

ASTRONOMY

Jupiter Brilliant in South

Jupiter, Venus and Mars are all visible in January evening skies but Venus, though bright, sets quite early and Mars is relatively faint.

By JAMES STOKLEY

► JUPITER, high in the south, is more prominent than any other planet or any star on January evenings. Three other planets are also visible, but only early in the evening.

At the beginning of the month you will see Venus low in the west just after sunset. It is even brighter than Jupiter. Rapidly drawing toward the sun, Venus will set at sunset by the end of the month and then will not be visible.

Mars is in the same part of the sky, but considerably fainter than Venus, although equal to one of the fainter first magnitude stars. Thus, it will be much harder to locate. Mars sets about two hours after the sun. Venus passes north of Mars during the night of Jan. 7, so on that evening and that of Jan. 8, they will be close together. The red color of Mars will help identify it.

Saturn in Aquarius

Saturn, of magnitude 1.3, is in the constellation of Aquarius, the water carrier. It is low on the western horizon and sets about three hours after sunset.

Jupiter, about a fifth as bright as Venus, can be seen in the southeastern sky as soon as it gets dark. It is directly south and at its highest position in the sky about 10:00 to 11:00 p.m. in the early part of January. Surrounded by some of the brightest stars in the sky, Jupiter stands in the constellation of Taurus, the bull.

Taurus and other constellations visible on January evenings are shown on the accompanying maps. These maps depict the skies as they look about 10:00 p.m., your own kind of standard time, at the first of the month, 9:00 p.m. on the 15th and 8:00 p.m. on the 31st. Because Mars, Venus and Saturn set fairly soon after the sun, they are not shown on the star maps.

To the right of Jupiter is the star called Aldebran, distinctly red, which marks the eye of Taurus, and is about a 15th as bright as Jupiter.

Directly below Jupiter stands Orion, most brilliant of all constellations. It is the only one with two stars of the first magnitude. One is Betelgeuse, the upper, and the other is Rigel. Between them is a row of three stars that form the belt of the warrior this group is supposed to portray.

Below and to the left of Orion is Canis Major, the greater dog. In it is Sirius, brightest of all nighttime stars, but only about one-half as bright as Jupiter.

Above Canis Major and farther to the left, you can see the lesser dog, Canis Minor, with brilliant Procyon. Still higher,

to the left of Betelgeuse, stand the twins, Gemini, with the stars Castor and Pollux. The latter is of first magnitude; Castor is a little fainter.

Auriga, the charioteer, stands above Gemini, and is shown on the northern sky map. In it is the bright star Capella. Next to Auriga, to the left, is Perseus, the great hero of mythology. Here we find Algol, not a very bright star but one that is famous for its light variations.

Low in the northeast is Leo, the lion, with still another first magnitude star: Regulus. The northern map also shows Deneb, in Cygnus, the swan, close to the northwestern horizon, as it is about to set. Earlier in the evening this first magnitude star can be seen to better advantage.

Looking ahead to what the astronomical calendar offers for the year, we find that perhaps the most important event is a total eclipse of the sun on Nov. 12. However, you will have to go to South America to see it from land.

Actually, this will be the second solar eclipse of 1966. The first, on May 20, is annular. That is, the tip of the moon's shadow will not quite reach the earth. People in line with the shadow will see the black disk of the moon in front of the

sun, which will not be completely covered. A ring of the sun's disk, the "annulus," will be visible around the moon.

The path where this will happen goes from a point in mid-Atlantic near the equator, across north Africa, Greece, Turkey, Siberia and China. Undoubtedly many astronomers will observe this also, even though an annular eclipse does not offer as many opportunities as one that is total.

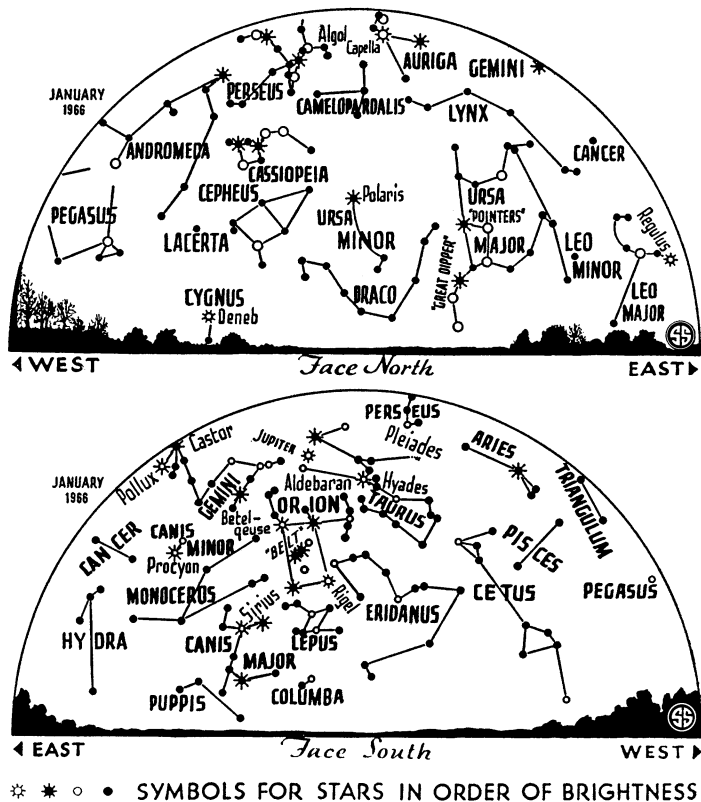
Both on May 20 and Nov. 12 a partial eclipse of the sun will be visible over a much larger area than that from which either the total or annular eclipse can be seen. In May the partial eclipse region will take in all of Europe, most of Asia and the northwestern half of Africa. In November it will include all of South America, southeastern Mexico, Central America, South Africa and part of Antarctica.

Penumbral Eclipses Due

Twice during the year, on May 4 and Oct. 29, the moon will enter the outer part of the earth's shadow. These are called "penumbral" eclipses, but they are not very interesting. The dimming of the moon's light is barely noticeable to the naked eye.

As for the planets, Jupiter will remain prominent in the evening sky until June. Then it will pass behind the sun, and will reappear in the early morning sky by the beginning in August.

In the autumn it will come again into the



evening sky, and by the end of the year will be prominent soon after it gets dark.

Venus, so conspicuous in the early evening during the first week or so of January, passes between earth and sun Jan. 26. After that, it will shine brilliantly in the morning sky before sunrise. Gradually dimming, it will again disappear, as it passes behind the sun on Nov. 8. By the year's end it will be low in the west after sunset, but it will not become conspicuous until about February 1967.

Mars Prominent in 1966

Mars, during 1966, will not be very prominent. It will leave the evening sky during the spring, and by summer will be in the east before sunrise.

Saturn will be an evening star until March. After that it will appear in the morning hours. By the end of the year it will be visible in the evening once more.

While Jan. 1 marks the beginning of 1966 for us, people in many parts of the world give the year other numbers. In the Jewish calendar, for example, we are now in the year 5726 and 5727 will begin Sept. 15. In Japan, Jan. 1 begins the year 2626.

According to the Mohammedan calendar, which counts years from the Hegira, Mohammed's flight from Mecca to Medina, New Year's Day will come on April 22, with the beginning of 1386. In the Indian calendar, March 22 is the beginning of 1888.

If we go to ancient calendars, we get still more numbers for the year. Largest is that of the Byzantine calendar: 7475 begins Sept. 14. The ancient Romans counted their years A. U. C. "Ad urbe condita," from the founding of the city of Rome. Jan 14 begins the year 2719 A. U. C. In the reckoning of the 3rd century Roman emperor Diocletian, Sept. 11 will mark the beginning of 1683.

In the Babylonian calendar of Nabonassar, May 2 will be the beginning of 2715, and in the Grecian calendar 2278 will begin Sept. 14 or Oct. 14, depending on which alternative is used.

So if you do not like 1966 for the year, you have a wide choice—if you change to some other calendar!

Celestial Timetable for January

JAN. EST

5	noon	Moon passes north of Jupiter Earth nearest sun, distance 91,400,000 miles
6	11:40 p.m.	Algol at minimum
7	12:17 a.m.	Full moon
	midnight	Venus passes north of Mars
8	5:00 a.m.	Moon nearest, distance 223,100 miles
9	8:30 p.m.	Algol at minimum
13	3:00 p.m.	Moon in last quarter
21	10:47 a.m.	New moon
23	7:00 a.m.	Moon passes south of Mars
	2:00 p.m.	Moon farthest, distance 252,600 miles
24	midnight	Moon passes south of Saturn
26	4:00 a.m.	Venus between earth and sun
27	1:30 a.m.	Algol at minimum
29	2:49 p.m.	Moon in first quarter
	10:30 p.m.	Algol at minimum

Subtract one hour for CST, two hours for MST, and three hours for PST.

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Books of the Week

Listing is for readers' information, not advertising. For convenient purchase of any book listed or any U.S. book in print, remit retail price (we pay postage) plus 25¢ handling charge if price is less than \$2 to Book Department, Science Service, 1719 N St., N.W., Washington, D. C. 20036.

ADOLESCENTS AND THE SCHOOLS—James S. Coleman—Basic Bks., 121 p., \$4.50. Views the problem of educating adolescents in the context of the modern social, political and economic order.

AIR CONSERVATION: The Report of the Air Conservation Commission of AAAS; James P. Dixon, Chmn.—Am. Assn. for the Advancement of Science, 335 p., maps, \$8. Presents background reports, summary of facts and recommendations for public policy on air pollution control.

THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC for the Year 1967—Nautical Almanac Office, U.S. Naval Observatory—GPO, 516 p., \$3.75. Basic calculations, data and fundamental tables.

ANCIENT EUROPE: From the Beginnings of Agriculture to Classical Antiquity—Stuart Piggott—Aldine Pub. Co., 343 p., illus., \$7.50. Survey interprets the main lines of European prehistory from the earliest agriculturalists in the seventh millennium B.C. to the incorporation of much of barbarian Europe within the Roman Empire.

ANCIENTS AND MODERNS: A Study of the Rise of the Scientific Movement in Seventeenth-Century England—Richard Foster Jones—Univ. of Calif. Press, 2nd ed., 354 p., paper, \$1.95. Reprint of 1961 edition of a study of the thought movement to which modern English science traces its sources.

THE ARCHITECT IN THE NUCLEAR AGE: Design of Buildings to House Radioactivity—J. F. Munce—Hayden Bk. Co. (N.Y.), 241 p., photographs, drawings, \$22.50. Describes the special aspects of housing an atomic plant or equipment or highly radioactive material.

THE ASSISTANT MEDICAL OFFICER: The Training of the Medical Auxiliary in Developing Countries—Edwin F. Rosinski and Frederick J. Spencer—Univ. of N.C. Press, 199 p., \$6. Study based on visits to medical schools, health centers and hospitals in five African and Asian countries.

ASTRONAUTICS FOR SCIENCE TEACHERS—John G. Meitner, Ed.—Wiley, 381 p., photographs, diagrams, \$8.95. Prepared by space scientists and engineers in order to bring high school teachers up to date in astronautics, a field currently involving the nation in an engineering effort of the magnitude of seven billion dollars per year.

THE BATTLE AGAINST BACTERIA: A History of the Development of Antibacterial Drugs, for the General Reader—P. E. Baldry—Cambridge Univ. Press, 102 p., photographs, \$4.50; paper, \$1.95. Reviews the great change in the pattern of disease wrought by vaccines, antibiotics and penicillin.

BIENNIAL REVIEW OF ANTHROPOLOGY, 1965—Bernard J. Siegel, Ed.—Stanford Univ. Press, 305 p., \$8.50. Covers recent research in physical anthropology, African prehistory, linguistics, social organization, peasant life, and cultural change.

THE BIOSOCIAL BASIS OF MENTAL RETARDATION—Sonia F. Osler and Robert E. Cooke, Eds.—Johns Hopkins Press, 151 p., illus., \$5.50. A seminar course designed to bring students of medicine recent scientific developments in the field, with emphasis on the possible relationship between biological and social factors in producing mild degrees of retardation.

BUGS OR PEOPLE?—Wheeler McMillen—Appleton-Century, 228 p., \$4.95. Facts, interpretations, opinions and predictions, based on pest control literature from official sources and on personal interviews.

CALCULATOR'S GUNNING: The Art of Quick Reckoning—Karl Menninger, transl. from 10th German edition by E. J. F. Primrose, foreword by Martin Gardner—Basic Bks., 132 p., \$4.50. Clearly written, practical advice on how to solve arithmetic problems more rapidly.

THE CHALLENGE OF SCIENCE—George Boas—Univ. of Wash. Press, 93 p., \$2.95. Philosopher reviews the reciprocal challenge of science to art, philosophy and religion.

CHEMISTRY: Opportunities and Needs—Committee for the Survey of Chemistry, Frank H. Westheimer, Chmn.—NAS-NRC, 222 p., illus., paper, \$5. Report assesses the quality and organizational structure of basic research in U.S. chemistry, presents detailed data and recommendations.

CHEMISTRY AND TECHNOLOGY OF EXPLOSIVES, Vol. II—Tadeusz Urbanski, transl. from Polish by Wladislaw Ornat and Sylvia Laverton—Pergamon Press, 517 p., illus., \$17.50. Treats in a comprehensive manner the chemical and physicochemical properties of nitric esters, nitroglycerine, glycol esters, alcohol esters and nitrocellulose.

CHEMISTRY IN THE SPACE AGE—Marjorie H. Gardner—Holt, 176 p., illus., \$2.95; paper, \$1.60. Helps young people explore the chemistry of the solar system and the possibilities of life on other planets.

COMMUNICATIONS OF THE LUNAR AND PLANETARY LABORATORY, Vol. 3, Nos. 41-49—Gerard P. Kuiper, Dir.—Univ. of Ariz. Press, 60 p., photographs, paper, \$5. Contains article on volcanic sublimates on earth and moon, reproducing photographs of Laimana Volcano, Hawaii, for their relevance to lunar studies.

COMMUNITY AND SCHIZOPHRENIA: An Epidemiological Analysis—H. Warren Dunham—Wayne State Univ. Press, 312 p., maps, \$12.50. An investigation of the conflicting evidence and methodological difficulties leading to the uncertainties concerning the meaning of epidemiological findings on mental disease, particularly schizophrenia.

COMPARATIVE GUIDE TO AMERICAN COLLEGES: For Students, Parents and Counselors—James Cass and Max Birnbaum—Harper, rev. ed., 725 p., \$9.95. Enlarged edition of up-to-date, analytical and comparative data about individual colleges.

A CONSTITUTION FOR THE WORLD—Intro. by Elisabeth Mann Borgese—Center for the Study of Democratic Institutions, 110 p., paper, single copies free upon request direct to publisher, Santa Barbara, Calif. 93193. A preliminary draft for a world constitution.

CONSTRUCTION SCHEDULING AND CONTROL—George E. Deatherage—McGraw, 316 p., diagrams, \$15. Covers in detail all the aspects of construction management, applying the Critical Path Scheduling technique as a point of reference.

DATA PROCESSING: Applications to Political Research—Kenneth Janda—Northwestern Univ. Press, 288 p., illus., \$7.50. paper, \$3.45. Introduces political scientists to some applications and advantages of punched card data processing technology, showing ways in which various types of political information can be processed by computers.

DIAMAGNETISM AND THE CHEMICAL BOND—Ya. G. Dorfman, transl. from Russian by Scripta Technica—Am. Elsevier Pub. Co., 182 p., diagrams, \$10. Presents modern theory of diamagnetism, magnetochemistry as a method for investigation, the structure of single and multiple covalent bonds, and applications of the magnetochemical methods.

DIELS-ALDER REACTIONS: Organic Background and Physico-Chemical Aspects—A. Wassermann—Elsevier Pub. Co. (N.Y.), 114 p., diagrams, \$5.50. Monograph summarizes the reactions in sufficient detail to be useful in the development of transition state theory.

A DIRECTORY OF INFORMATION RESOURCES IN THE UNITED STATES: Social Sciences—National Referral Center for Science and Technology—GPO, 218 p., paper, \$1.50. Alphabetical listing by name, gives organizational and operational descriptions of organizations ranging from Aboriginal Research Club to Young Mnemonics Library.

THE EARTH IN SPACE: A Source Book for Elementary School Teachers—Jay William Erickson—Teachers College Press, 265 p., illus., \$5.75; paper, \$3.50. A short overview of teaching units on the earth's atmosphere and the solar system, discussing in some detail study projects on the earth in space, for primary and intermediate grades.

THE ECOLOGICAL THEATER AND THE EVOLUTIONARY PLAY—G. E. Hutchinson—Yale Univ. Press, 139 p., illus., \$5. Collection of essays dealing with the influence of the environment on the course of evolution.

ECONOMICS OF RESEARCH AND DEVELOPMENT—Richard A. Tybout, Ed.—Ohio State Univ. Press, 458 p., \$7.50. Papers and comments based on 1962 conference on socioeconomic research of German and U.S. scholars.

ELECTROMETALLURGY OF CHLORIDE SOLUTIONS—V. V. Stender, Ed.—Consultants, 138 p., illus., paper, \$20. Reports of the Fifth All-Union Seminar on Applied Electrochemistry held at Dnepropetrovsk Institute of Chemical Technology, in 1962.

ELEVEN-DIGIT REGULAR SEXAGESIMALS AND THEIR RECIPROALS—Owen Gingerich—Am. Philosophical Soc., 38 p., paper, \$1. Transactions, new series, Vol. 55, Part 8.

EMPLOYER'S INVENTORY OF CRITICAL MANPOWER—Engineering Manpower Commission and Scientific Manpower Commission—Eng. Manpower Comm. (Engineers Jt. Council), rev. ed., 36 p., charts, paper, \$3. Enables employer to analyze his own manpower situation in regard to military service liability of employees.

EXCURSIONS INTO CHEMISTRY—John H. Woodburn—Lippincott, 145 p., illus. by Frank Lamachia, \$4.50. Designed to arouse the interest of boys and girls to explore the major branches of chemistry.

FERTILIZATION—C. R. Austin—Prentice-Hall, 145 p., illus., \$4.95; paper, \$2.95. Deals with the