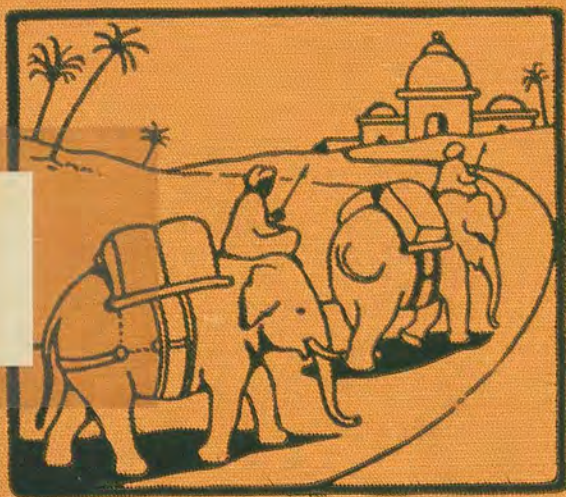


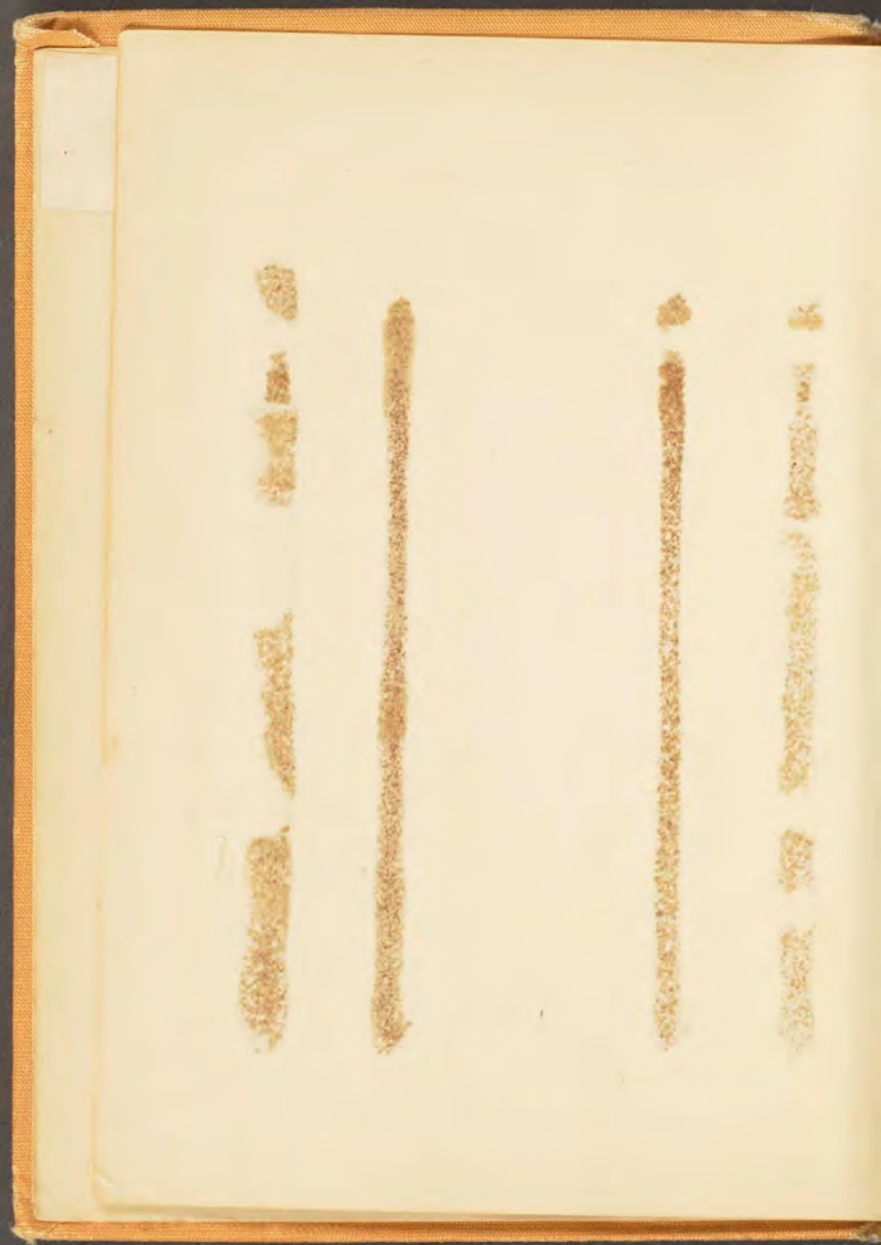
The Romance
of Your
Birthstone



Hope Swengel

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THE ROMANCE of
your BIRTHSTONE



AARON'S BREASTPLATE
(See Foreword, P. 9)

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THE ROMANCE
OF YOUR BIRTHSTONE

by

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FOREWORD

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THE COÖRDINATING COUNCIL ON
NATURE ACTIVITIES

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Foreword



EMS have ever been one of man's most precious treasures. From the time when he was little more than a savage, clothed in skins and living in caves, he loved the brilliantly colored stones which he found in the earth; often they went with him to his grave. All through our history we read of the cruel deeds committed, dangers faced and adventures undertaken because of man's passionate love for gems. No wonder, then, that strange legends of their mysterious power have been told. Indeed it was an ancient belief that God, realizing their influence over man, hid them deep in the earth, away from his greedy reach.

Some of the very oldest pictures and writing we have were painted and carved on precious stones. Because of their hard and durable quality they have remained untouched and unmarred by the thousands of years through which they have lasted. We do not know just how early the engraving was begun, but engraved gems have been found in Babylon, Assyria and Egypt,

in ruins which date back many thousands of years before Christ was born.

Long ago, when only a very few people were able to write, before mail was safely taken care of by the governments, every person of wealth and position owned a ring bearing his seal or signet engraved on a precious stone. This seal in those days corresponded to one's signature to-day, and was often regarded as its owner's most valued possession. In Daniel, 6:17, we read that Darius sealed up the lions' den with his signet; and I Kings, 21, tells us that Queen Jezebel used Ahab's seal upon letters which she falsely wrote in his name. There is another well-known story of Hannibal's stealing the seal of the Roman General Marcellus and almost capturing a town in consequence.

Some of the most beautiful descriptions of precious stones to be found in literature are in the Bible. Two of these are usually thought to have given rise to the superstitions determining the order of birthstones. One of these is the account in Exodus, 39, of the breastplate of the High Priest Aaron. This breastplate was eight inches square, set with twelve gems, each engraved with the sign of one of the twelve tribes of Israel. Superstitions concerning these twelve stones have persisted in one form or another to

the present day, especially in the wearing of birthstones. The early historians, Jerome and Josephus, both mention the connection between the high priest's breastplate and the months of the year.

The other story occurs in Revelation, where the order in which the twelve foundation stones of the Holy City were laid is supposed to have determined the order of birthstones. At first, people tried to own all twelve stones, wearing a different one for each month, but later each person wore the stone of the month in which he was born. To-day the names of the birthstones differ slightly, but the earliest ones are all based either upon the list of foundation stones mentioned in Revelation or upon the gems of Aaron's breastplate.

Do you know the story of your birthstone, the mystery and romance which lie hidden in its luminous, glowing depths? Do you know why it was chosen for your month, and the particular phases of good and ill fortune which are attributed to your stone? If not, you will find a complete account of the birthstone for each month in this book. You will also find the minerals of which it is composed, the countries in which it is found, and the primitive legends and superstitions which cling to each gem, even to-day.

The author has made no attempt at exhaustive research, but has aimed to bring together interesting material with the hope of stimulating further study on the part of the reader. Free use has been made of the material presented by others, and it is hoped that the bibliography to be found at the end of the book may be of assistance to those who wish to go further into this interesting field of study.

The Coördinating Council on Nature Activities takes pleasure in presenting to its friends this first of a series of inexpensive booklets which will appear from time to time under its auspices. Because it is so often difficult to obtain interesting and authoritative information in a form suitable for young people, it is hoped that nature leaders will find these little volumes helpful.

G. CLYDE FISHER.

I
Gem Symbolism

AS EXPRESSED IN LEGEND
AND FOLKLORE

AMONG the antique expressions of human culture which have been handed down to us throughout the ages we find ample evidence that our prehistoric forebears began to appreciate the decorative value of gems and precious stones at an extremely early stage in their development. The subtle charm which holds a 20th century woman spellbound before a jeweler's window doubtless prompted our mother Eve to devise ways for hanging these vivid scraps of color about her person. So it happens that conspicuous among the miscellaneous hodgepodge of articles of the bronze age excavated from a lake-dweller's grave in Bohemia are a number of rough, uncut garnet pebbles drilled by some unknown process, because archaeologists have assured me that they know of no implement belonging to this cultural horizon which could have produced holes in this hard material. These pebbles were evidently intended to be worn as a necklace or armlet by some savage beauty dead and laid away before the dawn of civilization.

Worked turquoise ornaments have been found among Egyptian remains dating back to 6000 B. C. and the bracelets of Queen Ter of the first Egyptian dynasty are probably the oldest pieces of jewelry known to exist.

It is then a most natural sequence that we should find legends and folk stories connected with the gems which were known to certain peoples. The strong appeal to the imagination engendered by the deep red of the ruby, the pure serene blue of the sapphire or the rainbow variability of the opal, which is not without its influence on us of the 20th century, must have moved strongly and deeply the emotional natures of our early forebears, and its cultural record as handed down to us constitutes a rich and vivid contribution to mythological and folklore literature.

Examining these myths as a whole it has seemed to me that the symbolism expressed in them is a color symbolism. By this I mean that the emotion recorded in, say, a birth legend of the diamond, deals neither with its hardness nor its brilliancy, although brilliancy finds a certain expression in relation to color, but with its *color* sentiment. Something of this has been transmitted to us of to-day, as witnessed in Quiller-Couch's alliterative rhythm.

"Rubies ripped from altar cloths
Rippled down her rich attire ;
Her mad shoes were scarlet moths
And a flame of fire."

I think that none of us can deny the potency of color symbolism in this intense word picture, in which the color red has been woven into the description until the poet's image glows with life and passion. And note, if you please, that much of the effect of this is due to the color symbolism of the ruby, a heritage transmitted to us through a lavish wealth of gem legend.

Roughly analyzing the psychological impressions of color values, we would arrive at something like the following :

White: Life, joy, innocence.

Red: Divine power, love, fire, human passion.

Deep blue: Heaven, virtue, truth, constancy.

Green: Hope, faith, victory.

Purple: Suffering, sorrow, peace, humility, purity.

Yellow: The goodness of God.

Among the stones in the breastplate of the high priest, the mysterious Urim and Thummin, the emerald was assigned to the Levites, the priestly tribe of Israel, the carbuncle or ruby to Judah, the pre-eminent, powerful tribe, and the amethyst to the tribe of Dan.

The Cabalists in naming the twelve stones which preside over the signs of Zodiac, assigned the ruby to Aries, the sapphire to Leo, and the diamond to Virgo.

According to a Talmudic legend the Ten Commandments were engraved on a sapphire, and Dr. George F. Kunz in his work on "The Magic of Jewels and Charms" notes a curious book called in Hebrew, "Sepher de Adam Kadmah," attributed to the Angel Raziel, which, legend states, was engraved upon a sapphire and given to Adam by its angelic author when Adam was driven from Paradise. Handed down from generation to generation it finally came into the possession of Solomon, whose court was the universal rallying point of all things occult connected with Hebrew myth.

The Talisman of Charlemagne, preserved in the Cathedral treasury at Aachen, is composed of two large sapphires cut *en cabochon*, one being oval form and the other square, constituting respectively the front and back of the relic. Enclosed between these is a cross made from the wood of the Holy Cross. This is visible when looking through the sapphire.

A quaint passage which I will quote from Bartolmæus Anglicus, a 13th century monk, throws a sidelight on the peculiar celestial quality of the sapphire symbolism:

“The sapphire,” he says, “is a precious stone and is blue in color most like to heaven in fair weather and clear, and is best among precious stones and most apt and able to fingers of kings. Its virtue is contrary to venom and quencheth it every deal. And if thou put an addercop (a spider) in a box, and hold a very sapphire of Ind at the mouth of the box any while, by virtue thereof the addercop is overcome and dieth, as it were suddenly, and this same I have seen proved oft in many and divers places.”

Star sapphires were regarded by the ancients as powerful love charms. They are said to have been worn by Helen of Troy for this purpose, a view which would tend to ascribe the Trojan troubles, over which we labored in our school days to a mineral rather than a vegetable source.

The lively green color of the emerald suggests purity, gentleness, hope, faith, victory. It is the gem ascribed among the apostles' stones to St. John. It was regarded by mediaeval mystics as antagonistic to sexual passion although, curiously enough, commonly assigned to Venus.

Perhaps the most suggestive legend connected with it and the one most filled with symbolism is that which describes a single emerald which was detached from the crown of Satan when he fell from heaven, because no longer could its pure

green ray brook the fiery evil of the fallen angel. From this perfect stone was fashioned the Sangraal, the cup from which Christ drank at the Last Supper and in which later the last drops of His blood were caught as He was taken from the Cross. And thus we find the emerald made the center of the most remarkable cycle of legends and the richest treasury of symbolism which has survived to us from the Middle Ages.

In the birth legend of the amber we seem to have an exception to the color symbolism governing these myths. It is, however, true that the quite obvious vegetable derivation of this gem could not fail to impress the Greeks, and we can hardly set down as a mere accident that their origin myth should have hit the truth so nearly. The Heliades legend, of which both Hyginus and Ovid have given elaborate versions, recounts the adventures of Phaeton, the favorite child of the Sun god Helios, and his death in a rash attempt to drive the horses of the chariot of the sun which his father, yielding to his entreaty, had entrusted to him for a day. Phaeton, disregarding the injunction not to whip the fiery animals, was seized with dizziness and terror on the height, and losing control of the flashing steeds approached too near the earth and set it on fire.

At the earnest entreaty of the goddess Earth,

who feared to be consumed, Jupiter launched a thunderbolt at Phaeton who forthwith fell into the Cridamus. The Naiads of the stream buried his body on the shore whither it had been washed by the waves.

His sisters, the Heliades, accompanied by their mother Clymene, a daughter of Oceanus, at last found the tomb of their brother. They remained beside it weeping bitterly, and became rooted to the spot. As a penalty for assisting Phaeton in yoking the horses to the chariot and encouraging his adventure they were changed into trees from the branches of which tears continued to fall. These tears, Ovid adds, were hardened by the heat of the sun and became amber, "which the river receives and sends to the Roman ladies for their adornment."

Such is the legend. Now in point of fact amber actually is the fossil gum exuded from a tree, it usually carries evidence of its gummy origin in the form of flies and other insects imprisoned inside of it, and the only point where the Greeks had to draw upon their fertile and extremely poetic imagination was to account for the trees from which the gum flowed. So it would here seem that the exception proved the rule with regard to color symbolism.

It is, however, the Orient to which we must

turn to find the birth legends of the gems clothed in all the rich beauty of symbolic imagery. In the folk stories which are handed down by successive generations of Hindu nurses to be told to the children, much as our own Mother Goose legends were told, we find the sapphire born of the last remaining drop of *Amrita*, "whose shadow is Immortality." The ruby, according to these old myths, was a diamond whose color was changed to red by the blood of a Maharanee, slain in anger, disappointment and envy. The diamond drops from the lips of Krishna as a reward for an act of pure and unselfish sacrifice. And so throughout the whole cycle of stories, always the color gives the key to the meaning of the legend.

—HERBERT P. WHITLOCK.

(Extracts from article appearing in the Jewelers' Circular—Oct. 11, 1916).

II

Garnet for January



ARNET is the gem of Aquarius which is the zodiacal sign for the month of January. It was the fourth stone in the breastplate of the high priest, and on it was engraved the tribal name of Judah.

People believed that by wearing a garnet they would be protected against accidents in travel. If a lion were engraved upon it, it warned of possible dangers and brought to its wearer health and honor. It was used as a poultice in its powdered form, and was believed to stimulate the heart. Asiatic people used garnets as bullets, in the belief that their glowing color might cause them to inflict a more deadly wound.

The gem is usually dark red, but it may be yellow, green, brown, or even black. It varies not only in color, but in hardness and in size, from that of a grain of sand to a stone several inches in diameter.

An inventory of the French Crown Jewels in 1791 mentions eight cups, each hollowed out of a

single garnet. Such huge crystals, however, are usually cloudy and of an inferior hue.

The more nearly the garnet's color approaches that of the ruby, the greater is its value. For this reason, the fiery-red variety is the most popular. It occurs in great abundance in the mountains about fifty miles from Prague in Czechoslovakia. This is probably the only place in the world where its collection and preparation for the market have been of sufficient importance to warrant an established industry. The diamond mines in South Africa have produced many fine garnets of this variety, but they were a drug on the market until called "Cape Ruby."

Similar stones are also abundant in the Navajo Indian reservations in Utah and Arizona. Here the garnet is scattered through the sands and gravels in small crystals that have been rounded by the scouring of the sands. The crystals are collected from the surface by the Indians and sold to tourists and traders.

Many other countries and states furnish gems darker in color. These are usually cut *en cabochon*, that is, into a very convex form on the upper surface while the base is hollowed out to give transparency to the stone. In this form it is called *carbuncle*. A rare shade of a pale rose color can be

exactly imitated by the burnt or "pinked" Brazilian topaz. One variety resembles the color of cinnamon and comes principally from Ceylon, although this shade has also been found in the lava of Mount Vesuvius. In North Carolina, beautiful gems of pale red and rose of exceptional brilliancy have been obtained.

The name "garnet" comes from the Latin word *granatus*, meaning seed-like, because the appearance of the crystals embedded in the matrix resembled the seeds of the pomegranate, and their color resembled the jelly-like juice of that fruit.

Garnet occurs in more than a hundred localities in the United States; so if you should find a piece of rock with small red grains scattered through it you may be pretty sure that they are garnets. At first sight the crystals all appear to be round, but if you can pry some of the perfect ones out of the rock, you will notice crystal faces, for garnet under favorable conditions crystallizes into very beautiful forms. These may exhibit crystal faces rivaling those of a cut gem, but under less favorable conditions they appear either in irregular masses or in rounded grains.

The gem has a marked tendency to include other minerals within its crystals. In some specimens

this tendency is so strong that the garnet crystal is only a shell enclosing other minerals, such as mica or quartz, which are so scattered through it that separation is very difficult.

Garnets are found in a great variety of rocks, especially, however, in the older ones, and when these decay the garnets fall out and are sometimes washed into the streams so that gems of quality are often collected from loose sand and stream gravels. Mining of gem garnets has taken place at very few localities because the gem is so abundantly distributed over the world that it is one of the cheapest stones, and commands so low a price that its extraction is seldom profitable. When it is quarried, the rock is usually drilled by hand and loosened with small charges of explosives so that it can be removed and broken down carefully, to free the garnet crystals without breaking them.

Stones of the finest quality are hard and lustrous, and upon them exquisite Roman intaglios were carved. The most famous one is the "Head of the Dog Sirius," engraved on a perfect stone of unusual size and beauty, which now belongs to the famous Marlborough collection. Another famous one is engraved with the heads of Socrates and Plato, a gem which has served above all other

means to identify the portraits of these philosophers. The garnet seems almost to be regarded as a royal stone, from the preference Persians have given it as the bearer of their sovereign's image. All varieties of garnet are hard to engrave, for it is very brittle—a fact which makes the skill of ancient engravers so much more wonderful.

The garnet has other uses, however, beside ornamentation. As a jewel in the bearings of watches and scientific instruments it is of importance. Most of the garnets used in this way are the chips produced during the cutting of gem garnets in Bohemia and Madagascar. The number of garnet jewels used monthly in watches is estimated at 250,000, and yet it is used only in the cheaper movements. Sapphire and ruby, being harder, are consequently more durable and are more extensively used. Jewels ground to thin plates for this purpose are made in Switzerland, to supply the greater part of the world's needs.

At present, garnet is mined in the United States for use as an abrasive, either as garnet paper, similar but superior to sandpaper, or as a loose grain or powder for grinding and polishing plate glass. Large quarries have been opened and mechanical equipment has replaced the older and

slower methods of handling the ore. New York State leads in the development of this industry because of the abundance of high grade garnet-bearing rock in the Adirondack Mountains, although New Hampshire, North Carolina, Delaware and Chester Counties in Pennsylvania, and Roxbury, Connecticut, also have deposits which have been worked at one time or another. Virginia, North Carolina, Arizona, Montana and New Mexico also produce garnets of gem quality.

A few years ago handsome green stones were found in Russia on the western side of the Ural Mountains. These range in color from olive to emerald green and make a beautiful decoration for pendants and necklaces, but are too soft for ring stones. The deep green varieties were at first confused with real emeralds, until their true nature was revealed by chemical analysis.

Another variety of garnet is now being marketed under the trade name of "South American jade." It takes an excellent polish and closely resembles true jade. Specimens of pink, white and blue have also been found, but it is of the deep red stone that the poet wrote:

"The gleaming garnet holds within its sway
Faith, constancy and truth for one away."

III

Amethyst for February



THE common amethyst, a lovely member of the quartz family is, because of its abundance, less valuable as a gem than its beauty would indicate. Its color varies from a mere suggestion of lavender to a purple so deep it is nearly black. The deeper the color, however, the less brilliant the stone, and for that reason ancient engravers worked almost exclusively upon the lighter stones. Because of its color, resembling that of a crushed grape, no doubt it got the name amethyst from a Greek word meaning intoxication, and people believed that the stone had the power to prevent drunkenness. Wine, therefore, was often drunk from sparkling amethyst cups, which artists carved from its largest crystals.

The amethyst is the ninth stone in the breastplate of the high priest, and is the birthstone for February. It was the stone of the tribe of Dan, which stood for judgment, hence it represents justice and courage. It has always been associated with religious forms. Roman Catholic bishops

still wear a ring of amethyst, and for this reason it is called the "Bishop Stone."

Romance has centered around it all through the world's history. As an amulet it was believed to give protection against witchcraft. If the name of the sun or moon were engraved upon it and the stone hung about the neck from the hair of a baboon or the feathers of a swallow, its wearer would be safe from hailstorms and intemperance.

The precious mineral corundum is occasionally found in alternate layers of red and blue, which gives it a deep purple color. It is then called, "Oriental amethyst," although it is really a purple sapphire and an exceedingly rare and beautiful gem. While not so hard as corundum, the Siberian stones of amethystine quartz rank next to it in the richness and depth of their dark violet color in which a rosy hue shines out from the purple.

The crystals are six-sided prisms which terminate in pyramids. The finest ones come from Siberia, where they occur in cavities in granite. Often they are found lying loose near the surface of the earth. Large gem crystals, in great quantity but of inferior hue, come from Brazil, where they may be found hidden in volcanic rock, or picked up as pebbles from the river gravels.

In fact, nearly every country in the world has a supply of quartz amethyst. In America, fine specimens have been found in Maine, Pennsylvania, North Carolina, and especially at Thunder Bay on the north shore of Lake Superior. The stones from there are highly colored, but not uniform or clear. Very few of them are of gem quality.

The amethyst was a favorite stone among the ancients upon which to engrave portraits; Cleopatra's signet was an amethyst, upon which was engraved the figure of the Persian deity Mithras. The stone was sacred to St. Valentine, who is said always to have worn one which bore the figure of a little cupid on it.

A likeness of the emperor Trajan carved in an amethyst fell into the hands of Napoleon when he was in Prussia. An old Egyptian amulet in an exquisite gold setting, which formerly belonged to one of the Pharaohs, is now in the Louvre; and Edward the Confessor had a ring with a large and gorgeous amethyst which is now in the Crown of England. The tradition is that it protects the king from contagious diseases.

There is an interesting Greek legend which tells of the origin of the amethyst. Bacchus, offended

by Diana and determined to avenge himself, declared that the first person he met as he went through the forest should be devoured by his tigers. As it happened, the first person to cross his path was the beautiful maiden Amethyst, on her way to worship at Diana's throne. In terror she called upon Diana to save her, and there before his eyes Bacchus saw the beautiful maiden changed to a pure white sparkling image of stone. Realizing his guilt and repenting of his cruelty, Bacchus poured his favorite wine over her, thus giving to the stone the exquisite violet hue we love.

IV

Bloodstone for March



JASPER, when it is of dark green color, with small red specks scattered through it, is called bloodstone or heliotrope, and is the birthstone for March. This stone is a variety of quartz, with a waxy lustre, and may be green, red, brown, yellow, gray, or black. Occasionally it is banded or in stripes of different colors, and cameos cut in this variety bring out effective contrasts. Bloodstone is supposed to be the twelfth stone in the breastplate of the high priest.

It was at the time of the crucifixion of Christ, according to an old legend, that the first bloodstone was formed. Lying at the foot of the Cross were some pieces of dark green jasper, on which fell drops of blood from the spear of the Roman soldier; since that time, these stones with particles of red in them have been known as bloodstones.

These are found in large quantities in India, Siberia, Bohemia, the Isle of Rum in the Hebrides, and Canada; and in our country, in

Georgia, Oregon, and California, generally occurring in masses of considerable size. The stone is sometimes embedded in other rock, but more often is found as pebbles in the beds of rivers. It is very hard, takes a fine polish and, because of the legend of its origin, was a favorite material for the carving of sacred objects.

The Egyptians, Babylonians, Arabians, and North American Indians especially valued it as an amulet in the shape of a heart. It has been effectively used in the form of vases and small statues. One, in a Paris museum, is a bust of Christ so carved that the spots of red look like drops of blood. A similar one is in the Field Museum in Chicago.

The gem variety of heliotrope, which is a beautiful translucent emerald, green with spots of vivid red, comes only from India.

The name "heliotrope" is from two Greek words meaning "sun reflecting." This name was applied to it because of the belief that when placed in water the stone gave forth a red reflection of the sun. A true bloodstone was believed to have the power of making cold water boil, and was used more extensively than any other stone to stop bleeding. According to Pliny, it was used in some

way by the ancient astronomers in observing and detecting eclipses of the sun.

The flower called heliotrope always turns its face to the sun, and when the juice from that plant was rubbed upon the stone it was believed to render its wearer invisible. Dante alludes to this idea when he says, "No hope of hiding-place or heliotrope."

It brought safety and long life to its wearer. Powdered and mixed with honey and white of egg, it was supposed to be a cure for tumor and to be especially valuable in stopping hemorrhage. It was also used to draw out the poison of snake bites, and it was believed that if a bat were carved upon it, it gave power over evil spirits and made incantations more effective.

To its other powers, Marbodius adds that of bringing rain:

"The Heliotrope of 'gem that turns the sun,'
From its strange force the name hath justly
won,
For set in water opposite its rays,
As red as blood will turn Sol's golden blaze;
And, far diffused the inauspicious light,
Doth with the strange eclipse the world
affright.

Boils next the vase, urged by its secret
power,
And flings far o'er the brim the sudden
shower;
And when the day enshrouded is in storms,
With blackest clouds it heaven's fair face
deforms."

Diamond for April

WHEN the God of Mines called his courtiers to bring him all known gems, he found them to be of every color and tint. He took one of each, crushed them together, and said: 'Let this be something that will combine the beauty of all': He spoke, and lo, the diamond was born, pure as the dewdrops and invincible in hardness; and when its rays shine in the light, it displays the colors of all the gems from which it was made."

Diamonds, when sparkingly clear and free from flaws, are most highly prized and are said to be of the "first water" when they have no tinge of color. They do occur in many colors: yellow, brown, and green stones are very common, but tints of blue and pink are more rare and more valuable. When colors appear in it the stone is called "off color." In a museum of Vienna there is a spray of colored diamonds of remarkable beauty, made up of stones of every shade and tint.

These beautiful gems were long considered to

have great supernatural powers. The diamond has long been held appropriate for the engagement ring because it was thought to soften anger, strengthen love, and promote harmony between husband and wife.

According to the Talmud, a gem supposed to be the diamond, worn in the girdle of the high priest, became dark or brilliant according to the innocence or guilt of an accused person. The Shah of Persia is believed to own a five-pointed star of diamonds which will make conspirators confess their crimes in its presence. Mary, Queen of Scots, was given one as a talisman against danger and poison.

Because of its hardness, the diamond was called "adamas," the Greek word for "unconquerable." This hardness was for centuries an obstacle to its use as a jewel, for its dull exterior looks no more beautiful than a piece of alum, and its hard skin barred attempts to reach its inner brilliance. The ancients merely smoothed its surface by rubbing two stones together, and it was therefore not until some time in the 15th century that it was classed as one of the most precious stones. Thus, the Romans wore the crystals in their native form. The clasp of Charlemagne's mantle was set with

four such stones. Slowly, the favor of this gem increased, and for a long time its use was confined to the rich and powerful.

The diamond's hardness, rather than its beauty, is what won its early fame. It is claimed that Moses used it for cutting the stones for the Tables of the Law and for fashioning the gems for Aaron's breastplate. The Prophet Jeremiah said that the sin of Judah was written with a pen of iron and the point of a diamond. In spite of this hardness, however, it was occasionally engraved. The English royal coat of arms is carved on a diamond which belonged to Charles V; the ostrich plumes of the Prince of Wales are upon the signet of Charles I; and portraits of famous persons exist on several other stones.

The development of the diamond as we know it to-day was very slow. Natural diamond crystals are like four sided pyramids with their bases set together. To polish the surfaces of these was the first step toward our modern brilliant cut. The arrangement of cut faces has changed and varied until, within the past generation, it has reached apparent perfection in the "brilliant cut" of 58 faces, resembling two cones united at their bases. Most of the world's diamonds are sent to

Amsterdam, the "diamond city," for cutting.

Of the light which strikes its many faces, part is reflected and part enters. Rays which enter are bent and scattered, giving that beautiful play of colors called its "fire," and internal brilliancy.

No solvents, not even acids, have the least influence in decomposing the diamond, but it can be consumed by fire at a temperature less than that required for melting silver, about 5,000° Fahrenheit. The experiment of burning the diamond was publicly successfully performed in 1694 at Florence, by means of a burning glass. Some of the most celebrated scientists of the day attended the ceremony at witnesses. The diamond first split, and emitted bright red sparks, and then was completely consumed.

Because of its infinitely thin layers, it can be broken quite easily, when the stone flies into such small scales that they are scarcely visible. These are used mounted in iron tools by gem engravers. Stones which were perfect when taken from the mines have been known to fly to pieces from natural causes.

Without the diamond much of modern engineering and mining operations would be impossible. Boring through solid rock has been greatly

facilitated by the diamond drill, and it is used for cutting the hardest steel.

India is usually thought of as the home of the diamond, for it was there that it was first found. Diamonds have since been discovered in Australia, Africa, Borneo, and other places in the Orient, and in some of the gold-bearing regions of the United States. In this country, they are generally of small size and not in sufficient numbers to warrant extensive mining so far.

All of the diamonds known in ancient times were obtained from the Golconda mines of India. Golconda itself, now a deserted fortress, was merely the market where the diamonds were bought and sold. The diamond district lies within an elevated triangle, several days' journey from Golconda, on a plateau broken into hills and valleys.

Long ago, when journeys to the Orient took several months, amid great dangers and hardships, those who came back told wonderful tales of eastern treasure. Marco Polo, a Venetian traveler, told a story of deep valleys full of caverns and precipices, among which the diamonds were found. He declared that people threw pieces of meat down the chasms, so that diamonds stuck to the

meat, which the birds carried to the mountain tops.

The crystals were discovered in sandstone or in the gravel of river beds, but the mines seem to have been practically exhausted in the 17th century. In 1725, however, small stones were detected by the gold miners in Brazil, which was a Portuguese dependency. The discovery caused great excitement; the King of Portugal declared a royal monopoly on the diamond mining land until 1834. By turning the streams from their natural courses, the diamonds deposited in the gravel were obtained by a process of washing. As an inducement to honesty, freedom was offered to every slave who found a diamond weighing 17 ounces. This event was attended with ceremony. The fortunate discoverer was crowned with a wreath of flowers and given gifts; yet a great many stones must have disappeared.

In 1867, the importance of these fields was eclipsed by the discovery of the South African mines. These mines are of two kinds: river digging, in the Vaal River, whose bed is made up of quartz pebbles with diamonds interspersed, whose appearance indicates that they have come from some distance, and dry diggings.

“The “dry diggings” are found on a plateau

between the Orange and Vaal rivers in a loose surface deposit that is easily worked. A curious miner investigating the yellowish ground underneath found it even richer in diamonds than at the surface. This is believed to be the only place where diamonds lie in the original matrix. For the first 50 feet down the earth is loose and soft, but the "blue ground," as it is called, below must be spread out in the open and frequently plowed over for one half to two years before the gems can be extracted. From this blue ground, the keen eyes of skilled natives were formerly used to pick out the gems, but now with a more improved method, the earth is put through a machine in which the diamonds adhere to greased trays. The stones are then passed on to the sorters, who separate them into parcels according to their size, shape, and quality. The Cape diamonds, as the South African stones are called, are unique in having no envelope or skin as the Brazilian stones have.

Of all precious stones, the diamond has the simplest composition. It is merely crystallized carbon, another form of which is the useful graphite or "lead" of a pencil. Scientists have learned to measure stars, to harness electricity, to transmit words and music on the waves of ether ;

yet all they have learned through careful research and costly experiments is that heat and pressure are important factors in the crystallization of carbon. Crystals of microscopic size have been produced artificially, but no one knows where Nature gathered her material.

Hindus used to believe that rock crystal is transformed to diamonds by lightning. Some of them, noticing that the stones were often found after heavy rains which washed away the clay that hid them, said that they just grew. Not until the discovery of diamonds in Africa, in what is believed to be their original matrix, was anything definite known of their formation. Here came the conviction, however, that their crystallization took place deep down in the earth, from which place the gems were belched forth, to be weathered and washed and scattered over the face of the earth.

Wherever diamonds are found they have come evidently from high places. Only in Africa have they remained in their original iron rocks. There, huge chimneys or chasms penetrate the earth to unknown depths—the Kimberley mines have been worked to a depth of 4,000 feet—with no signs of a termination. The "blue ground" which fills

these "pipes" must have been forced up from below, since it is entirely different from surrounding rocks. In it the gems are lodged.

Usually, however, diamonds have been found far away from their original mountain homes. Thousands of years ago, the mother rock was broken up and scattered far and wide. During the centuries the matrix has been altered beyond recognition, but the diamonds have remained the same, except that their rounded corners hold a record of their long, slow journeys. With more centuries they were again buried with earth washed down by mountain torrents, and in later ages new streams cut through their beds and uncovered them once more.

In these days of abundance, when the shop windows are filled with glittering gems, we forget the old stories of diamonds which blazed from among the folds of princely turbans; which brought bloodshed and adventure, and played prominent parts in secret negotiations. Certain diamonds have been so intimately linked up with human affairs that they have become historical.

The most ancient and celebrated Indian diamond is the Great Mogul, weighing 240 carats. It is connected in history with some of the worst revo-

lutions of India. During the Persian Invasion it was lost sight of. Its fate is unknown, unless the Koh-i-nur and Orloff were cut from it, as has been suggested.

No diamond has had a more romantic history than the Koh-i-nur or "Mountain of Light." Tradition says that it was found in India between 4,000 and 5,000 years ago, and that it is the oldest known diamond in the world. It was kept safe at Delhi until the Persian invasion in 1739. In a deceptive act of courtesy, the Persian conqueror proposed to exchange turbans with the dethroned emperor, in the folds of whose headgear the diamond was concealed, and thus he obtained possession of it. It passed from ruler to ruler until the annexation of the Punjab to British India in 1849. Then the Koh-i-nur was presented to Queen Victoria, and the "stone of fate" passed from the land of its birth to the royal treasury of Windsor Castle, where it may now be seen.

The stone known as the Orloff has had a devious and adventurous career. It began as an eye in the statue of an image in a Buddhist shrine, whence it was stolen by a French soldier and sold to a British sea captain. It was finally sold to Prince Orloff, who presented it to Catherine II of

Russia. She placed it in the royal sceptre and prized it as one of the most beautiful stones in the world, but it was lost during the Russian Revolution, although there are strange rumors of it still.

The largest of colored diamonds is the Blue Hope. It weighs only 44 carats, but it is unique of its kind. It was once in the French Crown, and is believed to have been then much larger than it is now. It was stolen from the crown and to prevent its discovery, was recut to its present square shape. It passed through many hands, and was last thought to be in the possession of a French jeweler by the name of Rosenau.

The Pitt or Regent diamond, before cutting, ranked next to the Great Mogul in size, weighing 410 carats. It was found by a slave in an Indian mine, and offered by him in exchange for his passage to a free country, but the captain took the gem and threw the slave overboard. Its cutting required nearly two years and the value of the fragments alone was reckoned at \$40,000. It was sold to the Regent of France by Thomas Pitt in 1717, and valued at \$2,400,000. By pledging it to the Dutch Government, Napoleon obtained funds for carrying on the military operations which were the beginning of his power. During

the French Revolution, it was stolen and buried, and years later one of the robbers told of its hiding place, so that all the thieves except him were put to death. Napoleon I had it set in the hilt of his sword; from there, it was taken by the Prussians at Waterloo and placed among their crown jewels. It is now in the Louvre in Paris.

The history of another gem, the Great Sancy, is so involved with conflicting tales that it has been called the "Sphinx." No one can unravel the mysteries of its appearances and disappearances during the 400 years or so of its existence.

It was a beautiful, almond-shaped Indian stone, covered all over with tiny facets, said to belong to Charles the Bold of Bergundy; but it was lost on the day of his defeat. Its career from then on became complicated. It was named for Seigneur de Sancy, French ambassador to the court of Queen Elizabeth, who sent it by a trusted servant to Metz. The messenger was murdered, but, knowing his servant, de Sancy recovered the body and found the diamond in his stomach. Various rulers have been said to own it since; several times it has been stolen; and there is now a rumor that it is in India once more, although no one is perfectly sure.

Another stone which is said to have belonged to Charles the Bold is sometimes confused with the Sancy. It was stolen from him by a soldier who wanted only the golden box, and threw the white stone away. Upon second thought, however, he went back for it and sold it to a priest for about fifty cents. The priest sold it for seventy-five cents, and it later came into the possession of Queen Mary, who returned it to Philip II, a descendent of the House of Bergundy.

The Pigott was one of the finest Indian stones, weighing 85 carats. It was introduced into Europe by Lord Pigott and later sold to the Khedive of Egypt. Dr. George F. Kunz tells its story thus:

One day the Khedive was mortally wounded by his enemy Raschid Pascha. Before he died he called his most trusted confidant, and told him that there were two treasures which he swore would never come into the hands of his enemy; so he gave these two commands: first, that his adored wife Vailica, should be strangled; and second, that his adored diamond which he always wore in a little green silk purse attached to his girdle should be crushed. When Raschid entered the palace, there, escaped somehow from her decreed death, stood the lovely Egyptian Queen;

but a little pile of glittering dust was all that remained of the great diamond."

One of the finest gems in the Persian treasury is the "Sea of Light," of great size and brilliancy. Another, "Crown of the Moon," was taken from its owner by torture, a favorite method of adding valuable gems to the Persian crown. The "Moon of the Mountains" was taken from the plumage of the peacock of the famous throne and carried off to Persia. Its subsequent history is connected with some of the blackest crimes on record.

"The Dresden Green" is a rare and beautiful diamond with no authentic history. It is one of the most conspicuous gems in the collection of the Green Vaults at Dresden.

"The Heart" formed the center of a rose composed of twelve large diamonds and an equal number of pearls, for a jewel in the turban of the first Mogul emperor.

The famous diamond necklace, owned by Marie Antoinette, which played a prominent part in bringing about the French Revolution, was one of the most daring frauds in history. One story connected with it is that Madame de la Motte, one of the Queen's attendants, told Cardinal Rohan that Her Majesty would purchase the neck-

lace. The Cardinal bought it and sent it to the Queen by Madame de la Motte, whose husband escaped with it to England, in the hope of breaking it up and selling the diamonds. When the plot was discovered, the Cardinal was sent to prison, and Madame de la Motte was sentenced but somehow escaped. Cardinal Rohan, Madame de la Motte and her husband were among the principal actors in the drama of the French Revolution.

A magnificent bouquet of French diamonds, so cleverly constructed that it can be taken to pieces, even to the petals of the flowers, and converted into seven different brooches, was exhibited at the London Exposition in 1851.

The largest of the Brazilian diamonds, weighing $254\frac{1}{2}$ carats and of perfect transparency and color, is the "Star of the South."

But all diamonds pale into insignificance when compared with the huge stone found in South Africa in 1905. It weighed $3025\frac{3}{4}$ carats and was transparent and colorless, with only one small flaw near the surface. It was called the Cullinan, after the Chairman of the Mining Company, but at the request of King George V, the name has recently been changed to "Star of Africa." The

Transvaal Government presented it to King Edward VII on his birthday in 1907. Two large stones have been cut from it and more than a hundred small ones. The largest, weighing 516½ carats, has been placed in the scepter and the other, weighing 309 carats, in the crown.

Before the addition of the Cullinan diamond, the crown contained 2818 diamonds, 297 pearls, and many other rare and exquisite gems. Its famous ruby, valued at \$500,000, was presented to the Black Prince by Spain in 1367. The crown is kept in a glass case within a double steel cage in the Tower of London, and is brightly lighted and guarded by night and day, except when worn once a year by the King when he opens Parliament.

VI

Emerald for May



EARLY one hundred years ago, a Frenchman picked up some emeralds on the west coast of the Red Sea. An expedition was organized and there in upper Egypt old mines and implements were discovered which dated back to 1650 B. C. Emeralds were found in the wrappings of Egyptian mummies, and inscriptions show that Greek miners labored there in the reign of Alexander the Great. One of the most celebrated rings in history is a large emerald worn by him and bearing his likeness. In Cleopatra's time, these mines were owned by her, and she freely gave emeralds engraved with her portrait to her ambassadors.

There have been other famous gifts of emeralds. Queen Elizabeth gave one to Henry IV of France, reminding him that the gem would not break as long as faith was kept between them. Napoleon is said to have made a point of giving Josephine only emeralds and pearls. When Henry II was given lordship over Ireland, the Pope sent

him an emerald ring as the symbol of his authority. Ireland is also called the Emerald Isle because of its beautiful green vegetation.

The hereditary treasures of princes of India, and gem collections found in their temples and shrines, show a lavish supply of emeralds. The famous Iron Crown of Lombardy is adorned with them. The crowns of kings and queens all displayed this gem, but as time went on the local supplies gave out, and emeralds became more and more scarce. Then suddenly, at the end of the sixteenth century, what was the surprise and delight of lovers of precious stones, to have the markets of Europe flooded with emeralds, emeralds whose beauty and size and color had never been equaled!

This is the romantic and tragic tale of where those new gems came from:

At that time, which is nearly four hundred years ago, in the mountains of South America, there flourished Indian tribes of unusual culture and civilization, called "Incas." These people were skilled in the arts and built beautiful palaces decorated with gold and silver and precious stones. The Incas were still growing in strength and importance when the Spanish exploring South Amer-

ica discovered them, invaded their territory, took away their lands and treasures, and, after forty years, totally conquered and subdued them.

Most abundant and beautiful of their precious stones was one of rich, deep, living green, which was not only used as an ornament but was closely associated with the religious life of the people. They worshipped a goddess who, they believed, dwelt in a huge emerald as large as an ostrich egg. This sacred symbol was displayed only on special occasions and was called the "Mother of Emeralds." The most acceptable offering which her worshippers could bring to her were other emeralds which they called "her children" and so the priests were in possession of great quantities of the gem.

In an attempt to protect their treasures from these invaders from Spain, the Incas threw hundreds of their precious stones into the lakes and refused to reveal the location of the mines. It was not until twenty years later that another searching party found the mines, where the number of pits and extent of the operations showed centuries of work.

In this remote and almost inaccessible country, on the steep and densely wooded slopes of the

Colombian Andes, lie these emerald mines, a series of large, open cuts which are entered through a narrow canyon and which look like an irregular network of white threads gleaming in the tropical sun. These lines are the calcite veins in the black limestone which carry here and there small cavities or "nests" lined with the crystals of emeralds and other gems.

The miners cut steps in the sides of the mountains on which to stand while breaking down the earth with pickaxes. When the bottom of the mine begins to fill up with the detached rock, water from nearby lakes is released, carrying away the valueless fragments of stone. This process is continued until the miners come upon green quartz crystals which indicate the presence of emerald "nests." When the rock containing the precious stone is detached, the laborers break it into smaller fragments and the gems are picked out by hand. The crystals are so fragile that the modern steam-shovel method of mining cannot be used.

The uncut emerald crystal is a six-sided prism, very beautiful in its natural state. The largest one known came from these Andean mines, and weighed nearly nine ounces. In color, transparency, and structure, it is almost flawless. In

the same collection, the property of the Duke of Devonshire, are also some rare uncut stones of early ages.

Emerald is a variety of beryl, and its great value is due to the infrequency with which a perfect grass-green gem is found. A flawless emerald almost never occurs. The finer the color, usually, the more faulty the stone, with many of its crystals cloudy and dull. A perfect emerald weighing about a carat costs sometimes as much as a fine natural ruby, and more than a diamond, while large stones are so rare that they bring fancy prices out of all proportion to their size. The stones we usually see in jewelers' windows called "emerald" may be green tourmaline, green garnet, or, if the collection is very fine, perhaps a green sapphire.

Beryls of all kinds are found in Pennsylvania, Maine, Connecticut, Massachusetts, and in various places upon the other continents, and the fine stone of the color of sea water, known as the aquamarine, is found especially in Alexander County, North Carolina. There is a golden beryl which is a clear yellow, like drops of honey, and there are brilliant blue and pink ones which a tiny drop of chromium might change to true emeralds.

In medieval days, the emerald was used in divination. The alphabet was placed around a bowl and an emerald suspended in it was supposed to spell out a message. It was also believed to render its wearer invisible if he were unmarried. Powdered and taken internally it was believed to allay fever and other ailments. A serpent facing the gleam of an emerald was said to be blinded by it, while to man's eye it was restful and beneficial.

It was the custom of gem engravers to keep beside them an emerald of which the "soft green luster" could relieve their tired eyes. Heliodorus, in the fourth century, described these as "gems green as a meadow in spring," and we are sure that no other precious stone is so well fitted to be the birthstone for May.

VII

Pearl for June



THIS beautiful gem formed by nature in the shells of oysters and mussels is found in nearly every corner of the globe. From prehistoric times it has been worshipped for its beauty. It is mentioned in the Book of Job and in the Proverbs of Solomon. The ancient Persians, Egyptians and Babylonians held the pearl in great esteem, and through them the Romans became acquainted with it.

An old and fanciful idea of the origin of the pearl is that if a drop of rain or dew falls into the shell of an oyster it is changed into a precious pearl. Many stories say that they were tears which the gods changed into pearls. East Indian warriors set pearls in the handles of their swords as symbols of the tears and sorrow which the sword may bring.

Hindu mythology attributes the creation of pearls to the God Vishnu, and so the people adorn their idols with them. The first jewel mentioned in the most ancient writing we are able to de-

cipher is the pearl, while records of it in historic times extend back more than three thousand years.

The most famous pearl fisheries lie on the west coast of Ceylon. There, sand banks fifteen to fifty feet below the surface of the water extend for several hundred miles. The fame of these banks goes back to the sixth century B. C., when Vijaya landed there and became the first king of the island. The fisheries are now regulated by the English government, and when announcement is made that they are to be opened, cities of thirty to forty thousand people spring up almost over night where only glistening sands had been a day or two before.

The fishing fleet anchored in the harbor takes one back thousands of years, for the methods of conducting a pearl fishery are practically the same now as they were then, and the type of little boats is unchanged. Some of them are painted bright red or blue or yellow, and they present a lively scene with their noisy crews dressed in gaily colored loin cloths and turbans.

At a signal the fleet of fifty or sixty boats sets off for the oyster banks. There the men work in pairs, one man remaining in the boat while the other descends into the water, amid the incanta-

tions of "Shark-charmers," men who are in the regular pay of the government, since no diver would descend without their presence.

The diver with his foot on a metal sinker, and only a long sharp knife and an amulet or charm to protect him from the sharks, or perhaps a verse of the Koran tied around his arm, takes a few deep breaths, holds his nose, or clips it shut, and is lowered into the water. When he strikes bottom he sets to work gathering oysters and throwing them into a basket attached to his belt. He is able to remain under water from forty to eighty seconds, when a jerk on the rope signals that he is to be drawn up. Breathing deeply he rests for several minutes and down he goes again. After forty or fifty plunges he is exhausted, and the man who has remained in the boat now takes his turn.

At noon the day's work is done. Each diver has collected about fifteen hundred shells, which are placed in bags and taken to shore. Three tons of shells is the average result of a day's work, but only one shell in a thousand contains the precious pearl. On the other hand, a single shell has been known to yield as many as fifty pearls. The shells themselves are of no small value, however, for the

mother of pearl they contain is used in making buttons and in hundreds of other ways.

The last half mile is a race between the divers, each eager to reach shore first to receive attention from the government officials. In a long procession, the bags of shells are carried ashore on the heads of the divers. Here they are divided into three equal piles, one of which is chosen to be given to the crew. Each man receives his share as the day's wages, which he often disposes of immediately to retail merchants.

The exciting task of examining the oysters takes place several days later under the close supervision of officials. During these days the oysters have been placed in shallow tanks and exposed to the sun's rays and to carrion flies until most of the fleshy tissue is destroyed. The tanks are then flooded to wash away as much as possible of the debris, and the search begins. After the pearls are removed from the shells they are carefully sifted and sorted according to size, color, and shape.

The smallest ones are called "dust pearls" and are of no value as gems. Most of them are sold to oriental physicians to be ground up into medicine, for in the East they still believe that they

cure heart and stomach troubles. The next size are called "seed pearls."

A truly fine gem must be free from speck or flaw, in shape spherical or pear-shaped, and translucent with an iridescent sheen. Although the traditional whiteness of pearls is often cited, they may range through shades of every color and be of the most fantastic shapes. Misshapen ones are called "baroques."

The white silvery pearls from Ceylon, while not of the largest size, have the finest luster. The Bahrein Islands in the Gulf of Persia are the next most valuable source. These gems are more yellowish than those of Ceylon, but are larger. Divers for pearls on this island have to contend with swordfish as well as sharks.

Pearls are also found in many places in the Pacific Ocean and in the Caribbean, and Red Seas. The coasts of California and British Columbia and the gulfs of Mexico and Panama are the chief sources on this continent. These localities were probably known to the Aztec Indians, for the Spaniards found great quantities of pearls among their treasures. The palace of Montezuma was said to be studded with pearls and emeralds.

Pearls frequently occur in fresh water mollusks in the rivers of America and Great Britain. Julius Cæsar dedicated to Venus a breastplate completely studded with pearls from Britain.

A fine pearl of enormous size was found at Notch Brook near Paterson, New Jersey, in 1857. Tiffany bought it for fifteen hundred dollars, and later sold it to the Empress Eugénie. Now it is worth more than ten thousand dollars.

Arkansas, Ohio, and Iowa have produced beautiful pearls, but on the whole, American gems are not sufficiently uniform in color and shape to compete with the oriental variety. An expert can tell immediately from what part of the world a pearl has come. Recently, pearls similar to those of Persia were discovered off the north coast of Africa, where scientists declare that the oysters migrated in search of food.

Just how a pearl is formed is still a matter of conjecture, although it is generally believed that a tiny parasite related to the tapeworm bores its way into the oyster; or a grain of sand may enter and form an irritant. This the oyster encloses with pearly secretions, and the beautiful gem is produced. Its characteristic luster is due to the play of light as it is reflected from concentric

layers like those of an onion. The thinner the successive coats the finer the luster.

The iridescence of mother of pearl, which is identical in consistency, is due not only to the layers but to the fact that they overlap like slates on a roof, and so catch and diffract light. Nearly all mollusks of pearly shells will occasionally yield pearls, but only two, the "pearl" oyster and the "pearl" mussel, repay the cost of fishing. The older ones are the most valuable, for it takes seven to nine years for gems to mature.

Even with the best of care a pearl must perish with age. Those found in ancient tombs crumbled to dust at a touch. When they become lusterless with age, attempts are sometimes made to remove the dull outer skin and lay bare an iridescent layer underneath, but the operation is delicate, performed under a magnifying glass with steel files—and then the result may be worse than before.

They may be quite successfully imitated by coating a glass bead with an iridescent substance made of the scales of the European bleak fish. When this lining is dry the globe is filled with hot wax. In cheap imitations they are not even lined, only heated in hydrochloric acid to give an iridescence to the surface.

For thousands of years the Chinese have inserted foreign bodies into the living oyster shell, sometimes in the shapes of idols. The oysters are then placed in a wire basket and sunk in the water for a year, and when opened the image is covered with pearl.

Just before the World War some lovely pearls with the true oriental luster reached Europe from Japan. A Japanese merchant and scientist had found the way to produce these perfect "Oriental" gems, now called "Japanese culture pearls." He patented his method, but it is slow and costly, requiring skill and patience—so that there is no danger that the market will be flooded.

The largest pearl ever known belonged to the Hope collection and is now in the South Kensington Museum in London. Its length is two inches, its circumference four and onehalf inches, and it weighs three ounces. The finest of existing pearls, called "La Pollogrina," is in a Moscow museum. Another by the same name belonged to Philip II and is in the Spanish Crown.

A pearl of large size was used by the Great Mogul as a pendant in a chain of emeralds and smaller pearls; another was suspended from the peacock adorning the famous throne. The Em-

press Eugénie had a necklace of matchless black pearls which sold at Christie's in London for twenty thousand dollars after the removal of the pearl clasp, which alone was sold for five thousand dollars.

An incident is told of an English merchant who, boasting of his wealth, dissolved and drank to the health of Queen Elizabeth a pearl valued at seventy-five thousand dollars. This practice of dissolving pearls for a beverage seems to have been a common one, and the resulting liquor was said to have a delicious flavor.

Pliny tells this well known story of Cleopatra, who wanted to outdo Antony's extravagance upon a single dinner: Wearing in her ears the two finest pearls in the world, "heirlooms of Eastern kings," she dissolved one of them in a cup of vinegar and drank it. The second pearl was sawed in halves to make a pair of pendants for the ears of Venus. The goddess, Pliny remarks, was "well satisfied with one half of Cleopatra's dinner."



VIII

Ruby for July



GF you were born in July, the "Gem of Gems" is your birthstone. That is the name given to the ruby by the Hindus, who prize it above all other precious stones. The glowing hue of the true oriental gem suggests an "inextinguishable flame that knows no end," and so is the emblem of true love, and brings to its wearer health, wealth, wisdom, and happiness. One who possessed a flawless ruby could dwell without fear in the midst of his enemies. If danger approached, the stone was believed to warn its owner by becoming dark and lusterless.

It is very difficult for others than experts to distinguish the ruby from stones of similar color, for it varies in shade from a pale pink to a deep purple or magenta; nor do many people know that the ruby and sapphire are identical, for the only difference is in the color. Both are corundum, the crystallized form of the very common mineral alumina, and the hardest substance in nature next to the diamond.

The choicest rubies are a pure deep red, described as "pigeon blood." One test of a ruby is to match it with the blood of a freshly killed pigeon dropped on the same sheet of paper on which it lies. It may be distinguished from other stones by holding it to the light; if it appears dark and opaque it is a garnet or spinel, but if the gem is a ruby it will be clear and transparent. A perfect ruby is worth several times the price of a diamond of the same size and quality.

The greater portion of the world's supply of rubies comes from Burma in the East Indies. The finest specimens are found near Mandalay, the capital of Burma, and years ago the government used to have especially beautiful stones escorted to the Royal Treasure House by an imposing procession of high dignitaries, soldiers, and elephants.

When the ruby-bearing land in Burma was held for state revenue by the Burmese king, who was styled "Lord of the Rubies," the mines were jealously guarded from curious visitors, and miners were forbidden to retain any stone of more than a certain size and value, as it then became the property of the king. On account of this secrecy, the history of these mines was not

recorded until the annexation of Upper Burma by the British in 1885.

In mining the jewels, a shaft is sunk until the ruby-bearing earth is reached. As this is quarried, it is hauled to the surface, washed, and sifted. Water enters the pit at about thirty feet, and powerful pumps work day and night to prevent the mine from being flooded, conducting the water in pipes to the surface, where it is used in washing.

After having been washed and screened, the deposit is taken to a sorting shed where it is sifted and washed again and again, and finally turned onto a table where the rubies are sized and evaluated by hand. Every few weeks a public sale is held at the mines. The final price paid for a stone is never disclosed. This enables the buyer to resell, which he often does on the spot, at great profit, sometimes amid scenes of wild excitement.

Mines are also in operation in the Chinese provinces bordering on Burma. Great quantities of the stone are found in Ceylon, but they are usually of an inferior hue, like those found in our own state of Montana. Near Franklin, North Carolina, however, a few beautiful rubies have come from the garnet-bearing rocks which abound there.

A clear, transparent, flawless ruby of any size is the rarest of all gems, and for that reason and because of their great hardness, these gems have seldom been used for engraving. Queen Victoria, however, owned a ruby bearing the portrait and name of Louis XII set in a massive gold ring. There is also a beautiful gem in existence on which is carved the head of Henry IV and the date 1598.

Perhaps the most remarkable virtue ascribed to the ruby by the ancients was the property of being self-luminous. For that reason, it was called "carbuncle" or "glowing coal"; or "lychnis" meaning "lamp-stone." A visitor to old Cathay says, "The Emperor hath in his chamber in one of the pillars of gold, a ruby half a foot in length, that in the night seemeth so large and clear and shining that it is as light as day."

A Syrian legend describes a certain goddess who "wears on her head a gem called lychnis, like a blazing torch, from which the whole temple is lighted as by many burning lamps." Other similar stories have grown up on account of its brilliance, such as the Indian legend which says that the abode of the gods is lighted by massive glowing rubies.

IX

Moonstone for August



DURING the waxing of the moon, the moonstone was believed to be effective as a love charm, and during its waning it enabled its wearer to foretell future events. Held in the mouth, a moonstone was thought to stimulate and refresh the memory. In India, it is considered a sacred stone and is believed to bring good fortune. When it is displayed for sale, the merchants place it on a yellow cloth, for yellow is a sacred color there.

True moonstone is the opalescent variety of feldspar, one of our most common minerals. It is frequently called "adularia" from the name of one of the highest peaks of Mt. Saint Gotthard in Switzerland, where it is found. The stones from there, however, are inferior in hue to the best moonstones, which come from Ceylon. These occur in masses, often several inches in diameter, in veins or cavities in granite, where the crystals of other gems are sometimes found occurring with them. In the United States it is found

principally at Mineral Hill near Media, Pennsylvania, and at Allen's Mica mine at Amelia Court House, Virginia.

The crystals of the moonstone are made up of thin layers of oblique parallelograms, giving the stone an iridescence which is especially beautiful in those found on the Isle of Ceylon. Those which come from Mt. Adula are transparent, with milky reflections in tints of green and blue. Some stones shine with a pearly light not unlike that of the moon. Still others resemble ice, while some are of luminous green. A very curious variety called the "Fish's Eye," made of very thin plates, has a rosy hue shining through the green.

In Siberia, a special kind of yellow moonstone called the "Gem of the Sun" is found. In it are shining rays like tiny hairs, produced by small crevices, in the layers of which the stone is made. The historian Pliny describes this yellow variety as sprinkled all over with golden spots. Rare and beautiful ones are sometimes cut into beads, which have reflections diverging from the center in the form of a star.

With its brilliant silvery rays, and the pearly reflections which seem to move around in the moonstone when it is turned back and forth, this

stone has always been held as a precious gem. Long ago it was believed to enclose the image of Diana, who represents the "moonlit splendor of night," and who was supposed to have the power of bestowing victory, wealth, and wisdom.

Pliny also tells us that an image of the moon contained in the stone daily waxes or wanes according to the phase of the real moon. The Greek poet Nonnus, long ago in the fifth century, wrote:

"Moonstone of a matchless white—

The gem that wanes when e'er the horned
queen

With wasting horn above the heavens is
seen,

But waxes still when e'er the moon,
renewed,

Pours from her horn the liquid silvery
flood."



*Alternative Birthstone for August;
Carnelian and Other Quartz Forms*



CARNELIAN, a member of the famous quartz family, is the alternative birthstone for August. It is a translucent yellowish-red stone, owing its color to oxide of iron, and its name to the Latin word *carnis*, meaning flesh, which its color resembles. A person wearing a carnelian was believed to be proof against any instrument or weapon made of iron, and to be safe from evil spirits.

This was one of the first stones used for ornamental purposes and for engraving. In fact, there were as many ancient engravings made upon it as upon all the other stones put together. Hieroglyphic texts from *The Book of the Dead* were often engraved upon amulets made of it, and it was especially satisfactory for seals, because the wax leaves it readily without destroying the impression. Its popularity among Mohammedan people may have been due to the fact that

Mohammed himself wore one as a signet. It is said that the Children of Israel engraved figures upon carnelians while they were in the desert. A most interesting carnelian which Napoleon picked up in Egypt, and always carried with him, has carved on it, "The slave Abraham relying on the merciful God." Later Napoleon wore it on his watch chain.

Carnelian is found in many parts of the world. Like agate it is scattered over the Egyptian desert, but the most beautiful species, called "sard," comes only from India. This occurs in a rich orange color, in reddish brown, and black; also in a light yellow variety resembling amber. Upon this and another favorite type of cherry-red carnelian the work of the finest Greek artists was done.

Another kind of chalcedony quartz, as those with a waxy luster are called, is onyx, in concentric bands of white and black or white and brown. Its name signifies "finger-nail," and its origin, according to a Greek legend, was supposed to be due to Cupid's cutting the nails of the sleeping Venus. There was a widespread belief that it caused nightmare and strife because of a demon imprisoned in it which awoke only at night. The

people of China feared this stone so much that they dreaded entering the mines, and would on no account wear it because of the calamities it was supposed to bring.

Its evil influences, however, were said to be neutralized when it occurred with sard or carnelian. It is then called sardonyx. This combination of colors made it a favorite for cameos. One of the most famous in history is the sardonyx upon which Queen Elizabeth's portrait was cut and set in the ring which she gave to the Earl of Essex as a token of her friendship. When sentenced to death, Essex sent the ring to Elizabeth, but it fell into the hands of the Countess of Nottingham, who was his enemy, and he was executed.

Another variety of quartz is the moss agate. Like all agates, it is often found in cavities of lava into which silica entered together with iron manganese, which gives to them their beautiful mosslike markings. Until the nineteenth century it was thought that moss agates really were moss enclosed in silica. The finest ones to-day come from India, where they are found as pebbles in the rivers. From China in recent years has come a supply of natural green and artificial red

and yellow moss agates. Fine ones are abundant in various parts of the Rocky Mountains, too, in the form of rolled pebbles in the beds of streams. Long ago, they were thought to be beneficial to the eyes and were held in the mouth to allay thirst.

Agate in general is but little used in modern jewelry, but for art objects and building decorations it is always in demand. There are many kinds, each with a name descriptive of its color arrangement, such as ribbon, rainbow, eye-agate and many others. Because of its hardness and toughness, its ability to take a high polish and because of its colored patterns, it has been extensively used for decoration. For centuries the center for its cutting and polishing has been Oberstein and Idar, Germany, where it used to occur abundantly and where it is now shipped in quantities for working from Brazil and other places.

The process of coloring agates artificially goes back to ancient times. In Arabia, according to Pliny, the stones were cooked seven days and seven nights in honey. Some of the layers, being more porous than others, absorbed more honey and, when placed in sulphuric acid, changed to bands of brown and black. Placed in boiling

solutions of different chemicals, agates can be made into many different colors and tints.

Agate used to be the birthstone for June, and was the first stone in Aaron's breastplate. Amulets of agate made their wearers good-natured and gave them victory and strength.

Deposits of amethyst, topaz, jasper, onyx, opal, agate, and other quartz varieties occur as petrified vegetation, of which the petrified forest of Arizona is an example. This forest has been made into a national reserve, and covers a thousand acres in which prostrate trees of giant size display all the colors of the rainbow.

The purest form of quartz is the rock crystal, which is found in beautifully formed six-sided crystals in many parts of the globe. The universal opinion of its origin used to be that it was ice-hardened by intense frost, and so it received its name "crystal," which is the Greek word for ice. At one time in Rome it was the custom for ladies to carry spheres of crystal quartz in their hands because of their refreshing coolness, a fashion kept up by the Japanese to the present day, especially when doing fine embroidery. Such balls of crystal have frequently been found among ancient remains, and were supposed to have been

used for burning lenses and for cauterizing wounds. Orpheus recommended such a ball as the most fitting way of kindling sacrificial fire and insuring the favor of the gods. The flame thus kindled was called the fire of Vesta.

Among the Ta-ta tribes of New South Wales it is used in rain-making ceremonies. They break off a fragment of the crystal and cast it heavenward, then wrap the rest of it in feathers. It is immersed in water and left soaking, and later buried in the earth or hidden away in a safe place until its congealed water melts and brings forth a downpour of rain.

In addition to all these wonders, the crystal played an important part in the art of the magician. It is the substance of which the shining ball is made in which the conjuror or crystal gazer is supposed to see a person's fate or fortune. The superstitious today use this method of prying into the future just as the ancients did centuries ago.

On account of a belief that the crystal was incapable of holding poison, it became a favorite material among the Romans for cups and goblets. These were frequently covered with the most beautiful ornamentation and were formed into

graceful shapes as fragile as bubbles. Nero is said to have had some magnificent cups of this kind engraved with subjects from the Iliad, which he broke into bits when his downfall took place, in order that no one else might drink from them.

Rock crystal makes a successful imitation of the diamond. It is very fashionable for beads and when artificially colored may pass for almost any other precious stone. A simple method of imitation is to paint the back with the desired color. It is also used for spectacles and in lenses for scientific and photographic work, and is becoming increasingly popular for window glass because of its transparency to ultra-violet rays, which carry the sun's healing and energizing powers. For years tourists have visited a house in Bruges of which the windows are all made of rock crystal with a faint amethystine tint.

Pure rock crystal is found abundantly in India, Japan, Brazil, Hungary, Switzerland, and in the United States, especially near Lake George. In the Swiss Alps, it occurs in rocks so difficult of access that the miner has to be lowered very carefully over the precipitous cliffs by ropes. Seeming to stand on air, he searches the side of

the cliff for crevices which may contain the desired crystals.

Sometimes these crystals contain cavities within which are imprisoned a few drops of water. This phenomenon was regarded as a most wonderful miracle of nature, as it truly is, and to the ancients was proof that the stone was formed of ice. Claudian has written :

“What art hath bound ye, by what wondrous
force,

Hath ice to stone congealed the limpid source?”
and,

“With the Alpine ice, frost hardened into stone,
First braved the sun and as a jewel shone.”

XI

Sapphire for September



HE color of the air as seen on
high

When not a cloud obscures the
tranquil sky."

This description of the sapphire suits well a perfect day in September, the month for which it is the birthstone. Like the ruby it is of the precious corundum, which, next to the diamond, is the hardest natural substance known. Corundum is the crystallized form of alumina, which as a constituent of common clay is one of the most abundant mineral substances known. It is most valuable as crystallized into corundum. Among its crystals are the greatest variety of truly precious stones, for it occurs in the color of every other gem, although they are all sapphires.

These gems were believed to bestow freedom from enchantment and captivity, to pacify enemies, and to procure favor with princes. Their power against poison was believed to be so great that a spider or reptile put in a glass with one

would die. Its remarkable coldness to the touch gave rise to the idea that it could extinguish fire. A gem in the church of Old St. Paul's in London was supposed to cure diseases of the eye, and stones were used for this purpose in many parts of Europe. The sapphire is the symbol of truth and constancy. Tradition says that it was upon a sapphire that the Ten Commandments were engraved, and that it was dedicated to deities by the ancients more frequently than any other stone.

Sapphires of the finest color come from the mines of Ceylon, which have been worked for centuries. Here the ancient Indians obtained their stones, just as they are found to-day, from the beds of streams where they are mingled with the gravel. In Queensland in Northeastern Australia, however, the deposits lie high above the creek beds and parallel to them. If clay is present it must be washed away, but usually the earth is merely loosened with pickaxes and the stones separated by sieves of peculiar construction.

There is a remarkable deposit of this mineral in Macon County, North Carolina, where it is enclosed in the veins of a green rock. The

crystals from there are small but occasionally quite perfect. In 1865, sapphires were discovered in gold-bearing gravel near Helena, Montana. The Yoga dike in which they are found is four miles long and is one of the greatest gem mines in the world. The stones are small but very valuable for watch bearings and need much less cutting for this purpose than oriental stones.

The presence of sapphires in Kashmir was not generally known until a monk brought a large crystal to a jeweler to be cut in the form of an idol. For years this monk had been exchanging sapphires for groceries, and was loath to give up the hiding place of his treasures.

More than half of the world's supply of sapphires comes from Siam, where the stones are found only a few feet below the surface in a light sandy clay. Small rough pits are dug in the ground and sand containing the gems is carried to a stream in large bamboo baskets with points in the bottoms. The baskets are placed in a current of water until the clay is all washed away and the gems, which are heavier than common stones, settle on the bottom in the points of the baskets and are picked out by hand.

Some of the cloudy sapphires from Ceylon

when properly cut display an opalescent star of six rays, due to tiny tubular cavities in the crystals. The gems were then called "star-stone" or "asteria" by the ancients, who valued them greatly and believed them to be powerful love charms. For this purpose, according to tradition, one was said to have been worn by Helen of Troy. A beautiful asteria weighing 543 carats, called, "Star of India," is in the American Museum of Natural History.

Another famous sapphire, of 132 carats, now in the Museum of Mineralogy in Paris, was found in Bengal. It is called the "wooden-spoon" sapphire, from the occupation of its finder. After many wanderings it was sold to the French Crown for \$34,000.

Because of its hardness the stone was seldom engraved. Natural crystals, slightly polished six-sided pyramids, were used in such objects as the crowns of the Gothic kings, the Iron Crown of Lombardy, or the Crown of Hungary. A magnificent head of Jupiter was carved in the purest Greek style and found set upside down in the pommel of a Turkish dagger. A full face Medusa's head is the chief glory of the Marlborough collection.

One of the most famous sapphires is the signet of Constantius II on which the Emperor is represented spearing a wild boar. The late Duke of Brunswick had a sapphire which formerly belonged to Mary, Queen of Scots, and which was engraved with the arms of England. One cut in the form of a rose, which belonged to Edward the Confessor, now ornaments the center of the cross in the Crown of England.

The sapphire was sacred to Apollo and was worn when inquiries were made at the oracle of his shrine; for this reason it was called Hyacinthus, the name of the youth loved by Apollo and changed by him into a flower of that name. Both its ancient and its modern names refer to its azure color. The writer of the Pentateuch describes it as "the body of heaven in its clearness." The Persians said that the earth rests on a great sapphire of which the reflection gives color to the sky.

The sapphire may present many shades of blue, but the one most highly prized is a deep velvety cornflower color. Capella describes it as "the dark violet of the Mediterranean before a storm," while Heliadorus says that it "imitates the color of the shallow sea under a steep rock, quivering gently and tingeing the bottom with violet."



XII

Opal for October



THE yellow, rose, and green of an October hillside, combined with the brilliant blue of the sky and softened by the inevitable autumn haze, are reflected in October's birthstone. This lovely colorful thing has in reality no color of its own, but nature has given it a trick of catching the light and breaking it up into tiny rainbows, which leads us to believe that the colors themselves are there. During upheavals and convulsions of the earth gases and boiling water seep through the cracks and crevices of rock, depositing silica. This combines with the water into a jelly-like substance, which, as it cools and hardens, cracks into a multitude of fissures. These fissures have grooved sides which diffract and decompose the light somewhat as a prism does. The thinner and more uniform the cracks, the more beautiful the color display.

Opal is the symbol of hope. It was highly prized by the ancients, although they regarded it with superstitious awe because of its almost

uncannily changes of color. Sometimes it was called the "thief stone" because it was believed to render its wearer invisible, and by wearing it thieves could carry away plunder in broad daylight.

Commercially there are three varieties: Oriental, fire, and common opal. The Oriental gem gives out a succession of fiery rays, poorly imitated in the sparks and colors of "fairy fuel." Its arrangement of color varies. When the grains are very small the light is called pin fire; when the color is in minute regular squares it is called harlequin; and "flash-fire" is the name applied when it is in a large pattern so that a single flash of color shows when the stone is moved.

Harlequin is the rarest and most beautiful variety. When it is translucent and the colors are regular with distinct checks of red, yellow, blue, and green, the gem is truly magnificent.

The less valuable opals are opaque and exhibit only a few of the colors. One of these called "hydrophane" will give out small bubbles of gas when put in water and it becomes transparent, flashing the colors of the oriental variety; but when removed from the water and dry again, it becomes once more opaque.

Trees and vegetable products are often changed to silica combined with water, and are then called "wood opal." At the foot of the geysers in Yellowstone Park silica has been deposited by the boiling waters, and accumulations of opal have resulted there which are called "geyserite." Another kind has its colors arranged in bands like agate, while jasper opal, unlike the others, receives its color from foreign substances. The play of light which makes "noble" gems so beautiful is lacking in all of these.

Sometimes the oriental opals are too tiny to be used separately, and the rock as a whole is cut and polished and sold as opal matrix. Its natural color is light yellow, but when it is soaked in oil and baked, it turns to a rich dark brown, "with little opal stars twinkling over its surface."

The oldest opal mines are in Hungary. This was the chief source of supply until fine specimens were found in Mexico. Now it is to Queensland and New South Wales that the world is indebted for its richest oriental gems.

The reddish yellow variety called "fire opal" comes abundantly from Mexico. This is one of the most beautiful stones, but if it becomes moist its colors fade. The Mexican mines have been

worked for many years, but the supply is far from exhausted. Dr. Kunz, who is one of the world's greatest gem experts, says that the opals gleam in the rock there "like little electric lights flashing on and off as the sunbeams falter on them, flaming like beasts' eyes when a beam of light strikes them through the night."

Only a very few of the stones, however, are really valuable, although they look like poems in color, "each one a miniature sunset as it lies in your palm, like a shower of fireworks as they pour from your fingers."

About 1890 a new source of supply was discovered. A hunter, while tracking a kangaroo in the great Australian desert at White Cliffs, New South Wales, chanced to pick up a handsome opal. This place is called by the natives, "Never Never Land," for it is a region of desolation where the sun shines terrifically by day, and where the howls of beasts fill the night with terror. Lacking all other beauties, the place has been endowed with a wealth of precious opal.

To the fortune seeker and the adventurer here weeks and months of hardship are repaid when a coveted jewel is unearthed. The mining camp consists of only a few shanties and tents, for the

men prefer the stars as their roof at night, after stories of mystery and adventure have been exchanged around the campfire. Men from all over the world have met here in search of their fortune, an Englishman of education perhaps digging side by side with an Australian Bushman.

Mining is carried on in a simple fashion. The prospector first stakes out a claim. Then he sinks a shaft, in a place probably determined by flipping a coin. The first three feet through which he digs is soft driftsand; then several more feet of conglomerate pebbles; and finally a hard, red, porous formation, which turns white with exposure to the sun, is reached. Great shining heaps of it indicate places where mining operations have been undertaken.

This material, which is of iron and sandstone, extends down indefinitely, and in it run parallel layers or seams of iron. Between these, the miner hopes to find the gems, filling cavities of the rock. Sometimes the bone of an extinct animal is unearthed, or a shell is found encrusted with opalescence, proving that once upon a time that part of the world was the bed of a great sea.

As the miner digs he looks for fiery specks of rock and for the "potch," which is worthless, but

which is always associated with the gem. This is supposed to be very immature opal that may in a million years become gem opal. The miner describes it as "opal without the fire," and to him it is worthless. To a lover of beauty, it is a riot of gorgeous colors.

All of western Queensland is rich in opal, and it is supposed that farther out in the desert even more of it exists. Almost every known gem has been found in this vicinity. Turquoise, sapphires, and garnets are frequently found, but their value there is lessened because of the wealth in precious opal.

Farther north, there is a place famous for the darkness of its opals, which are called "black" in contrast to the lighter colored ones. In 1900, deep black opals, with wonderful flashes of green, red, and blue, were found at Lightning Ridge, New South Wales. The sandstone in which they occur is very rich in iron, which no doubt is responsible for the depth of their tint. They are of great value, and are regarded as an exceptionally lucky stone.

Combining the colors of all the precious stones, this gem was believed to combine also all of their virtues, until unhappy superstitions began

to gather around it. There were several real reasons for these superstitions. It is so fragile and easily broken that its owner might well consider himself unlucky at times. Unscrupulous merchants are often able to take advantage of their purchases, since poor opals moistened in oil will exhibit beautiful colors until the stone dries, and the fraud is not likely to be detected until too late. Also, in displaying a gem a merchant often holds the opal in his palm because heat enhances its color. The most important factor, however, in spreading the idea of its being unlucky was the novel written by Sir Walter Scott called, "Anne of Geierstein," in which it was represented as an enchanted stone.

The Empress Eugénie refused to wear the gem because of this superstition, but with Queen Victoria it was a favorite. She brought it back to popularity by giving opals to each of her daughters upon their marriages, and to many of her friends, her object being, no doubt, to benefit English subjects in Australia where opals had been found.

The Roman Senator Nonius had an opal which he prized so highly that he preferred to be out-

lawed and to suffer exile rather than give it up to Mark Antony, who desired it.

For more than two hundred years the Imperial Cabinet of Vienna has owned one of the most beautiful opals in the world, weighing seventeen ounces.

Among the French Crown Jewels are several handsome opals, but probably the most remarkable one of all was a fire-opal owned by Empress Josephine which was called the "Burning of Troy" because of the numerous red flashes of flame it emitted.

XIII

Topaz for November



THE golden glow of the sunset and the rich brown of autumn leaves are captured in the birthstone for November. We usually think of topaz as yellow, but sometimes it is nearly white, and it has been found in almost every color. Beautiful varieties of delicate sherry-colored stones come from Siberia, although their color fades when exposed to the light. For this reason the fine collection in the British Museum is kept in darkness.

A beautiful saffron yellow called "Indian Topaz" is found occasionally in Ceylon. One of sea green color comes from Bohemia, and a sky-blue one from Scotland, while Brazil furnishes specimens in gold, ruby, rose, and blue.

There is also a perfectly colorless variety which often passes for diamond because of its brilliancy. It is found in the form of washed pebbles in the gravel of streams and rivers of Brazil and is called by the Brazilians "Pingus d'agoa," meaning drops of water. The celebrated "Braganza" dia-

mond among the crown jewels of Portugal which until recently was supposed to be a real diamond is probably one of the finest of these "pebbles" ever found.

Topazius in the breastplate of Aaron is believed to have been a light green serpentine, while the tenth stone, chrysolite, meaning "golden stone" was no doubt the topaz. It was believed to cure diseases of the eye if it were placed in wine for three days and three nights and the liquid rubbed on the eyes just before going to sleep. Powdered and taken in wine it was thought to cure asthma and insomnia.

The golden yellow variety which comes from Brazil is the true topaz. The finest stones are of a bright citron shade, at times showing a clear gold color. The largest one ever found weighed eleven and one-half pounds and required several months to cut. The topaz occurs principally in cavities in granite and gneiss, associated with tourmaline, mica, and tin. In its natural state it is an oblong crystal which often has as many as thirty or forty facets or crystal faces. It is found to some extent in Mexico. In the United States, several beautiful specimens have come from Cheyenne Canyon, near Pike's Peak.

Small but brilliant crystals have been found in Utah and near Bald Mountain, New Hampshire.

The most important European source is in Saxony where in a steep wall of rocks the gems are found in small fragments associated with tourmaline and cemented together by quartz. There is also a much harder, heavier stone called "Oriental Topaz." This is really a yellow sapphire. A large number of the yellow stones that masquerade as topaz are citrine quartz. The true topaz by heat or friction becomes electric and like amber will pick up small pieces of paper.

One of the strange peculiarities of topaz is that of changing color from yellow to pink when heated. A stone selected to be "pinked," as the process is called, is packed in lime, magnesia and asbestos, and the temperature slowly and carefully raised until the stone is red hot. Then it is slowly cooled, and if heated just enough it will have a beautiful rose-petal tint; but this desired shade is hard to get, for if the temperature were not high enough the stone would be a salmon color instead, and if too high, the color would entirely disappear.

Topaz is not of the first rank of precious stones, but the scarcity of gems of good color and free

from flaws makes it valuable, while its hardness enables it to take a high polish.

A legend told by Pliny suggests that the name "topaz" came from *Τοπαζειν* or "topazein," meaning "to seek," because the earliest known locality from which it was obtained was an island, Topazas, in the Red Sea which was often surrounded by fog and therefore difficult for sailors to find. This island, which still holds quantities of splendid stones, was thought to be guarded by a chosen few whose duty it was to kill anyone who tried to land there. Even those who had a right to seek the gems could not see them in daylight, for it was only after nightfall that they were revealed by their radiance.

Belief in the virtue of this gem to dispel terrors of the night and prevent bad dreams was probably due to the association of its golden color with the sun. Like the ruby it was supposed to have the power of giving out light and it has always been the symbol of friendship.

XIV

Turquoise for December



OF ALL opaque stones, turquoise, which is the birthstone for December, ranks highest among lovers of precious gems. Lacking crystalline form or natural luster, it must depend for its beauty solely upon its color. The stones of finest quality are of a soft blue tone, like a cloudless summer sky, but these are exceedingly rare. The color often shades into a pale green, which lessens their value. In fact, a large proportion of all turquoise mined is so inferior in color that it is utterly worthless. Its blue is due to the presence of copper, while a predominance of iron causes the greenish shades.

Being somewhat porous and comparatively soft, turquoise should never be immersed in liquids or allowed to touch anything dirty or greasy. Even with the greatest care the color may fade with time, and for that reason the ancients believed it varied with the state of a person's health and lost all color upon death, but recovered it when placed on the hand of a new and healthy owner. Others

said that the color varied with the hours of the day, or that if suspended in a glass the stone would tell the hour by striking against it the exact number of strokes.

In Germany, turquoise was fashionable for engagement rings because of the belief that it would remain unchanged while love lasted. To look upon a turquoise when one first awakes in the morning is said to insure a happy and prosperous day. In "The Merchant of Venice," when Jessica goes away with her father's jewels, Shylock grieves over the loss of his turquoise, which he says he would not have lost for a "whole wilderness of monkeys."

Turquoise was supposed to protect its wearer from injury, since it saved him from the fracture of a bone by breaking itself. It was often attached to the bridles or harness of horses, or even fastened in their tails, to make them more surefooted.

As late as the 17th century Anselmus De Boot, court physician to Rudolph II of Germany, expressed the belief of many people of that period concerning precious stones, saying:

"What God can do by Himself He can do also by means of good and bad angels, who are

enabled to enter precious stones to guard men from dangers. However, to ascribe undue powers to them is especially pleasing to the spirit of evil, who steals into the substance of the little gem and works such wonder by it that some people do not place their trust in God but in the gem. . . . Thus it is perhaps the spirit of evil which exercises its power on us through the turquoise, teaching us that safety is not to be sought from God but from the gem."

De Boot then gives his own experience in being protected from injury by a turquoise on a dangerous narrow road at night. At that time it was very popular as a man's ring, and a writer of the 16th century says, "the turquoise is regarded so highly by almost all people that many think they are not in a good position suited to their rank until they own a fine one."

Turquoise occurs at comparatively few places on the globe, and these are almost always in barren desert land. Its mining is consequently attended by great difficulties and hardships, such as lack of water, excessive heat and distance from supplies. The most important deposits in the world are near the small village of Maden, 36

miles from Nishar in Persia. Maden is the birthplace of Omar Khayyám, who wrote:

“The temple I frequent is high,
Its turquoise-vaulted dome, the sky,
That spans the world with majesty.”

There are a great number of mines there in the hills, which have been worked for thousands of years. There is a legend that one opening called “Isaac’s mine” was discovered by Abraham, the father of Isaac, more than two thousand years before Christ.

Pliny tells a curious story of how the Persians were accustomed to obtain the turquoise from inaccessible mountain heights by shooting arrows to detach them from the projecting cliffs. In reality, the work is carried on by means of picks and crowbars. Streaks of crumbly sand thread through the limestone and sandstone and form pockets in the rocks, where the best gems are found as irregular or kidney shaped nodules. To obtain them tunnels are driven into the mountain side and vertical shafts cut at intervals for light and ventilation. The detached rock is hauled to the surface in buckets. There the fragments are broken by hammers, and the larger pieces of tur-

quoise picked out and evaluated. Poorer material is sifted and sold by the pound.

These Persian stones reach nearly all parts of the world. They first came to Europe by the way of Turkey and thus the stones came to be called *Turchesa* by the Venetians who imported them, and by the French, *Turquoise*. When the precious stones are too tiny to be worth separate work, pieces of the surrounding rock in which they are embedded are cut with them and sold as turquoise matrix.

The Shah of Persia has for a long time reserved for himself the choicest stones found at Nishapur, and his collection of turquoise is said to be the finest in existence. He has a turquoise costume, and in his palace is the celebrated Peacock Throne. This is said to be "covered with sheets of gold on which precious enamels and fantastic birds are set with rubies, emeralds, sapphires, and turquoise, culminating in the supreme radiation of a diamond sun."

In Persia, it was believed that to obtain good fortune one must see the reflection of the new moon either on the face of a friend, on the Koran, or on a turquoise. Upon the rounded surface of the stone are frequently engraved Persian

and Arabic inscriptions, usually passages from the Koran.

Since it is but little harder than glass, turquoise was easily worked even by primitive peoples possessing the crudest tools, and, as well as being engraved, it was often cut into peculiar shapes of animals and worn as amulets or charms. Hindu priests said that whoever should gaze upon a turquoise after looking at the new moon was sure to come into possession of great wealth, especially if it were worn on the index or on the little finger.

The oldest mines of turquoise in the world and the earliest mining operations recorded by history are found on the Sinai Peninsula which connects Arabia and Egypt. This is a barren, almost uninhabited country, and was the "wilderness" through which the Children of Israel passed on their way out of Egypt. Broad, low openings with heaps of dug-out stones piled before their entrances lead into tunnels, and these open here and there into larger chambers, in the walls of which the turquoise were found.

Many inscriptions were written within the mines and about their entrances, commemorating Egyptian kings by whom the expeditions were sent, and on a hill opposite the mines are ruins of miners'

huts and a large temple built in 5300 B. C. In it are inscriptions to Hathor, god of the "Turquoise Land," and records and tools left by the workers show that operations were carried on there at intervals from 5500 B. C. to 1100 B. C. and probably long before that.

The oldest group of jewelry known in the world is a set of bracelets of gold and turquoise, which probably came from these mines. After 1100 B. C. there are no traces of further work until the mines were rediscovered by a Scotchman in 1845.

In America, the most important deposits of turquoise are in the ancient Cerrillos mining district in Santa Fe County, New Mexico. Extensive excavations were made there by the Indians before Columbus discovered America. Among them crude stone implements and pottery have been found.

The American Journal of Science states that "tens of thousands of tons of rock were broken out" with these primitive instruments. At the bottom of the deserted pits pine trees more than a hundred years old are now growing. Many of the mines in this vicinity are still worked by the Indians, who build large fires at the base of

the rock until it becomes heated; then cold water is dashed over it and the sharp change of temperature splits it loose.

That the stone was one of importance to ancient Indian tribes is shown by its frequent presence among beads and ornaments found in their graves. In one burial room several thousand turquoises were arranged on the wrists, ankles and neck of the interred body. It was their custom on the burial of a chief to place a turquoise in his mouth. In some instances, turquoises were even used as fillings for teeth.

To-day, few religious rites of the Indians take place without turquoise. In the "Mountain Chant," which is one of the most important Navajo ceremonials, five turquoises and a stick decorated with blue are buried. To the Apache medicine man a turquoise is the badge of office, or medical diploma, and it is supposed to have unusual powers of healing in itself. A small turquoise bead placed on a bow or arrow assures the Apache of accurate aim. It also has some relation to rain and can always be found at the end of a rainbow after a storm, if one searches in the damp earth.

The Navajo also believes that if turquoises are

thrown into a river with a prayer to the Rain God, rain will follow. Many stones are also offered to the wind spirit, for the Indians say that when the wind is blowing it is searching for turquoise.

To the Aztecs, it was a sacred stone devoted to temple offerings and decorations of gods. No person was allowed to own or wear it, for it was very rare in Mexico.

The color of the turquoise has always been an emblem of beautiful and sacred things.

In China and Egypt many images of the gods are colored blue. In Thibet, where the turquoise figures in many legends, the sky is called "The Turquoise of Heaven."

In a folk tale of the Zuni Indians, an eagle alights on the top of the "Mountain of Turquoise" which is so blue that the light shining on it paints the sky blue; and among the Pueblos it is known as the stone that "stole its color from the sky."

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