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BRITANNICA JUNIOR ENCYCLOPÆDIA

For Boys and Girls

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Thousands of pagodas, or temples, dot the landscape of Burma, where Buddhism plays an important part in the life of the people. The Shwedagon Pagoda at Rangoon, the Burmese capital, is one of the largest. See **BUDDHA AND BUDDHISM; BURMA, ASIA.**

BAAL (*bā'āl*) was any of many gods of the Canaanites and Phoenicians. The word *Baal* means lord. Baals were gods of the Semitic peoples, who lived in ancient times from Arabia to Syria. Some of the Baals were gods of the fields and sheepfolds. Prayers for fertility were offered and the first fruits of the harvest were given to their images. Other Baals were gods of the cities, and temples were built to them in Tyre, Sidon, and Carthage. The Carthaginian conquerors Hannibal and Hasdrubal took the endings of their names from Baal or Bal. Living among the Baal worshipers were the Jews, who worshiped a single God. Often they were attracted to the worship of a Baal. The Bible tells how some Jews prayed to Baalpeor in the desert and were killed by order of Moses. Solomon built a temple to a Baal in Jerusalem. Ahab and Jezebel tried to make Baal-worship the state religion. The prophet Elijah and later prophets, especially Hosea, denounced the ceremonies of Baal worship. Not until much later, in the Persian period, did this Semitic religion disappear.

BABEL (*bā'bēl*), **TOWER OF**, was a huge construction mentioned in the Bible in Genesis 11. The descendants of Noah went to the plain of Shinar in Babylonia. To make a proud name for themselves, they began building a city and a tower whose top would reach up to heaven. The Lord did not approve of this; he therefore made them speak different languages so they could not understand one another. As a result they stopped their building and scattered through-

out the world. The city was called *Babel*, a word used today to mean "confusion."

According to Babylonian sources, almost every important Mesopotamian city had a large temple with a tower attached. The tower, called "ziggurat," was a series of platforms, each one smaller than the one on which it rested. Steps or ramps led to the top, on which was built a shrine where the local god was worshiped. It is thought that one of these may have given rise to the stories of the Tower of Babel.

Records show that the first settlers arrived at Babylon before 2000 B.C. In the language of the native people, Babel, Babylon, or *bab ilu* meant "gate of god." During the centuries, the city was many times destroyed, rebuilt, and enlarged. Nothing now remains of the earliest temple tower.

Herodotus, the widely traveled Greek writer who lived in the middle of the 5th century B.C., probably visited Babylon and

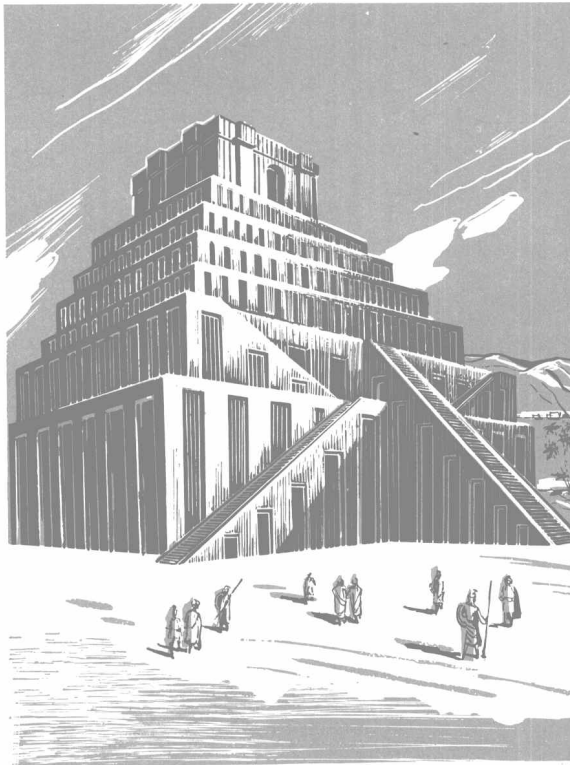
its temples. He wrote that King Nebuchadnezzar, who reigned at the beginning of the 6th century B.C., made his capital into a wonderful city.

The temple and its tower, dedicated to the god Marduk, were once again rebuilt. In one of the Babylonian documents describing the tower the base is given as about 300 feet, and its height, too, as nearly 300 feet.

In the centuries after the death of Alexander the Great (323 B.C.), Babylon slowly fell into decay. The bricks of the temple tower were reused by

According to legend, the Tower of Babel, when finished, was to reach the sky.

Adapted from a reconstruction by Eckhard Unger; Oriental Institute, The University of Chicago



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the people until today hardly a trace of it remains. (See also BABYLON AND BABYLONIA; MESOPOTAMIA.)

BABOON (*bā bōon'*). Travelers of olden times told weird tales of a race of dog-faced men who inhabited Arabia and Africa. Today it is believed that these creatures were nothing but the common baboon. Baboons are monkeys with doglike muzzles, cheek pouches for storing food, legs of nearly equal length, and tails that in some of the species are mere stumps. Their faces are quite naked, but their bodies are covered with hair. They walk on all fours, and, unlike other monkeys, have difficulty in standing upright.

Chacma baboons, the species usually seen in zoos, live in bands and are very destructive to crops. They steal down from the hills at dawn in great numbers, but so softly that even the watchdogs do not hear them. When they make a raid, they form a long chain and pass their booty from one to another until each has had his share. If the dogs bark, the baboons scatter with their stolen fruit. Their food consists not only of plants and fruits, but of ants, lizards, and spiders as well. Bands of baboons are sometimes seen in Ethiopia helping one another to overturn rocks in search of ants.

The mandrill, another species of baboon, has enormous canine teeth and a long face that is

fantastically colored blue and scarlet. It is one of the most feared animals of the Congo Forest.

The female baboon gives birth to only one young at a time. These animals may be bred successfully in zoos if they are caged in the open during the warmer months of the year. Some species live as long as 15 years. The males develop large canine tusks and have vanquished even leopards in battle. In ancient Egypt the baboon was worshiped as sacred; they were also tamed and trained to pick up fruit.

BABY (*bā'bī*). The human baby is born helpless. He can see, though not well. He can hear but he can not talk. He can move his arms, but he can not roll over. He can turn his head, but he can not lift it off the bed. He can kick his legs in the exact movement he will later use in walking, but he can not walk. He can smell milk, and when he has milk, he can suck, swallow, and breathe at once, something no older person can possibly do, but the milk must be given to him. He can not get it himself. He is complete and perfect, even to tiny fingernails and toenails, but to live he needs help.

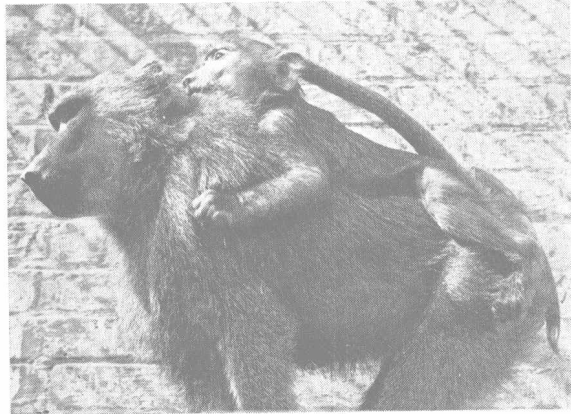
It will take the baby somewhere between 12 and 20 years to mature (grow into an adult). Animal babies mature rapidly, but even they can not mature alone. All babies need help, from a mother, a father, or another mature being.

A baby is born ready for life. For nine months he has been preparing for this great test. At once, the minute he is born, he breathes, he cries, he coughs, sneezes, and kicks. He does not wait for the world to come to him. He seeks it out. As soon as he is strong enough, he turns his head and looks. As soon as he can control his arms and hands, he feels and touches. As soon as his back and legs and feet will support him, he walks. He does not have to be taught any of this. He does it all when he is ready. Everything a baby does, every movement he makes, is part of getting ready. All his movements have a purpose or goal. That goal is to be a mature human being who can walk, talk, eat, and think for himself.

Human babies and animal babies are both fairly helpless at birth. There the likeness ends.

A young baboon rides on its mother's back when it wants to travel quickly. These are Doguera baboons, an African species. The mother is about 24 inches long without the tail and stands 14 to 15 inches high at the shoulders.

Courtesy Chicago's Zoo at Brookfield

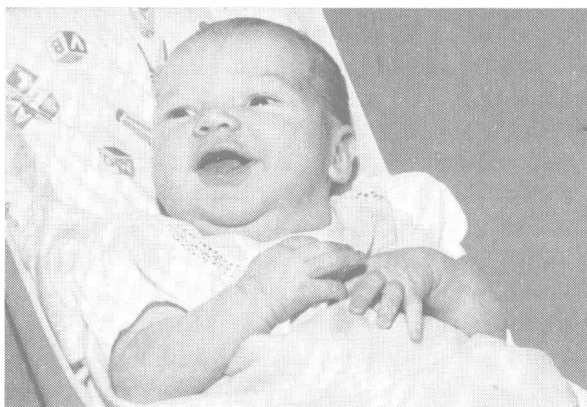


The human baby some day will hold his head high and stand straight. He will walk and run on two legs. He will be able to understand and speak words. He will be able to make or do wonderful things with his hands, for man has a thumb that belongs to man alone. Some animals have thumbs, but man's thumb is joined to his hand in such a way that with his thumb and any finger he can form a closed circle or pick up a crumb.

A tiny baby seems all head and wrinkles. His stomach is big, his legs tiny and short. He looks weak. Yet he can live and do well under many hardships and in any climate. Given only a little help, he will flourish anywhere in the world. Whether the weather is hot or cold, wet or dry, he will adjust to the cli-

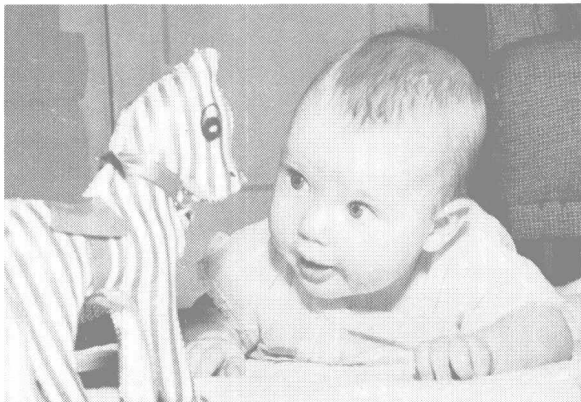
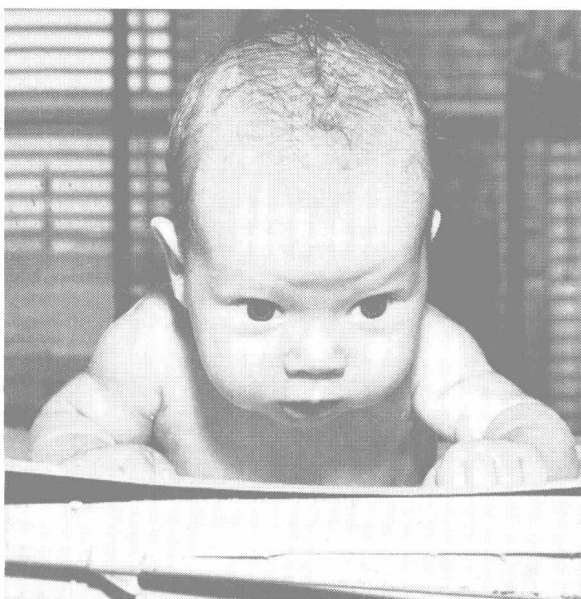
mate. Few animals can do this.

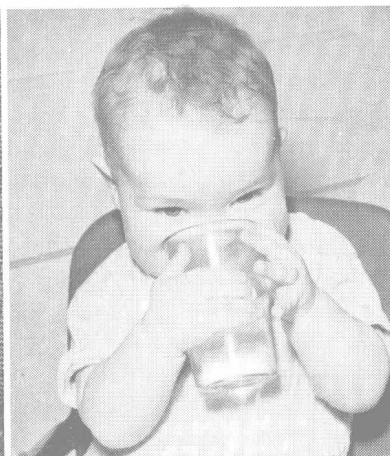
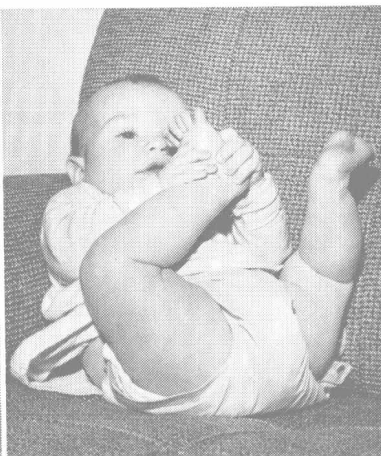
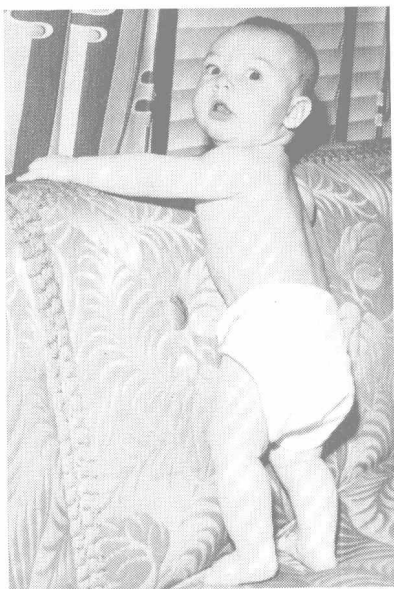
Because a little baby seems helpless, many people believe he does not think. Actually a baby thinks from birth. No one knows how a baby thinks or what he thinks. He listens to sounds. He makes soft noises which are not crying. He is aware of being picked up, of being cuddled, of being talked to softly, and of music. He is also aware of the nearness of milk, for he turns his mouth toward milk and tries to find it with his hands. A baby can tell his mother his troubles by the way he cries, for a baby has five different cries. One cry means he is hungry. Another means he is in pain. The others mean he is uncomfortable, is frightened by a loud noise, or thinks he is about to fall.



Photos, Robert Williams

David during his first year of life. Above left: At 20 days he smiles. Above right: Second month, 6th day. Raises head. Below left: Fourth month, 20th day. Sits up. Below right: Fourth month, 24th day. Studies favorite toy.





Photos, Robert Williams

Left: On the 3rd day of his fifth month, David stands erect. **Center:** He examines his toes on the 21st day of the fifth month. **Right:** When he is seven months old, he drinks milk from a glass that he holds himself.

Every baby born in the world begins life with a cry. To a mother her baby's first cry is a wonderful sound, for it means she now has her own living baby. The baby does not mean to cry. He can not help it. Crying occurs when the baby takes air into his lungs for the first time and suddenly expels some of it. It takes about two weeks for a baby's lungs to open all the way. Until then nature helps him get more oxygen from the air he breathes. At birth a baby has additional red blood cells to help him absorb more oxygen. This makes up for his lungs' being partly closed. A baby is also helped by breathing reflexes. When he yawns or coughs, he breathes in the extra oxygen that he needs.

All babies everywhere are very much alike. Out of 200 things that describe any one baby, 199 would be the same for other babies. The only big difference would be skin color. However, in all the world no two babies can be exactly alike. The way each baby looks and grows depends on his parents and grandparents and their ancestors for ages back. How a baby acts depends both on his ancestors and on the people who care for him. All babies grow and develop in the same way. One baby may grow faster than another and be fatter or thinner, but all babies follow the same pattern of growth.

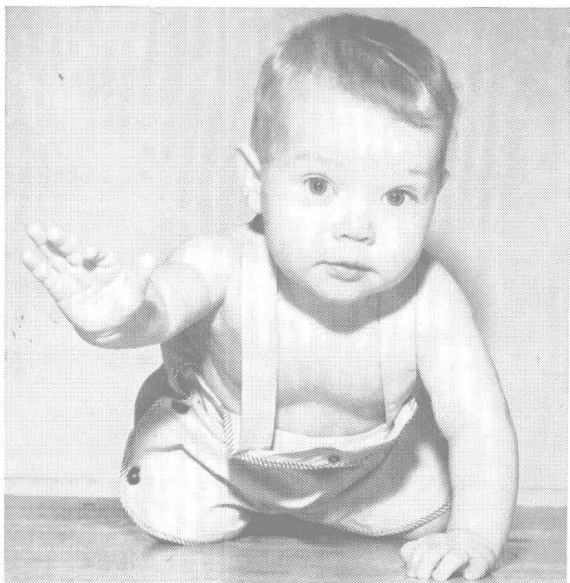
Babies do not grow all at once. They grow bit by bit. No part of a baby's body develops enough for him to use it well until the nerve pathways connecting that part to his brain are ready. Some babies never learn to walk. That is because the nerve pathways connecting the baby's legs or back to his brain have been injured. The brain is there, the legs or other parts are there, but until the passageway to the brain is fully developed, the brain can not control the movement of the legs. Nerve pathways do not develop everywhere in the body at the same time. They start with the pathways nearest the brain—the eyes and ears and mouth—and go from the head down. A baby uses his hands before he uses his back, smiles before he talks, and sits or crawls before he stands or walks. All babies, human or animal, develop this way. It is called the head-to-tail law: head first, feet last. Because of this, babies can not be trained to use the toilet when tiny. The baby's bladder and bowel muscles which control elimination do not develop fully until after he walks. Naturally a baby does not understand what he is doing until that time. Mothers sometimes try to train babies early, for mothers often tire of changing diapers, but the baby never likes it. He may seem to be trained, but later he starts to wet and soil. If trained when his muscles are ready, he usually trains easily.

Every child wonders how well his new baby brother or sister can see. A baby can see at birth, but he does not see well. When he is looking straight at something he does not see it as it really appears but as a gray shadow. (He hears voices clearly, however, and soon turns his head and eyes toward the sound.) No baby sees perfectly until he is six months old, although by the time he is a month old he can follow a light, faces and sounds with his eyes and at two months he will recognize a face.

Every family is in a hurry for its baby to smile, for a baby seems to come alive when he smiles. Babies smile at about the same time. They smile toward the end of the first month of life. A baby smiles at this time even if he is blind. He smiles if he is premature (born earlier than expected) not about four weeks after the day he is born but four weeks after the day he was expected to be born. The average baby lives inside his mother nine months before birth. A premature baby might be born when he had lived inside his mother only eight months. He would not smile, then, until he was at least eight weeks old. A baby born later than ex-

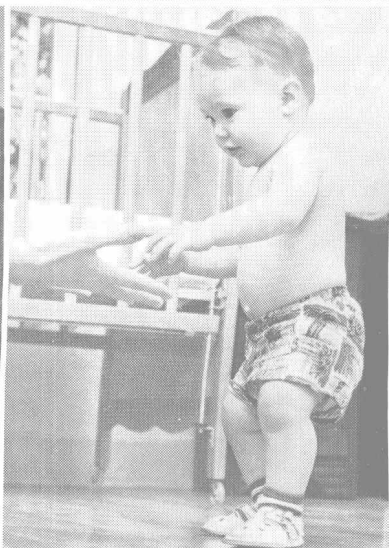
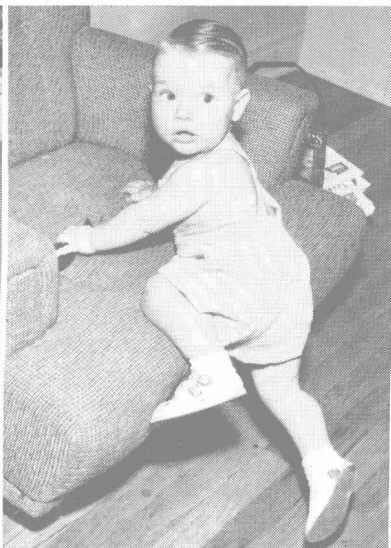
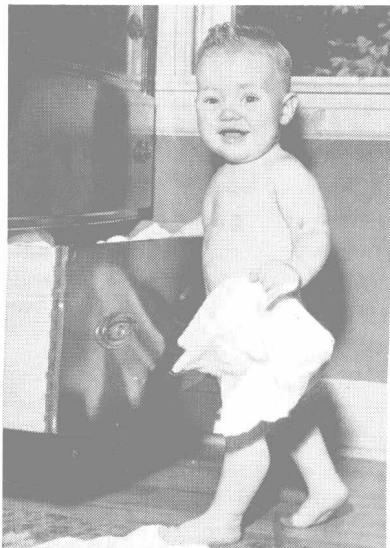
pected would smile sometime during his first month.

The baby's first little smile is not a smile at someone or something, but just a smile. It is his first big forward step in life. A month later he coos, which is a soft little sound. Then, a month at a time, he learns these things: He controls his head and is able to hold it up by himself. He controls his trunk (body) and is able to roll over. He controls his hands and is able to play with a toy or reach for what he wants. He controls his back, arms, and legs by crawling. He controls his thumb and is able to



Right: David crawls on the 16th day of his eighth month. Below left: At nine months, he stands alone and gets into mischief. Below center: Early in his tenth month he is able to climb onto chairs. Below right: By the time David is a full ten months old, he has learned to walk.

Photos, Robert Williams





use it and his index finger to pick up something as tiny as a crumb. He stands alone. He walks with help. He walks alone.

Not all babies take each of these forward steps. Some babies never crawl; they scoot along the floor sitting up. Some do neither. One day they simply stand up. A little later they walk. The Japanese, for instance, do not permit their babies to creep or crawl, yet Japanese babies learn to walk as well as any other baby and at about the same time. A baby walks as a little bird flies, when it is ready.

Small babies need a great deal to eat. Because they grow so fast and accomplish so much in a short time, they seem always hungry. A healthy baby who gets plenty to eat will double his birth weight in five months. How and what a baby eats varies from one land and one people to another. In most countries mothers nurse their babies with the milk that nature supplies in a mother's breasts at the very time a baby needs it. But the people of Alor, an island near New Guinea in the Pacific Ocean, chew food for the baby to swallow and feed it to him from a papaya leaf. In the Mentawie Islands in the Pacific the baby is adopted at birth by the mother's father and fed by the mother's brothers. The Eskimo baby feeds from his mother's breast for two years, but when he is a few months old his mother gives him food she first chews. In ancient Greece babies often were fed goat's milk and honey, and in early times the Hindus of India fed the baby a handful of butter and honey twice a day and milk at night.

Mother's milk is best, but if a mother does not nurse her baby, he is given a formula in a nursing bottle. Formula is a mixture of milk and sugar so nearly like mother's milk that babies' stomachs do not seem to know the difference. The babies born in the United States are extremely healthy. A good reason for this

A mother and child (1) of a South Pacific island. A Mexican baby (2) goes shopping, hanging on his mother's back. This baby of China (3) wears a small "pillbox" hat and a high-collared robe. The Eskimo mother's son (4) rides on her shoulder. American Indian babies rode backward (5), in an elaborate cradle-board like this. The little African (6) sees the world from behind his mother's back.

is their diet. They are given vitamins and proteins (strained meat, chicken, fish) at an early age. Vitamins are important for strong bones and nerves. Proteins build muscle. A United States baby also gets lots of fresh air and sunshine. If he lives in a cold region where there is little sun in winter, he is given Vitamin D in his milk as a substitute for sunshine.

A baby seems to grow smoothly and easily. Actually, there is a big upset in his life when he is small. This is called weaning and occurs when he has to learn to stop taking milk from a nipple and take it from a cup or glass or spoon. The baby sometimes makes a great fuss because he likes milk and hates change. Most babies in the United States are weaned gradually. Their mothers help them get used to a spoon or cup when they are very small by feeding them strained fruits or meats or cereal. They also learn early to sip orange juice from a glass. By the time a baby is eight months old, he usually eats a wide variety of baby food which includes meat, potatoes, vegetables, and puddings, and drinks his milk from a cup at the end of his meal. Some babies continue to take a bottle at night until they are a year or two years old.

Different peoples in different lands care for their babies in different ways. The Hopi Indian baby is bound to a board until he is three months old, with only his head free to move. His development does not seem to be any slower than that of a baby who is free to move from birth. The Sioux Indian baby is strapped on his mother's back and carried wherever she goes, and the Arapesh baby in the far Pacific is kept in a net bag close to his mother during the day and sleeps beside his father at night. Until a few years ago many people in central Europe believed in swaddling their babies, wrapping them in blankets and clothes so tightly the babies could not move. The average baby today, however, lives in comfort and freedom. He wears soft, loose, knitted garments, sometimes only a shirt and diaper, and when not in someone's arms or in a carriage, stays in a crib.

In whatever way they are fed, or dressed

or handled, babies the world over need certain things:

They need to be fed.

They need to be protected from danger.

They need to be clean.

They need to be picked up when they cry.

They need to be played with and talked to.

They need love. A baby would rather have a smiling face bent over him speaking gentle, loving words than all the lace pillows and satin blankets in the world.

Nothing in life is as important to a human being as being cared for when small by someone who loves him and shows that love. A baby's association with his mother is his first meeting with another human being. How she cares for him through infancy (babyhood) and childhood affects him all the rest of his life.

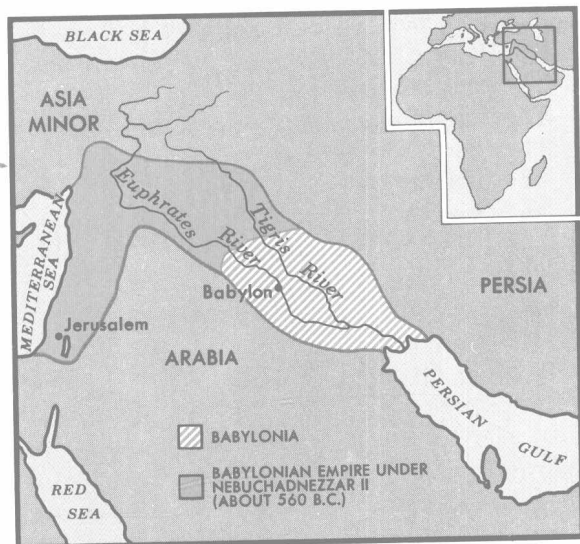
BABYLON AND BABYLONIA (*bāb'i lōn* and *bāb'i lō'nī ä*). The ancient city of Babylon was built on the Euphrates River about 60 miles south of Baghdad, the capital of present-day Iraq. The word Babylon meant "gate of god" in the language of its settlers. Babylonia was the term used in ancient times for the land around Babylon. The area included all the land between and around the lower Tigris and Euphrates rivers. This area makes up the southeastern part of Iraq today. (See MESOPOTAMIA.)

Babylon, the City

The city of Babylon was first mentioned in ancient records about 2200 B.C. It became important when Hammurabi came to power about 1700 B.C. During following centuries Babylon was often invaded. It lost much of its political importance, but it remained a center of cultural and religious influence.

Babylon had its second period of greatness under Nebuchadnezzar II (605-562 B.C.). He rebuilt the city and made it the capital of a great empire. After the time of Nebuchadnezzar, the Persians captured Babylonia. In following centuries it slowly lost its importance and finally disappeared.

The older buildings at Babylon were so completely destroyed by invaders that little remains



Locator map of Babylonia.

of them. Archaeologists, however, have uncovered large parts of the city of Nebuchadnezzar. It was rectangular in shape, and built on both sides of the Euphrates River. The city measured about $4\frac{1}{2}$ miles around. Surrounding the city were two thick walls with eight gates, and a walled moat filled with water. Clustered about the city were small settlements. The population of Babylon may have been as high as 200,000 in the 6th century B.C.

The remains of the city show that it had brightly colored temples, palaces, and public buildings. A terraced building in one of the temple areas may have been the famous "Hanging Gardens." The "Tower of Babel" was probably about 300 feet high with a small temple on top. (See BABEL, TOWER OF.)

The Land and Early Settlers

Long before the city of Babylon was built many different peoples had settled in Babylonia. They were attracted by its fertile land and warm climate. To the north and east the climate was not as pleasant. Also, the land became rough as it rose to the mountains of Asia Minor (Turkey) and Persia. To the south was the Persian Gulf, and on the west and southwest were the deserts of Arabia and Syria.

Men moved into the northern part of Babylonia at least 6,000 years ago. Archaeological

excavations show that these people lived in small villages. The men were farmers, shepherds, hunters, and fishermen. They made crude dishes and pots of clay, used stone and bone tools, and carried on some trade.

At the time when the early settlements were made in the north, a large part of southern Babylonia was under the waters of the Persian Gulf. The gulf extended about 150 miles farther inland than it does today. The Tigris and Euphrates rivers, however, regularly deposited large amounts of soil near their mouths. The soil slowly filled the gulf and created swampland. This land was very fertile, and at once attracted people. Some came down from the northern part of Babylonia, others from the highlands of Iran. Semitic tribesmen from the deserts to the west also pushed in.

The Sumerian Age

Among the early settlers were the Sumerians, a people whose race and language origins are still uncertain. By 3000 B.C. these people lived in most of southern Babylonia. There they created an advanced civilization.

Small city-states ruled by kings were scattered over the countryside. Agriculture was very important, and irrigation canals crisscrossed the fertile land. Barley, wheat, dates, and many kinds of vegetables were grown. Domestic animals included sheep, goats, cattle, and donkeys. Carts and boats were used.

A surprising amount of industry developed. Gold, silver, copper, and fine stone were used by craftsmen and sculptors. Artists made beautiful jewelry and pottery. There were large, brightly decorated palaces with columns and arches. Fine woolens and linens were woven. Trade spread beyond Babylonia and followed regular routes to Syria, Asia Minor, Persia, and possibly much farther.

By 3000 B.C. the settlers in Babylonia were using a form of writing known as *cuneiform*. (See ALPHABET.) At first crude signs and pictures were scratched on lumps of moist clay which were then dried. Later these several hundred signs no longer looked like pictures, but became formal symbols. They were made by pressing a sharpened reed into moist clay

tablets. The tablets were then often baked in ovens and thus became lasting records. Many tens of thousands of tablets have been found and scholars have learned to read them.

Much is known about Sumerian religion as a result of archaeological excavations. Each little state had its favorite god and goddess, and its own special religious ceremonies. Certain gods, however, were the same in many states. Most of them seem to have been nature gods such as the sun, earth, and water. In every city there were temples in honor of the gods.

The king was the ruler of the city-state as well as its high priest. When a city-state became powerful and conquered other cities its gods were more widely recognized and honored. Temples came to be strong money-making organizations.

Sumerian temples also were centers of learning. In addition to religion, they taught reading, writing, arithmetic, and the first steps in geometry, astronomy, calendar-making, medicine, and surgery. Some of this knowledge later was passed on to the Greeks.

Over the centuries rival Sumerian cities carried on almost endless war. As a result, well-equipped armies were developed. Soldiers wore body armor and helmets and carried battle-axes, spears, and bows. They fought in close formation and were often supported by war chariots. The city-states became weakened by warfare. So when new Semitic invaders pressed into Babylonia, the Sumerians were unable to protect themselves. Thus, some of the city-states were taken over by Semites.

New Invaders of Babylonia

About 2300 B.C. a Semitic conqueror, Sargon, began his rule over the city-states in Babylonia. His capital was Akkad in the north. Sargon's kingdom spread eastward into the mountains of Persia and westward toward the Mediterranean Sea. Sargon, as well as his successors, adopted much of Sumerian civilization, including its religion, arts, and laws. As the two cultures mixed, the Sumerian system of writing came to be used for the Semitic language. After the time of Sargon, northern Babylonia was often called "Akkad" while the southern part was referred to as "Sumer."

Shortly after 2200 B.C. fierce invaders from the Persian hill country destroyed the kingdom established by Sargon. These Gutti tribesmen plundered many Babylonian cities. Deeply hated by Semites and Sumerians, they were driven out of the country by about 2100 B.C.

After the Gutti, King Shulgi, of the Sumerian city of Ur, ruled a long time over most of Babylonia. After his rule the kingdom broke apart and independent Sumerian and Semitic city-states were again set up. More invaders moved in. These were the Elamites from the Persian highlands, and the Amorites, other Semitic tribesmen from the northwest. Centuries of warfare followed.

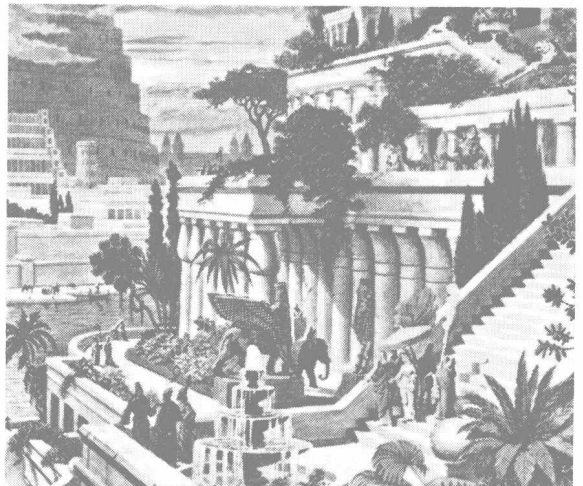
The Hammurabi Age

The famous Amorite king, Hammurabi, whose capital was Babylon, conquered all of Babylonia by about 1770 B.C. He also carried his wars eastward into Persia and northwestward toward Asia Minor.

Hammurabi set up a strong central government and tried to form a united state. He is noted for his legal code, a gathering of the best Sumerian and Semitic laws and customs. The code contained more than 280 laws. It was engraved on a stone monument, about eight feet high, which archaeologists found in 1901. This impressive black pillar is now in the Louvre Museum in Paris, France.

The Hanging Gardens of Babylon were one of the Seven Wonders of the World.

Bettmann Archive



The code recognized a society divided into classes. It provided different penalties for crimes committed by people in each group. The cruelty of many of the punishments showed a primitive society. Some of the laws governing business and property, however, showed an advanced civilization. Women had many legal rights and privileges. Slaves were protected by law and could be granted their freedom.

The civilization of the Hammurabi age was closely related to the older Sumerian culture. Its religion was based on Sumerian practices.

Kassite and Assyrian Control

After Hammurabi, central government broke down quickly. In southern Babylonia a separate independent state arose. Hittite invaders from Asia Minor made a successful raid and captured Babylon but then withdrew.

Shortly after 1600 B.C. the Kassites, an uncivilized people, forced their way in from the northeastern mountains. For about 400 years Kassite kings ruled in Babylonia. Culture, business, and trade declined.

In the 13th century the Assyrians, who lived just north of Babylonia, made many raids southward. Invasions by this growing Semitic group made possible the ending of Kassite rule in Babylonia. This was done in 1171 B.C. by the forces of Elam, a state in the mountainous country to the east of Babylonia.

Elamite control over Babylonia, however, was weak. By 1146 B.C. Nebuchadnezzar I had set up a native dynasty in Babylon. Assyria invaded Babylonia so many times that it could not form a strong independent state. By 700 B.C. Assyria had taken over completely in Babylonia. When Babylon rebelled in 689 B.C. the city was completely destroyed. (See ASSYRIA.)

By 650 B.C. the great empire of Assyria was beginning to show signs of breaking apart. In southern Babylonia, the Chaldeans became independent. These Semitic tribesmen had moved into Babylonia during Assyrian rule. In 612 B.C. Nabopolassar, the Chaldean king who had gained control over Babylonia, joined the Medes from the Persian highlands. Together they defeated the Assyrian army and destroyed Nineveh, the capital of Assyria.

The New Babylonian Era

The new Babylonian or Chaldean Empire flourished under Nebuchadnezzar II, the son of Nabopolassar. The empire became one of the powers of the Near East. Nebuchadnezzar destroyed Jerusalem and the Kingdom of Judah (586 B.C.) while trying to enlarge his empire.

Babylon again became a brilliant capital. Thousands of cuneiform tablets have given detailed information on the life of the age. Trade and industry as well as the arts were important again. Temples were rebuilt and religious activity grew. When Nebuchadnezzar II died, however, decline again set in.

Persian Rule, and Later

Cyrus the Great created the Persian Empire between 559–530 B.C. He captured Babylonia in 539 B.C. and made it a province of his empire. Babylonia, however, kept its own culture. When Alexander the Great conquered the Persian Empire (334–330 B.C.), Babylonia was still an important and wealthy part of the empire.

In the centuries after Alexander, during the Seleucid rule, Babylonia kept some of its old traditions. However, soon after the Seleucids took over (311 B.C.) they built a new capital, Seleucia, north of Babylon. The people of Babylon were moved to the new city. The history of Babylon was ended.

Many traces of the civilization remained, however. Cuneiform writing was used until the beginning of the Christian era. But by that time most of the old cities had fallen into ruin. When the Tigris-Euphrates Valley became important again a few centuries later it was made so by the Arabs.

BACCHUS (*bāk'ūs*) was the god of wine in both Greek and Roman mythology. The Greeks also called him Dionysus. His father was Zeus (Jupiter), the king of the gods, but his mother, Semele, was human. Paintings of Bacchus show him wearing vine leaves and ivy around his head, and carrying a stick covered with vine leaves and ending in a pine cone. Leopards or tigers pulled his chariot. In it he traveled through many countries, teaching the people

how to make wine out of grapes. He always had many men and women traveling with him, singing, dancing, and drinking wine. Bacchus married Ariadne, the daughter of Minos, the king of Crete.

One story about Bacchus says that as a young boy he was found by some sailors who wanted to sell him as a slave. Acetes, the captain of their ship, ordered them to free Bacchus. But the sailors refused and sailed away. When the ship was in the middle of the ocean, Bacchus made it stop. Ivy and grapevines twisted around the masts. All the sailors jumped into the ocean and turned into dolphins. Only Acetes was saved. He became a follower of Bacchus.

BACH (*bäk*) **FAMILY.** During the 17th and 18th centuries a son often followed the occupation of his father. Some families, such as the famous Bach family of Germany, were musicians. Starting with Veit Bach (1555?-1619), seven generations of Bachs are known. Veit was a miller and baker by trade but he played the lute and the zither. His younger son, Johannes (?-1626), also was a musician.

Johannes' son, Christoph, became a court musician. One of Christoph's sons, Johann Ambrosius (1645-1695), was only 22 years old when he was appointed to play with a group directed by his uncle.

Johann Ambrosius' youngest son, Johann Sebastian Bach (1685-1750), was born in Eisenach. His father taught him to play the violin. He became the most important musician of the family. After his father's death, ten-year-old Johann Sebastian went to live with his older brother, Johann Christoph (1671-1721), the organist of the small town of Ohrdruf. There Johann Sebastian sang in the church choir and his brother taught him to play the clavier.

Johann's brother had a manuscript of famous clavier pieces. It has been said that because his brother was jealous of young Johann's musical talent, he would not let the boy see this manuscript. But after the family went to bed, Johann spent hours copying the music by moonlight. When his copy was almost finished his brother discovered it and took it from him.

When Johann Sebastian was 15 years old, he

left his brother's home and became a member of the choir at the convent of St. Michael at Lüneburg. There he began to study the organ and composed some of his own pieces.

A few years later Johann became the organist at the church in Arnstadt. During this time, he composed music and improved his playing of the organ, the instrument he loved best. The story is told that he walked 150 miles from Arnstadt to Lübeck to study with the famous organist Dietrich Buxtehude.

Bach accepted his first important position, organist at the Duke of Weimar's chapel, in 1708. During his nine years there, he began to compose an entire library of organ music.

In 1717 Bach became chapel master to Prince Leopold of Anhalt-Cöthen. Six years later he became cantor of the Thomasschule in Leipzig. While he held this position, he produced his greatest religious music. Great musicians from all over Europe often went to Leipzig to hear the master play.

In his last years, Bach became totally blind. Ten days before his death in 1750, his sight returned. He is considered one of the finest organists and composers of all time.

Among his many works are chorales or hymns and 200 religious cantatas for choir. His longer religious works include *Christmas Oratorio*, the *Passion According to St. Matthew*, the *Passion According to St. John*, and the *Mass in B Minor*.

One reason Bach is called the "Father of Modern Music" is because of the change he made in the way keyboard instruments were played. Before Bach, musicians used only four fingers to play on a keyboard. Bach taught his students to curve their fingers and use their thumbs as well. Perhaps even more important Bach introduced unusual harmony and themes which weave in and out of his music.

Johann Sebastian Bach's most important mu-



Rischgitz

Johann Sebastian Bach.

sic for keyboard instrument is called the *Well-Tempered Clavier*. This is a book of 24 pieces, each written in a different key. Bach also wrote suites, sonatas, and concertos for keyboard as well as for other instruments.

Bach had a large family. His first wife died in 1720, and he married again the following year. Three of his sons, Wilhelm Friedemann (1710–1784), Karl Philipp Emanuel (1714–1788), and Johann Christian (1735–82), became noted musicians.

Wilhelm Friedemann, called the “Halle Bach,” was an outstanding organist. He was also a capable teacher and mathematician. He wrote several clavier, organ, and instrumental works, as well as symphonies.

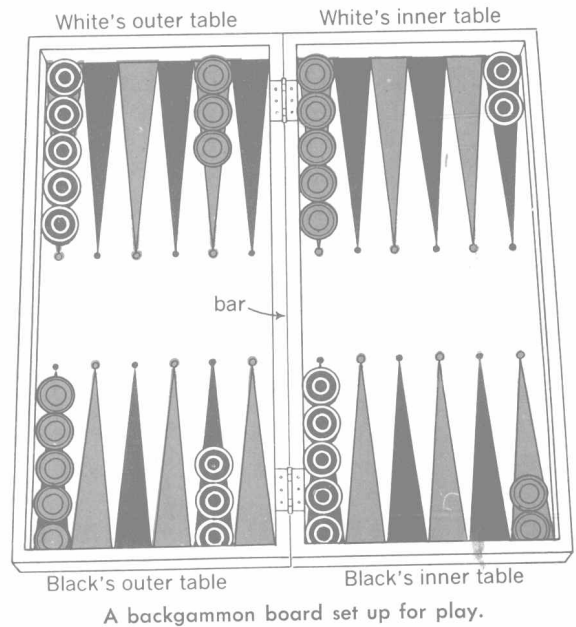
Karl Philipp Emanuel Bach (“the Berlin Bach”) developed his father’s ideas of keyboard technique. He was considered the greatest authority of the 18th century on clavier playing. He wrote *Essay on the True Art of Playing Keyboard Instruments*, which is still the most masterful book of its kind. He was very successful as a clavier composer, although he also wrote vocal and instrumental music.

Johann Christian Bach, called the “English Bach,” went to Italy in 1754, and shortly afterward was converted to the Catholic faith. Johann Christian wrote two kinds of music which no one else in his family had tried, opera and Catholic church music.

The music of Johann Sebastian Bach was rediscovered 100 years after his death, when Felix Mendelssohn and other musicians made public many of his compositions. In the 20th century more and more music of the Bach family has been found and prepared for printing.

BACKGAMMON (*băk'găm'ŭn*) is a game played with checkers on a board. Two dice are used to determine how far the checkers are moved. The object of the game is to cross the board to the goal.

Backgammon is played on a board of four parts or tables marked with six points colored white (or red) and black. Each player has 15 men or checkers; one set is white or red and the other black. The men are moved from point to point according to the numbers thrown with



the dice. If a doublet (the same number on both dice) is thrown, the total number of the spots is doubled.

White moves from Black’s inner or home table to Black’s outer table, then across to his own outer table, and finally to his own home or inner table. Black moves in the opposite direction.

A point occupied by one man is called a blot. If the opponent can move one of his men to a blot, the man already there goes back to the bar. This is the raised strip between the two halves of the board. This man cannot be moved into the game until a number is shaken which would take it to some unblocked point. A player can move no other man while he still has one to enter. After getting his men into his own inner table, he “bears them off the board” by shaking the exact number of the point he wishes to empty. The player wins who first bears all his men off the board.

BACON (*bă'kŭn*), **FRANCIS** (1561–1626), was one of the most important philosophers, or thinkers, of England. His ideas about how scientists should study things in nature helped to bring about the modern way of thinking, called the scientific method. (See SCIENCE AND SCIENTIFIC METHOD.)

Bacon, the youngest of eight children, was

born in London. When he was 12, he went to Cambridge University, and when he was only 15 he went to France to work for the English ambassador. Two years later he went back to England to study law. At 23 he was elected to Parliament where he soon became very well known.

One of Bacon's best-known books was his *Essays*, which was first published in 1597. Each essay was a very short piece of writing in which he tried to teach a lesson by discussing both sides of a subject such as studying, conversation, friends, and healthful living.

After James I became King of England (1603), Bacon received many honors. He was made a knight in 1603, and in 1617 he was made Lord Keeper of the Great Seal. In 1618 he was appointed Lord High Chancellor. The king also gave Bacon the titles of Baron Verulam and Viscount St. Albans.

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In 1621 Bacon was accused of taking bribes. After he admitted his guilt, he was fined and put in jail for a few days. Afterward he was not allowed to hold any government job.

The last five years of Bacon's life were spent writing books. His *History of the Reign of King Henry VII* is the first English book about the life of a king which tells about the man as a person, as well as about his reign.

Among Bacon's other important books are *The New Atlantis*, which describes an imaginary perfect country; *The Advancement of Learning*; and the *Novum Organum*. In these books Bacon explained how scientists should study things as they really exist in nature and then try to figure out what caused a particular thing to be as it is. Later, by experimenting, the scientist could see whether any one cause would always have the same result. This method, which is called *inductive* reasoning, is used by all scientists today, but it was new in Bacon's time.

One of Bacon's experiments led to his death. He packed a dead chicken with snow to see if cold would keep the body from decaying. Working outdoors he caught a cold which became a serious illness and caused his death.

BACON, ROGER (1220?-1294), was one of the greatest thinkers, or philosophers, of his time. His greatest interest was in science and in improving the schools and ways of teaching. He often experimented with chemicals and with unusual scientific tools. Many people thought he used witchcraft or black magic. In fact, for hundreds of years he was famous as a powerful magician. Today he is remembered as one of England's earliest scientists.

Born near Ilchester, England, Bacon studied at Oxford University and the University of Paris. Besides studying Latin and Greek as most scholars did, he also learned Hebrew and Arabic.

Bacon liked to experiment—particularly in astronomy, alchemy, and mathematics. Through experiments he learned about lenses and how they magnify. He wrote of the process for making gunpowder. Through his study of astronomy

The great Francis Bacon was called by Alexander Pope
"the wisest, brightest, meanest of mankind."



Grace, Honour, vertue, Learning, witt,
Are all within this Porture knitt:
And left to time that it may tell,
What worth within this Peere did dwell

he found that the calendar then being used was incorrect, and made a better one.

Bacon believed that there were only two ways to learn: by experience, which included experimenting; and by reason, or logical thinking. Most scholars at that time accepted what earlier scholars taught. Bacon's way of learning was unusual because he doubted everything that could not be proved. He often told other teachers and students that their way was foolish. This made them very angry with him.

About 1257 Bacon became a Franciscan friar, but he always seemed to disagree with his superiors. They kept him in prison for many years and would not let him have books or equipment. He managed to study in secret, however, and wrote an important book for Pope Clement IV. This book, *Opus majus*, explains the different kinds of knowledge. He also wrote many other books and pamphlets on science and mathematics.

BACON'S (*bă'kūnz*) **REBELLION** (*rē bēl'yūn*) was a revolt of Virginia farmers in 1676 against Governor William Berkeley. It was led by Nathaniel Bacon, a rich, intelligent young planter.

Many people found it very hard to make a living in Virginia during the 1660's and 1670's. Tobacco prices were low and taxes were high. Then in 1675 Indians began attacking the Virginia frontier. When Berkeley did nothing to protect the frontier settlements, the farmers decided to protect themselves. They organized their own army and asked Bacon to lead it.

Berkeley was angry and called Bacon a rebel, but Bacon fought and defeated the Indians. Bacon's supporters won an election held in 1676. The new assembly set up a militia under Bacon and changed some of the laws.

While Bacon was fighting the Indians, Berkeley organized troops. After defeating the Indians, Bacon and the frontiersmen defeated Berkeley's troops and burned the state capital at Jamestown. Bacon became ill with a fever and died in October 1676. Without Bacon the rebellion soon ended. Berkeley arrested more than 30 of the leaders and hanged them without a trial.

The Rebellion was one of the first steps by

which the people were to demand the right to vote and to have a voice in government.

BACTERIA (*băk tēr'ī ä*). Bacteria are living beings (organisms) so small that they can be seen only with a microscope which enlarges several hundred times. Therefore they are called *microorganisms*. Long before they were seen, people knew about the results of bacteria at work. They caused wine to ferment, milk to sour, and dead plants and animals to decay. Ideas about what caused these changes were often related to superstition or religious beliefs.

Bacteria were not really seen until a strong enough microscope was developed by a Dutchman, Anthony van Leeuwenhoek. Leeuwenhoek ground lenses and built microscopes, and he loved to look at everything he could through them. He made drawings of the things he saw. His drawings, which were printed in 1695, clearly showed that he had seen bacteria.

Kinds of Bacteria

The many kinds of bacteria can be grouped by their shape and behavior. The commonest are shaped like a short stick or rod and are called *bacilli*. Others are round like a ball and are called *cocci*. Still others, the *spirilla*, are long, threadlike, and curl or spiral like a corkscrew. Sometimes bacteria change their shape when they grow in a different place.

Bacteria have only one cell, which is more like that of a plant than an animal. The outside is a skinlike cover, or *membrane*, which is not waterproof. The inside is filled with a material called *protoplasm* (see CELL AND CELL THEORY) and usually does not have a single center, or nucleus. The outside cover is important because any chemical used to destroy the bacteria must be able to pass through the membrane. Around the whole is a slimy material which can change shape and often forms tiny threadlike tails, called *flagella*. Bacteria can move, although they have no feet. Some move by waving the flagella. Others without flagella seem to move with wormlike shortening and lengthening of the cell.

Some bacteria have a more distinct shell or *capsule*. It is hard for the defending white