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Newspapers and magazines



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Cellular telephone



ChicagoLand Television News

Television news broadcast



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Letters



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The Internet



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Business meeting

The many kinds of communication enable people to share information and provide entertainment in a variety of ways. The pictures on this page show some examples of how people communicate with other individuals, with small groups, and with a large audience.

Communication

Communication is the sharing of information. People communicate both *interpersonally* (between individuals) and through communications systems that transmit messages between large numbers of people.

Individuals communicate using many different *modes*—that is, in many different ways. For example, they may communicate through gestures and facial expressions as well as by speaking and writing. Communications systems, also called *media*, range from long-used systems, such as books, to new systems, such as the Internet, a worldwide network of computers. Other major media include newspapers and magazines, sound recordings, film, telephone and telegraph networks, radio, and television. Together, the communications media form a vast industry of great social importance.

How people communicate

Interpersonal communication. No one knows how human communication began, but most scholars be-

lieve that communication through language began at least 150,000 years ago. The emergence of language was a decisive factor in the growing ability of early human beings to work together to make and use tools, shelters, and other products.

People communicate using not only language, but also other modes, such as gesture and body position, mathematics, and music. Modes of communication also include visual images, such as works of art. They vary in their use from culture to culture and from person to person. Individuals are often better at using one mode than another. Acts of communication often employ more than one mode.

Communication using language requires both a physical component—the central nervous system and muscle coordination—and cultural learning. Beginning early in life, human beings develop a basic understanding of several forms of communication. For example, babies about six months old begin to use hand gestures and distinct syllables simultaneously to express themselves. Face-to-face interaction with other people during the first three years of life is essential for a child to form the ability to communicate.

Communications systems are widely used in schools, businesses, government agencies, and households. Some communications systems, such as the tele-

phone system, are networks through which users mainly exchange messages one-to-one. Others, such as magazines and radio or television broadcasting operations, transfer messages to many people at once. The Internet is an example of a *hybrid* system, capable of communicating both one-to-one and one-to-many.

Millions of people around the world work in the communications industry. Many kinds of workers are needed to make a communications system function. The television industry, for example, relies on writers, camera operators, technicians, and on-air talent. It also employs salespeople to sell advertising time, market researchers to study audience habits, and many other specialists.

Communications systems are organized differently in different countries. In the United States, electronic communications systems developed as private businesses whose main goal was to earn profits. In most other countries, they began as government services financed primarily through service revenues and taxes. Most telephone systems originally operated as parts of national postal services. In some countries, government subsidies helped support newspapers.

Economic forces shape and limit communications systems. For example, in many areas, television networks develop programs and services to help advertisers target desired audiences. Telecommunications systems are well developed in wealthy countries, but they have only begun to expand into developing regions.

The development of communications systems

Prehistoric times. After language developed, people exchanged news chiefly by word of mouth. Runners carried spoken messages over long distances. People also used drumbeats, fires, and smoke signals to communicate with others who understood the codes they used.

Early writing systems. Around 8000 B.C., people in southern Mesopotamia began using clay tokens that had different shapes and markings. They probably used these tokens originally for such functions as counting and record keeping. These crude numerical notations gradually combined with pictures. Sometime shortly after about 3300 B.C., this combination emerged as the writing system known as *cuneiform*, which used wedge-shaped characters. Many scholars believe cuneiform was the first writing system.

Other people probably invented their own writing systems independently, based on other principles and using other materials. For example, early systems of writing developed in Egypt, China, the Indus Valley (now part of India and Pakistan), and Central America.

Over time, early writing systems became increasingly *phonetic*—that is, they used symbols to represent individual speech sounds instead of objects. They also became increasingly *abstract*—that is, they used symbols that represented ideas rather than actual objects. Eventually, writing became so abstract that it became *alphabetic*. Alphabets made it possible to write down any word in the spoken language using comparatively few characters. Nonalphabet writing systems are still used in many parts of the world. In written Chinese, for example, each character stands for a word or part of a word.

During ancient times, the letter was the primary medium for long-distance communication. Couriers carried letters on foot, on horseback, or by ship. They main-

ly distributed government ordinances and edicts. Military leaders used homing pigeons to carry messages.

About 500 B.C., the ancient Greeks developed a fast method of sending messages from city to city. The system used a series of brick walls. The walls were close enough together so that each could be seen from the one next to it. Indentations along the top of each wall represented the letters of the alphabet. To send a message, a person lit fires in the appropriate places on the wall. A watcher on the next wall saw the fires and relayed the message. This system of communication is called a *visual telegraph*.

The ancient Romans got news from a handwritten sheet called *Acta Diurna* (*Daily Events*). Government officials made a few copies each day and posted them in public. Often, slaves recopied these sheets and delivered the duplicates to readers throughout the Roman Empire. Using the empire's extensive network of roads, the messengers carried mail over land at a speed of up to 50 miles (80 kilometers) a day.

Throughout the ancient world, use of written communication remained severely restricted. Few people could read and write, and writing materials were costly. The chief writing surfaces were *papyrus*, made from a plant, and *parchment*, a kind of treated animal skin. Such materials required expensive, skilled preparation.

During the Middle Ages, which began in about the A.D. 400's and lasted about 1,000 years, news continued to spread mostly by word of mouth. Town criers walked the streets announcing births, deaths, and other events of interest. Entertainers, peddlers, wandering preachers, and others who traveled from place to place carried messages and news.

Christianity exerted a powerful influence on communications systems throughout the Middle Ages. Most books and other writings involved religious themes, and most scribes were monks. Scribes often toiled for months to finish a single volume, and so they produced few books. They decorated much of their work with pictures and designs in color or in gold or silver leaf. These illustrated books were luxury items, and they were written mainly in Latin—the language of the church and of scholars. Thus, they had limited distribution.

The rise of printing. Between the 1300's and the 1600's, several events increased the demand for written materials in Europe. One event was the growth of commercial merchant classes, who needed written materials for advertising and record keeping. Another was the Renaissance, a period of intellectual awakening that stimulated people's interest in books and other literature. Paper, which had appeared in Europe in the 900's, had become cheap and widely available. Hand copying could no longer satisfy the demand for written materials. In the 1400's, printing, which had long been known in East Asia, came to Europe.

The first European printers did not make books. Instead, they made playing cards, which were in great demand. An artist carved a raised image of a card on a block of wood. Then the printer inked the image and pressed a blank card against it. The picture was transferred to the card. Printers soon used this method, called *block printing*, to make books as well as cards. Printers in China, Japan, and Korea had practiced wood-block printing of texts at least as early as the 700's, but it



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A **Nativity scene**, also called a *crèche*, shows the baby Jesus surrounded by Mary, Joseph, the Magi, and shepherds. Many crèches also include such animals as donkeys, oxen, and sheep.

Christmas

Christmas is a Christian *feast* day that commemorates the Nativity, the birth of Jesus Christ. A feast is a time of celebration. The Nativity feast originated in ancient times and evolved over many years. In the 1800's, it also became a children's holiday and the center of a major commercial season. Christmas traditions vary throughout the world. Most Christians observe Christmas on December 25, but the exact date of Jesus's birth is unknown.

The history of Christmas

In the A.D. 300's, Christians began celebrating a religious feast based on Bible accounts of Jesus's birth. In time, both religious and nonreligious traditions developed around the feast. Artwork and music also were created to celebrate the Nativity. Today, the Christmas season is a special time of year for many people throughout the world.

Origins of the Christmas story. The Christian New Testament contains two accounts of the Nativity, in the Gospels of Matthew and Luke. Both tell that Jesus was born in Bethlehem and that his mother, the Virgin Mary, was married to a carpenter named Joseph.

The Gospel of Matthew records that a new star appeared when Jesus was born, and that astrologers from the East called Magi followed the star to Jesus. Matthew also recounts that the Magi asked Herod, the Roman-

appointed ruler of Palestine, for help in finding the child. According to prophecy, the infant would grow up to become "king of the Jews." The news filled Herod with fear that he would lose his throne. He ordered the slaughter of all baby boys in Bethlehem. Jesus's family escaped after an angel warned Joseph of the danger in a dream. They fled to Egypt and remained there until Herod died.

The Gospel of Luke says that the angel Gabriel appeared to Mary and told her she would give birth to humanity's savior. Christians call this event the Annunciation. Luke also tells that after receiving the news, Mary visited her cousin Elizabeth, the future mother of John the Baptist, a famous Jewish prophet. Christians call this meeting the Visitation.

According to Luke, Mary and Joseph traveled from Nazareth, their home, to Bethlehem to register for a Roman census. Jesus was born in Bethlehem in a stable and laid in a *manger* (feeding trough) because his parents could not find a room at any inn. Angels appeared in the sky and announced the birth of Jesus to some shepherds, saying, "Glory to God in the highest heaven, and on earth peace among those whom he favors!" (Luke 2:14). Later, Mary and Joseph took Jesus to Jerusalem and presented him at the Temple there, according to Jewish law.

Early Christians also looked outside the Gospels to develop the Nativity story. They began interpreting Old Testament prophecies in relation to Jesus's birth. For example, the Book of Isaiah says: "The ox knows its owner, and the donkey its master's crib . . ." (Isaiah 1:3). The "master" became associated with Jesus. As a result, many Nativity scenes include oxen and donkeys.

Early Christians added their own details and interpretations to the Nativity story. For example, Matthew says

the Magi followed a star to Jesus. Christians in the 100's added that it was an extremely large star and the brightest one in the sky. Some Christians came to believe that the Magi in Matthew were three kings. This tradition began in North Africa in about the 200's. The *theologian* Origen asserted that there were three Magi, partly because of a prophecy and partly because Matthew says they brought three gifts—gold, *frankincense*, and *myrrh*. A theologian studies God and religion. Frankincense and myrrh are materials used in perfumes. Later Christians believed that the Magi represented various peoples of the world, so they portrayed them as an African, a European, and a Middle Easterner.

A new religious feast. Like Jesus, the first Christians lived in Judea, part of the Roman Empire. The empire was huge, extending from Syria to Britain (now the United Kingdom) and surrounding the Mediterranean Sea. Early Christians took their new faith into much of the empire, where Christianity developed in many ways. Such developments included the establishment of new religious feasts.

In the middle A.D. 200's, Christians began to consider establishing a feast to honor the Nativity. But the Bible did not provide a date for Jesus's birth. Many people honored Jesus as the "light of the world" and compared him to the shining sun. A North African named Sextus Julius Africanus suggested the winter solstice, the shortest day of the year, for the date of the Nativity feast. After the solstice, the daylight hours grow longer, recalling how Jesus's birth enlightened the world. On the Julian calendar used by the ancient Romans, the winter solstice fell on December 25.

December 25 was not the only date considered for the Nativity feast, but it became popular, especially in Rome. *Pagan* (non-Christian) Romans had two major feast days that occurred at the winter solstice. Christian leaders realized that a Nativity feast on December 25 would challenge the attraction of these pagan feasts. By 336, Christians in Rome had begun celebrating the feast of the Nativity on December 25. However, not all Christians chose December 25. For example, Armenian Chris-

Outline

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tians chose January 6. By the early 400's, most Christians had accepted December 25 as the feast date.

In 1582, the Roman Catholic Church adopted the Gregorian calendar, which most people use today. However, some Eastern churches continue to observe religious feasts according to the Julian calendar. For example, Russian Orthodox believers observe Christmas on January 7, which corresponds with December 25 on the Julian calendar.

Since ancient times, Christians also have observed Epiphany. This feast commemorates the adoration of Jesus by the Magi or, in Eastern churches, his baptism. Most Christians observe Epiphany on January 6. The Twelve Days of Christmas are the twelve days from December 25 through January 5, the day before Epiphany.

Christmas soon became an extremely important feast day, like Easter. Easter followed a preparatory period called Lent, and Christians decided that Christmas should follow a similar period. By the end of the 500's, they had established Advent, a period of four weeks during which to prepare spiritually for Jesus's birth.

Developing Christmas traditions. Some Christmas traditions were added based on non-Christian customs. The early Christians worked to convert pagans to their

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Bethlehem is the birthplace of Jesus Christ in the Gospels of Matthew and Luke. The city lies south of Jerusalem in the West Bank. Bethlehem is chiefly a religious shrine. It has many houses of worship and other religious institutions.

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took a long time to carve the words into the blocks. **The invention of movable type** made printing much faster. This printing system employed carved letters that could be used over and over again. After printing a page, a printer separated the pieces of type and rearranged them. A Chinese printer named Bi Sheng had invented movable type in the 1000's, but Europeans independently developed the technique much later.

Most historians consider Johannes Gutenberg, a German goldsmith, to be the inventor of movable type in Europe. In the mid-1400's, Gutenberg brought together several inventions to create a whole new system of printing. He made separate pieces of metal type, both capitals and small letters, for each letter of the alphabet. He lined up the pieces of type in a frame to form pages. Gutenberg inked the type using ink he had created from paint, dye, and other substances. Finally, he used a press similar to a wine press to put uniform pressure on the paper. His was the first printing press in Europe.

The effects of printing. Printing quickly became a vital new medium of communication and soon replaced hand copying. It spurred the production of Bibles and other religious texts in such commonly spoken languages as German, English, and French. As the number of literate people increased, common-language translations satisfied a growing demand for reading material.

Printing stimulated the rise of public opinion as a political and cultural force. Debates over church practices, economic issues, foreign policy, and social problems

quickly erupted into print. Many of the materials printed during this period were single sheets called *broadsides* or pamphlets known as *chapbooks*. The new medium of print aided the Reformation, which began as an effort to reform the Catholic Church and ended with the establishment of Protestant churches.

By the 1600's, merchants, bankers, and commercial traders had become heavy users of print media. Printed newsheets called *corantos* appeared in the Netherlands, England, and other trading nations. The *corantos* reported mostly business news, such as which ships had landed and what goods they carried. The news-sheets enabled merchants to learn of conditions affecting prices in distant markets. *Corantos* also printed advertising. They are considered the first true newspapers.

The 1700's. The Industrial Revolution, a period of rapid industrial expansion, began in Britain (now also known as the United Kingdom) in the 1700's. The revolution spread throughout Europe and to North America by the early 1800's, bringing about dramatic changes in the lives and the work of the people. At the same time, a movement toward democratic government swept these regions. A continuing transformation of communications and shifts in the control of communications systems accompanied the economic and political changes. See **Industrial Revolution**.

The publication of books, magazines, and newspapers, as well as broadsides and chapbooks, made different kinds of information and entertainment available to

more and more readers. By the end of the 1700's, European voyages of discovery and conquest had spread printing to many parts of the world.

Nearly from the beginning of the print era, monarchs in each European country granted a few leading printers a legal right, known as a *letters patent*, to publish and sell particular titles. This allowed kings and queens to censor what was published. During the 1700's, people challenged this system. In 1710, the British Parliament passed the first national copyright law. Many other countries eventually adopted the British version of the modern copyright system or created their own. Copyright laws established clear legal rights to authors and publishers of books and other printed products. They also reduced rulers' influence over the print media. Literary property became increasingly valuable. Publishing surged during the late 1700's. But rulers continued to levy taxes on paper, thus restricting both the availability of printed materials and freedom of expression.

During the 1700's, private operators ran local letter delivery services in some European cities. But royal monopolies operating under exclusive charters granted by the king or queen ran the great postal systems that spanned long distances across kingdoms.

In the late 1700's, the French engineer Claude Chappe developed a visual telegraph similar to that of the ancient Greeks. It consisted of a series of towers between Paris and other European cities. An operator in each tower moved a crossbar and two large, jointed arms on

the roof to spell out messages. An observer on the next tower read the messages and passed them on.

The 1800's brought a significant improvement in printing technology. They also brought the development of photography and of high-speed communication in the form of the telegraph and telephone.

The increasing impact of printing. In 1811, the German printer Friedrich König became the first to use a steam engine to power a press. Although printers continued to set type by hand, they could now print materials hundreds of times faster, and so could produce large numbers of copies cheaply. In 1814, *The Times* of London became the first newspaper to use König's press. By the mid-1800's, wide access to printed materials had led to a rapid increase in literacy in industrialized countries. Literacy was slow to increase in the developing countries of Africa, Latin America, and Asia, which produced only a small fraction of the world's printed materials.

The invention of photography further aided communication. Many American, British, and French scientists contributed to the development of photography, and no one person can be called its inventor. In 1826, a French physicist named Joseph Nicéphore Niépce made the first permanent photograph. Niépce's technique, which he called *heliography*, involved exposing a metal plate to light for about eight hours. As a result, Niépce could photograph only motionless objects.

The French painter Louis J. M. Daguerre worked as Niépce's partner for several years. In the 1830's, Da-

Highlights in the history of communication

Prehistoric people used paintings and drawings to tell stories.

The Semites invented the use of the alphabet for writing.

The Chinese invented paper.

The German metalsmith Johannes Gutenberg reinvented movable type.

Printed newsheets called *corantos* appeared.

● About 20,000 B.C.

● About 3300 B.C.

● About 1500 B.C.

● 59 B.C.

● By A.D. 1

● About 1045

● Mid-1400's

● Mid-1500's

● 1600's

The Sumerians developed the first known system of writing.

The Romans began a handwritten newsheet that was a forerunner of today's newspapers.

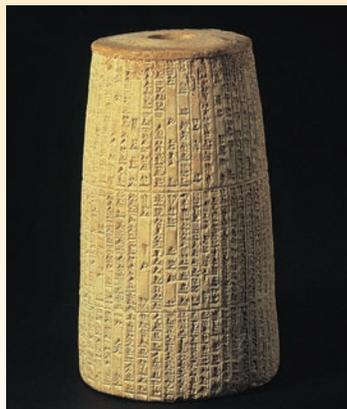
Pi Sheng, a Chinese printer, invented movable type.

The English made the first pencils of *graphite*, the substance used today.



WORLD BOOK illustration by Richard Hook

Smoke signals were one of the earliest forms of long-distance communication. Such signals could send only limited information—a warning, for example.



Deutsches Museum, Munich, Germany

Cuneiform writing consists of wedge-shaped characters stamped on clay. The clay cylinder above was inscribed during the 500's B.C. in Babylon.



Deutsches Museum, Munich, Germany

Wax tablets were once a common writing surface. The early Greeks wrote on such tablets with a pointed tool called a *stylus* and laced the tablets together.



Detail of an Italian manuscript (about 1331) by Giovanni de' Nuxigia; Bibliothèque Nationale, Paris (SCALA/EPA)

During the Middle Ages, artists copied books by hand, letter by letter. They covered their work with gold, silver, and colored decorations called *illumination*.



Bettmann Archive

Printing from movable type was invented in Asia during the 1000's and in Europe during the 1400's. A shop of the 1600's is shown above. At the left, typesetters assemble type to form pages. In the background, an assistant inks a page. At the right, a printer turns a huge screw on the printing press to push paper against the type.