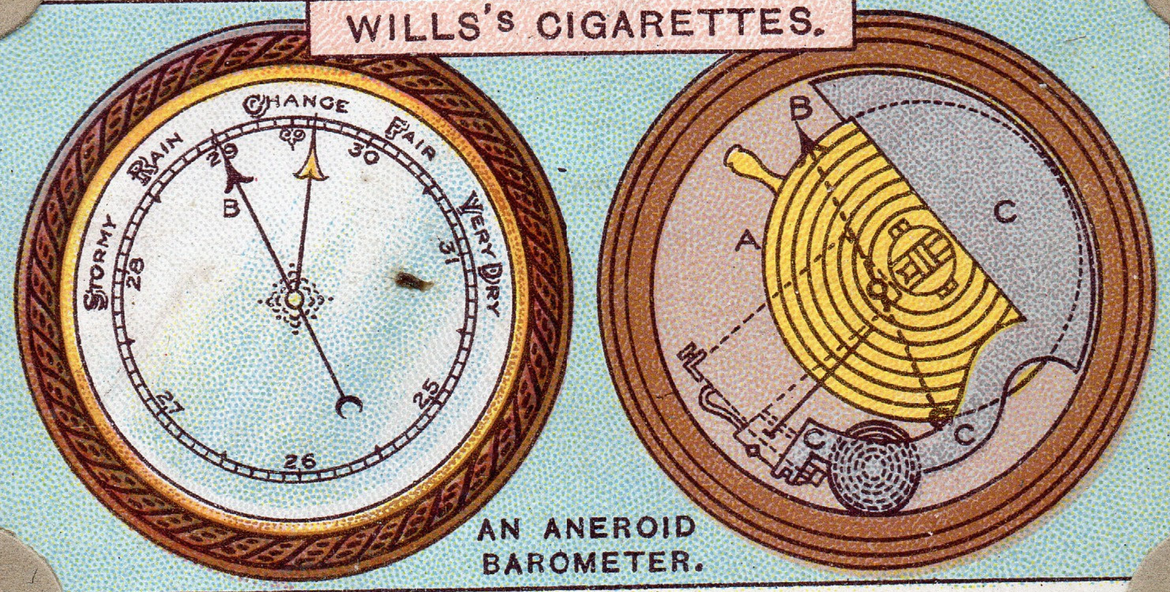
WILLS'S

CIGARETTE PICTURE-CARD ALBUM

Do You Know...?
Second Series

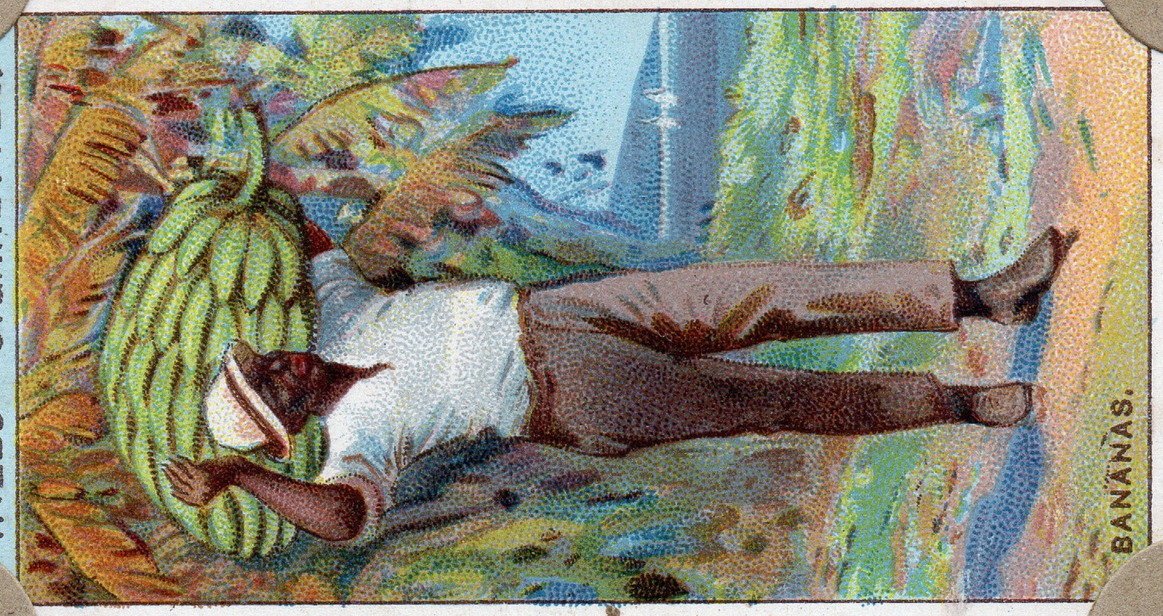
PRICE ONE PENNY

WILLS'S CIGARETTES.



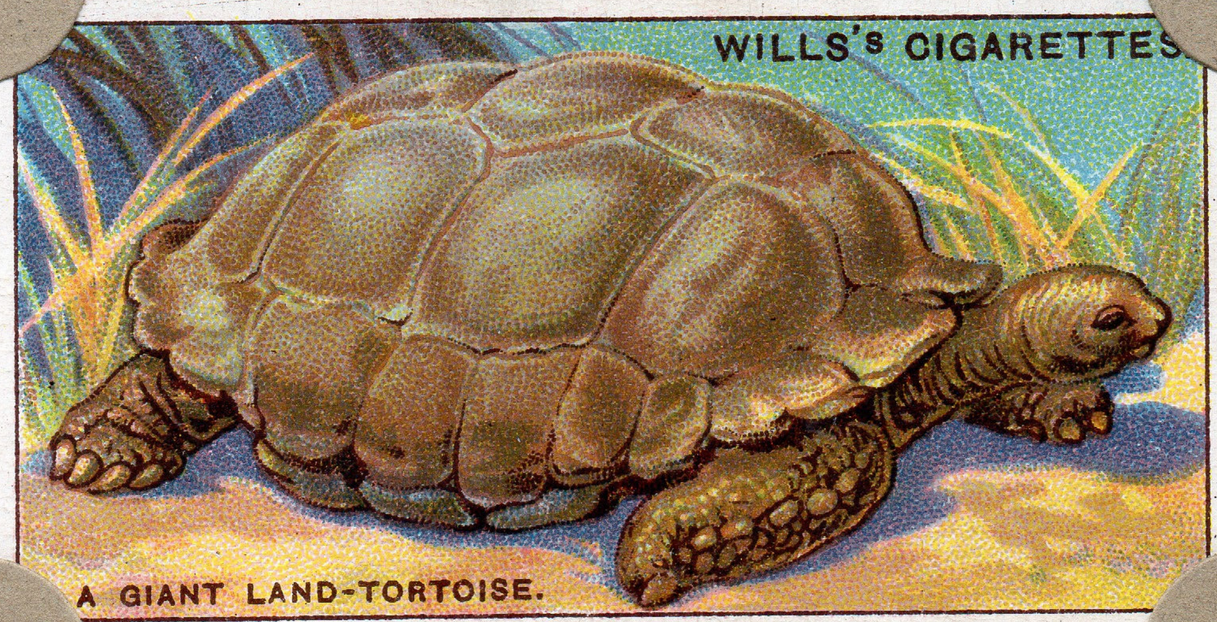
AN ANEROID BAROMETER.

WILLS'S CIGARETTES.



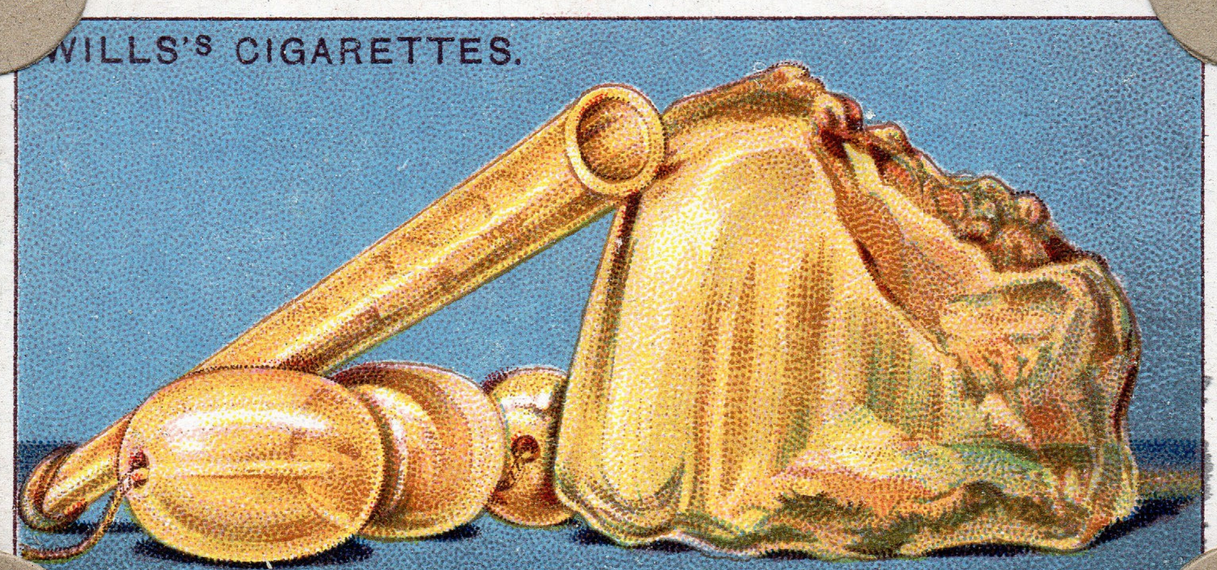
BANANAS.

WILLS'S CIGARETTES



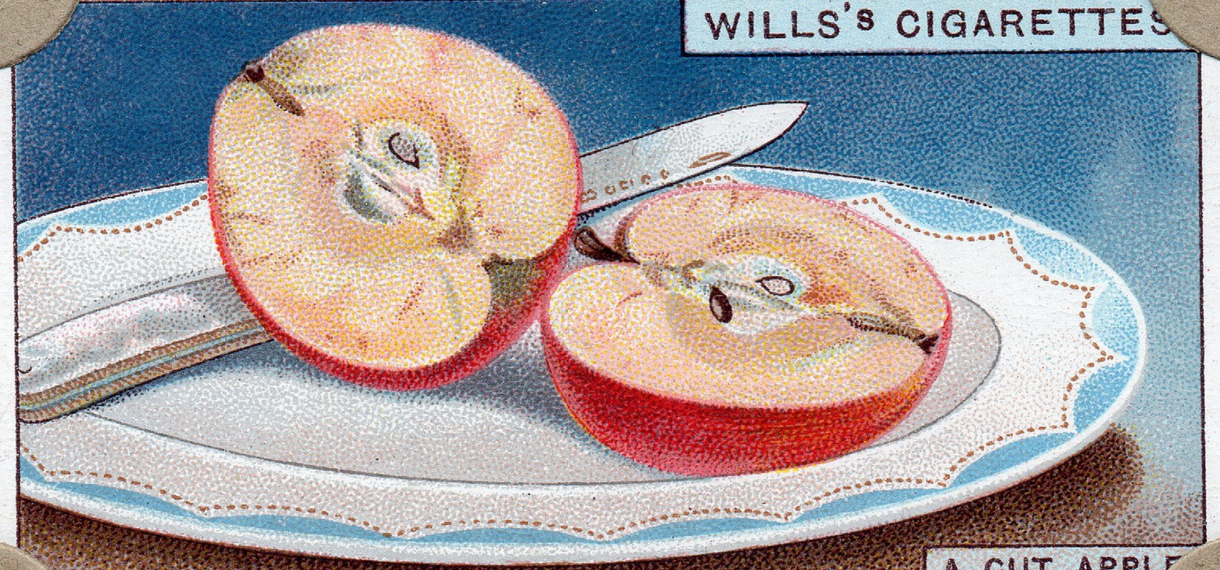
A GIANT LAND-TORTOISE.

WILLS'S CIGARETTES.



WORKED AMBER. NATURAL AMBER.

WILLS'S CIGARETTES



A CUT APPLE

2ND SERIES OF 50

DO YOU KNOW
how the Aneroid Barometer works?

The picture on the right illustrates the construction of the instrument, and shows, in diagrammatic form, an aneroid barometer with its face removed. A flat round box of corrugated metal (A) is exhausted of air, and forms a sort of spring which is affected by every variation of pressure in the atmosphere. Attached to the centre of this box is a curiously shaped lever (CC), which is connected by means of a chain, with a hair-spring, which regulates the hand (B). The actual movements of the box are very slight, but by means of this mechanism they are multiplied 657 times at the point of the hand.

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DO YOU KNOW
which Animals live longest?

The giant land-tortoises of the Islands of the Indian Ocean, and of the Galapagos Islands, off S. America, are considered to be the longest lived of all animals. Their chief rivals are the elephants, but exact information as to the age of such animals is difficult to obtain, and naturalists usually regard the land-tortoise as the Methusaleh of the animal kingdom. One of these venerable creatures, brought to England from the Island of Mauritius in 1897, was known to be at least 200 years old, and weighed five cwt.

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DO YOU KNOW
what Amber is?

Amber, which is found in large quantities on the shores of the Baltic and the North Sea, is the fossilised resin of a species of pine tree. Beautifully preserved mosses, as well as leaves, flowers, fruit, and even insects are sometimes found embedded in the fossil resin. Large fragments of amber cast up by the waves are collected at ebb-tide, and sometimes the shallow-water is dredged, and the amber raked up from between the boulders, while in other places it is mined in underground galleries. It is chiefly used for beads and other ornaments, for cigarette holders, and for the mouth-pieces of pipes.

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DO YOU KNOW
where Bananas come from?

The two varieties of banana most widely cultivated are the Jamaica banana, chiefly grown in the West Indies; and the China or Canary banana which has a thinner rind and a more delicate flavour, and is cultivated principally in Madeira and the Canary Is. The fruit, which is gathered while still green, is brought from Jamaica by vessels of the Direct West India Service, packed in specially fitted rooms, and ripens during the voyage. In 1921 over 2½ million bunches were imported from the Canary Is., and over 1¼ million from the British West Indies.

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DO YOU KNOW
why an Apple turns brown when cut?

This change in colour occurs with many varieties of fruit and vegetables, and also with some kinds of meat. The juice of apples and pears contains many chemicals, among them being one which turns brown when acted upon by ferments or *enzymes* present in the juice, as soon as the interior of the fruit is exposed to the air. Heat kills these *enzymes* altogether, hence boiled apples never turn brown. On the other hand the iron in a steel knife appears to encourage them, and an apple cut with such a knife turns brown very quickly. Chemists tell us that the richly coloured compounds of iron are largely responsible for the varied colours of plants and animals.

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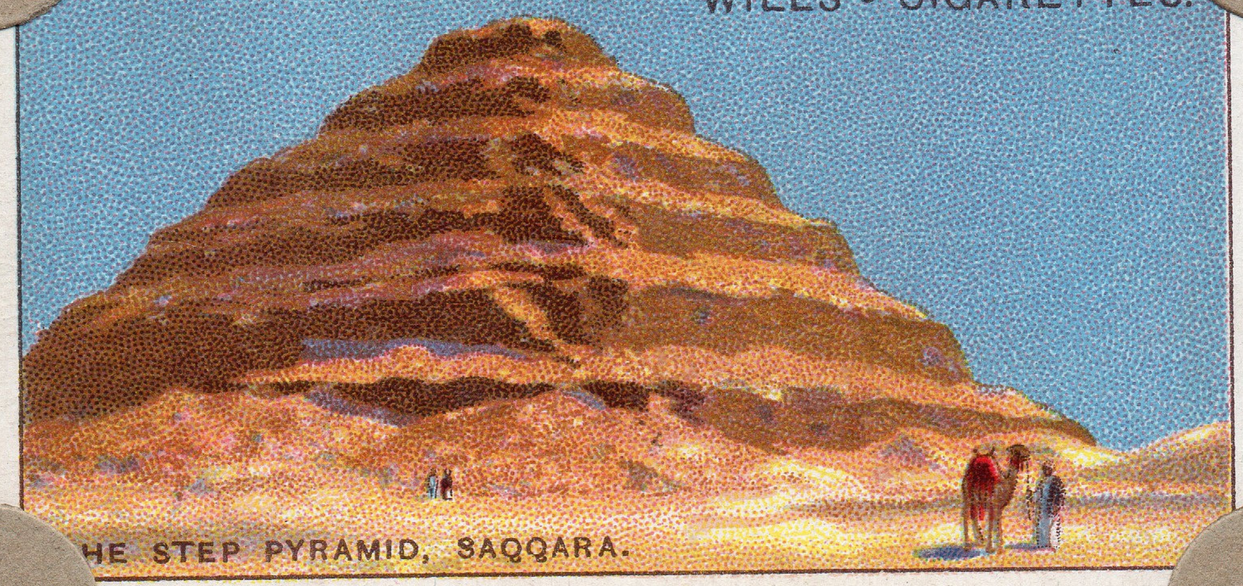
WILLS'S CIGARETTES.

A BISHOP.

WILLS'S CIGARETTES.



HE STEP PYRAMID, SAQQARA.

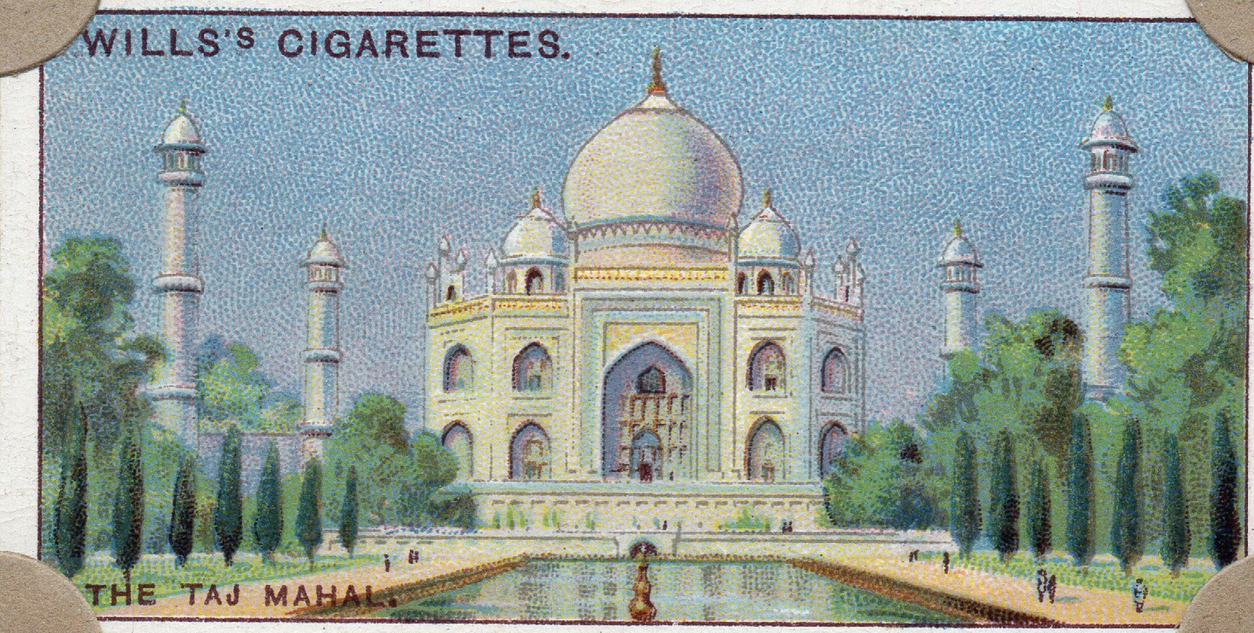
WILLS'S CIGARETTES.

THE BLOOM ON GRAPES.

WILLS'S CIGARETTES.

A "BEDEGUAR" OF WILD ROSE.

WILLS'S CIGARETTES.



THE TAJ MAHAL.

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DO YOU KNOW

why a Bishop wears a Laced Hat?

In the time of the Tudors the clergy wore caps of black cloth, the brims of which were cut, forming several flaps. The front flap was turned up, but those at the sides were allowed to hang over the ears. Sometimes these flaps were held up by laces attached to the crown, and although the stiff brim of the modern silk hat no longer requires such support, the little strings are still worn as part of a bishop's uniform. In other cases the flaps, instead of being held by cords, were stiffened with pasteboard, and these developed into the modern college "mortarboard."

W.D.&H.O.WILLS

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DO YOU KNOW

what causes the Bloom on Grapes?

The delicate and beautiful film which covers freshly gathered grapes is not really part of the fruit, neither is it made by the grape-vine. It consists of enormous numbers of tiny organisms, or microbes, which have multiplied until they have covered the skins of the grapes, and produced the characteristic bloom which makes the freshly gathered fruit so beautiful. It is interesting to remember that the grape-vine has been cultivated for at least 3,000 years, grape-stones having been found with mummies in Egyptian tombs of about 1000 B.C.

W.D.&H.O.WILLS

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DO YOU KNOW

what causes the "Bedeguar" of the Wild Rose?

The pretty pink, green, and crimson "Bedeguar," or "Robin's Pincushion," often found on the leaves of the wild rose is really a gall formed by an insect called *Rhodites rosæ*. Each gall is a sort of "nursery" in which the early stage of the insect's life is passed in safety. The picture on the right shows one of these "nurseries" in section, with the grubs in their cells. The parent gall-fly lays its eggs in one of the leaf-buds, causing an irritation in the leaf-tissue which gives rise to the feathery growth we admire so much.

W.D.&H.O.WILLS

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DO YOU KNOW

where the Oldest Buildings in the World are?

The most ancient records of monumental architecture at present known are to be found in Egypt, though it is possible that still earlier buildings may be discovered in the valley of the Tigris. Stone seems to have first been used in building tombs of certain kings of the 1st and 2nd Dynasties. The oldest large building which has survived is the "Step Pyramid" at Saqqara, Egypt, built by Zeser, 2nd king of the 3rd Dynasty, about 200 years earlier than the Pyramids at Gizeh. In estimating the dates of early Egyptian kings authorities differ considerably, Prof. Steindorff dating the 3rd Dynasty kings 2,980–2,900 B.C., and Prof. Flinders Petrie 4,960–4,771 B.C.

W.D.&H.O.WILLS

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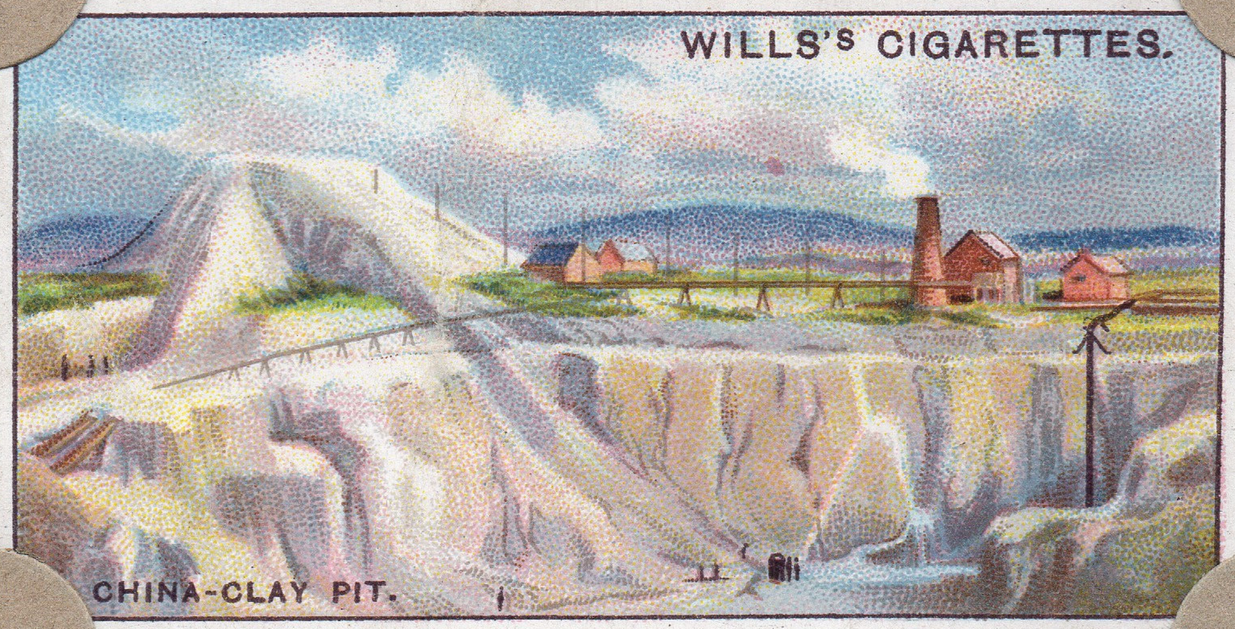
DO YOU KNOW

which is the most beautiful Building in the World?

The beautiful Taj Mahal, at Agra, India, is usually acknowledged the world's most perfect building. It was built by Shah Jehan to the memory of his wife, Mumtaz-i-Mahal ("Chosen of the Palace"), who died in 1629. This gem of architecture, which is of white and coloured marbles, occupied seventeen years in building, and it is recorded that the masons alone were paid the sum of £600,000 for their work. The tombs of Shah Jehan and his wife lie beneath the central dome, surrounded by an exquisitely fretted marble screen, studded with precious stones.

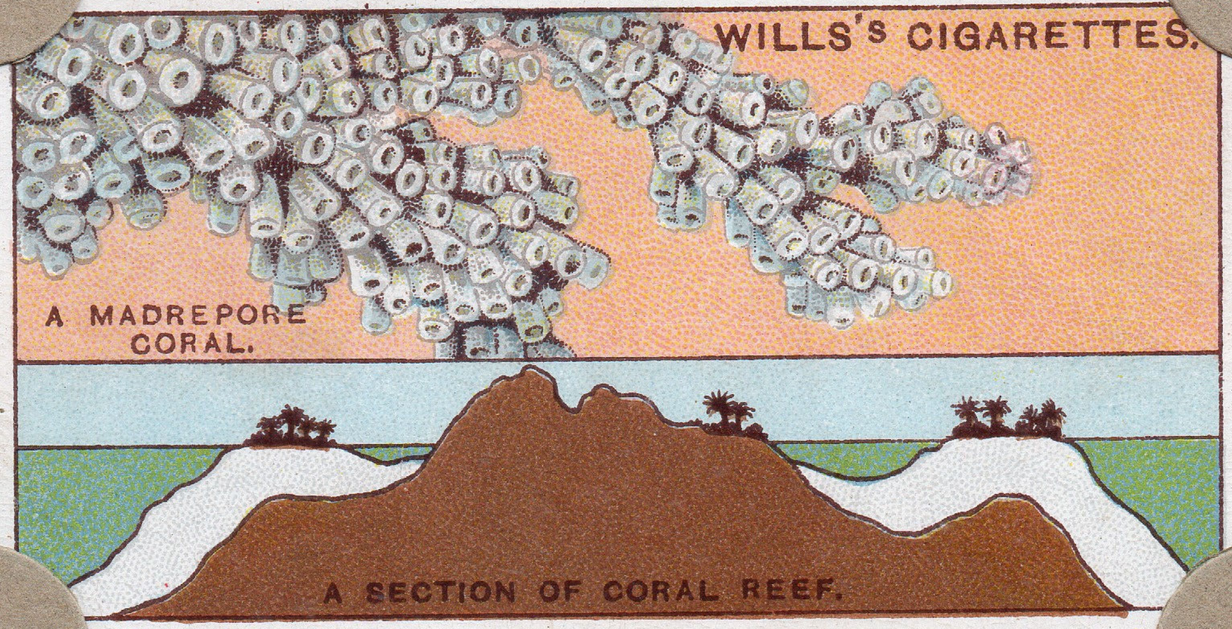
W.D.&H.O.WILLS

WILLS'S CIGARETTES.



CHINA-CLAY PIT.

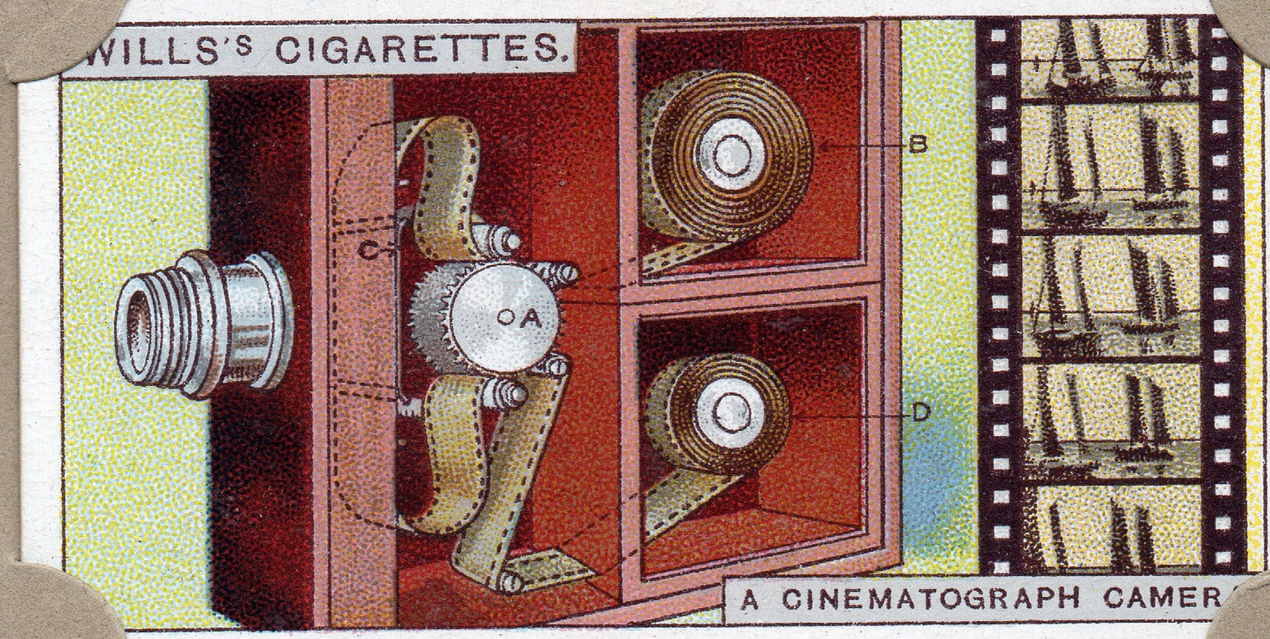
WILLS'S CIGARETTES.



A MADREPORE CORAL.

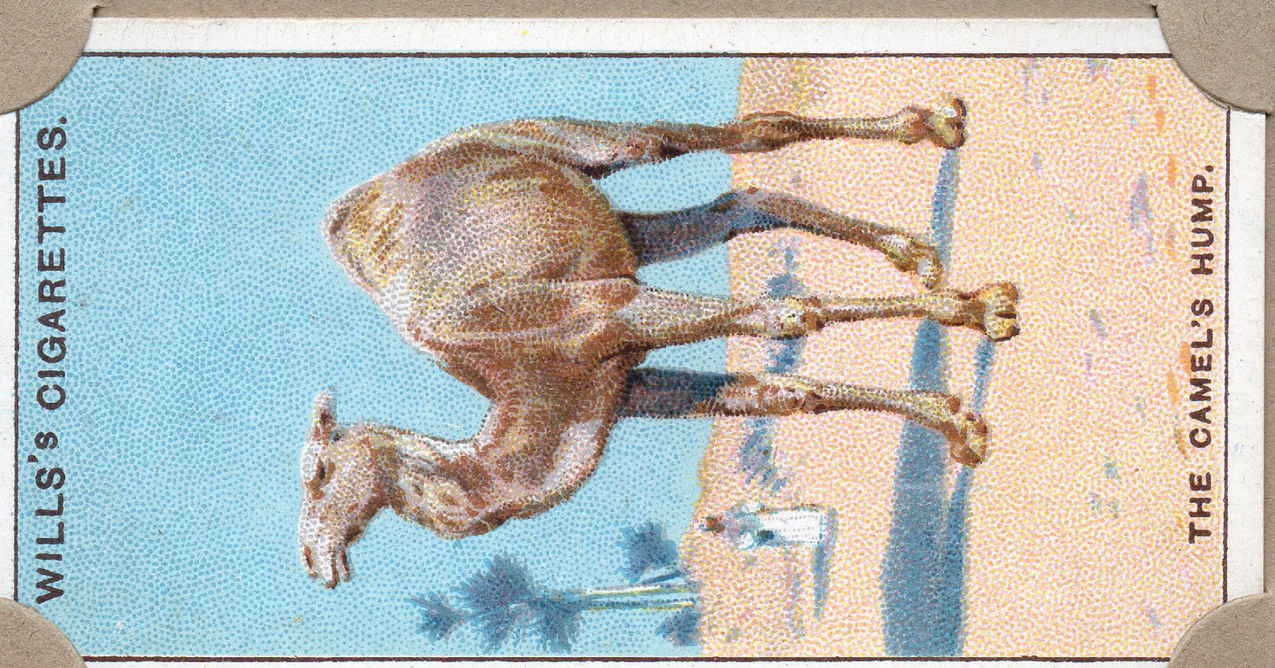
A SECTION OF CORAL REEF.

WILLS'S CIGARETTES.



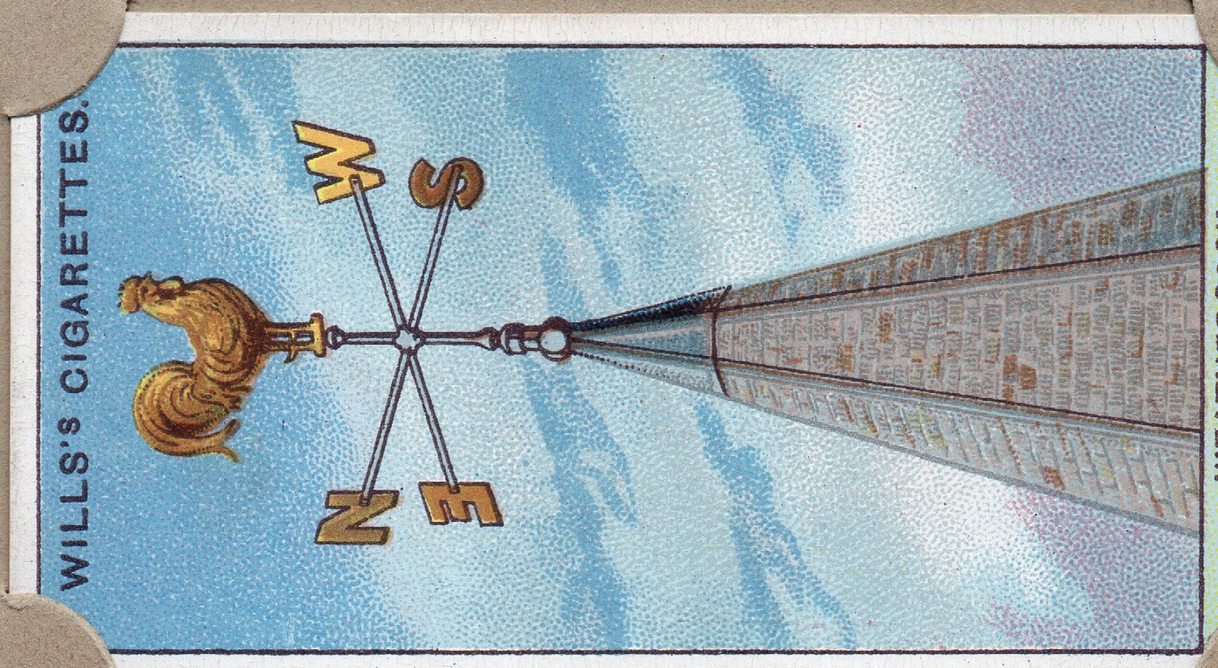
A CINEMATOGRAPH CAMER

WILLS'S CIGARETTES.



THE CAMEL'S HUMP.

WILLS'S CIGARETTES.



WEATHERCOCK.

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DO YOU KNOW
what China-clay is?

China-clay, or kaolin, is a pure white clay found in Cornwall, and largely used in the manufacture of china and in paper-making. China-clay is really decomposed felspar produced when granite and other hard rocks were broken up by hot gases perhaps during volcanic action. In Cornwall, strong jets of water are directed against the sides of the mines, and the clay washed out. The liquid containing the clay in suspension is pumped into tanks, where the impurities subside. The refined liquid is then passed into large shallow tanks, where the clay settles. It is afterwards cut into blocks, and removed to a drying-house.

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DO YOU KNOW
how Cinematograph pictures are taken?

Our picture shows the interior of a camera for taking "Moving Pictures." By turning a handle the operator rotates the driving sprocket (A), which is fitted with two rows of teeth arranged so as to fit into the perforations along the edges of the film. The upper spool-box (B) contains the unexposed film, which is carried forward smoothly and evenly to the lens, where it is held in focus by a piece of mechanism called the "gate" (C). This device has an aperture 1" × ¾" through which the light passes on to the film. The exposed film is wound up on the spool (D) in the lower box, and is then ready for development.

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DO YOU KNOW
why the Camel has a Hump?

The camel's hump is not a water-reservoir, but a huge mass of fat which serves as a reserve store of food, on which the animal can live for a time when deprived of other supplies. The size of the hump is always a good indication of the animal's condition, and a course of over-work or bad feeding will reduce it almost to nothing. The camel carries its reserve water in its stomach, the walls of which are provided with a large number of pouches or cells in which can be stored as much as a gallon and a half of water.

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DO YOU KNOW
how a Coral Reef is formed?

The red coral sometimes worn as an ornament, and the larger branched corals seen in museums, are really the hard skeletons of the coral animal or polyp, a miniature sea-anemone. Countless generations of these creatures have lived and died in the warm waters of the Pacific and Indian Oceans, piling up cell upon cell until vast structures of hard stony coral "rock" are set up. Sometimes this occurs round the shores of an island, and then a circular "coral reef" is formed, as shown in the lower diagram. The other picture shows a Madrepore Coral, one of the principal reef-builders.

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DO YOU KNOW
why the Cock is used on Church Weather-vanes?

The weather-vanes of the majority of our older cathedrals and churches are surmounted by a model of a cock, which is often gilded. In all probability these were originally set up by the old cathedral-builders to remind all who saw them of the Apostle Peter's denial of Christ, and therefore to serve as a warning. Long after the original meaning was lost sight of, "weathercocks" continued to be set up on church spires, although in modern days weather-vanes bearing other devices are often erected.

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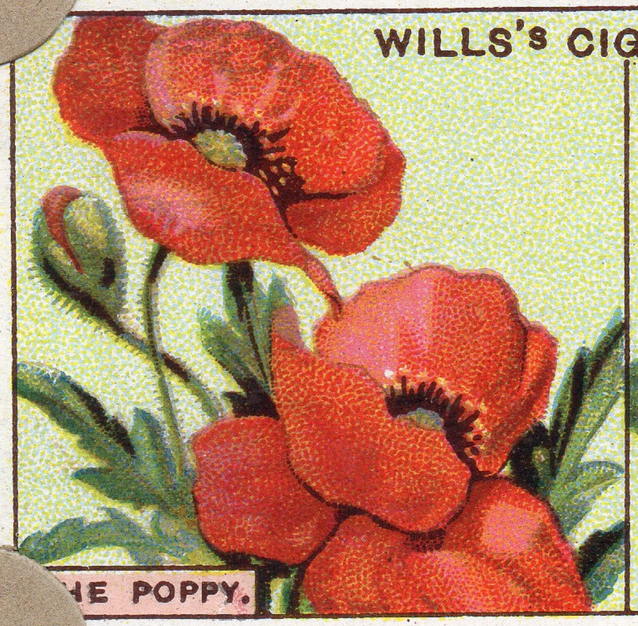
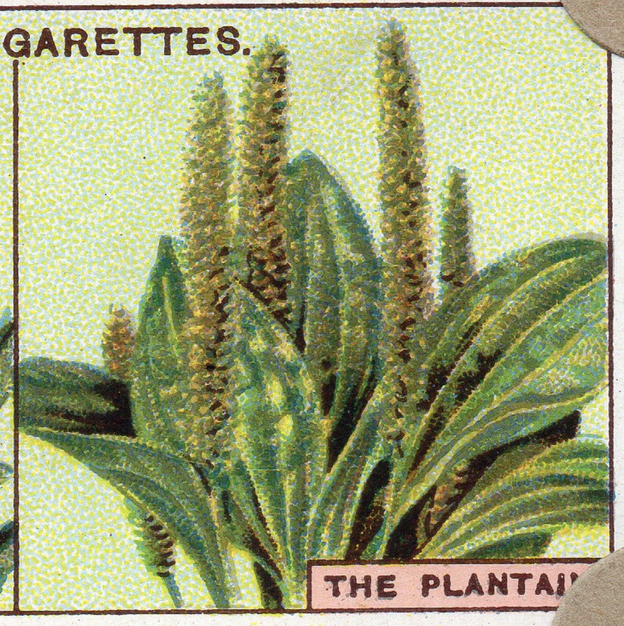
WILLS's CIGARETTES.

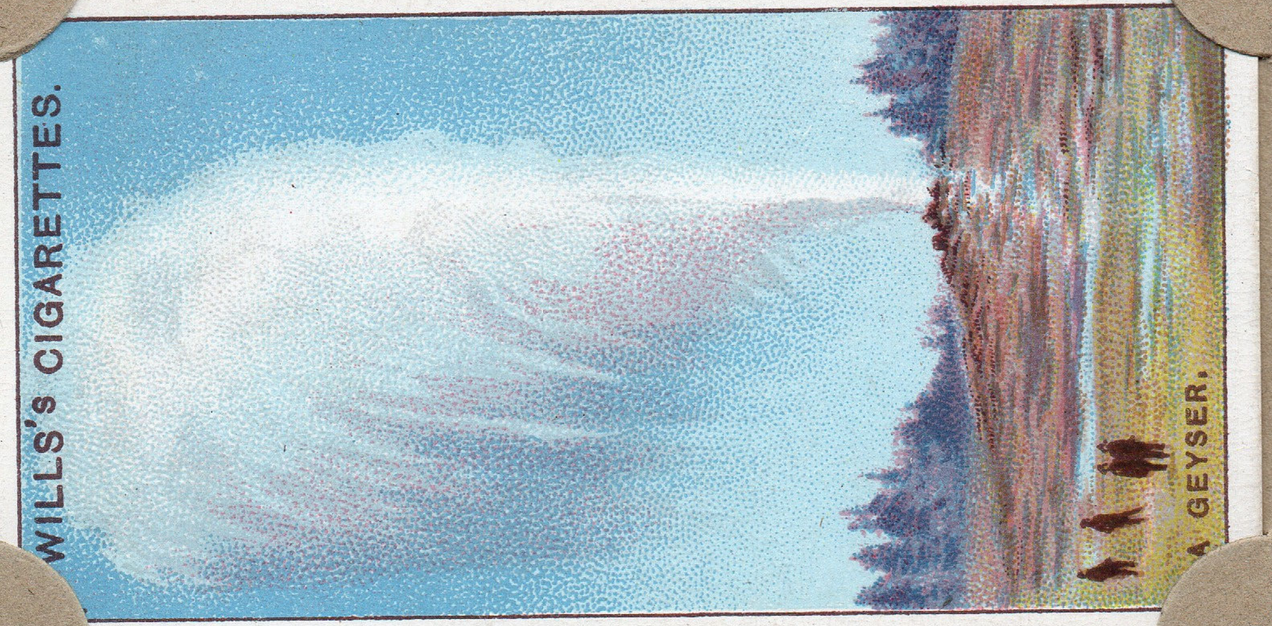


HE POPPY.



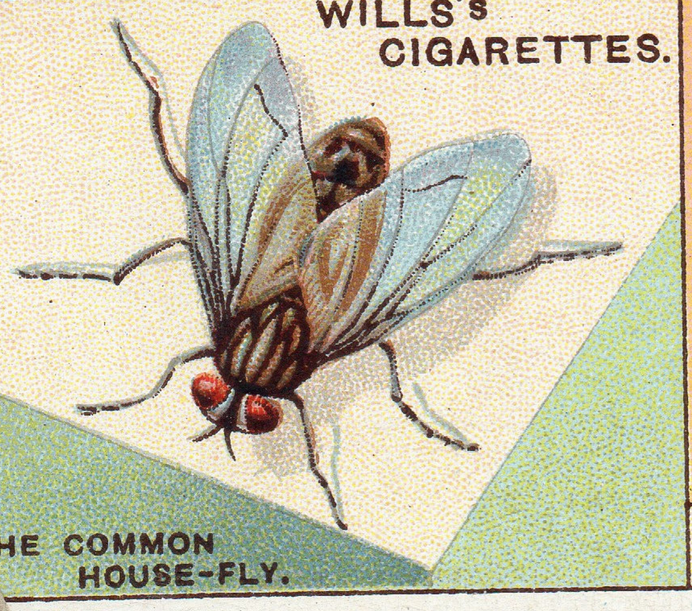
THE PLANTAI

WILLS's CIGARETTES.

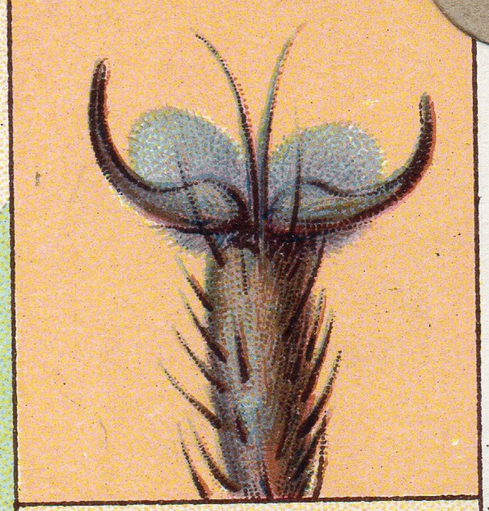


A GEYSER.

WILLS's CIGARETTES.

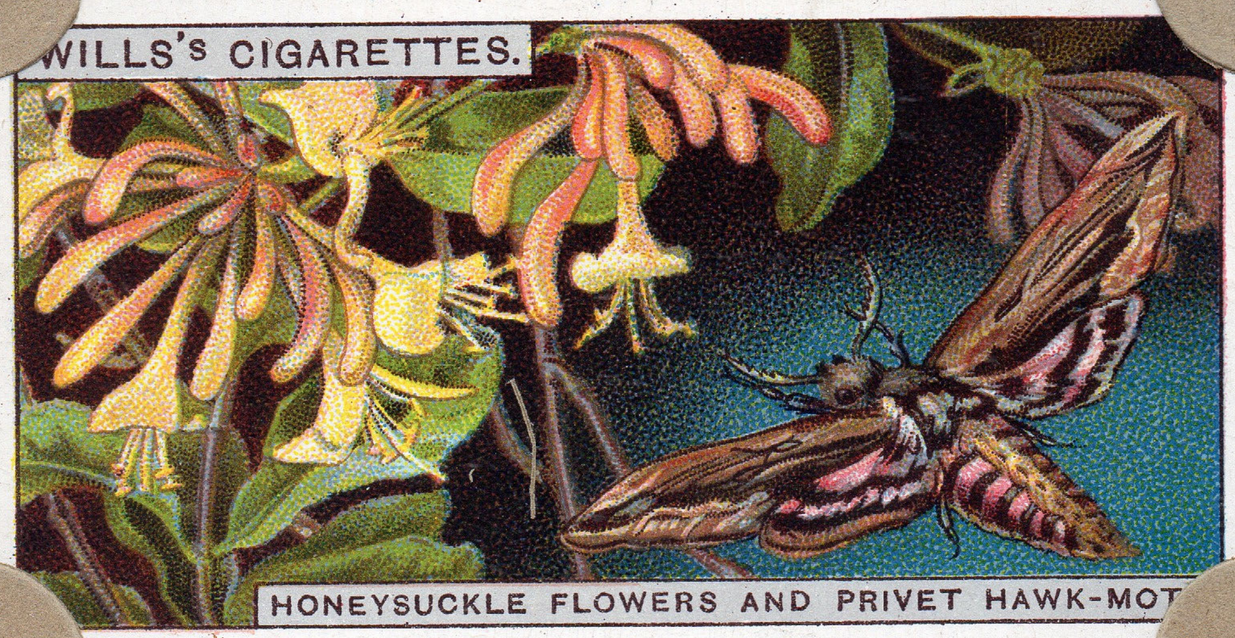


THE COMMON HOUSE-FLY.



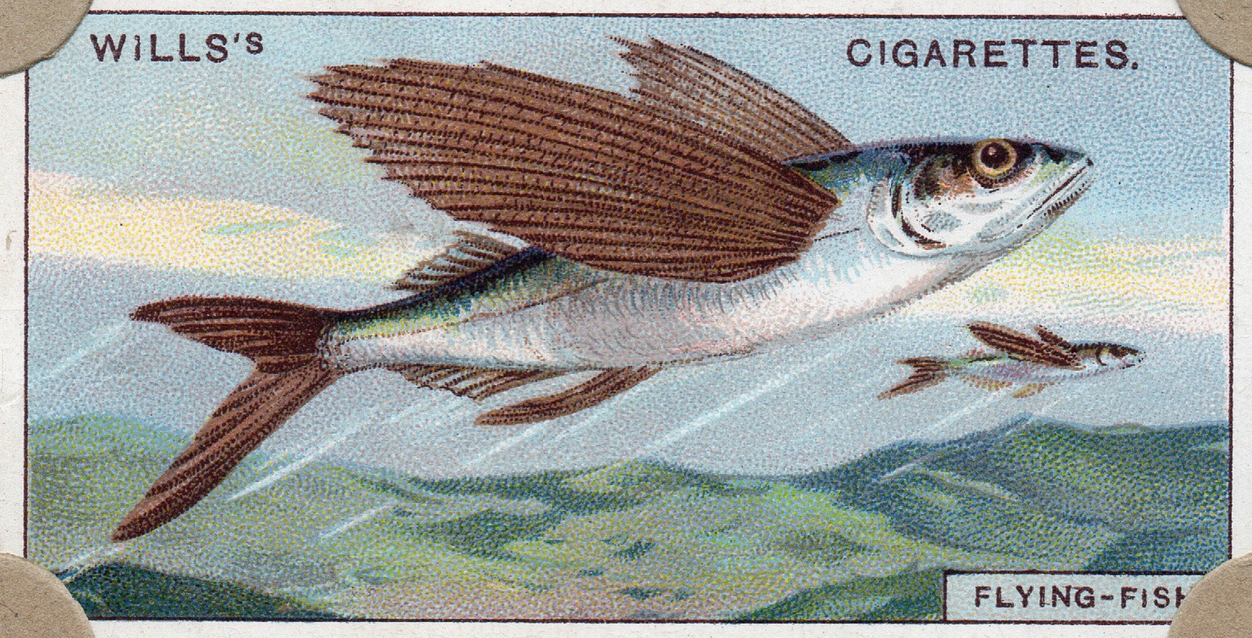
FOOT OF FLY - MAGNIFIED.

WILLS's CIGARETTES.



HONEYSUCKLE FLOWERS AND PRIVET HAWK-MOT

WILLS's CIGARETTES.



FLYING-FISH

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DO YOU KNOW
why some Flowers are brightly coloured and others not?

The brightly coloured petals of the poppy, rose, buttercup, dandelion, &c., are specially arranged to attract insects. Bees, butterflies, moths, flies and sometimes beetles visit the flowers to gather the pollen and nectar they contain, and in their flights transfer the pollen from one flower to another, thus ensuring the development of seed. Other plants, such as the plantains, pine, &c., bear small and quite unattractive flowers which contain no nectar. These are never visited by the bees, and their pollen, which is very loose and powdery, is carried by the wind.

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DO YOU KNOW
why Flowers smell?

Many of our plants require the assistance of insects of various kinds to transfer their pollen from one flower to another and so ensure the formation of seed. The perfume of the flowers attracts these insects, who fly to gather the honey inside. The honeysuckle, for example, becomes much more fragrant at dusk when the Privet and Convolvulus Hawk-moths appear. These insects are especially attracted by this flower, and seem able to smell its perfume at a great distance. While the moths are diving to the bottom of the long corolla-tubes and sucking the honey, their bodies become well dusted with the pollen.

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DO YOU KNOW
how the Fly walks upside-down?

Although science has shown us that the common house-fly (*Musca domestica*) is both a nuisance and a danger, it has also revealed several remarkable facts about it. Its mouth, for example, is a remarkably efficient vacuum pump, while each of its eyes possesses no less than 2,000 six-sided facets, each of which is a separate double convex lens. The fly's leg has five joints, the last of which is furnished with two cushion-like pads, covered with minute trumpet-shaped hairs from which a sticky fluid is secreted. These enable the fly to walk upside-down on glass.

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DO YOU KNOW
what causes a Geyser?

Geysers are springs of water usually rising from great depths, which have become heated up to boiling point, and sometimes even turned into steam by the great heat which is always present far down below the earth's surface. Some geysers, like most of those in the Yellowstone National Park, U.S.A., give a steady outflow of steam and boiling water; while others, in which the pressure is much greater, explode at intervals, throwing vast quantities of boiling water, mud, and steam to a height of more than a thousand feet. One of the largest geysers in the world is the Waimangu Geyser, New Zealand.

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DO YOU KNOW
why the Flying-Fish flies?

More than forty different species of flying-fish are to be seen in tropical and sub-tropical seas, taking their beautiful flight over the water, sometimes singly, but usually in shoals. The flying-fish does not fly as a bird flies, but leaps out of the water to escape from larger fish who prey upon it. The enormous fins shown in our picture act as planes or parachutes, and steady the fish as it glides through the air at considerable speed, sometimes as far as 500 feet in one flight. Flying-fish travel farthest against the wind, in rough weather.

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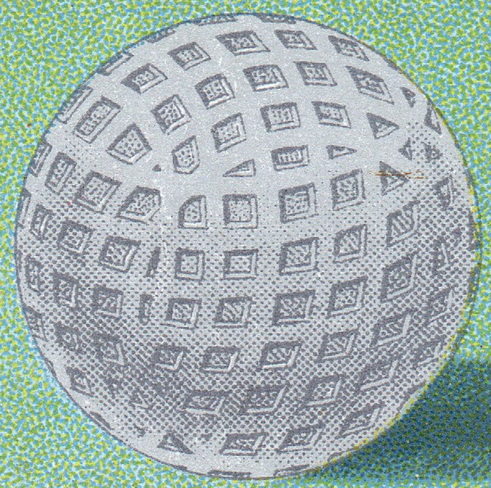
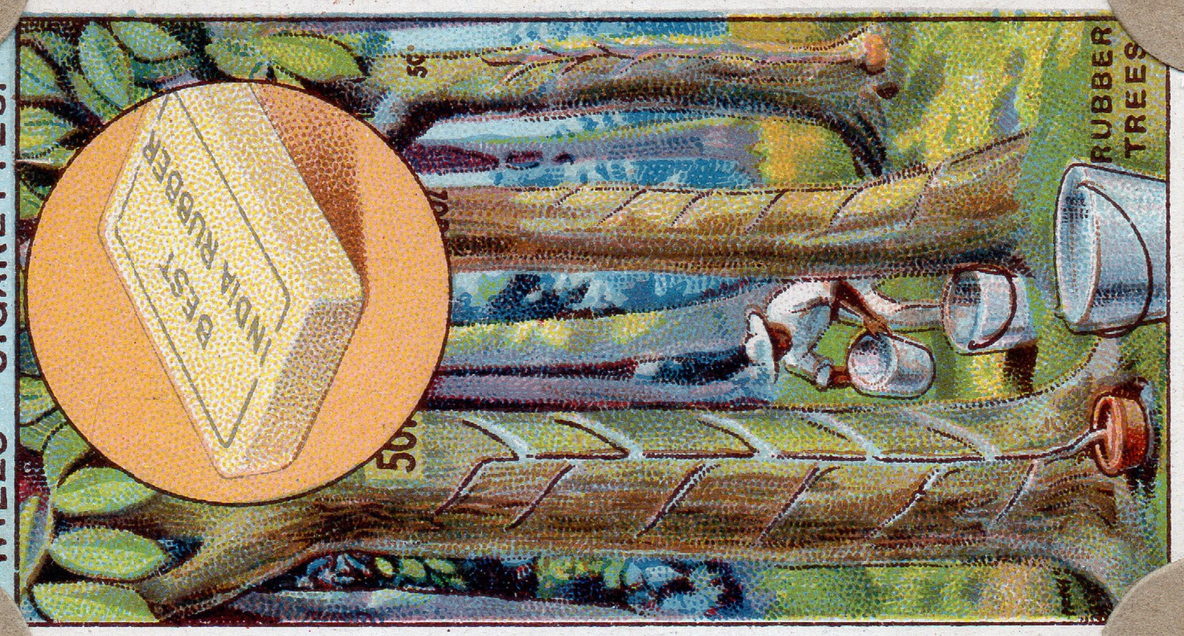
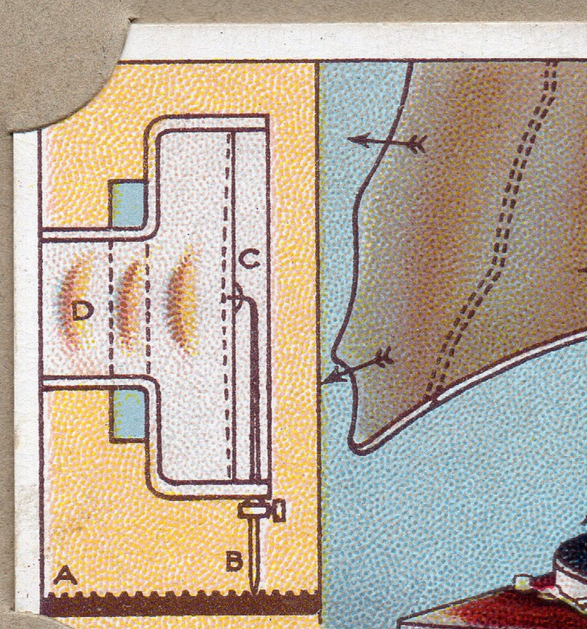
WILLS'S CIGARETTES.



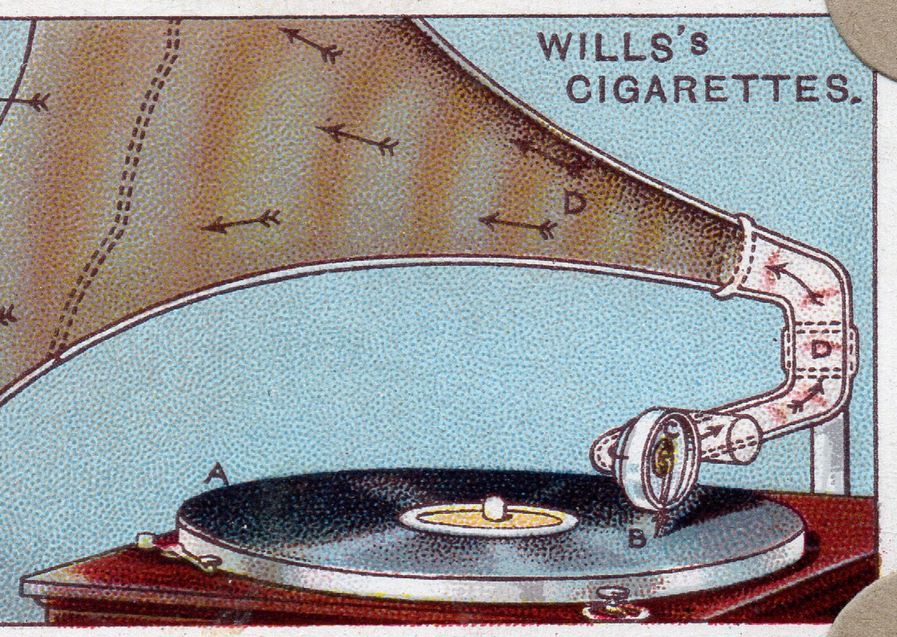
A GOLF BALL.

WILLS'S CIGARETTES.



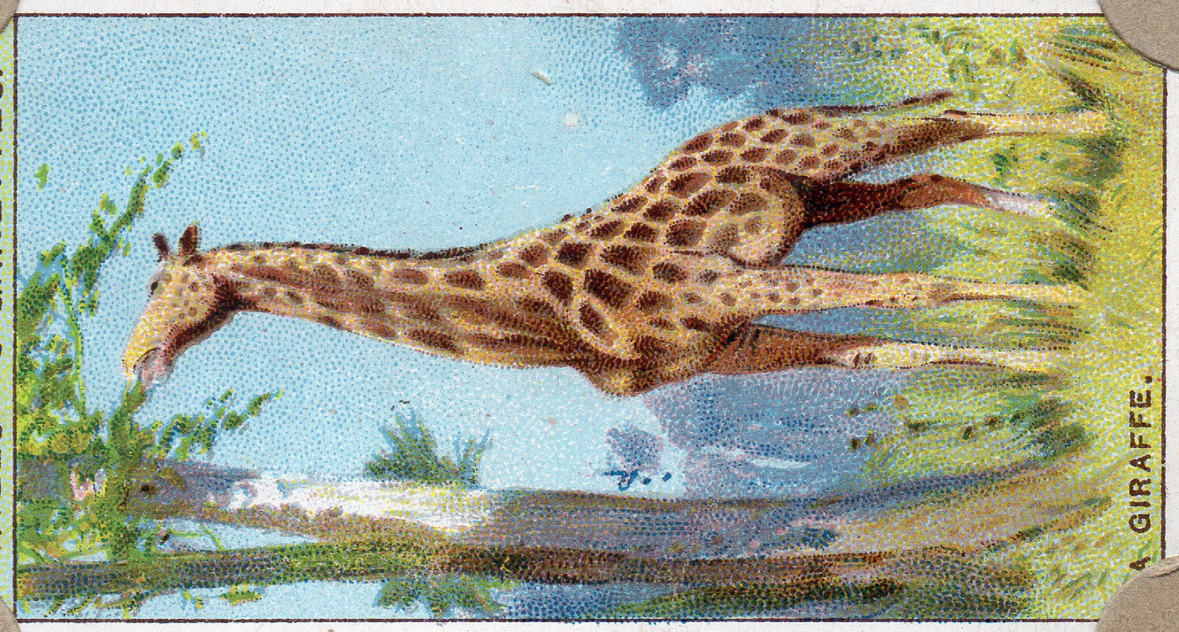


WILLS'S CIGARETTES.



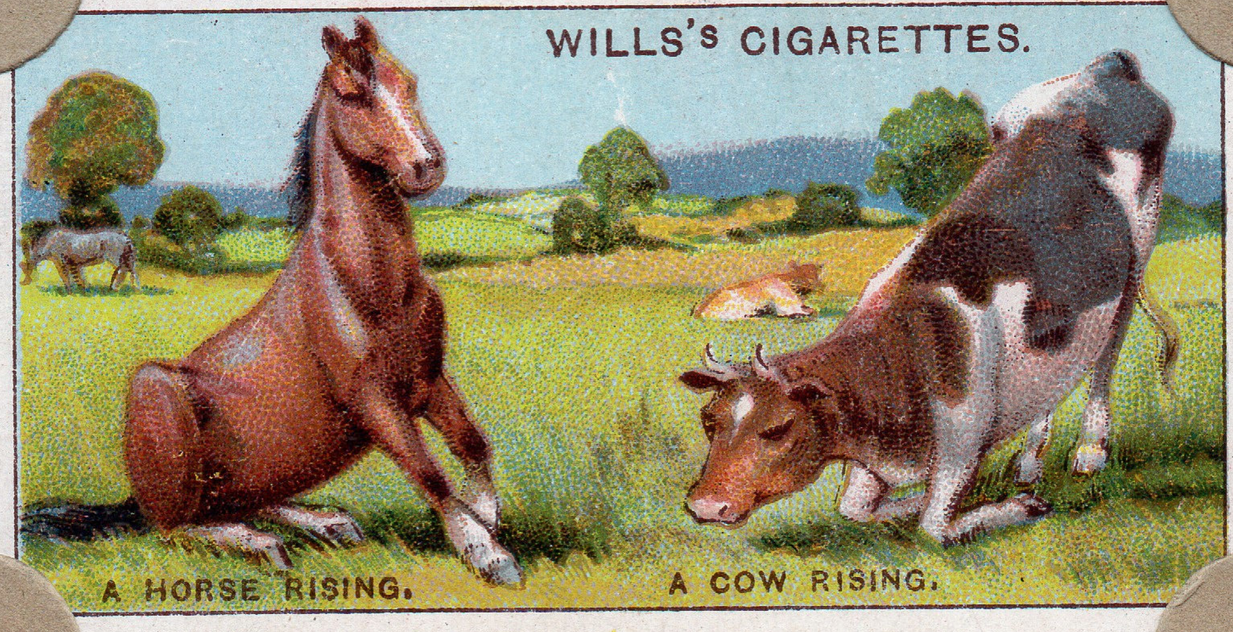
GRAMOPHONE.

WILLS'S CIGARETTES.



A GIRAFFE.

WILLS'S CIGARETTES.



A HORSE RISING.

A COW RISING.

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DO YOU KNOW
why a Golf Ball is not Smooth?

Whether golf originated in Scotland or was imported from Holland is uncertain; we know, however, that in 1457 the game was extremely popular in Scotland. In the 16th century two men were prosecuted for "playing of the Gowff on the Links of Leith every Sabbath the time of the sermonses." Early golf balls were of leather stuffed with feathers, but these were superseded by *smooth* gutta-percha balls. It was noticed that these flew farther and straighter after being dented by the irons in play, and so it became customary to dent the balls by hand, until special machinery was introduced to mould them in various patterns.

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DO YOU KNOW
why a Giraffe has a long neck?

The giraffe, which is only found in Africa, is the tallest of all living animals, sometimes measuring as much as 19 feet in height. Their great height and length of neck enable them to reach with ease the leaves of the tall acacia trees which form their favourite food. Giraffes feeding among trees are not easily seen, as their dappled skins blend perfectly with the splashes of light and shade thrown on the tree-trunks. When pursued, giraffes take to the jungle, and are able to penetrate dense thickets quite easily, their thick hides being proof against the most frightful thorns.

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DO YOU KNOW
how a Gramophone acts?

The telephone, invented by Bell in 1876, was in a sense the parent of the gramophone, for the vibrating diaphragm of Bell's telephone suggested to Edison the principle he afterwards developed in his phonograph. From this primitive machine of Edison the modern gramophone has developed. Our picture shows the circular *record* (A), which has upon it zig-zag grooves along which the *needle* (B) travels. Attached to the needle is a *thin disc* of *glass* or *mica* (C), which vibrates as the needle moves up and down the zig-zag grooves, and so reproduces the waves of sound which pass out through the *horn* (D).

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DO YOU KNOW
what India-rubber is?

Shortly after the discovery of America, it was noticed that many S. American Indians played with balls made from an elastic substance, which possessed the power of removing pencil marks from paper, and became known as "Indian Rubber." Beneath the bark of certain trees and shrubs a milky juice is secreted, which may be collected by means of incisions in the bark. On exposure to the air this milky latex solidifies into the rubber of commerce, the older trees yielding the better qualities. The principal sources of rubber are S. and Central America, Ceylon, Malay States and the East Indies generally, and W. Africa.

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DO YOU KNOW
why the Horse straightens its fore-legs first when rising, and the Cow its hind-legs?

The wild ancestors of the horse used to roam the open grassy plains of Europe in vast herds. While resting among the tall grass, they would rise on their fore-legs at the first sign of danger and keep a sharp look-out. The Aurochs, or wild oxen, from which our domestic cows are descended, were creatures of the woods, surviving in the Black Forest down to Roman times. When danger threatened, they would rise on their hind-legs, their heads remaining low in order to watch under the trees for any approaching enemy.

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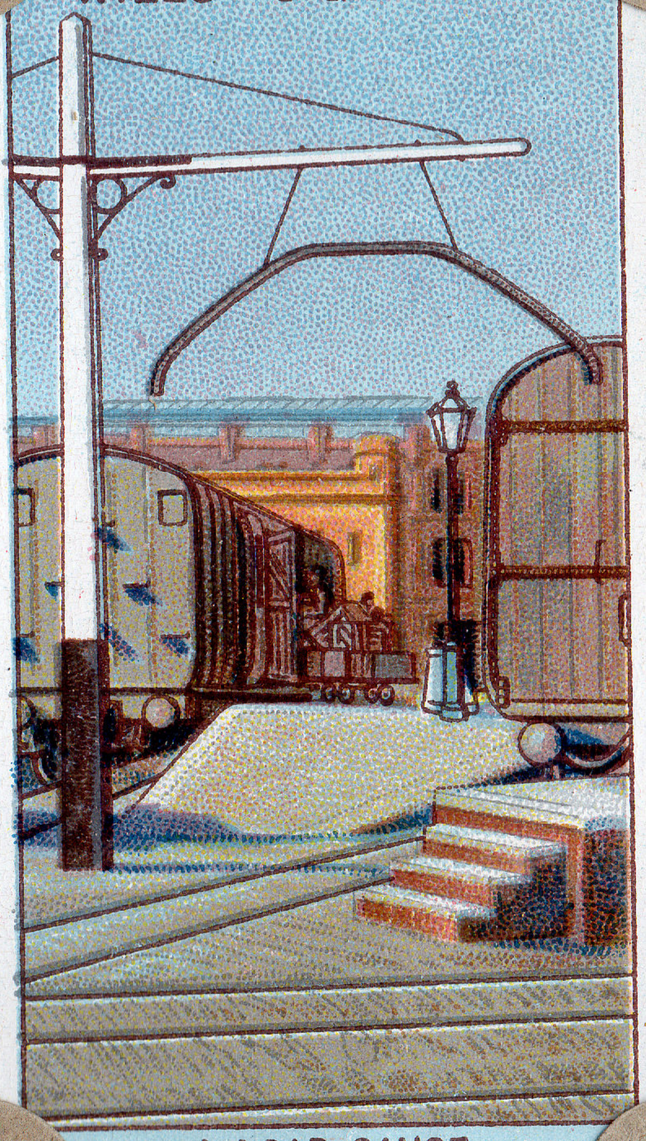
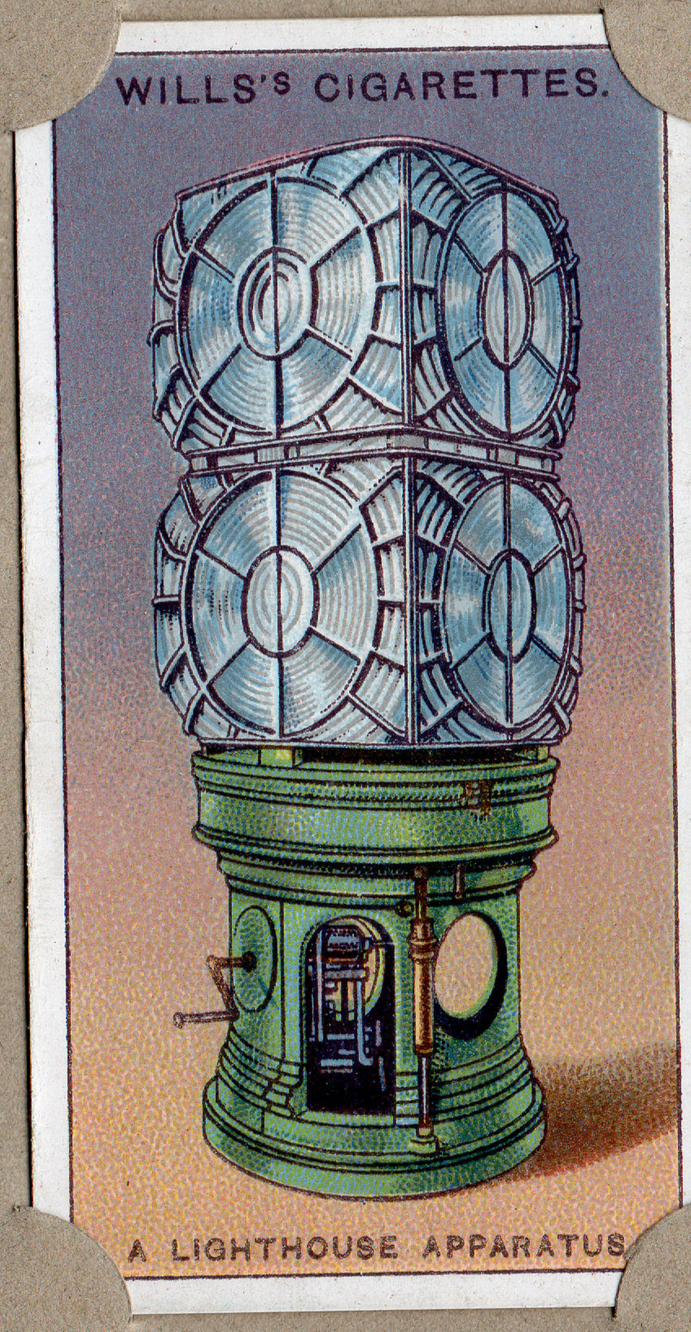
WILLS'S CIGARETTES.



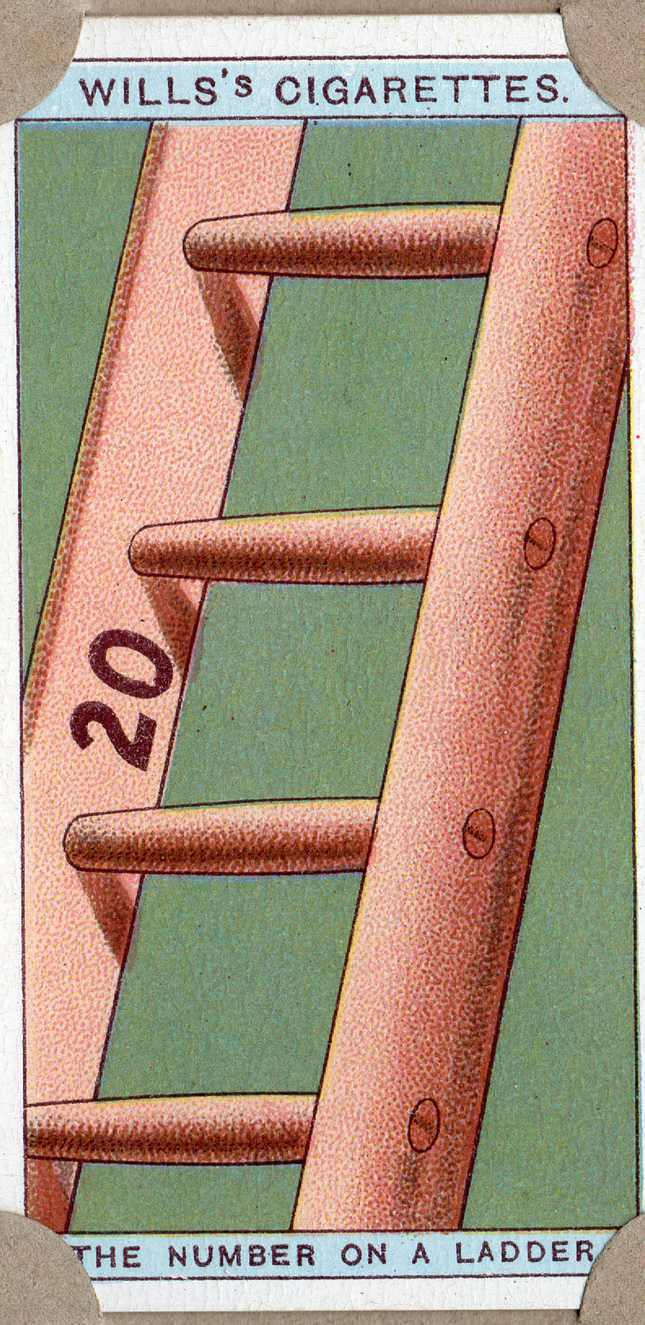
A LOAD-GAUGE.

WILLS'S CIGARETTES.



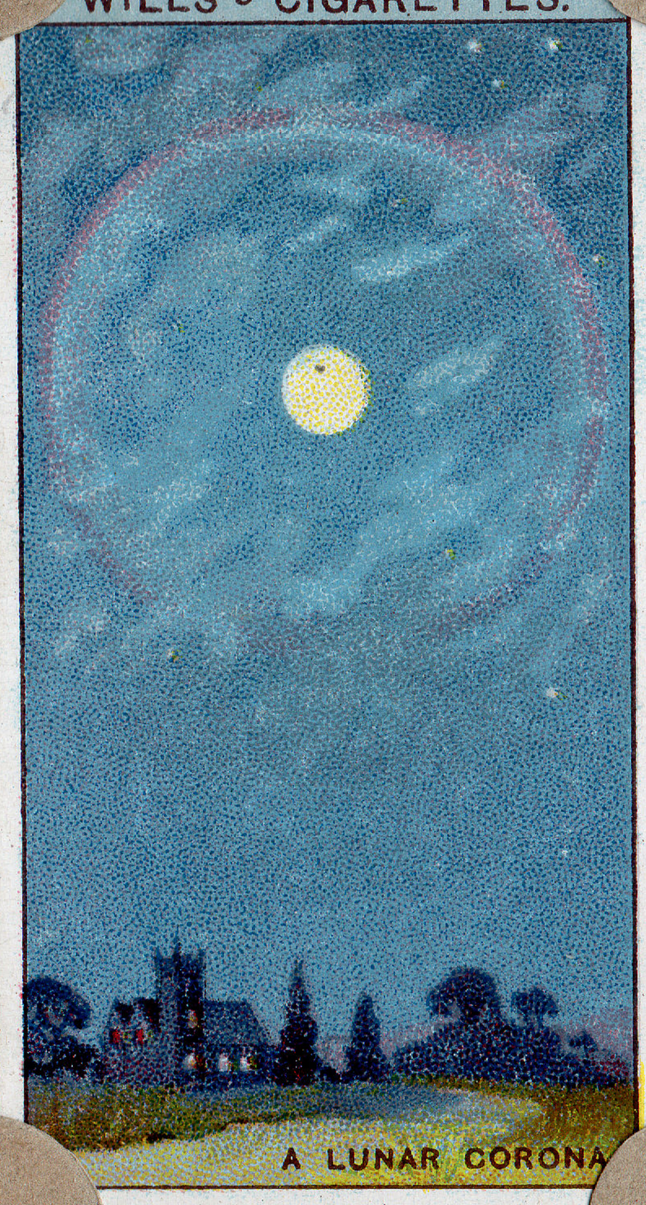
A LIGHTHOUSE APPARATUS

WILLS'S CIGARETTES.



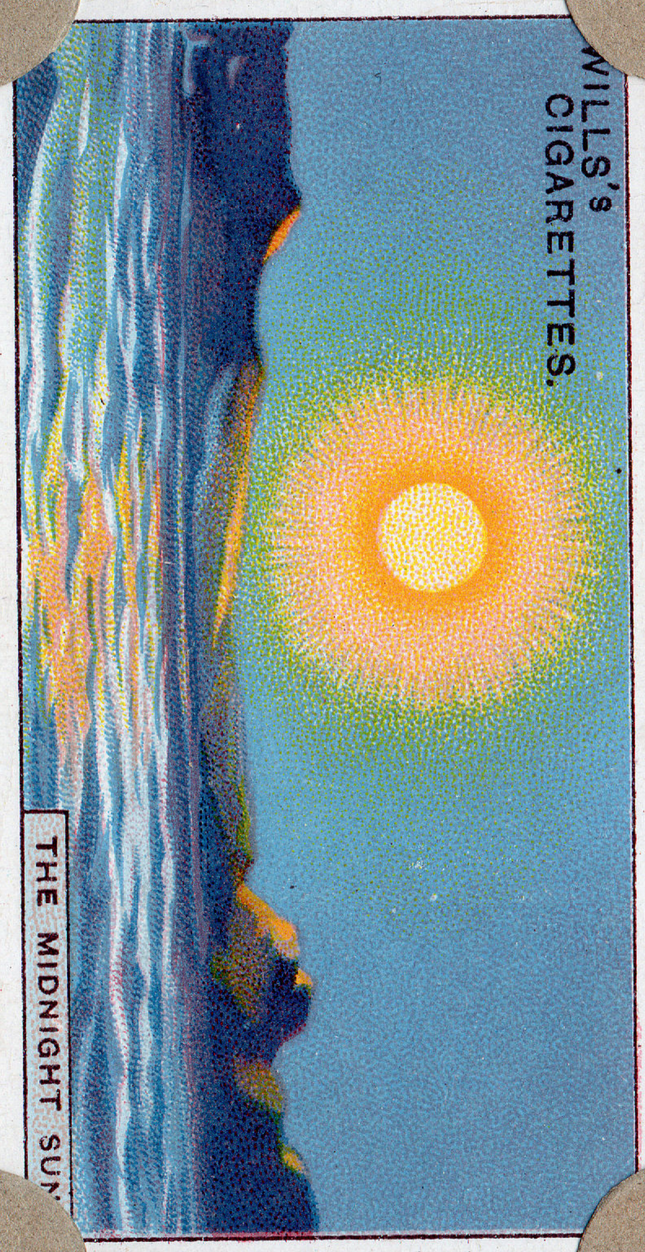
THE NUMBER ON A LADDER

WILLS'S CIGARETTES.



A LUNAR CORONA

WILLS's CIGARETTES.



THE MIDNIGHT SUN

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DO YOU KNOW

why a Ladder has a Number?

Leaning against the wall, or lying on the ground in any builder's yard one may usually see a number of ladders of various lengths, used in painting and repairing the outsides of houses. These ladders often have numbers painted or stamped inside the uprights, as shown in our illustration. The number 36 on a ladder does not mean that it is the thirty-sixth ladder in the yard, but that it has 36 steps or rungs, which are usually placed about 8 or 9 inches apart. By glancing at its number, a workman can judge whether a ladder is long enough to reach the required height.

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DO YOU KNOW

what causes the Midnight Sun?

Day and night are, of course, caused by the earth's rotation once in 24 hours. In summer the north hemisphere slopes towards the sun, and receives more than half the day's sunlight. On June 21st, the longest day, London has about 17 hours daylight, Edinburgh 17½, and the Shetlands over 18. As one goes still farther north the sun is seen for a yet longer time, until in latitude 66½° N., one enters the Arctic Circle, where the sun remains above the horizon throughout the 24 hours on June 21st, and does not set at all.

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DO YOU KNOW

what makes the Light in the Lighthouse?

The earliest lighthouses were set up on coasts of Egypt and Greece, the famous Pharos of Alexandria, built about 260 B.C., being regarded as one of the wonders of the world. In the 17th and 18th centuries towers with wood or coal fires were erected at Tynemouth, St. Bees Head, the Lizard, and other dangerous points. These were gradually replaced by powerful fixed lights, which have now been superseded by occulting (intermittent) lights, or by revolving, flashing, or coloured lights easily distinguished by sailors. Our picture shows the elaborate lenses in the "lantern" of a modern lighthouse, the lighting being usually either electric or incandescent mineral oil.

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DO YOU KNOW

why a Curved Iron hangs over the Rails in many Stations?

In or near most large railway stations one may see hanging from a support, or from the roof, an iron bar bent into the shape of an arch. An important station usually has several of these load-gauges, which show the height of the lowest tunnel or bridge beneath which the railway trucks may have to pass. The load-gauge enables the railway men to know how high the trucks may be loaded in order to pass underneath bridges and tunnels in safety.

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DO YOU KNOW

what causes a Lunar Corona?

Complete circles of faint rainbow-tinted light are sometimes seen round the moon, usually when the night sky is veiled with thin haze. Small circles, in which the red tint is outside and the blue nearest the moon are termed *Coronas*, and are due to the presence of tiny drops of water vapour which break up the light into various colours. Occasionally when the barometer is falling a larger ring is seen, the diameter of which is about 90 times that of the moon. This is a *Lunar Glory*, or *Halo*, and in this case the red band is nearest the moon.

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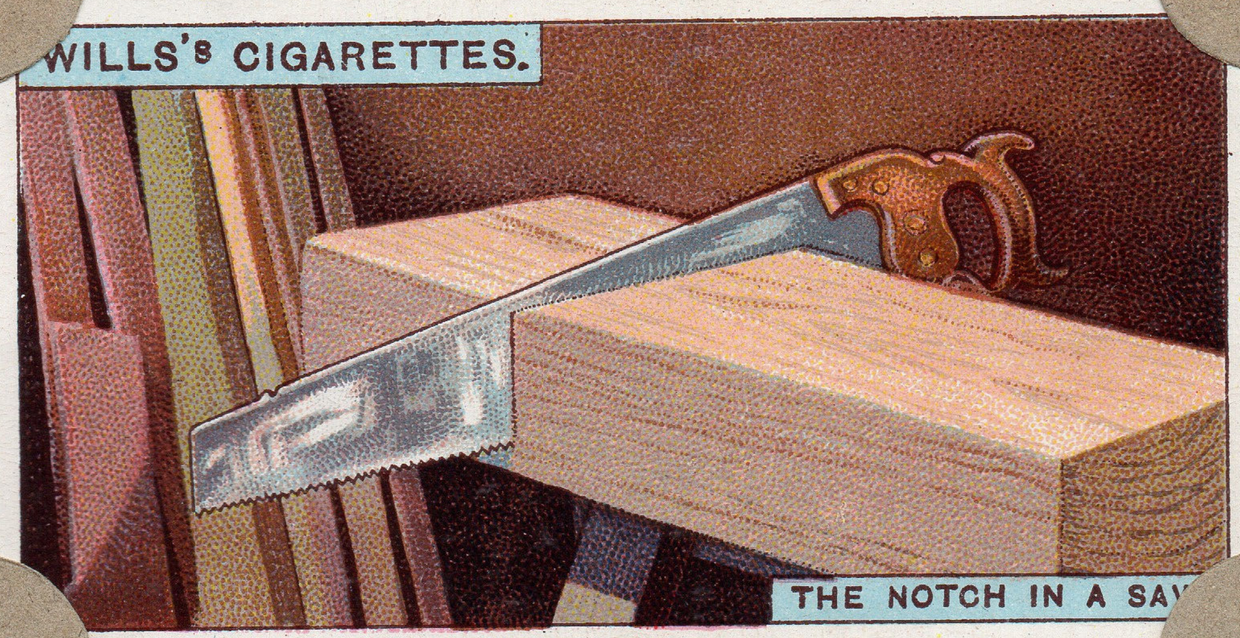
WILLS'S CIGARETTES.

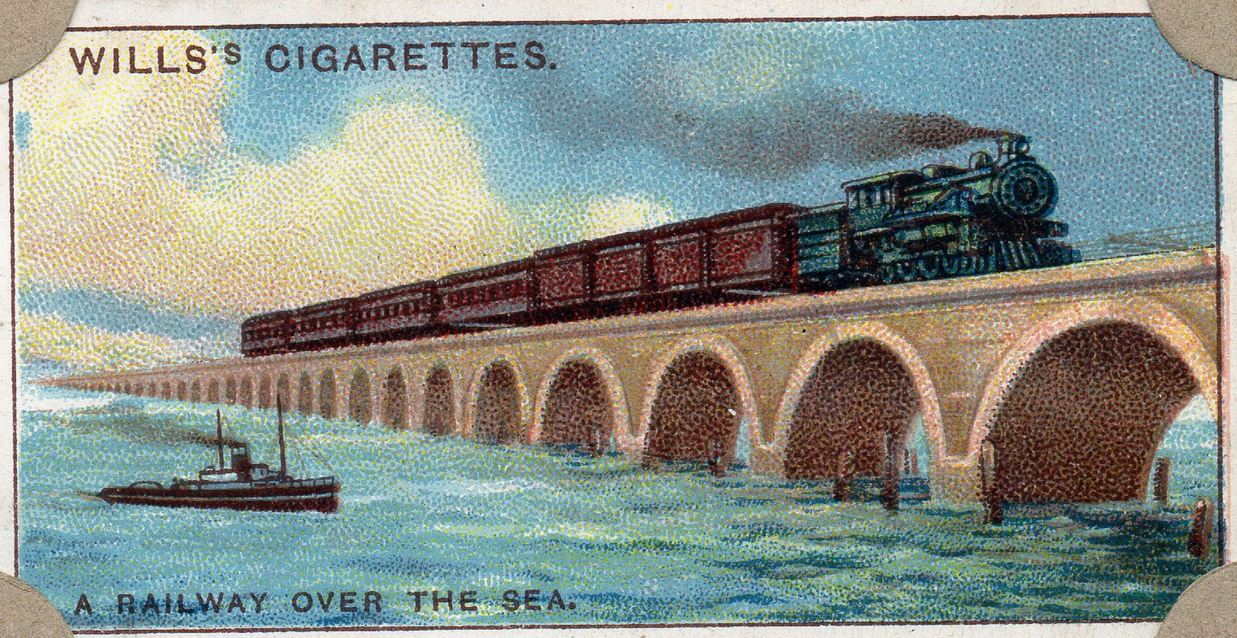
THE BARK AND FLOWERS OF CINCHON

WILLS'S CIGARETTES.



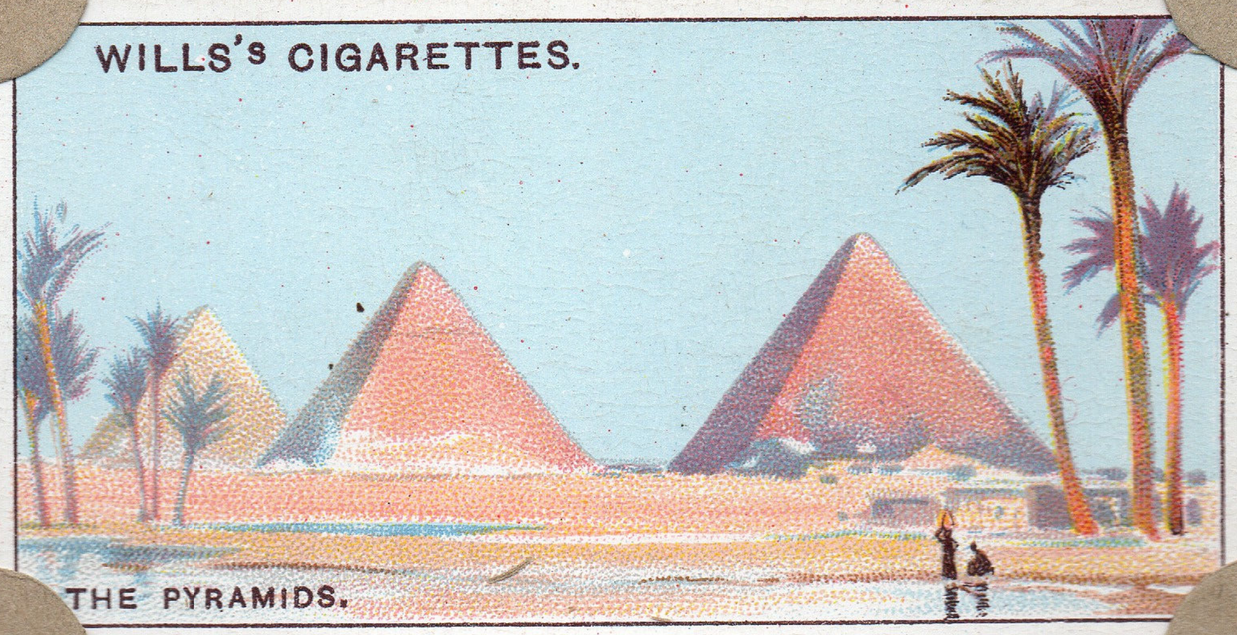
THE NOTCH IN A SA

WILLS'S CIGARETTES.



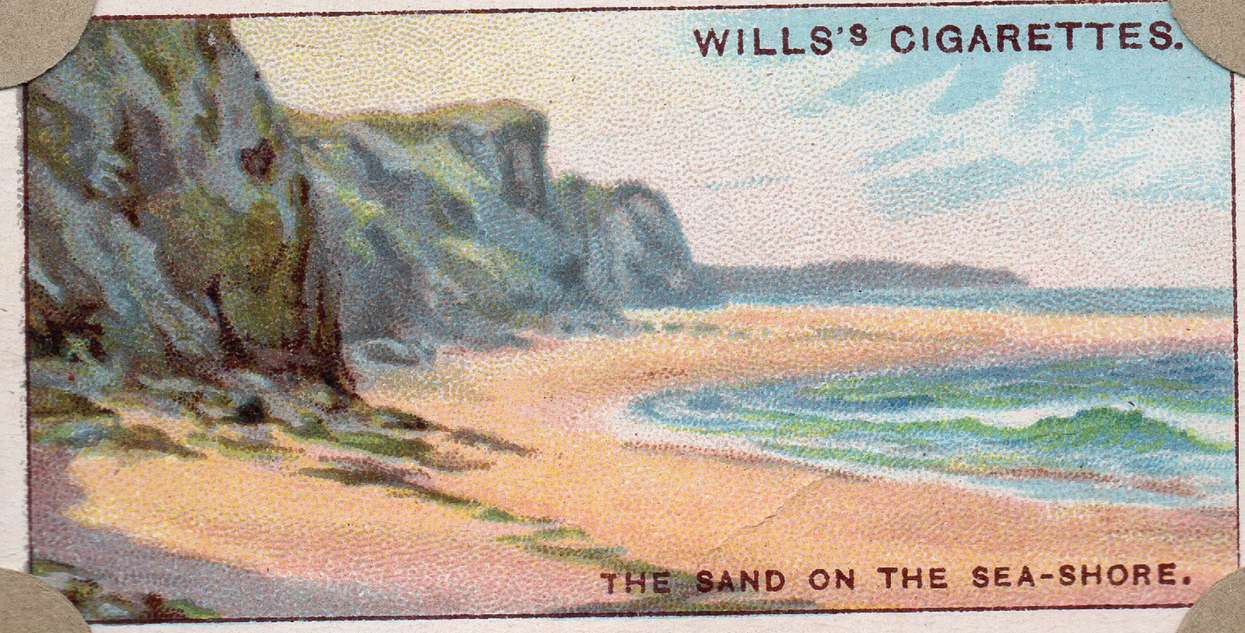
A RAILWAY OVER THE SEA.

WILLS'S CIGARETTES.



THE PYRAMIDS.

WILLS'S CIGARETTES.



THE SAND ON THE SEA-SHORE.

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DO YOU KNOW
what Quinine is?

The curative qualities of quinine were first discovered by the Indians of S. America, one of whom is said to have cured a Jesuit missionary of fever by means of it. The Jesuits introduced the medicine into Europe, where it became generally known as Jesuits' bark, Peruvian bark, or Cinchona. It is now largely cultivated in S. America, India, and Java, which are the chief sources of the world's supply of quinine. The trees are uprooted when they contain the maximum amount of the drug, and their bark stripped. In India the bark is sometimes only partially removed, and allowed to grow again. Quinine is an invaluable medicine in tropical countries.

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DO YOU KNOW
why a Saw has a Notch in its top edge?

Many large saws have a small notch at the top edge near the narrow end of the tool. When very thick blocks are being sawn through, it often happens that fine sawdust or small splinters of wood partly fill the cut, and impede the action of the tool. By just turning the saw upside-down the carpenter is able to clear away the sawdust, &c., by means of the notch provided for that purpose.

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DO YOU KNOW
where a Railway runs over the Sea?

The Key West Extension of the Florida East Coast Railway is in many respects the most remarkable railway in the world. It crosses the Bay of Florida, and connects Miami on the mainland with Key West Island, an important U.S. naval station, about mid-way between Florida and Cuba. It was commenced early in 1905, and completed by January 1912, about 2,800 men being engaged on the work, the majority of whom had to be housed in boats. Twenty-three miles of embankment and six miles of viaduct were laid through the open sea, linking up the chain of islands between Florida and Key West.

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DO YOU KNOW
who built the Pyramids, and why?

The Pyramids at Gizeh, near Cairo, are really tombs built by Egyptian kings of the 4th Dynasty. The Great Pyramid was built by Khufu, or Cheops, about 4,700 B.C. *(Flinders Petrie)*, the second Pyramid by Khafra, and the third by Menkaura. Close by are several lesser pyramids which are tombs of other royal personages. Each pyramid is a solid mass of masonry, built up of horizontal layers of stone on a foundation of rock, and containing at its centre one or more tomb-chambers entered by long galleries. The base of the Great Pyramid is over 755 feet, and its height about 481 feet, 150 feet higher than St. Paul's.

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DO YOU KNOW
how the Sand comes on the Sea-shore?

Sand consists almost entirely of crystalline particles of quartz mixed with little fragments of shells. When granite and other rocks are broken up by the weather, many of their constituents are washed away into the soil as food for plants; while clay and quartz remain, and are carried to the sea by the streams and rivers. Round the coasts wind and sea are constantly breaking up the cliffs into shingle, sand, and mud. The grains of sand, being much larger and heavier than the fine particles of clay, settle near the sea-shore, while the finer clay is carried far out to sea.

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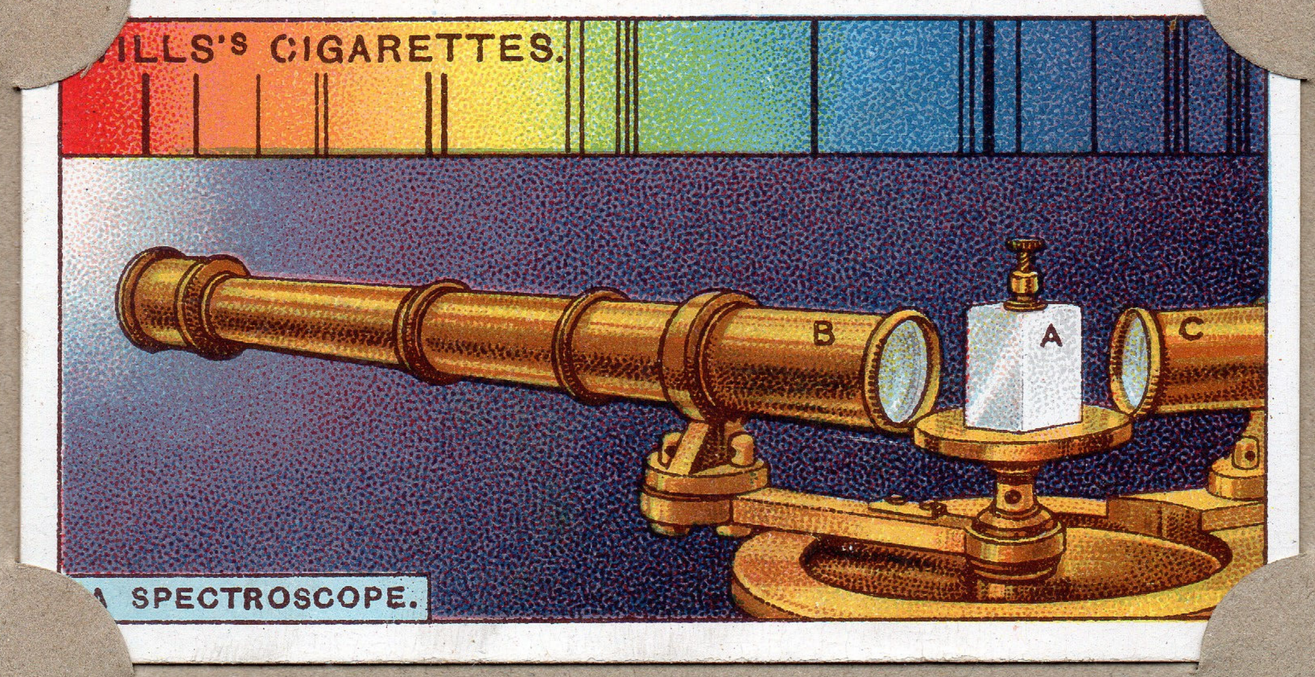
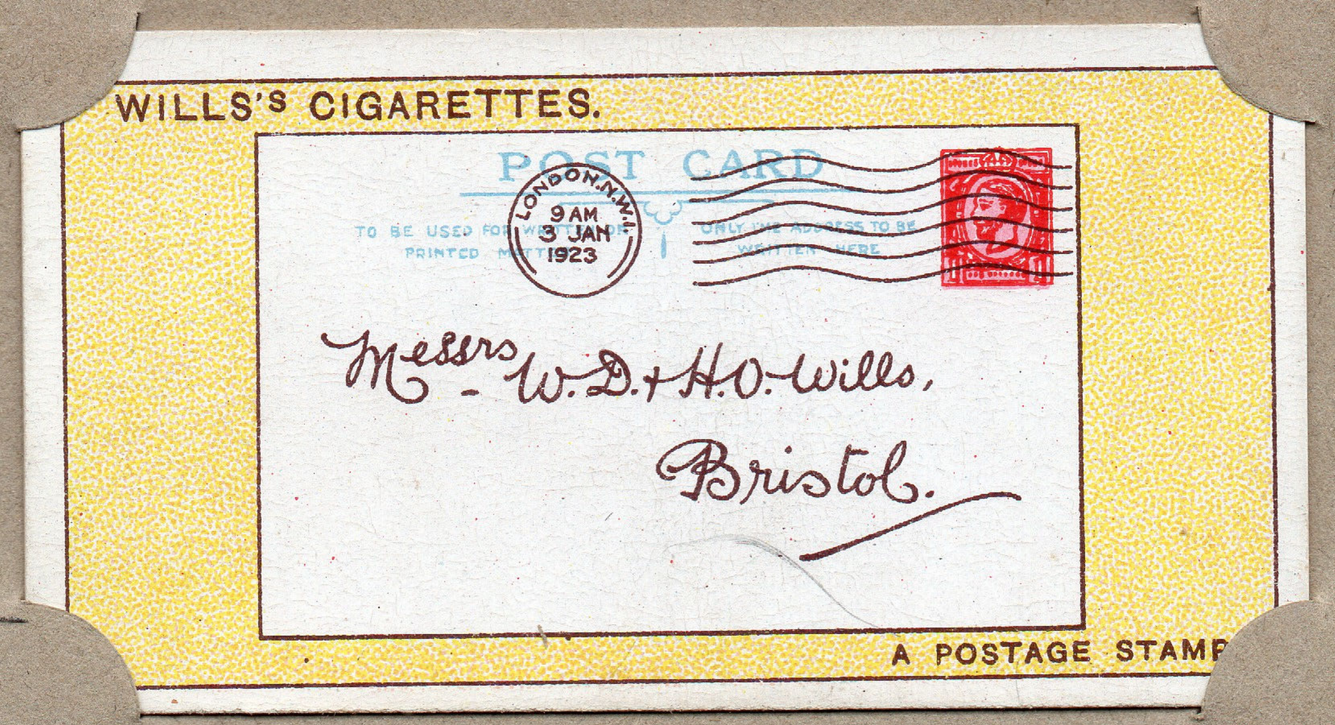
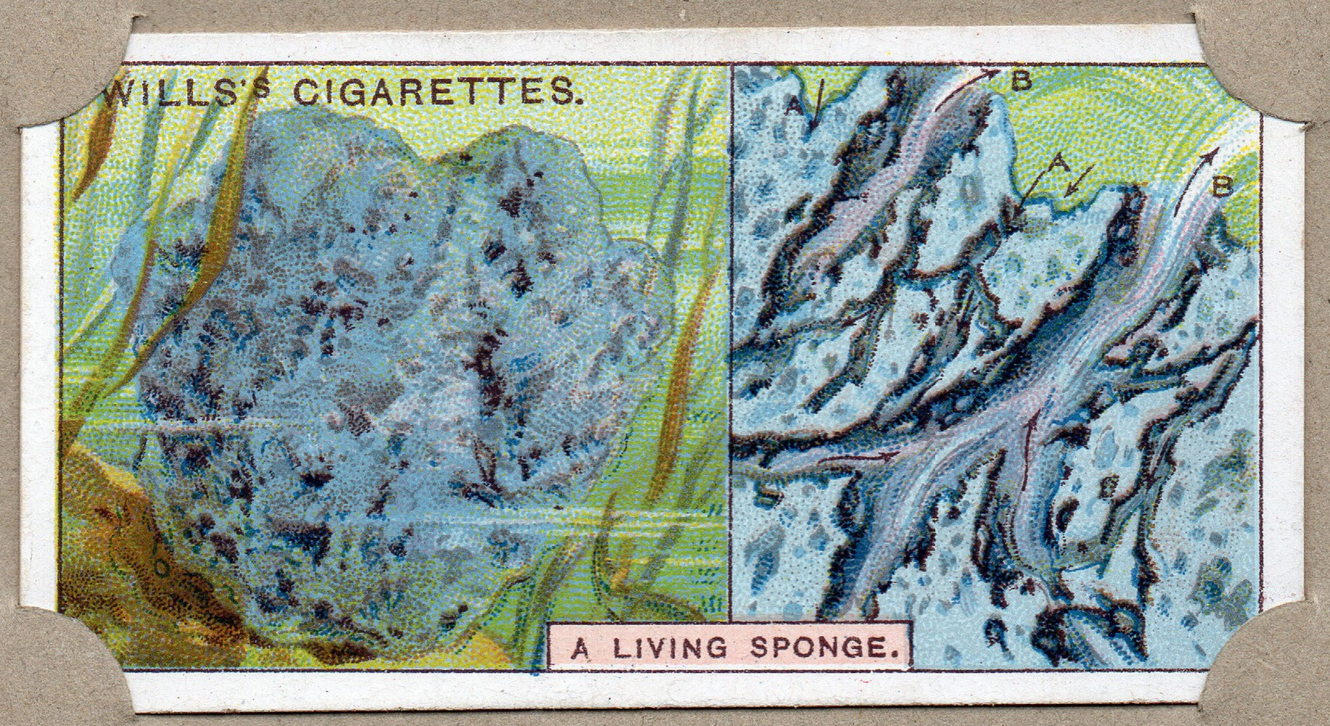
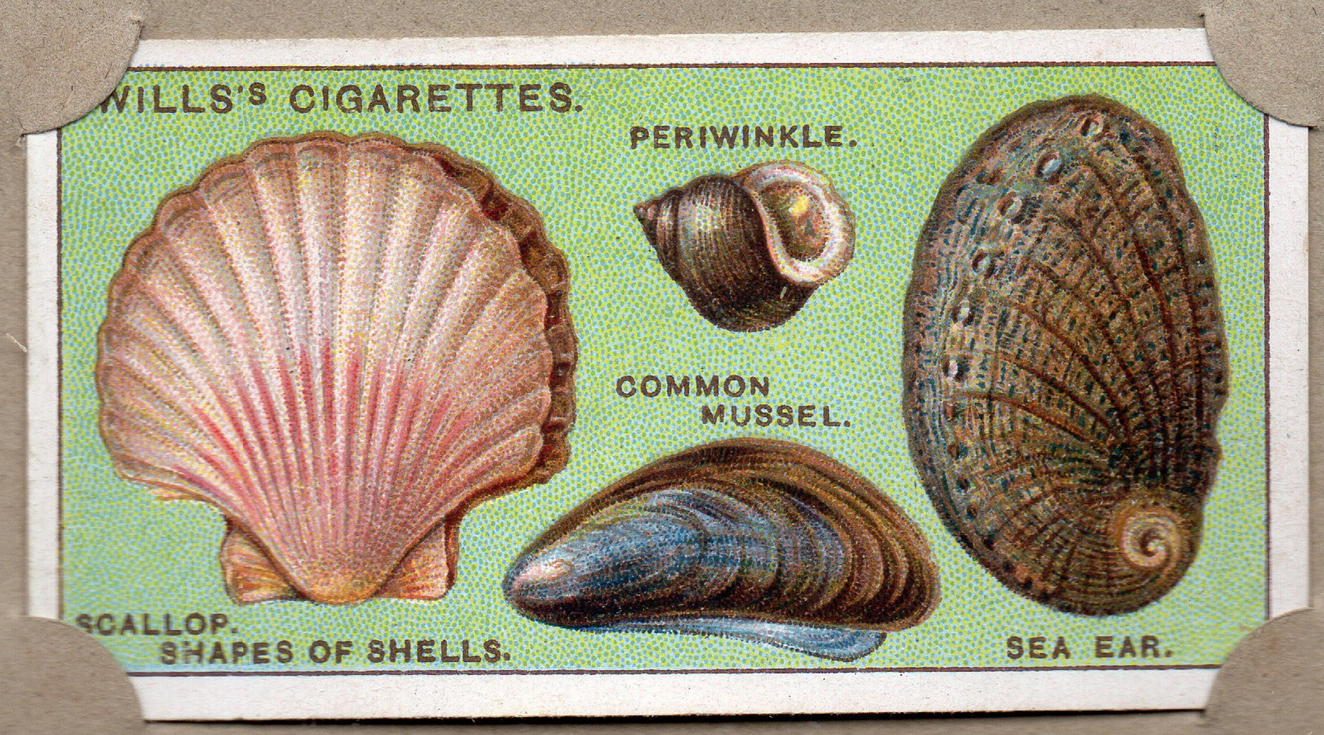

ILLS'S CIGARETTES.
B
A
C
A SPECTROSCOPE.


WILLS'S CIGARETTES.
POST CARD
LONDON.N.W.4
9 AM
3 JAN
1923
Messrs W.D.+H.O.Wills,
Bristol.
A POSTAGE STAMP


WILLS'S CIGARETTES.
A
B
A
B
A LIVING SPONGE.


WILLS'S CIGARETTES.
PERIWINKLE.
COMMON MUSSEL.
SCALLOP.
SHAPES OF SHELLS.
SEA EAR.

WILLS'S CIGARETTES.
STALACTITES & STALAGMITES

2ND SERIES OF 50

DO YOU KNOW
how the Spectroscope acts?

Falling raindrops sometimes break up the light of the sun into coloured beams, and form a rainbow, or natural spectrum. A glass prism possesses this property in greater degree, and this has been utilised in the spectroscope, which is an instrument for studying the spectrum. The picture shows the prism (A) clamped upon a table. On the left is a tube (B) carrying a lens, and provided with a slit through which light is admitted, and on the right is a telescope (C). The "solar spectrum," or band of coloured light into which sunlight is broken up, is shown in the upper illustration. The dark lines are known as Fraunhofer's lines.

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DO YOU KNOW
why the Stamp is stuck at the top right-hand corner of the envelope?

When Queen Victoria came to the throne letter-writing was an expensive luxury, and postal rates varied considerably, the charge for a letter being sometimes as high as one and eightpence. On January 10th, 1840, uniform penny postage came into operation, largely owing to the efforts of Mr. (afterwards Sir) Rowland Hill. The following May "adhesive duty labels," or postage stamps, were introduced. Originally all stamps were cancelled by hand, and as millions of letters had to be handled, it was necessary to have them stamped in the most convenient place, i.e. the top right-hand corner.

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DO YOU KNOW
what a Sponge is?

The sponge is really a dried skeleton, which, when living, was inhabited by microscopic, jelly-like marine animals. The diagram on the right shows a section of the living sponge, which is of a bluish colour. Sea-water is constantly entering by the small pores (A), carrying food to the tiny animals within, and passing out by the large *oscules* (B). Huxley compared the sponge to "a kind of city under water, where the people are arranged so that each can obtain his food from the water as it passes along." Sponges are obtained chiefly in the Mediterranean, and off the W. India Islands.

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DO YOU KNOW
why Shells vary in shape?

Our picture shows four typical shell-shapes; two being shells in *one piece*, or *Univalves*, and the other two *Bivalves*. The sea-ear, periwinkle, limpet, &c., are all found on rocks in shallow water, exposed constantly to the beating of the waves. Their shells are therefore strong, and free from projections which would catch the water and cause them to be swept away. The wedge-like shape of the common mussel has been brought about by its habit of associating in tightly packed masses. The beautiful shell of the scallop has hollow ribs, which make it strong, but light, and adapted for rapid movement through the water.

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DO YOU KNOW
how Stalactites are formed?

Rain-water as it penetrates the roof of a lime-stone cave dissolves some of the lime, and as the water gradually evaporates the lime remains attached to the roof in the form of a tiny ring, of about the same diameter as a drop of water. As the water continues to flow, the ring of lime slowly lengthens into a tube, and soon a solid rod of lime, or *Stalactite*, is formed. From this the water drips slowly to the floor and evaporates, leaving its lime behind. In this way another rod of lime, a *Stalagmite*, is built up on the floor, sometimes uniting with the first to form a column.

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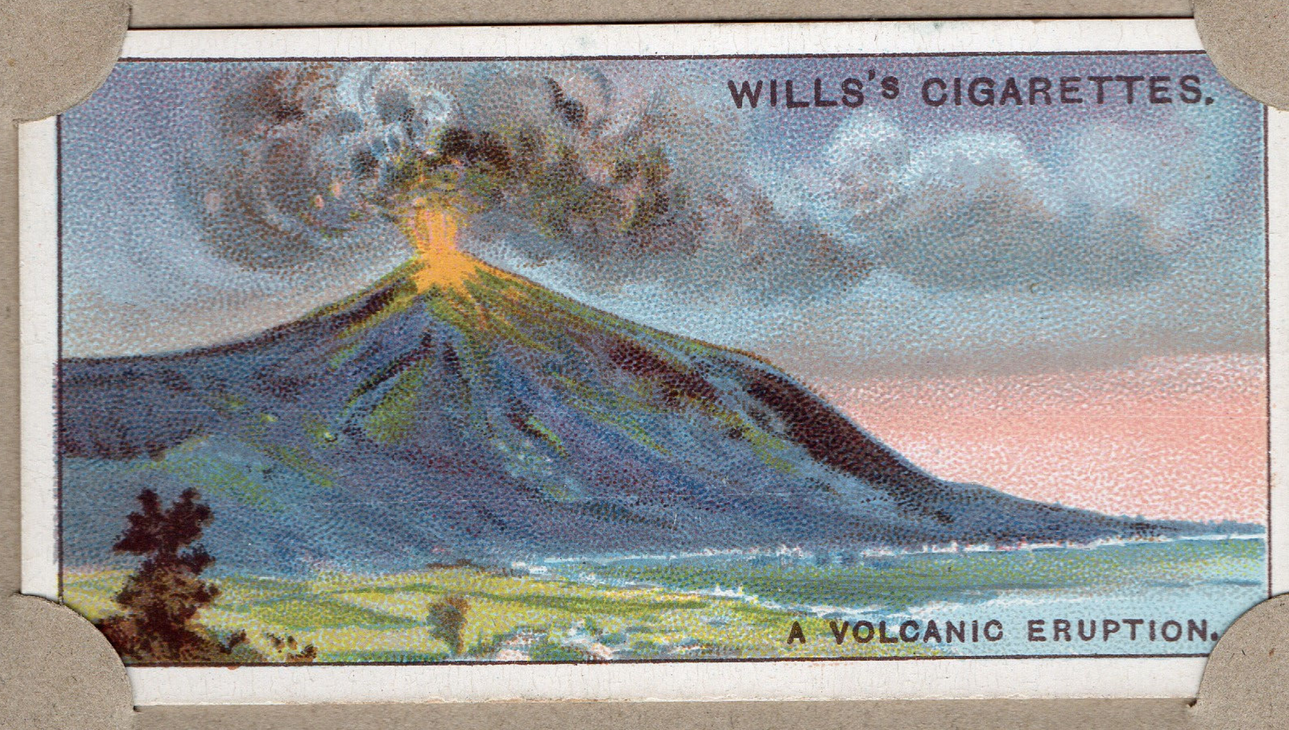
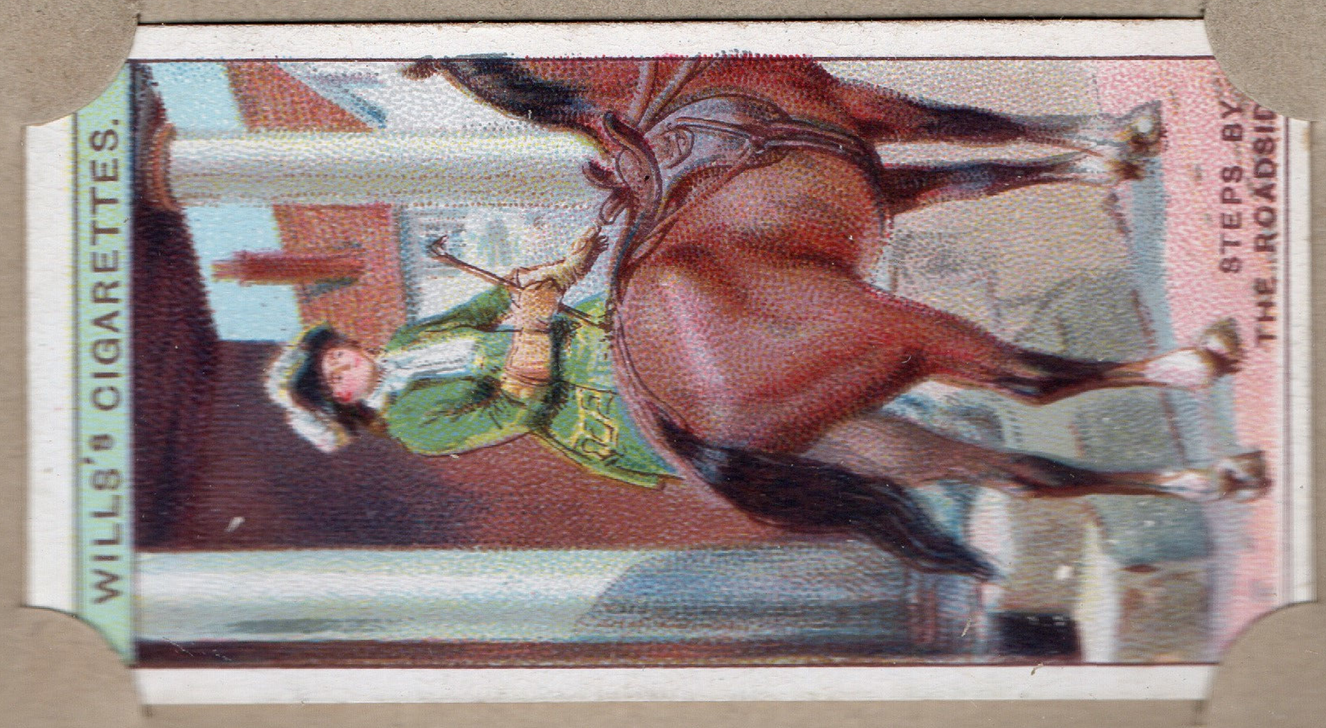
WILLS'S CIGARETTES.
THE SUN MAKES US BROWN


WILLS'S CIGARETTES.
A VOLCANIC ERUPTION.

WILLS'S CIGARETTES.
A TIDAL WAVE.


WILLS'S CIGARETTES.

WILLS'S CIGARETTES.

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DO YOU KNOW

why the Sun makes us Brown?

The presence of colouring matter under the skin is not confined to the negro or "coloured" races, but is common to all. In the darker races it is, of course, much more abundant, probably owing chiefly to the stimulating action of the sun. The pigment, or colouring matter, is found in the fourth of the five layers of which the epidermis, or outer skin, is composed. It has long been thought that the browning of the skin is due rather to the sun's *light* than to its *heat*, and in recent years it has been proved that this effect is caused chiefly by the ultra-violet rays present in the sunlight.

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DO YOU KNOW

what a Tidal Wave is?

The term "Tidal Wave" is popularly applied to the enormous waves which follow an earthquake occurring near the sea-coast, as is frequently the case. Disturbances take place in the sea-floor, and occasionally great landslips occur beneath the ocean, with the result that the water is violently agitated for many hours. At first the sea retires a long distance, then returns in a vast tidal wave, or series of waves, overwhelming everything within reach. After the Messina Earthquake of 1908, tidal waves 35 feet high were observed, and waves of over 200 feet in height are said to have been recorded off the South American coast.

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DO YOU KNOW

why Stone Steps were placed by the road-side?

While walking through some of the old towns and villages in the provinces, one often sees beside the roadway a short flight of stone steps, two or three usually, reaching to a height of about three and a half feet. These steps are often placed near a church, or a rural inn, and are relics of the days when riding on horseback was about the only means of travelling any distance. They were used principally by ladies to assist them in mounting and dismounting their horses, and the worn appearance of many of these stone steps shows us how very useful they were.

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DO YOU KNOW

what causes a Volcanic Eruption?

We have several proofs that the interior of the earth is intensely hot; e.g. the presence of hot springs rising from great depths, and the fact that the temperature in tunnels and borings gradually rises as the depth increases. Although in most places the solid "crust" of the earth is, fortunately, several miles thick, in some districts (S. Italy, S. America, Iceland, and the E. and W. Indies), it is much thinner, and the fires break through occasionally as volcanic eruptions. Vast clouds of smoke pour from the volcano, followed by streams of white hot molten rock, which flow down the mountain sides in great quantities, sometimes destroying entire cities.

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DO YOU KNOW

which is the Biggest Tree in the World?

This enormous tree is a Cypress, growing at Tule, Oaxaca State, Mexico, which is probably greater in girth than any other tree in the world. The trunk is 154 feet in circumference, and would require 30 men with arms outstretched to span it. The *tallest* trees in the world are believed to be the *Sequoia gigantea*, the famous big trees of California. One of these which has fallen, measures 112 feet in circumference, and must have stood about 450 feet in height when growing. Scientists estimate the age of some of these trees at seven or eight thousand years.

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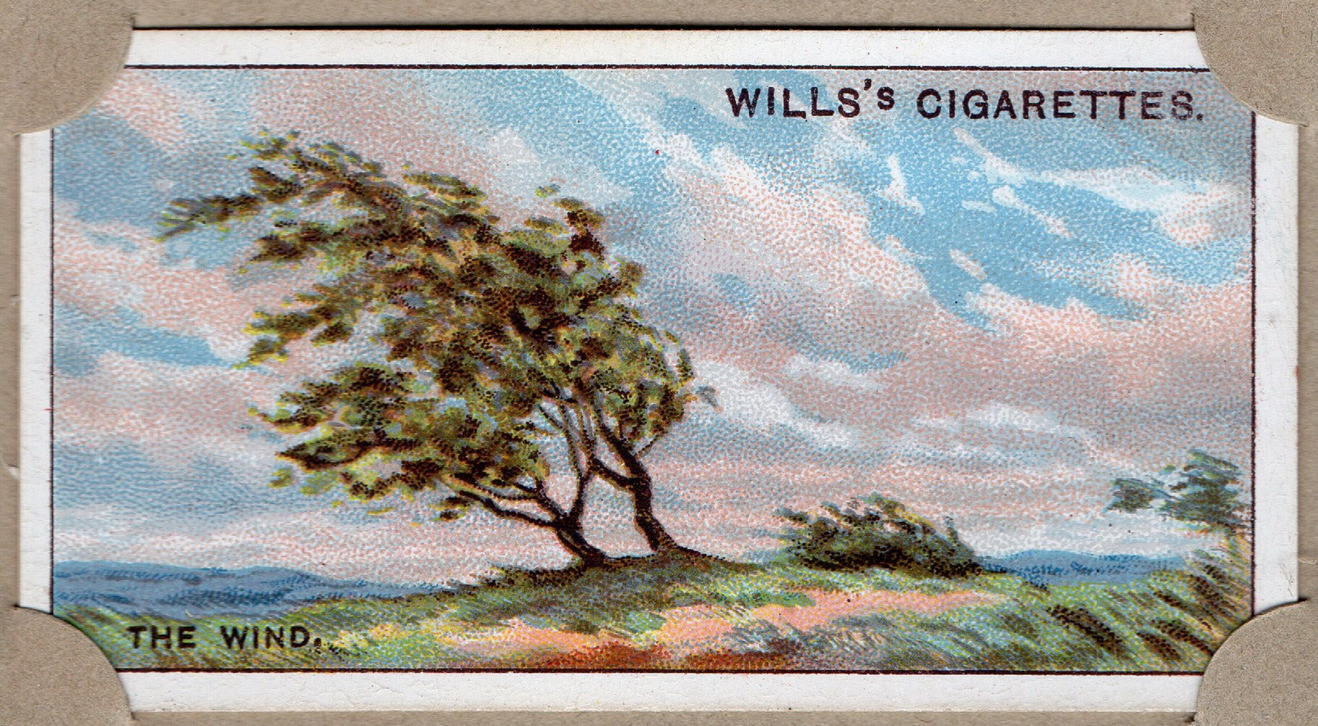
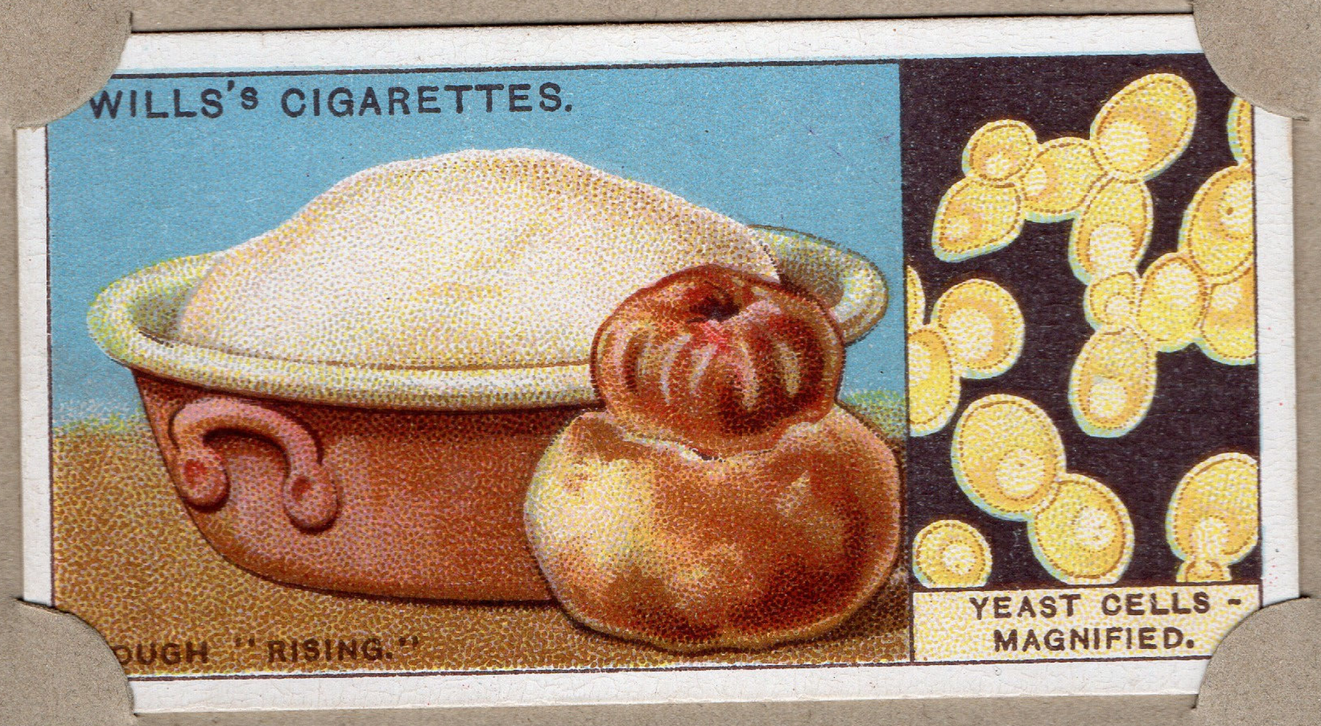
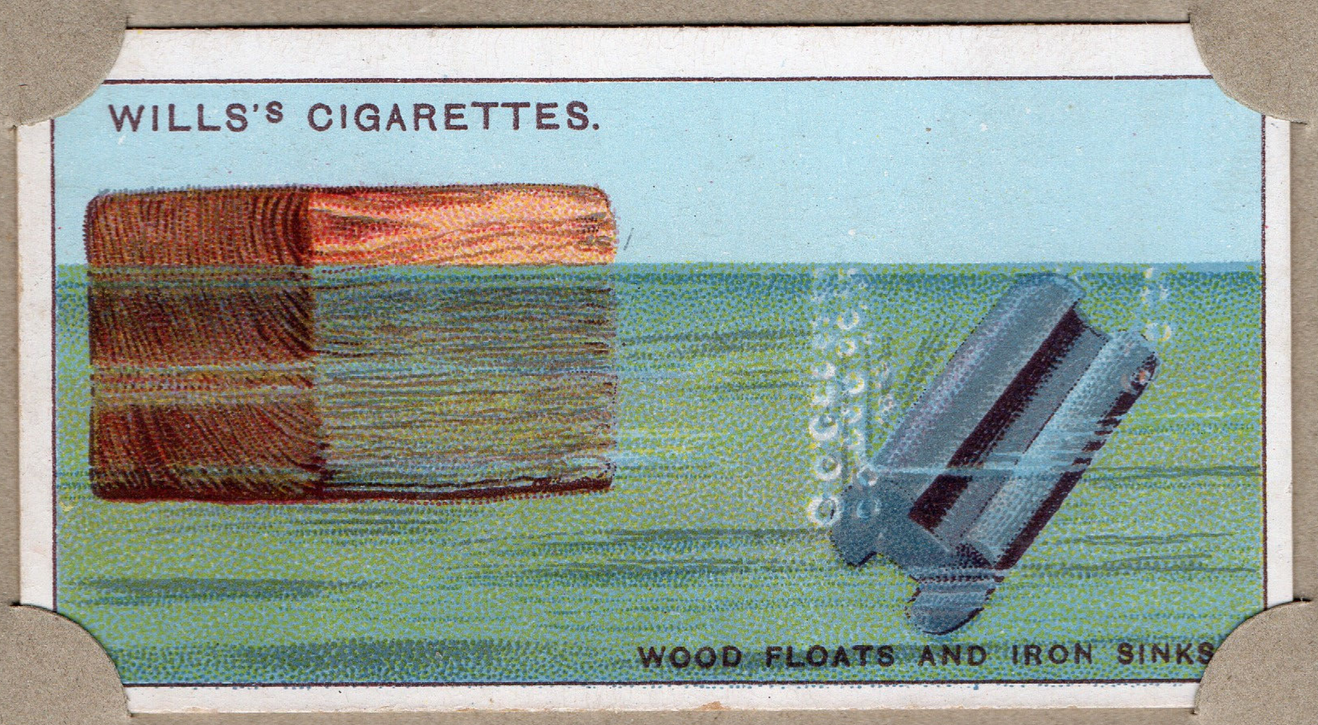
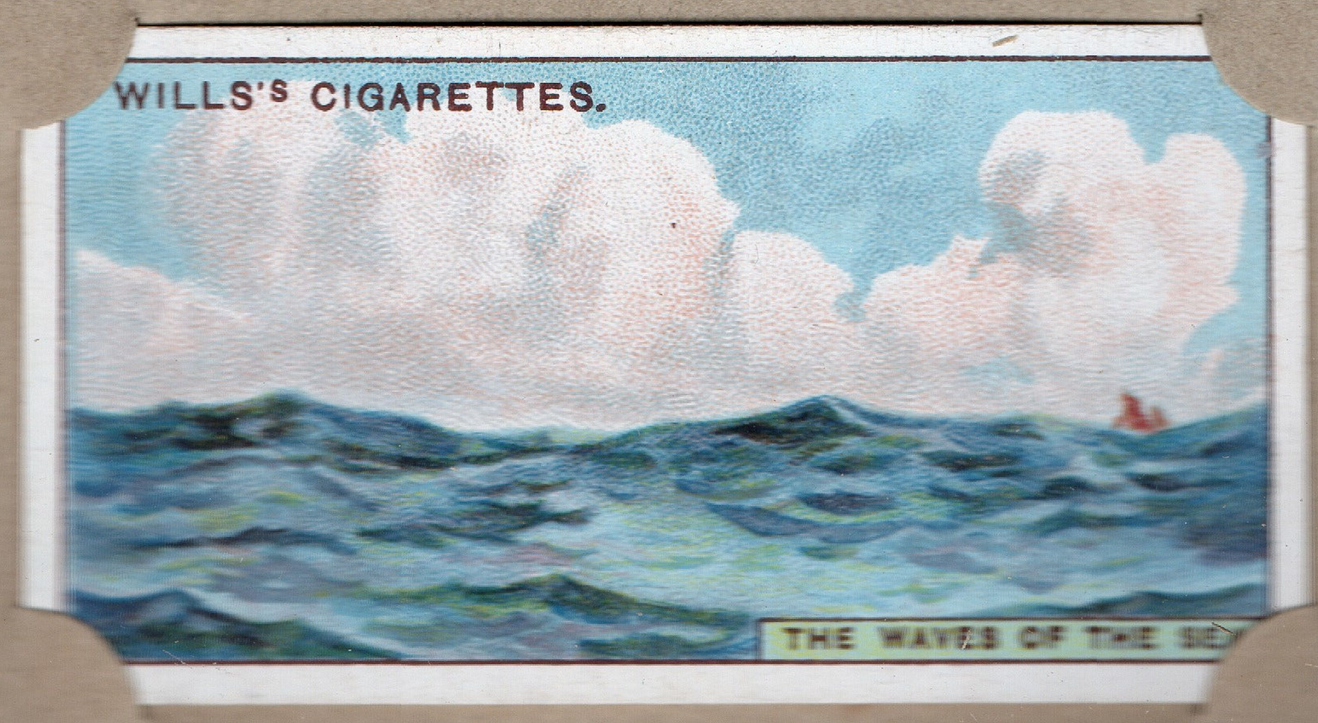
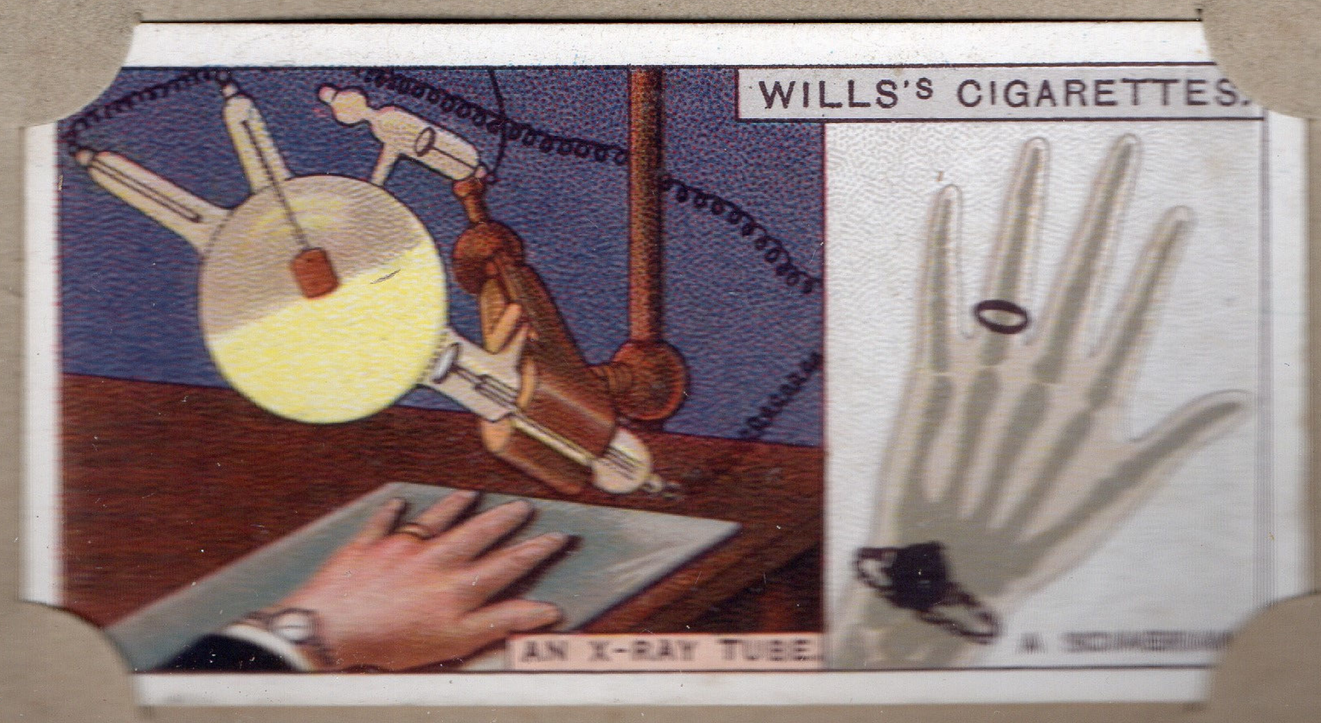

WILLS'S CIGARETTES.
THE WIND.


WILLS'S CIGARETTES.
OUGH "RISING."
YEAST CELLS -
MAGNIFIED.


WILLS'S CIGARETTES.
WOOD FLOATS AND IRON SINKS


WILLS'S CIGARETTES.


WILLS'S CIGARETTES.
AN X-RAY TUBE.

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DO YOU KNOW

what causes the Wind?

When air becomes warm it expands, becomes lighter and rises, while fresh, colder air blows in and takes its place. That is why there is usually a breeze by the seaside. The land grows warm in the sunshine, while the sea remains comparatively cool, so there is generally a flow of cooler air from the sea taking the place of the warm air rising from the land, or as we call it, a sea breeze. These differences of temperature occur all over the world, big areas of land and water becoming unequally hot and making the layers of air above them unequal in temperature, and therefore different in pressure.

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DO YOU KNOW

why Wood floats in water, and Iron sinks?

When a block of wood floats, you will notice that about four-fifths of it is below the surface, or in other words that wood displaces about four-fifths of its own bulk of water, for before the wood was immersed water filled the space now occupied by the wood. But the weight of the whole block of wood must be equal to that of the water displaced, for the water round the wood holds it up, as it did the displaced water. Wood floats, therefore, because it can displace its own weight of water without being immersed, and iron sinks because it cannot do so.

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DO YOU KNOW

what causes the Waves, and why the Sea is salt?

Waves are not caused by the tides, but by the wind, for when there is no wind the sea is as calm as the proverbial millpond. The foamy crests of the waves are due to the presence of salt in the sea-water, for pure fresh water hardly foams at all. Rain-water on its way to the rivers dissolves many kinds of rocks, especially salt and limestone; so the rivers are constantly taking salt to the sea, and when the sea-water is evaporated by the sun the salt is left behind. As time passes, therefore, the sea is gradually becoming more and more salt.

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DO YOU KNOW

what Yeast is?

When any sweet liquid, such as malt extract, or fruit juice, is warmed and exposed to the air, fermentation takes place, the sugar being changed into alcohol, and carbonic acid gas given off. This change is due to tiny yeast spores which are usually floating about in the air. When these plant-cells find a suitable liquid they commence to grow, each cell putting out "buds," which become larger, and, after giving out "buds" of their own, split off from the parent cell (*see diagram*). Distillers' or brewers' yeast is used in bread-making, the carbonic acid gas given off during fermentation being retained by the dough, and causing it to "rise."

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DO YOU KNOW

what the X-rays are?

Towards the end of the 19th century Sir W. Crookes devised the "Crookes Tube," a glass vessel exhausted of air, and somewhat like an electric bulb lamp, but with two platinum wires sealed into its walls. When a current from an induction coil is passed through the tube, a beautiful phosphorescent light is seen, and invisible radiations ("X-rays") are given out which possess the remarkable power of penetrating substances opaque to ordinary light. On the left is shown an X-ray tube in use, and on the right a Sciagram, or "photograph" of the hand, taken after a few seconds' exposure to the rays.

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BRISTOL & LONDON

WILLS FOR QUALITY
REGISTERED TRADE MARK