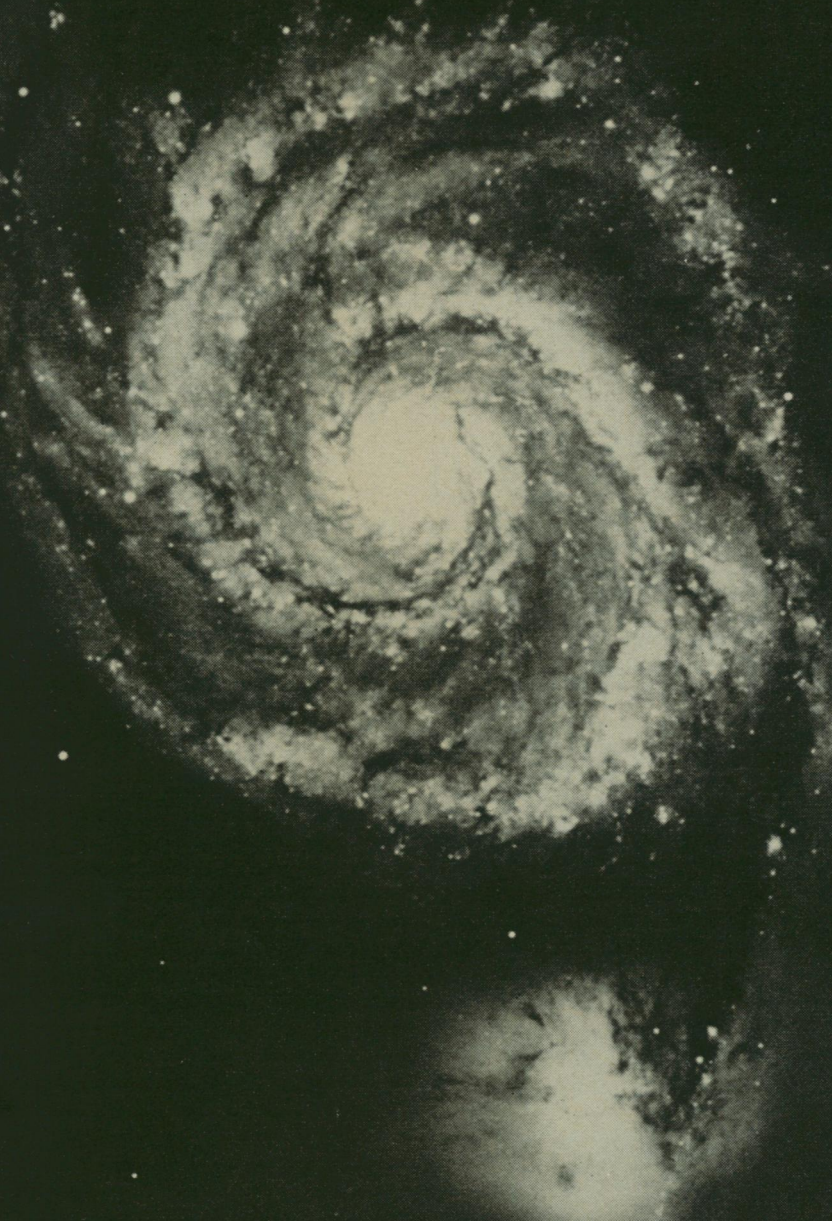


# science news

Feb. 26, 1972  
vol. 101, no. 9, 129-144



**After the big bang, what?**



# science news®

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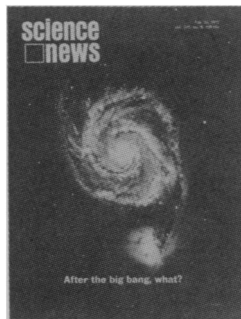
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Galaxies are a fundamental feature of the ob-  
served universe. Cosmologists are facing the  
difficult problem of explaining how they could  
have formed in a universe that began in a big-  
bang explosion. See p. 140. (Photo: Hale Ob-  
servatories)

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## EARTH & SPACE

**EARTH'S MOVEMENTS, THE** (1 reel, 11 min.). COLLABORATOR: *Henry J. Otto, Ph.D., Professor of Elementary Education, University of Texas.* Through the use of animation, models, and live action the film graphically shows four movements of the earth and how these movements affect the earth. Such important concepts as earth's revolution and rotation are clearly depicted. Explains how these factors account for day and night, time differences, and the changing seasons. Also shown are the procession of the equinoxes and galactic rotation.

#130-3300 / 11 min. / color / \$8

**OCEANOGRAPHY AT WORK** (*Diamonds Under the Sea*) (2¼ reels, 24½ min.). Today's prospectors hunt diamonds with the tools of science. Geologists on the "Xhosa" use seismic surveys coordinated with land-based radar beacons to map the ocean floor. Then divers using underwater television probe for rock samples. Another ship, the "Rockeater," caps the search by drilling into a charted gravel deposit to bring diamonds from under the sea. Produced by Willard Bascom for Ocean Science and Engineering, Inc.

#130-3305 / 24½ min. / color / \$13

**READING WEATHER MAPS** (1¼ reels, 13½ min.) COLLABORATOR: *Glenn O. Blough, LL.D., Professor of Education, University of Maryland.* Step-by-step preparation of a station model includes symbols for cloud coverage, wind direction and speed, dew point, and barometric pressure and tendency. Based on hundreds of station models in North America, we see isobars, low and high pressure areas, warm and cold fronts, and areas of precipitation added to complete the weather map. We see how the weather map may be used to forecast weather.

#130-3310 / 13½ min. / color / \$8

**SPACE SCIENCE: COMETS, METEORS, AND PLANETOIDS** (1 reel, 11 min.). COLLABORATOR: *Fletcher Guard Watson, Ph.D., Professor of Education, Harvard University.* This film introduces the minor members of the solar system and discusses theories explaining their origin. The use of the spectroscopic and radio and optical telescopes in providing us with the information about these bodies is discussed. Events such as the meteor shower of 1833, the approach of Halley's Comet, and the movements of planetoids are shown in telescopic photographs, live photography, animation and other special effects.

#130-3315 / 11 min. / color / \$8

**SPACE SCIENCE: EXPLORING THE MOON** (1½ reels, 16 min.) COLLABORATOR: *J. Allen Hynek, Ph.D., Director, Dearborn Observatory, Chairman, Department of Astronomy, Northwestern University.* The exploration of the moon, from Galileo's first telescopic view to man's first step on its surface, is presented in fascinating detail. Ancient maps, photographs and motion pictures taken through telescopes and by the first men on the moon identify major surface features and illustrate the 400-year long story.

#130-3316 / 16 min. / color / \$11

**SPACE SCIENCE: GALAXIES AND THE UNIVERSE** (1¼ reels, 13½ min.). COLLABORATOR: *Stanley P. Wyatt, Ph.D., Professor of Astronomy, University of Illinois.* Telescopic photographs and models using fiber optics introduce irregular, spiral and elliptical galaxies. Explains how Cepheid variables help in determining galactic distances, and illustrates quasars and the two types of stellar populations. Demonstrations visualize three prominent explanations of the expanding universe: steady-state, big-bang, and pulsating theories.

#130-3317 / 13½ min. / color / \$8

**SPACE SCIENCE: THE PLANETS** (1½ reels, 16 min.). COLLABORATOR: *Fletcher Guard Watson, Ph.D., Professor of Education, Harvard University.* Telescopic motion pictures, animation, and other special effects survey the nine planets and their satellites. The film shows how we learn about the planets and provides information about their temperatures and atmospheres, periods of rotation and revolution, and the distance of each planet from the sun. The film also shows that instruments launched into space are adding to our information about the planets.

#130-3319 / 16 min. / color / \$11

**SPACE SCIENCE: STUDYING THE STARS** (1¼ reel, 13½ min.). COLLABORATOR: *Stanley P. Wyatt, Ph.D., Professor of Astronomy, University of Illinois.* How do astronomers gather information about the stars? The film shows how optical and radio telescopes can measure the energy-radiation of stars, how distance can be found to the stars by the parallax method and by comparing their brightness or magnitude. We see methods used to keep track of star movements, and how the star's light gives clues to its heat, composition, movement, and size.

#130-3320 / 13½ min. / color / \$8

**SPACE SCIENCE: THE SUN AS A STAR** (1¼ reels, 13½ min.) COLLABORATOR: *Orren C. Mohler, Ph.D., Professor of Astronomy, Chairman, Department of Astronomy, University of Michigan.* Compares the sun with other stars on the basis of size, mass, temperature, brightness and composition. Shows some of the work of scientists and their understanding of fusion. Presents the life story of a star, from gas cloud into the main sequence, then into a red giant and finally to a white dwarf.

#130-3321 / 13½ min. / color / \$8

## ENVIRONMENTAL EDUCATION

**CONSERVING OUR MINERAL RESOURCES TODAY** (1 reel, 11 min.). COLLABORATOR: *Clark I. Cross, Ph.D., Associate Professor of Geography and Physical Science, University of Florida.* As our industrial society consumes more mineral resources, the decreasing supply of such irreplaceable materials as coal, oil, stone and metals makes conservation a problem for today. Conservation for better living requires development of renewable resources such as waterpower to conserve coal, more efficient mining and extraction methods; and new sources of power, such as nuclear and solar energy.

#130-3624 / 11 min. / color / \$8

**CONSERVING OUR WATER RESOURCES TODAY** (1 reel, 11 min.). COLLABORATOR: *Samuel N. Dicken, Ph.D., Head, Department of Geography, University of Oregon.* The population explosion and expanding industrialization have helped to make water one of our most precious resources today. This film dramatically surveys the domestic, agricultural, and industrial uses of water in the United States, diagrams the water cycle and shows our major sources of water. In addition, the film indicates methods for conserving surface and ground water, as well as for reclaiming and purifying water, in order to avoid future shortages.

#130-3626 / 11 min. / color / \$8

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For 8-day rental, double the rate.

**CONSERVING OUR WILDLIFE TODAY** (1 reel, 11 min.). COLLABORATOR: *Darward L. Allen, Ph.D., Professor of Wildlife Ecology, Purdue University.* By cutting forests, draining swamps, replacing natural vegetation with crops and polluting air and water, we have drastically changed the amounts and kinds of wildlife an area can support. Understanding the carrying capacity of the land for wildlife will help us manage our environment to support wildlife needs more effectively.

#130-3627 / 11 min. / color / \$8

**DARWIN AND THE THEORY OF NATURAL SELECTION** (1¼ reels, 13½ min.). COLLABORATOR: *Robert I. Bowan, Ph.D., Professor of Biology, San Francisco State College.* Young Charles Darwin's voyage on H.M.S. BEAGLE resulted in discoveries that have had a profound effect on nearly every field of human knowledge. Through Darwin's observations of the coasts and islands of South America and experiments made in England, we see how this scientist developed his Theory of Natural Selection. Many rare views of animal and plant life were photographed on the Galapagos Islands. *Chris Award, Columbus Film Festival.*

#130-4025 / 13½ min. / color / \$8

**GENETICS: MENDEL'S LAWS** (1¼ reels, 13½ min.). COLLABORATOR: *William K. Baker, Ph.D., Professor of Zoology, The University of Chicago.* Scenes photographed in Gregor Mendel's own garden in Brno, Czechoslovakia, add authenticity to this presentation of his original work with pea plants, which has become the basis of the present science of genetics. The film duplicates some of Mendel's experiments, and clearly explains his laws of Dominance, Segregation, and Independent Assortment. Later work by de Vries, Correns, Morgan, and Muller is also described.

#130-4032 / 13½ min. / color / \$8

**GENETICS: IMPROVING PLANTS AND ANIMALS** (1¼ reels, 13½ min.). COLLABORATOR: *William K. Baker, Ph.D., Professor of Zoology, The University of Chicago.* Four methods which geneticists use to control the heredity of plants and animals are clearly illustrated: the techniques of inbreeding, hybridizing, development of desired mutations, and increasing the number of chromosomes. Their effect on improving size, taste, color, hardness, and other desired characteristics is shown in scenes filmed in the laboratory, the greenhouse, and on experimental farms.

#130-4033 / 13½ min. / color / \$8

**GENETICS: CHROMOSOMES AND GENES (MEIOSIS)** (1½ reels, 16 min.). COLLABORATOR: *William K. Baker, Professor of Zoology, The University of Chicago.* Specially constructed models show that differences in individuals of every plant or animal species are traceable to the sperm and egg cells, produced through the process of meiosis. These cells contain only half the number of chromosomes present in other body cells. The chromosomes are randomly assorted, thus accounting for individual differences. Other causes demonstrated in this film are crossing-over and mutation.

#130-4034 / 16 min. / color / \$11

**GENETICS: FUNCTIONS OF DNA AND RNA** (1¼ reels, 13½ min.). COLLABORATOR: *William K. Baker, Ph.D., Professor of Zoology, The University of Chicago.* In all living things—simple or complex, one-celled or many-celled—heredity means transmission of characteristics from cell to cell. This film shows cellular mechanisms that make heredity possible: DNA in the nucleus, and messenger RNA and transfer RNA in the cytoplasm. Illustrates not only how specific DNA codes result in specific proteins, but how mutation and differentiation may occur.

#130-4035 / 13½ min. / color / \$8

**GENETICS: HUMAN HEREDITY** (1¼ reels, 13½ min.). COLLABORATOR: *William K. Baker, Ph.D., Professor of Zoology, The University of Chicago.* Scientists study human inheritance from three viewpoints: biochemical genetics, which deals with the chemistry of DNA and the chemical changes caused in the body by genes; nature-nurture studies, which compare the effects of heredity and environment; and population genetics, which is concerned with frequencies of certain genes in whole populations. The film illustrates with specific examples some findings of the three approaches.

#130-4036 / 13½ min. / color / \$8

**HUMAN BODY, THE: THE BRAIN** (1½ reels, 16 min.). COLLABORATOR: *J. Langdon Taylor, Ph.D., Associate Professor of Biology, Wayne State University.* The human brain—about three and a quarter pounds of sensory, associative and motor neurons—is the central organ of the nervous system and regulator of all voluntary and involuntary actions in the body. Laboratory demonstrations, X-ray footage, specimens and animation are employed to visualize its basic functions, to clarify what is known about this organ and to explore some of its mysteries.

#130-4045 / 16 min. / color / \$11

**HUMAN BODY, THE: THE CHEMISTRY OF DIGESTION** (1½ reels, 16 min.). COLLABORATOR: *John S. Gray, M.D., Ph.D., Chairman, Department of Physiology, Northwestern University Medical School.* Nutrient molecules in food are too large to be absorbed into the body. Through the chemical processes of digestion, these nutrients are split into small, component molecules that can be absorbed. Animation, X-ray footage and laboratory demonstrations illustrate the major steps in the digestion of carbohydrates, fats and proteins.

#130-4046 / 16 min. / color / \$11

**HUMAN BODY, THE: CIRCULATORY SYSTEM** (1¼ reels, 13½ min.). COLLABORATOR: *George K. Fenn, M.D., Professor of Medicine, Northwestern University Medical School.* The entire circulatory system is analyzed by means of animation, cinefluorography, drawings, and close-ups of live organs. Included are the heart, lungs, and kidneys; the key processes of the circulatory system; and the network of arteries and veins that carry blood throughout the body. *Silver Reel Award, Golden Reel Film Festival, National Film Award, Scholastic Teacher Magazine.*

#130-4047 / 13½ min. / color / \$8

**HUMAN BODY, THE: DIGESTIVE SYSTEM** (1¼ reels, 13½ min.). COLLABORATOR: *John S. Gray, M.D., Ph.D., Chairman, Department of Physiology, Northwestern University Medical School.* Animation, X-ray, and live action scenes of the major digestive organs give a detailed account of the function of this system—to break down chemically the complex nutrients, carbohydrates, proteins, and fats into simple food materials. The roles played by the salivary glands, esophagus, stomach, pancreas, liver, gall bladder, and small and large intestines are clearly defined and related to each other. *Chris Award, Columbus Film Festival.*

#130-4048 / 13½ min. / color / \$8

**HUMAN BODY, THE: MUSCULAR SYSTEM** (1¼ reels, 13½ min.). COLLABORATOR: *Raymond C. Ingraham, Ph.D., Professor of Physiology, College of Medicine, University of Illinois.* This film looks at the three types of muscle which make up the human musculature system. The structure and function of voluntary muscle tissue is explained in detail, using photomicrography, models, and animation. Laboratory demonstration illustrates the role of the nerve impulse in muscular contraction. The film also explains the role of ATP in the complex chemical process of muscular movement.

#130-4049 / 13½ min. / color / \$8

**HUMAN BODY, THE: NERVOUS SYSTEM** (1¼ reels, 13½ min.). COLLABORATOR: *Jean Spencer Felton, M.D., Professor of Occupational Health, University of California, Los Angeles.* This film study of the nervous system emphasizes the basic functions of this system, its main organs, the various neurons of which these organs are composed, and the principal areas of the brain. Microscopic views of nerve tissue, a specimen of a human brain, animation and anatomical charts will help students to visualize this complex system and gain a better understanding of its control of the body processes.

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