. 66, 1958	6 issues per year (550 pages per year)	American Inst. of Physics 335 East 45th St. New York 17, N. Y.	$45 per year $20 per year to libraries of academic institutions
Zhurnal Eksperimental 'noi i Teoreticheskoi Fiziki (Journal of Experimental and Theoretical Physics)	Vol. 28, 1955	Monthly (3,700 pages per year)	American Inst. of physics 335 East 45th St. New York 17, N. Y.	$75 per year $35 per year to libraries of academic institutions
Zhurnal Tekhnicheskoi Fiziki (Journal of Technical Physics)	Vol. 26, no. 1, 1956	Monthly (2,000 pages per year)	American Inst. of Physics 335 East 45th St. New York 17, N. Y.	$55 per year $25 per year to libraries of academic institutions

RUSSIAN SCIENTIFIC JOURNALS AVAILABLE IN ENGLISH

Sponsored by other agencies

Subject	Translation Beginning	Frequency	Agency	Sponsor	Subscription Price
BIOLOGY					
Biofizika (Biophysics)	1957 issues	Bimonthly (750 pages per year)	Pergamon Institute 122 East 55th St. New York 22, N. Y.	National Institute of Health	$30 per year
Biokhimiia (Biochemistry)	1956 volume	Bimonthly (1,100 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.	National Institute of Health	$20 per year
Fiziologicheskii Zhurnal SSSR im. I. M. Sechenova (I. M. Sechenov Physiological Journal)	1957 issues	Monthly (1,400 pages per year)	Pergamon Institute 122 East 55th St. New York 22, N. Y.	National Institute of Health	$60 per year
Uspekhi Sovremennoi Biologii (Russian Review of Biology)	July-Aug. 1959 issues		Oliver & Boyd, Ltd. Tweeddale Court Edinburgh, Scotland	Dept. of Scientific & Industrial Research, G. B.	£ 6.10s per year
CHEMISTRY					
Doklady Akademii Nauk SSSR: Otdel Khimicheskoi Tekhnologii (Chemical Technology Section)	1956 issues	Bimonthly (100 pages per year	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.		$15 per year

Doklady Akademii Nauk SSSR: Otdel Fizicheskoi Khimii (Physical Chemistry Section)	1957 issues	Bimonthly (500 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.		$160 per year
Doklady Akademii Nauk SSSR: Otdel Khimii (Chemistry Section)	1956 issues	Bimonthly (800 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.		$110 per year
Koks i Khimiia (Coke & Chemistry)	Possibly July 1959 issue		Cleaver-Hume Press, Ltd. 31 Wright's Lane London, W.8., England	Dept. of Scientific & Industrial Research, G. B.	£ 5.5s per year
Kolloidnyi Zhurnal (Colloid Journal)	1952 issues	Bimonthly (600 pages per year	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.		$80 per year
Uspekhi Khimii (Chemical Reviews)	Jan. 1960 issue		Cleaver-Hume Press, Ltd. 31 Wright's Lane London, W.8., England	Dept. of Scientific & Industrial Research, G. B.	£ 15 per year
Zhurnal Analiticheskoi khimii (Journal of Physical Chemistry)	1952 issues	Bimonthly (800 pages per year	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.		$80 per year
Zhurnal Fizicheskoi Khimii (Journal of Physical Chemistry)	July-Aug. 1959 issue		Cleaver-Hume Press, Ltd. 31 Wright's Lane London, W.8., England	Dept. of Scientific & Industrial Research, G. B.	£ 30 per year

Subject	Translation Beginning	Frequency	Agency	Sponsor	Subscription Price
Zhurnal Neorganicheskoi Khimii (Journal of Inorganic Chemistry)	June 1959	Monthly	Clever-Hume Press, Ltd. 31 Wright's Lane London, W.8., England	Dept. of Scientific & Industrial Research, G. B.	£ 30 per year
EARTH SCIENCES					
Doklady Akademii Nauk SSSR: Otdel Geokhimii (Geochemistry Section)	1956 issues	Bimonthly (110 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.		$15 per year
Geologiia Nefti (Petroleum Geology)	Vol. 2, no. 1	Semi-monthly (1,080 pages per year)	The Review of Russian Geology 533 Harden St. Columbia, S. C.		$18 per year
ENGINEERING & TECHNOLOGY					
Avtomaticheskaia Svarka (Automatic Welding)	Jan. 1959	Monthly	British Welding Research Association 29 Park Crescent London, W.1., England	Dept. of Scientific & Industrial Research, G. B.	£ 10.10s per year $29.50
Biuletin' Izobretenii (Bulletin of Inventions)	Jan. 1959	Monthly	Pergamon Institute 122 East 55th St. New York 22, N. Y.		$30 per year

Derevoobrabatyvaiushchaia Promyshlennost' (Woodworking Industry)	July 1959 issue		T. D. A. 21 College Hill London, E.C.4., England	Dept. of Scientific & Industrial Research, G. B.	£ 5.5s
Elektrichestvo (Electric Technology) (Selected papers)	1957, no. 1-4	Quarterly	Pergamon Institute 122 East 55th St. New York 22, N. Y.		$56 per year
Izvestiya Vuz: Aviatsionnaya Tekhnika (Aeronautical Engineering)	*	*	*	Dept. of Scientific & Industrial Research, G. B.	*
Izvestiya Vuz: Tekhnologiya Tekstil'noi Promyshiennosti (Technology of Textile Industry)	*	*	*	Dept. of Scientific & Industrial Research, G. B.	*
Liteinoe Proizvodstvo (Foundry Production)	*	*	*	Dept. of Scientific & Industrial Research, G. B.	*
Plasticheski Massy (Plastics)	*	*	*	Dept. of Scientific & Industrial Research, G. B.	*
Kauchuk i Rezina (Crude and Vulcanized Rubber)	May 1959	Monthly	Research Assn. of British Rubber Mfrs, Shawbury, Shrewsbury Shropshire, England	Dept. of Scientific & Industrial Research, G. B.	£ 5.5s per year

*To be announced

Subject	Translation Beginning	Frequency	Agency	Sponsor	Subscription Price
Priborostroenie (Instrument Construction)	May 1959	Monthly	Taylor & Francis, Ltd. Red Lion Court Fleet Street London, E.C.4., England	Dept. of Scientific & Industrial Research, G. B.	£ 6. per year
Stal' (Steel)	June 1959		I. S. I. Grosvenor Gardens London, S.W.1., England	Dept. of Scientific & Industrial Research, G. B.	To be announced
Stanki i Instrument (Machines and Tooling)	Jan. 1959	Monthly	Production Engineering Research Associates Melton Mowbray Leicestershire, England	Dept. of Scientific & Industrial Research, G. B.	£ 3.10s per year in England £ 4.4s outside England
Svarochnoe Proizvodstvo (Welding Production)	April 1959	Monthly	British Welding Research Association 29 Park Crescent London, W.1., England	Dept. Of Scientific & Industrial Research, G. B.	£ 5.5s per year
Tsement (Cement)	1956 issues only	Bimonthly	Consultants Bureau, Inc. 227 West 17th St. New York 11, N. Y.		$60 per year
Tsvetnye Metally (Nonferrous Metals)	Jan. 1960	Monthly	Primary Sources 11 Bleecker Street New York 12, N. Y.		$95 per year

Vestnik Mashinostroeniia (Bulletin of Machine Building)	March 1959	Monthly	Production Engineering Research Associates Melton Mowbray Leicestershire, England	Dept. of Scientific & Industrial Research, G. B.	£ 4. per year
MATHEMATICS					
Problemy Kibernetiki (Problems of Cybernetics)	No. 1, 1959	Probably two issues per year	Pergamon Institute 122 East 55th St. New York 22, N. Y.		$20 per year
Uspekhi Matematicheskikh Nauk (Russian Mathematical Review)	July-Aug. 1959 issue			Dept. of Scientific & Industrial Research, G. B.	To be announced
PHYSICS					
Atomnaia Energiia (Atomic Energy)	1956 issues	Monthly (1,200 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 22, N. Y.		$75 per year
Atomnaia Energiia (Atomic Energy) (Incorporated in Journal of Nuclear Energy, London, Part A)	1956 issues	3 vols. per year (Part A)	Pergamon Press, Ltd. 122 East 55th St. New York 22, N. Y.		$20 per volume
Doklady Akademii Nauk SSSR: Otdel Prikladnoi Fiziki (Applied Physics Section)	1957	Bimonthly (600 pages per year)	Consultants Bureau, Inc. 227 West 17th St. New York 22, N. Y.		$200 per year

Subject	Translation Beginning	Frequency	Agency	Sponsor	Subscription Price
Izvestiia Akademii Nauk SSSR: Seriia Fiziki (Bulletin of the USSR Academy of Sciences: Physics Series)	Vol. 18, no. 3, 1954	Monthly (1,600 pages per year)	Columbia Technical Translations 5 Vermont Avenue White Plains, N. Y.		$215 per year

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RUSSIAN LITERATURE IN THE FIELD OF ASTRONAUTICS - PART II. In the December 1960 issue of "Space Intelligence Notes" listing was given of the contents of selected Soviet books that have not been translated into English, followed by a discussion in considerable detail of the book "Russia's Rockets and Missiles". On page 5 of that issue it was noted that books appearing to date have been of three types: (1) straight translations of complete Soviet works, (2) Soviet-edited compilations of articles, and (3) surveys of Soviet developments based largely on translations from scattered sources put together by English language authors. We shall use these three basic breakdowns and briefly review examples of each.

TRANSLATIONS OF COMPLETE SOVIET WORKS. The best example of a Russian astronautical book translated into English language is "Soviet Space Science: the Russian Story of Artificial Satellites, by Ari Shternfeld (Basic Books, Inc., New York, 361 pages; originally translated by the Technical Documents Liaison Office at Wright-Patterson AFB, Ohio). The book was published in 1959 and has both a foreword and epilogue by Willy Ley. It provides an unusually complete general introduction to space science and technology and is divided into 11 chapters as follows: "The Laws of Motion of Artificial Satellites," "Motion of the Satellite Relative to the Observer on Earth," "The Rocket Starter of the Artificial Satellite," "Launching of an Artificial Satellite," "Construction of Artificial Satellites," "Man in Cosmic Space," "On-Board an Artificial Satellite," "Observation of Artificial Satellites and their Communications with the Ground," "The Descent to the Earth," "Artificial Satellites of Bodies of the Solar System," and "The Utilization of Artificial Satellites." There are two appendices covering the "dissemination of the ideas of astronauts" and the question of territorial rights to the space above the atmosphere. There are also conversion tables and an excellent index.

Within this structure of presentation Shternfeld looks into such widely diversified subjects as sidereal time of revolution of an artificial satellite, life of an artificial satellite, projections of the motions of an artificial satellite on the Earth, apparent motion of a satellite in the celestial sphere, principles of rocket engines, rocket propellants, atomic rockets, optimum satellite take-off trajectories, correction of trajectories and orbits, acceleration tests of a manned orbital rocket, life under the conditions of weightlessness, problems of food and respiration, the microatmosphere and its conditioning, measuring equipment and instrumentation for observation and control, radio telemetering of the parameters of motion of an artificial satellite, physical phenomena on retardation by the atmosphere, etc.

A 285 page book at a somewhat more simplified technical level is entitled "Sputniks and After", written by Karl Gilzen and published by McDonald Ltd, London in 1959. The author graduated from the Moscow Aviation Institute and is a specialist in thermodynamics. He has been a lecturer at both the Moscow Aviation Institute and the Moscow Higher Technical College and is a member of the Bureau of the Astronautical Section of the Chkalov Air Club of the USSR. His earlier works were on the subject of thermodynamics.

Gilzin's book is divided into six parts entitled: "From Fantasy to Science," "A Miraculous Engine," "The Attack on Interplanetary Space," "Conquest of the Universe," "Man in Space," and "A Look into the Future." Within these broad divisions the book provides a background history of Russian developments leading to the realization of rocket propulsion systems, missiles, satellites, and spacecraft.

It is generally considered that the first liquid propellant rocket motor powered airplane flight was made in the United States during the Summer 1941; however, Gilzin declares that on February 28, 1940, a plane towing a glider plane with a liquid fuel rocket motor took off from one of the aerodromes in the suburbs of Moscow. The pilot, V. Fyodorov, flew the airplane "independently," using the liquid propellant rocket motor for thrust. Gilzin goes on to say that "slightly over two years later, on May 15, 1942, Capt. G. Bakhchivanji made the first flight in a plane with a liquid fuel rocket motor designed by V. Bolkhovitnov".

The book continues discussing in turn the advantages of staged rockets, propulsion systems, the nature of the Earth's atmosphere, carrier vehicle and satellite vehicle design, and the like. Gilzin seems to be rather interested in the idea of winged rockets and does not hesitate to point out that "the idea of winged rockets also originated in Russia". It appears that Tsander first proposed them by suggesting that a carrier rocket be equipped with wings whose lift could be used both at the takeoff and during the landing of the "cosmic ship."

Since it has been difficult to learn much about Russian experiments with rocket powered airplanes and Dynasoar-type vehicles, it is natural that we focus some attention to the words of Gilzin. For example, he writes that "studies by Soviet scientists show that by combining tremendous flight speed with wing lift it is possible to make a much more effective flight. The present level of development of reaction technique already makes it possible, in theory, to build a super-long-range rocket plane capable of making a non-stop round-the-world flight.....The creation of a super-long-range plane is possible only because the liquid-fuel motor can insure tremendous altitude and flight speed. Such a motor works only a few minutes, during which it consumes all the fuel stored up on the plane, and, of course, during these few minutes of powered flight the plane cannot make a very long range flight. But a powerful liquid-fuel rocket motor will, in the very few minutes that it operates, carry the plane to a tremendous altitude and impart to it a tremendous velocity. The free flight of the plane beginning from this altitude can cover a very great distance and be of long duration.

"The round-the-world flight of a plane with a liquid-fuel rocket motor will be something as follows: The powerful motor of this plane will, during the few minutes it operates, carry the plane to an altitude of 300-400 kilometers and impart to it a velocity of not less than 4 kilometers a second, or about 14,000 kilometers an hour. True, to attain such figures, the motor must operate on new and better fuels, such as insure greater jet velocity than at the present time.

"The motor operates only during these first minutes of flight; then it stops and not a drop of fuel is consumed any more. The plane flies forward, expending the kinetic energy it accumulated during the take-off run. In this respect such a flight greatly resembles a flight in space.

The plane begins its free flight around the Earth from this tremendous altitude, gradually descending. At first glance it seems that such a free flight at such high altitudes is out of the question, for when gliding, the weight of the plane must be only slightly more than the lift of its wings, and at an altitude of hundreds of kilometers there is practically no wing lift simply because there is almost no air there. This means that the plane will not come down gradually but will drop like a stone from the altitude to which the motor carried it.

"True, the plane will drop like a stone. And it would, of course, drop very quickly were it not for the fact that it is mobile. But when falling to the Earth the plane is also flying around the Earth at a tremendous speed. If the Earth were flat, the plane would soon fall down on it, but it is a sphere, so that as the plane continues to drop towards the Earth, flying around it at a tremendous velocity, it succeeds in covering a great distance - 6,000-7,000 kilometers. But more than that: when the plane, descending in this manner, breaks into the lower, denser strata of the atmosphere at a tremendous velocity, its wing lift makes itself felt. The plane seems to be repulsed from these dense strata of the atmosphere, it rebounds like a flat stone along the surface of water, and then rushes upwards once more. It will not, of course, attain its former attitude since the velocity has already been diminished, but it can again climb up to an altitude of 200 or more kilometers.

"By going through such wave-like motions, which gradually die down, and by means of its final free inclined flight in the dense strata of the atmosphere, the plane, calculations show, is capable of landing at the very same aerodrome from which it took off. The entire round-the-world flight will take no more than several hours, and the plane will not even have to turn around and land against the wind, as is usually the case, but will land in the very same direction as it took off.

"Such are the wonderful results of the combination of the initial speed of thrust, the characteristic feature of all missile flights (known as ballistic flight) and the lifting power of the wing, the basis of aerodynamics."

In the discussion of the first two Soviet artificial satellites the statement is given that the "take-off weight of the rocket used for the launching of these Sputniks is equivalent to no less than 500 and 1,000 tons respectively". Very complete summaries of the first three Sputniks are subsequently given.

From here Gilzin moves into more speculative subjects: orbital observatories, manned space stations, the lunar objective, interplanetary flight.

In the chapter probing into advanced non-chemical propulsion systems, the author examines the type of propulsion that might be needed for intra-orbital transfer. Here we learn of another Russian "first": In considering methods of intraorbital transfer "one of the first thoughts to occur is: cannot the force of pressure of the solar beams be used during the flight of an intra-orbital ship? The existence of this pressure was first established by the Russian physicist P. Lebedev back in 1900. In order to establish the existence of this pressure and to measure it, Lebedev himself performed a most delicate experiment, one which surprised even those who knew of his ability as a brilliant experimenter. The delicacy of the experiment is connected with the very low force of the pressure of light. For instance, the pressure of the solar rays on a sheet placed at right angle to the beam at such a distance from the Sun as the Earth, is equal to one-half kilogram per square kilometer! This is a very slight force, but it nevertheless plays a very big role in nature. The pressure of light reflects the tails of comets from the Sun. It is also supposed to play an important part in the life of the stars, in particular limiting their maximum dimension.

"Tsander made calculations showing how we can use the pressure of the solar rays to move spaceships in the field of solar gravitation. By using very thin metal sheets it is possible to equip the ship with mirrors having tremendous surfaces and capable of reflecting the solar rays. These sheets of metal may be thousandths of a millimeter in thickness. According to Tsander's calculations, if the surface of such a mirror is 0.1 square kilometer, the mirror will weigh about 300 kilograms. However, such a mirror will create a force of only 50 grams. Under the influence of this force, the speed of a vessel weighing 50 tons (on Earth) will increase one hundredth of a millimeter per second for every second. Obviously, the pressure of the solar rays would not be capable of driving a spaceship even if only in the field of solar gravitation.

"Since the solar rays that fall on the ship from without are incapable of solving this task, perhaps it can be solved by using the pressure of light rays which are given off by the ship itself. If, let us say, a powerful projector is installed on the ship, the pencil of light rays emitted by it will cause a reaction exactly like that caused by the pressure of a pencil of solar beams borne on the mirror. But even this reaction is too little to create a rocket operating on light. To increase the force of reaction to this pencil of light rays, it is necessary to heat the surface radiating this pencil to a temperature of millions of degrees. This is impossible, of course."

The author then proceeds to consider more conventional nuclear rockets and electrostatic propulsion systems. The interesting part of the above discussion is that theoretical analysis of solar sailing systems are credited to Russian scientists, and are rejected as impractical.

The book terminates with chapters on life in spaceships, the development of lunar bases, and the final exploration and exploitation of the planetary

system. "Sputniks and After" is rather well illustrated and contains photographs of the first three Sputniks, geophysical rockets and their instrumentation, dog compartments, etc.

"Sputnik into Space" by M. Vassiliev (Souvenir Press, London, 1958, 147 pages) is a curious book, originally translated from the Russian (Puteshestviya v Kosmos) into Italian (Su Sputnik nel Cosmo), and then from the Italian into English. It was written "under the supervision of" Prof. V. V. Dobronravov, of the Soviet Academy of Science, and has eight chapters on the universe in which we live, the glorious undertaking, the motors of spaceships, in space, the stages of the great offensive, the assault on the Moon and journeys to outer space. A final chapter is entitled simply "Conclusion" which ends with "We have been privileged to make the first step: and it is for the men of the future to envy us our happiness."

"The Other Side of the Moon", This is a short 36-page book translated by J. B. Sykes of a pamphlet issued by the USSR Academy of Sciences. Published in New York by the Pergamon Press (1960), it has a foreword by A. N. Nesmeyanov, in which it said that "in this book, the USSR Academy of Sciences presents for the first time the results of a preliminary study of those photographs which were made from the automatic interplanetary station. The study of this material continues, and the Academy will shortly issue a scientific publication including the photographs, a description of the features on the opposite side of the Moon, the method of determining their nature, and other information." Briefly, the book discusses the design of the automatic interplanetary station, its orbit, photography and image transmission, and the unseen side of the Moon. Three Lunar Farside photographs are reproduced.

"Beyond the Planet Earth", by Konstantin Tsiolkovsky was also published by Pergamon in 1960. We have here a work of fiction which was written at the turn of the century, serialized in the Russian Journal "Priroda i lyudi", and later published in book form in 1920 at Kaluga under the title of "Vnezemli". Attention is focused on this fiction work not only because it provides some insight into the thinking of Tsiolkovsky but because it contains a short but concise 16-page history of the life of Tsiolkovsky and in general the history of Russian rocketry since the 19th century.

A. Sternfeld's "Interplanetary Flight" (New York, 1958, Imported Publications and Products) is a short (59 page) book for the general reader. Subjects covered include the dangers of space flight, life in spaceships, design of artificial satellites, uses of satellites, interplanetary voyages, etc.

"Introduction to Rocket Technology" by V. I. Feodosiev and G. V. Siniarev (Academic Press, New York, 1959) treats, in 344 pages, the theory of reactive motion, rocket motion combustion, nozzle flow theory, flight mechanics, trajectories, stabilization and steering, launching devices, GSE, etc.

SOVIET-EDITED COMPILATIONS OF ARTICLES. "Artificial Earth Satellites" a two-part book edited by L. V. Kurnosova, was published in 1960 by the Plenum Press, Inc. (New York) and is 227 pages long. It records the results of the investigations carried out in accordance with the International Geophysical Year Program with the help of Sputniks 1, 2, and 3. There are various contributors to the volume whose table of contents reads as follows:

Cosmic rays measurements with artificial earth satellites

Determination of atmospheric density from the observed deceleration of the first artificial earth satellites

Determination of density of the upper atmosphere from secular variations of orbital elements of the first two artificial earth satellites.

Motion of an artificial earth satellite about its center of mass

Optical methods for the observation of artificial earth satellites

Use of the Doppler Effect for determining orbit parameters of an artificial earth satellite

Rocket measurement of electron concentration in the Ionosphere by means of an ultrashortwave dispersion interferometer

Distribution of electron density as a function of height from data of experiments with rockets and artificial earth satellites: effect on propagation of radiowaves.

Research on animal flight in an artificial earth satellite

Dynamic effects during the motion of artificial earth satellites

Some results of measurements of thermodynamic parameters of the stratosphere obtained with the aid of meteorological satellites

Disturbances occurring in the gaseous medium during the flight of a satellite

Preliminary results of a determination of the density of the atmosphere above 100 kilometers

An investigation of the ionic composition of the earth's atmosphere using rockets and satellites

Soviet ionospheric studies using rockets and artificial earth satellites

Preliminary report on geomagnetic measurements carried out from the third Soviet artificial earth satellite

Micrometeorite studies using rockets and satellites

The search for corpuscles with the help of the third artificial earth satellite

The study of the soft component of cosmic rays outside the earth's atmosphere

The heavy nuclei of primary cosmic radiation

Solar batteries

An acoustical method for the measurement of the mechanical parameters of meteorites

The Russian Literature of Satellites (International Physical Index, Inc., New York, 1958), in two volumes, is edited by D. I. Blokhintsev, V. I. Veksler and others. It is a translation of "Progress in Physical Science", Volume 63 of the Academy of Sciences USSR. In Volume 1 are six articles: "Certain Variational Problems Associated with the Launching of an Artificial Earth Satellite" (Okhotsimskii and Ensev), "Determining the Lifetime of an Artificial Earth Satellite and Investigating the Secular Perturbations of its Orbit" (above authors and Taratynova), "The Motion of an Artificial Earth Satellite in the Non-central Gravitational Field of the Earth when Atmospheric Resistance is Taken into Account" (Taratynova), "The Effect of Geophysical Factors on the Motion of an Artificial Earth Satellite" (Iatsunskii), "Certain Problems of Moon Flight Dynamics" (Egorov) and the "Use of Artificial Earth Satellites for Verifying the General Relativity" (Ginzburg). Volume 2 contains 11 articles ranging from "Silicon Solar Batteries on Sources of Power in Artificial Earth Satellites" (Vavilov et al) and "Rocket Investigations of the Composition of the Atmosphere at Great Altitudes" (Mirtov) to "Measurement of Positive-ion Concentration along the Orbit of an Artificial Earth Satellite" (Greenbaus and Zelikman) and "Investigation of the Solid Component of Interplanetary Matter Using Rockets and Earth Satellites" (Polosko).

"Soviet Writings on Earth Satellites and Space Travel" (New York, Citidel Press, 1958, 253 pages) simply offers a bound collection of Soviet astronautical articles covering such topics as the Sputniks, manned space flight, orbits and trajectories, spaceships, etc.

SURVEYS OF SOVIET DEVELOPMENTS BASED ON TRANSLATIONS FROM WIDELY SCATTERED SOVIET SOURCES AND ON ANALYSES BY WESTERN AUTHORS. The leading book in this category is "Behind the Sputniks", put together by F. J. Krieger, and published by the Public Affairs Press, Washington, D. C., in 1958. This book is well known to most workers in the space science and technology fields and will not be analyzed in any detail. As most readers will recall, it is based on the Rand Corporation Research Memoranda RM-1760 and RM-1922 released in 1957.

The book contains an introduction by Krieger following which translated articles appear by many leading Russian space experts. These are divided into seven sections: "Space Flight Comes of Age," "Problems of Astronautics," "Biological Factors," "Lunar and Cosmic Projects," "Rocket and Missile developments," "Satellite Plans," and "The Sputnik" (the first Soviet satellite).

There are very useful appendices providing information on the Soviet Commission on Interplanetary Communications, notice to radio amateurs provided by the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences (designed to permit amateurs to prepare for the reception of satellite signals), a list of members of the Interdepartmental Commission on Interplanetary Communications, etc. A very complete bibliography on Russian language books, monographs, and articles appears at the end.

"The Soviet Air and Rocket Forces" is edited by Asher Lee and was published by Frederick A. Praeger, New York in 1959 (309 pages). While the better part of this book deals with air offense and defense strategy, long-range air attack, the development of jet fighters and fighter bombers, etc., there are useful sections on Soviet missiles. Chapter 9, entitled "Soviet Missiles," treats the subject directly, but it is not the only chapter dealing with missiles. Information is provided on the postwar developmental history of Soviet military missiles, centers of production, test sites, the contribution of German engineers to Russian rocketry, etc. Paragraphs are devoted to such vehicles as the T1, T2, T3, T3A, T4A, T5, T6, T7, and T8, the J 1, 2, and 3 series; the Golems; and the Komets.

"Soviet Strategy in the Nuclear Age" by Raymond L. Garthoff, Frederick A. Preger, New York, 1958, is 283 pages long. While it does not claim to emphasize missiles as they affect Soviet strategy, they are mentioned throughout and one complete chapter is devoted to them (Chapter 10: "Missiles and Soviet Strategy"). This chapter looks into the role of missiles, debates rockets vs. bombers for offense, future prospects for ballistic missiles, defense against long-range ballistic missiles, and operational control of ballistic missiles.

U. S. REDUCES REPORTS OF SOVIET SCIENCE DATA. Lack of public interest was given as the reason for a sharp curtailment of the Commerce Department's satellite inspired program of supplying English translations of Soviet scientific literature.

The department has stopped issuing 100 publications that boiled down every article appearing in 100 technical journals of the Soviet Union.

Partly to replace these, the department plans six new publications that will abstract only those articles in both Soviet and Chinese Communist

magazines that are deemed most significant. Each of the six will cover a separate broad area of science and technology.

The original program was established after the Russians launched their first satellite in 1957. There were widespread complaints at that time that American scientists were not keeping abreast of developments behind the iron curtain.

It is not a lack of public interest in the Russian publications but more likely a lack of public desire to fight government red tape and the long waiting periods required to obtain the material that is the cause of the lack of participation.

INTELLIGENCE BRIEFS:

Soviets have reflected radar signals off the planet Venus with 265 kw transmitter and a "super-sensitive receiver".

West Germany's Bochum Observatory picked up, during November 1960, unexplained radio signals that may have been Soviet space carrier vehicle failures.

Marshall Kirill Semenovich Moskalenko succeeds Mitrofan I. Nedelin as chief of Soviet Rocket Command.