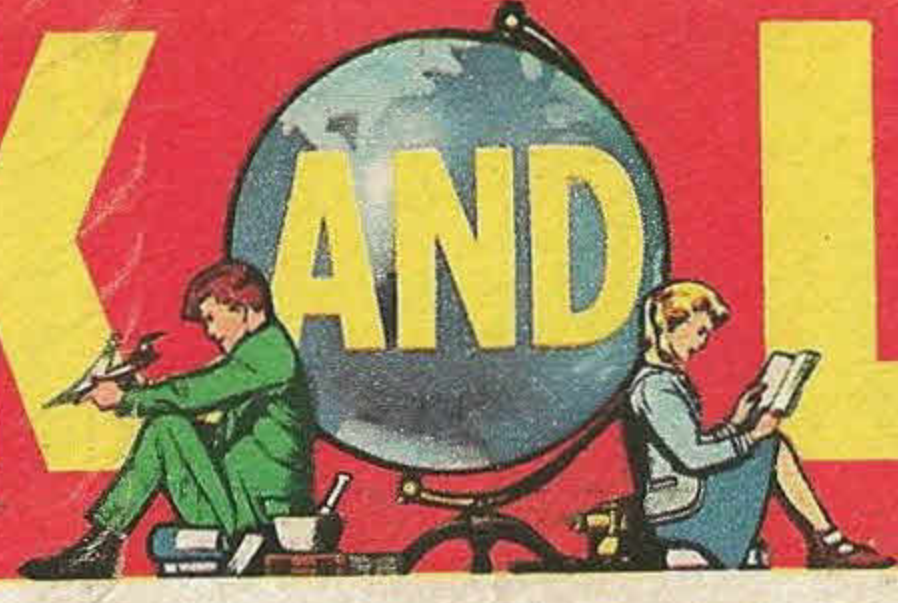


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16

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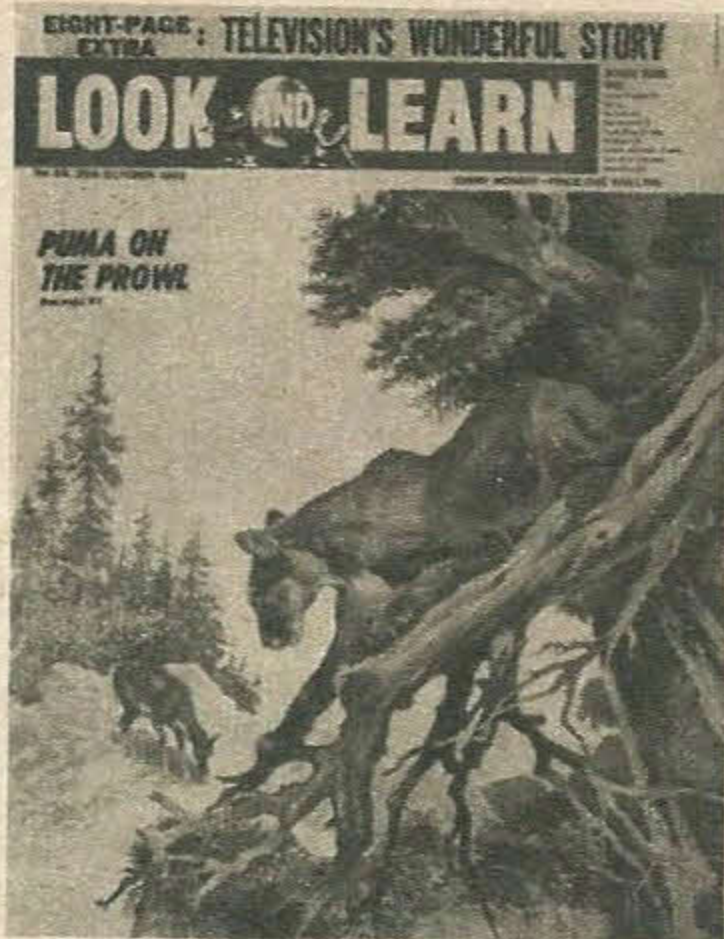
PUMA ON THE PROWL

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OUR COVER PICTURE

On the cover you can see the puma, America's biggest member of the cat family, about to leap on its prey—and what a tremendous leap it can make! William Hudson, the famous British naturalist, told a story about a puma which raided a sheep-farm in South America. One night the shepherds saw the puma climb into a tree. To stop it escaping, they built a circle of fires around the tree. Suddenly they heard a rustling noise, followed by a thud outside the circle. The puma had escaped—by jumping at least forty feet. You can read more about the puma in this week's "Wonders Of Nature."

Quick Quiz

SCIENCE

1. In which part of the human body would you find the cerebellum?
2. Long, straight clouds that look like bars sometimes appear in the evening sky. What are they called?
3. To every atom of oxygen in a drop of water there are two atoms of — which element?

LITERATURE

1. In which famous book does Sam Weller appear?
2. Who wrote *Pendennis*?
3. "Stands the church clock at ten to three, And is there honey still for tea?"—wrote Rupert Brooke in a poem which has immortalized a famous English village. Which village?

WORDS

1. What colour is *cobalt*?
2. Where would you expect a spiderman to be working?
3. What is a *leprechaun*?

PEOPLE

1. Abel Tasman was the discoverer of Tasmania. What nationality was he?
2. Where would you expect to find Black Rod?
3. Who is the man in charge of British Railways?

HISTORY

1. Who was the father of the Black Prince?
2. John Churchill was a leading army officer in the seventeenth century. By what title did he later become famous?
3. Who was the Maid of Orleans?

ANSWERS ON PAGE 27

CHILDREN'S NEWSPAPER

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BETWEEN OURSELVES

WILL it be good-bye to the penny when the decimal system of coinage comes to Britain? It would seem so. We shall have to talk in terms of cents.

Thus will end the history of a coin which began way back in Anglo-Saxon times. It began as a silver coin and until the reign of Edward I (1272-1307) was heavily marked with a cross so that if you wanted to give somebody change, you just broke off one or more of the quarters! It was the only coin issued in England until the coming of the gold florin in 1343.

But will it really be good-bye to the word penny if we do get decimal coinage? In America it has been the name for the one-cent piece ever since the day in 1786 when Congress ordered that no foreign coins should continue to be current in the United States of America,

and the English penny was removed from circulation.

Americans still say "A penny for your thoughts" and talk about "earning an honest penny." But the plural is always "pennies" and never "pence."

It may well be that even when our own law decrees the coming of the cent, we shall still call it by the name that has been with us for centuries.

When the change does come, nobody will regret the disappearance of one "coin" that does not even exist—the guinea. This has not been minted since 1817, but it is still featured on many price tickets, and introduces a ridiculous complication. For example— and see how quickly you can answer—how much is seven-and-a-half guineas?

The Editor

Hair Raising Facts

I WAS surprised to learn that there are about 100,000 hairs on the head of the average person, and although the hairs are only 1/400th of an inch in diameter, four of them can support the weight of one pound.

The hair on a man's chin grows at the rate of 1/100th of an inch every twenty-four hours.

JAMES NORRIS

Sydney, Australia.

Two Capitals

I EXPECT many readers have heard of winter and summer palaces, but have they heard of winter and summer capitals? Bhutan, an inde-

pendent state in the Eastern Himalayas, between Tibet and India, has a climate ranging from ice and frost in the extreme north to hot sunshine in the south. So Punaka is the winter capital and in the summer the capital transfers to Trashichod-zong.

ROBERT JOHNSTON

Kings Wood, Bristol.

Women Barred

COULD you please tell me what "Salic Law" is?

PHILIP DENNISON

Stowmarket, Suffolk.

This term applies to a law which bars females, or those who trace their descent

through females, from succeeding to a throne.

This code of law originated among the Salic Franks of the Fifth century A.D.

Swiftest Animal

WHAT member of the animal kingdom can run the fastest?

TONY STEELE

Borehamwood, Herts.

The swiftest of all animals is the cheetah, which is said to be able to move at over fifty miles an hour.

Egg Timer

HOW many days are required for hatching a hen's egg?

JENNY THOMAS

Newcastle, Staffordshire.

Hens' eggs require twenty-one days to hatch, during which time the eggs are maintained at a constant temperature by the heat of the bird's body. The eggs are regularly turned by the hen and they need occasional moisture to keep the pores in the shell open and allow the growing chick inside to breathe.

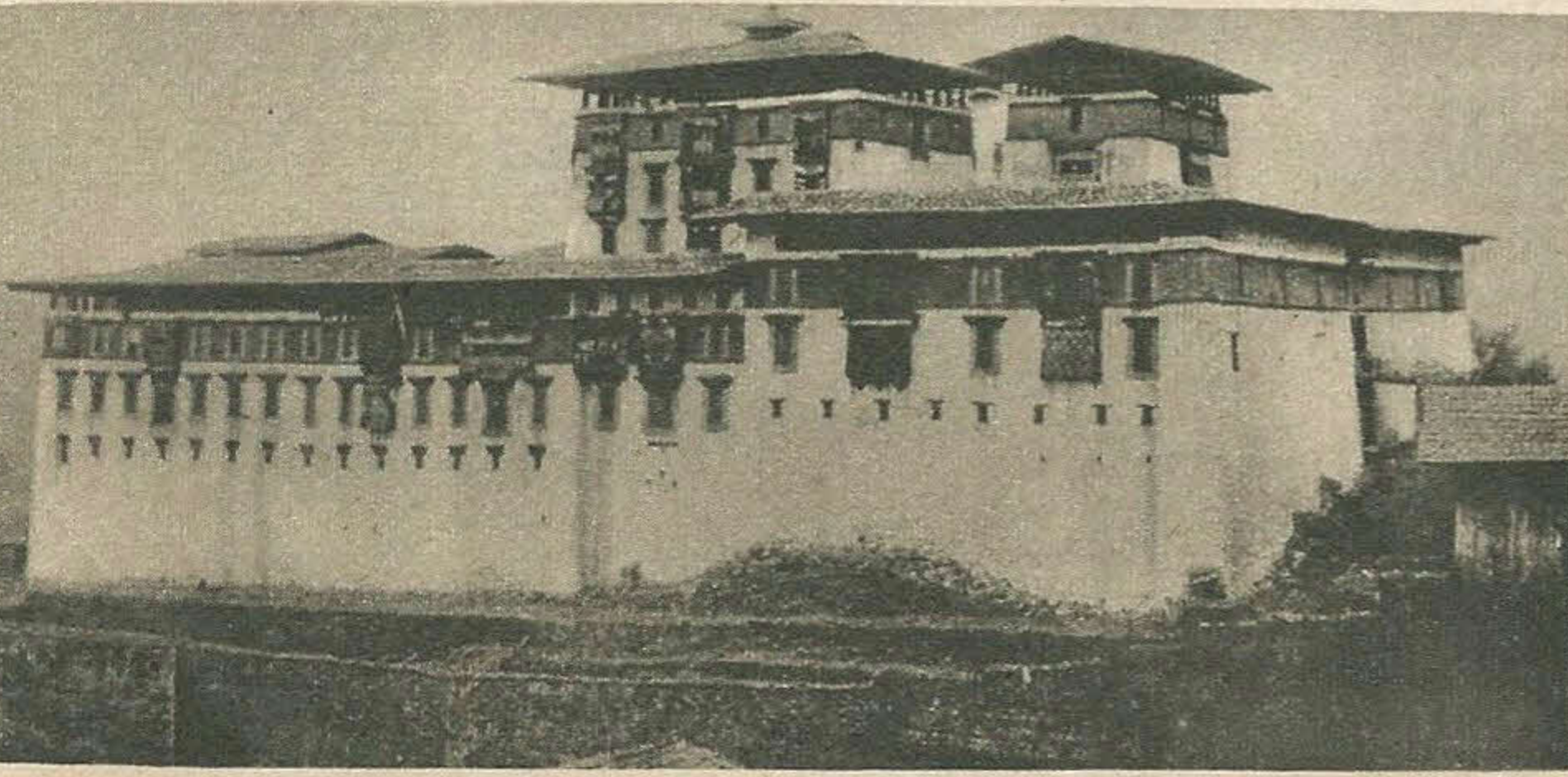
King's Cure

COULD you tell me how the custom "touching for the King's evil" originated?

PETER MITCHLEY

Tunbridge Wells, Kent.

"King's Evil" is an old name for scrofula, a skin disease. The saying comes from the fact that at one time the touch of the King of England's hands was supposed to cure this disease.



A fortified citadel or castle in the hills of Paro Jong, Bhutan.

DETECTIVE IN A

BLACK BOX

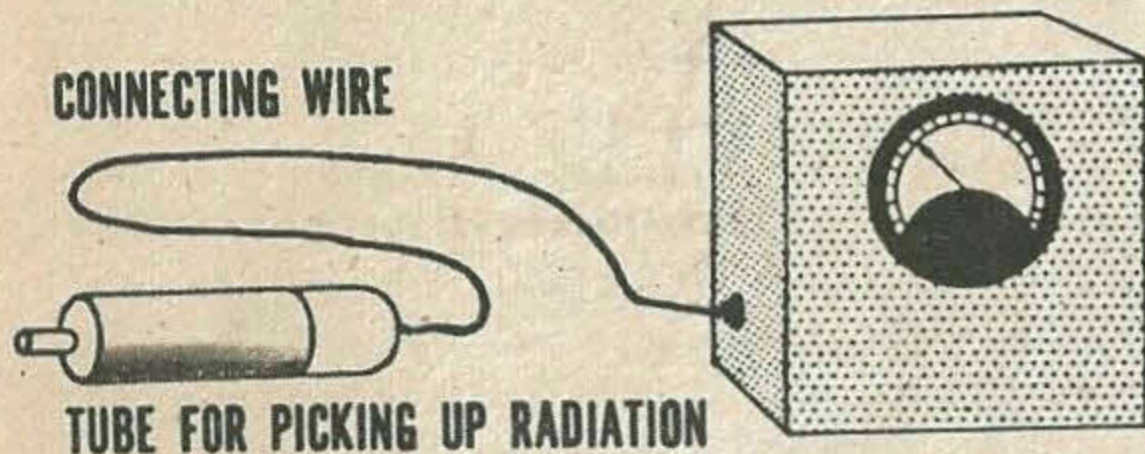
Whether you are prospecting for uranium in Africa or detecting radiation in an atomic power station, you take with you a small black box and listen for its click-click-click

IN the white-tiled rooms of an atomic station, overalled research workers move quietly about their jobs. Suddenly the silence is broken by a sharp clicking sound from a black box on the wall.

Immediately everyone is alerted: for this sound means that something in the room is sending out deadly radioactive rays. The research workers immediately pick up other black boxes like the one on the wall, and start holding them against the walls, door, chairs, tables and even their own clothes.

As they near the source of radioactivity—probably some uranium dust—the clicking becomes faster and faster, until at last the con-

BOX WITH VALVE AND DIAL



When the geiger counter comes into contact with radioactive rays it emits a sharp clicking sound and indicates the strength of the radiation on a dial.

taminated object is identified. This object has to be decontaminated immediately—either by being washed with water or treated with chemicals. If it is a piece of clothing, it is burned.

These black box detectors are "geiger counters." They were invented at the end of the last century by a Dr. Geiger, at just about the time that radioactive substances were first being isolated and identified.

Before this, people were virtually unaware of the invisible world of radioactivity around them. And even when scientists first began to realize the potential dangers of radioactive rays, they had no certain means of detecting them.

This was not surprising, as radioactive rays are

quite different from other kinds of rays. Each ray consists of streams of minute particles, each of which is less than a million-millionth of an inch across, and each of which travels at several thousand miles a second.

Each particle, during its extraordinary fast journey through space, "bombards" any air molecules that stand in its path and breaks them into pieces. Some of the pieces that are broken off the air molecules are "electrons"—little particles of electricity.

It is this "atom-smashing" property of radioactive rays that allows the rays to be detected. The diagram (below) shows the detector end of the geiger counter. It consists of a glass tube full of air, through which passes an electric current. But as the circuit is broken by a gap (A) no current can pass through the tube.

When a radioactive ray passes through the glass it strikes an air molecule inside the tube and releases electrons. These electrons provide a path for the current in the tube to jump the gap between the metal foil that lines the tube and the wire in the centre, thus completing the circuit.

The current generated in the battery then flows suddenly through the circuit in the direction of the arrows, and produces a sharp "click" in the loudspeaker. The greater the strength of radiation, the greater the number of clicks.

A special device counts the number of clicks per second, and this "count," as it is called, can be read on a dial on the side of the box.

Most of the background radiation that comes from radioactive rocks in the soil is quite harmless, but many other kinds of radiation are dangerous, especially the kinds of radiation found in atomic power stations. Geiger counters are the easiest and simplest way of detecting stray radioactive rays.

Geiger counters have also been

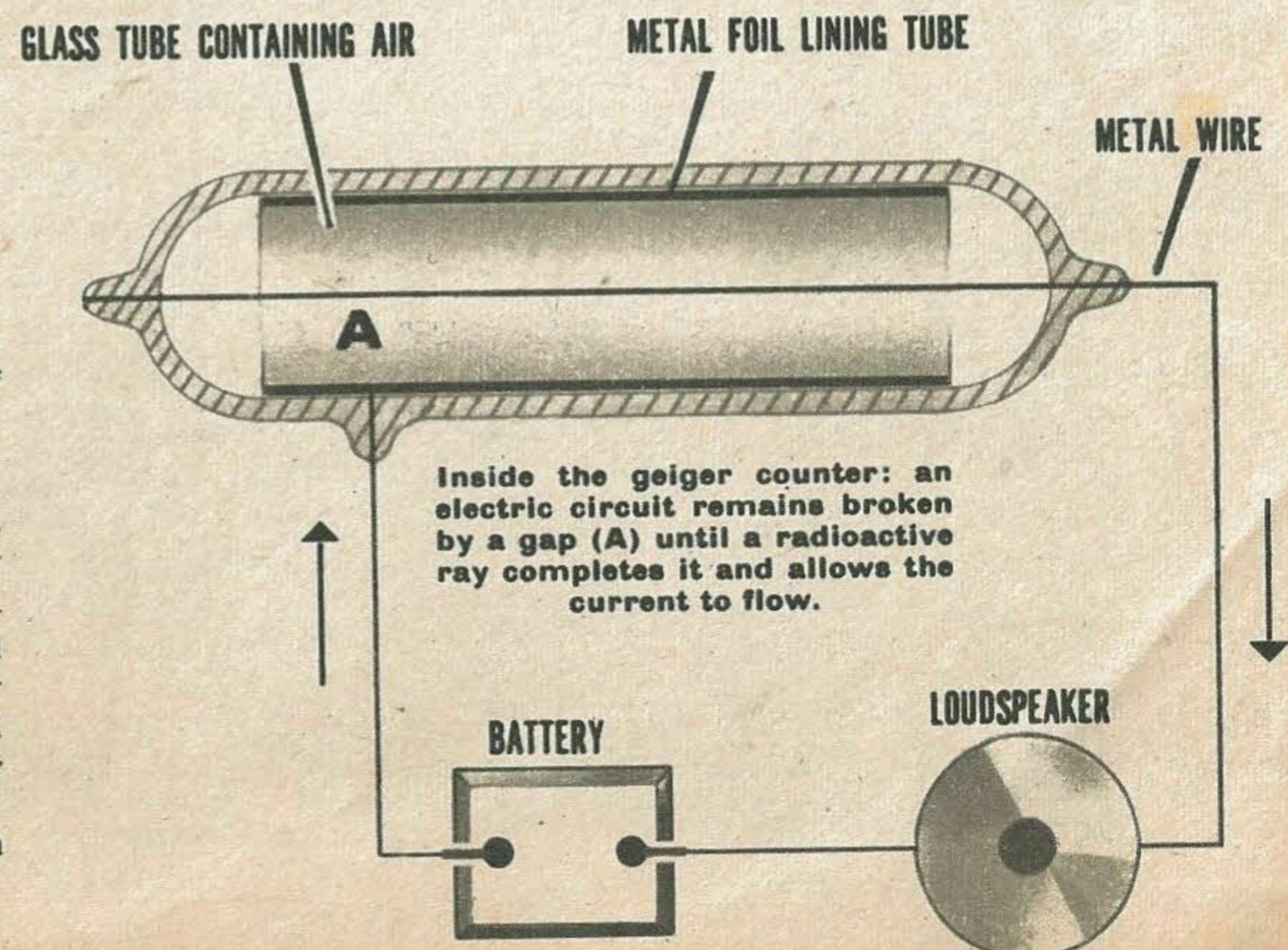
put to many practical uses. One of the things they are used for is to detect obstructions in the hundred-mile-long pipe-lines that carry oil across the deserts in the Middle East.

A tiny amount of a radioactive substance is put in a steel cylinder called a "go-devil." The go-devil is put in the pipe at one end and is then pushed along the pipe by the oil flowing through it. When the go-devil comes to an obstruction it sticks.

Space Rays

TECHNICIANS drive slowly across the desert in jeeps, following the path of the pipe-line and holding out a geiger counter as they go. When the geiger counter gives its warning clicks, the position of the obstruction has been found, and digging down to the pipe under the ground can begin.

Geiger counters are also mounted on satellites to detect the cosmic rays and other radiation that lie in vast belts above the surface of the earth. In this way astronauts are protected against radiation dangers.



DID MRS. O'LEARY'S COW DESTROY A CITY?

Chicago in 1871 was like a great bonfire of wood waiting to be lit. When the spark was struck, 13,000 buildings went up in flames. But how it began will always be a mystery

MRS. O'LEARY was milking her cow in the barn. The cow kicked over an oil lamp and set light to a pile of tinder-dry hay. And that began the great Chicago fire of 1871.

Well, that is what many people believed. Others thought that some lunatic fire-raiser began it all.

Whatever the truth about the beginning, the sequel was staggering in its immensity.

By the evening of October 10, less than forty-eight hours later, 1,900 acres of Chicago was a smoke-wreathed, smouldering scar upon the land of Illinois.

The flames had devoured some 13,000 buildings, among them 1,600 shops with some of the finest merchandise in the world upon their counters, some sixty churches and 600 factories.

Over 2,000 street lamps were so badly damaged that they had to be replaced. More than 122 miles of pavement was destroyed.

In all, almost \$100 million worth of damage was done. And 100,000 people were made homeless.

But if nobody actually knew how the fire started, why was it allowed to spread at such a rate? Why did nobody realize that Chicago in 1871 was like a bonfire waiting to be lit?

Well first of all it was a city whose population had multiplied ten times in twenty-one years.

The railway boom proved that Chicago was ideally placed for traffic between the West coast and the East coast. She had her own growing meat packing businesses, she was the granary of the prairies around her, she was the outlet to the rest of the country for the Michigan iron and steel industry.

James Parton, an American historian, wrote,

when he visited the city in 1867: "In all Chicago there is not one lodging house. Thrifty workmen own the houses they live in and the rest can still hire a whole house. Consequently seven-tenths of Chicago consists of small wooden houses in streets with wooden sidewalks."

The streets were as crowded as those of New York, with great shops, elegant hotels and public buildings, wide and gracious avenues on which stood the mansions of the wealthy merchants.

But there were those who saw those workers' houses for the pine frame shanties they were, and the piles of timber stacked along the River Union's banks as a great tinder box of a city that could so easily erupt in a vicious, unquenchable firestorm spread by the gusts of wind that played constantly around the city's buildings.

These people also saw a city water system that was just not equal to the demands of a population of 300,000.

Wind and Drought

IN spite of this, speculative builders continued to break fire regulations by erecting still more shanties for the workers.

The stage was set for a mighty blaze in 1871. A city built almost entirely of highly inflammable pine; a long hot summer that had brought a drought with it, a strong wind to whip any flames to a searing fury, and an inadequate fire brigade.

On October 7, 1871, almost four blocks of the city were destroyed in a blaze that lasted only two hours.

Some twenty-one hours later Mrs. O'Leary's cow—if we accept the legend—plunged the oil lamp into the hay of the barn at the corner of

DeKoven and Clinto streets. The Great Fire of Chicago had begun.

Right from the start the firemen, already tired from fire fighting the previous day, realized that this one was going to be too big for them.

No sooner was an engine moved to a better point from which to work than a blaze would break out elsewhere.

But the racing terror of wind and flame seared through those workers' shanties and wiped out whole timber yards and mills.

Robbery and Looting

THEN across the river it spread into the business quarter. In the basement gaol of the Court House 150 prisoners faced being burnt alive. They were released—and celebrated their freedom by racing across the road to loot a jewellery store.

For some time firemen fought to save the Court House with its invaluable records of the city's history, but they were beaten and the Great Bell which had been ringing continuously since the fire started crashed into the basement.

The people fled, each man, woman and child clutching some treasured piece of furniture, some personal object, a memory of happier days.

Ships on the river burned down to the water line. The great grain elevators exploded in towering pyramids of flame. The water works themselves were wiped out in a flash.

Pavements built on props of rotten wood collapsed. Robbery, hooliganism and looting went on unchecked. Women were sent crashing to the ground by thugs who tore their mean bundles of clothing apart in their greed for gold and silver.

The one bright note in all this disaster was that for all the panicking, for all the collapsing buildings, comparatively few people were hurt.

Roots of Wealth

WHEN it was all over and the fire was spent, 1,900 acres sent up the stench of burnt cloth, wood, oil and lumber, and piles of brick and crazily confused patterns of girders and iron columns were all that the eye could see, with here and there a building that had curiously survived. The citizens of Chicago, moving back from the prairieland, back from the shallow waters of Lake Michigan where they had fled for safety, wondered if there would ever be a Chicago again.

But the roots of the city's wealth had not lain in the mansions and the shacks. The roots were those railway lines that went snaking out across the United States . . . eighteen trunk lines, ten thousand miles of track.

And the good Illinois soil was ready to work again . . . to throw up its thousands of acres of corn, to feed the pigs and the cattle for the meat packers of Chicago.

All Chicago really had to do was rebuild its warehouses and its grain elevators, its goods yards, its factories and its homes.

The city rose again.



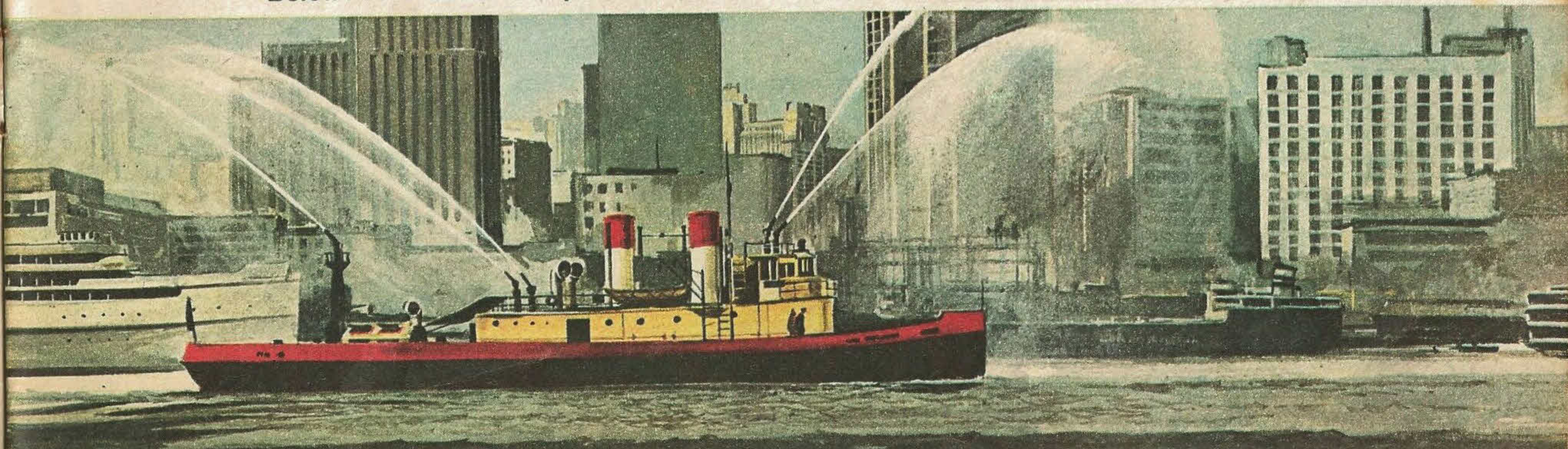
◀ The fire has gone, Chicago is destroyed. In 1871 it was almost unbelievable disaster. Not for another seventy years, in the Second World War, was devastation on such a scale to be accepted as commonplace by the world.

DISASTERS THAT SHOCKED THE WORLD



The city was doomed, and for many inhabitants the river provided the only path of escape through the flames

Below: Fire floats with powerful jets are only part of Chicago's fire defences today



WHEN THE EARTH CRACKED UP

... the pieces floated slowly away on the molten rock—until they formed the continents we know today

EVER since reliable maps of the world came into existence, explorers and geographers have been intrigued by the almost perfect "jigsaw" fit which certain continents of the world make with each other—particularly the Atlantic coasts of Africa and South America.

Around the beginning of this century, Dr. Eduard Suess, an Austrian geologist, designed a special map of the world in which all the continents were fitted together to make a single "super-continent."

He even gave a name to this "new world." He called it Gondwana Land, after a province in India, because it was India that proved most difficult to fit into the jigsaw.

For a few years Gondwana Land remained no more than a scientific curiosity. Then, in 1912, a German scientist called Alfred Wegener suggested that the super-continent of Gondwana Land might actually have existed about 200 million years ago.

He believed that this vast continent gradually broke up into separate pieces which then drifted slowly apart until they reached their present geographical positions on the map of the world.

Exactly how this happened forms the basis of his theory, the theory of the "continental drift."

Up and Down

THEN, as now, scientists were agreed that the Earth is covered by a cool and hard crust or "skin" of rocks, about 70 miles thick, that make up the continents and the ocean floor.

But beneath this outer skin is a second layer, called a "mantle." The mantle is believed to consist of rock which is almost molten.

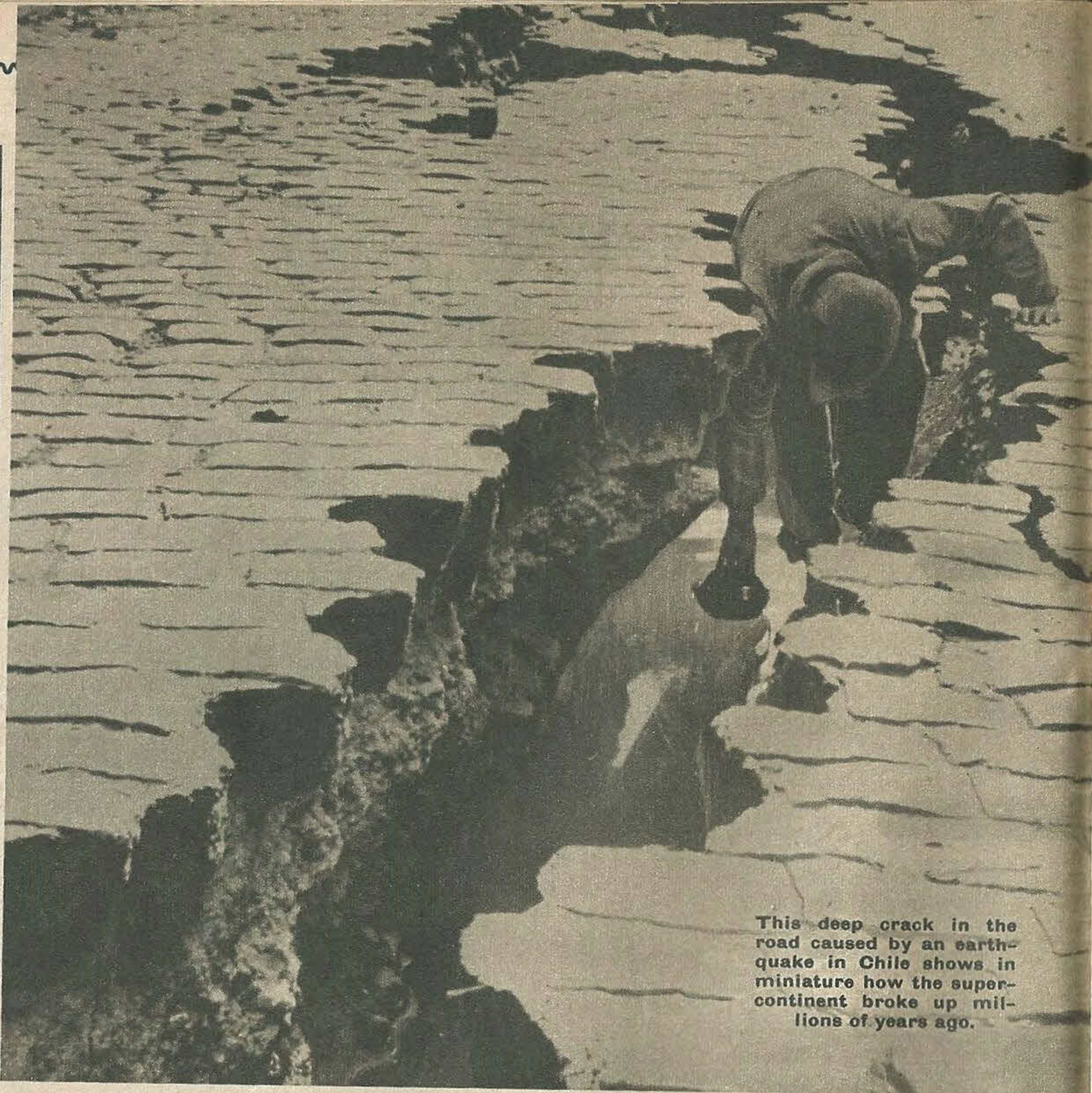
On this molten rock float the continents, bobbing slowly up and down like icebergs on the sea. The continents bob very, very slowly—less than a fraction of an inch per year.

Wegener argued that if the continents could move up and down then they could also "drift" sideways. Today many scientists believe that Wegener's picture of what happened is correct.

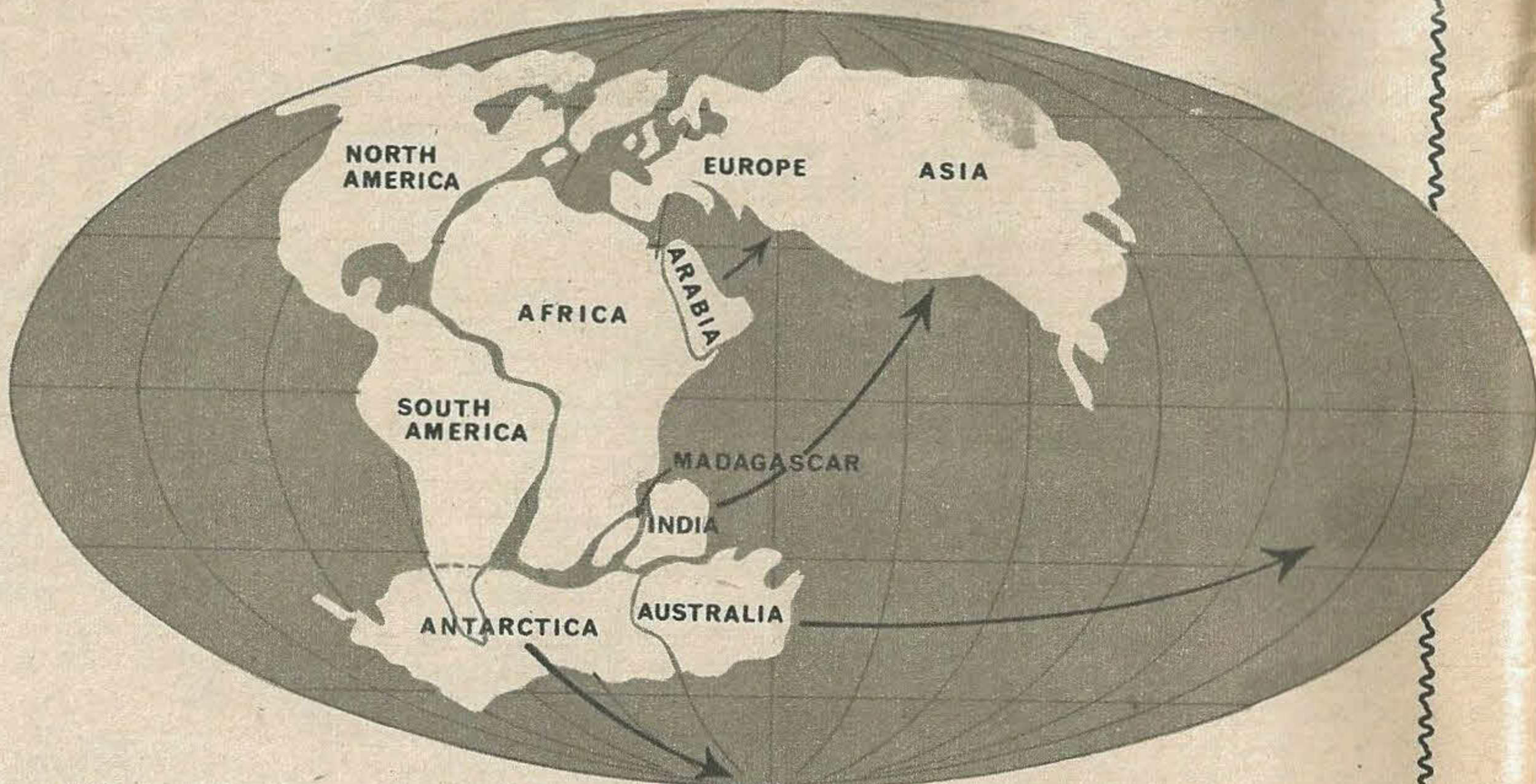
About 200 million years ago a giant crack appeared in the super-continent, which gradually widened as the sections drifted slowly apart, until 100 million years later the world was roughly divided into the regions which are now North and South America in the west, and Europe, Asia and Africa in the east.

Then the Americas drifted apart until they remained connected only by the narrow Isthmus of Panama.

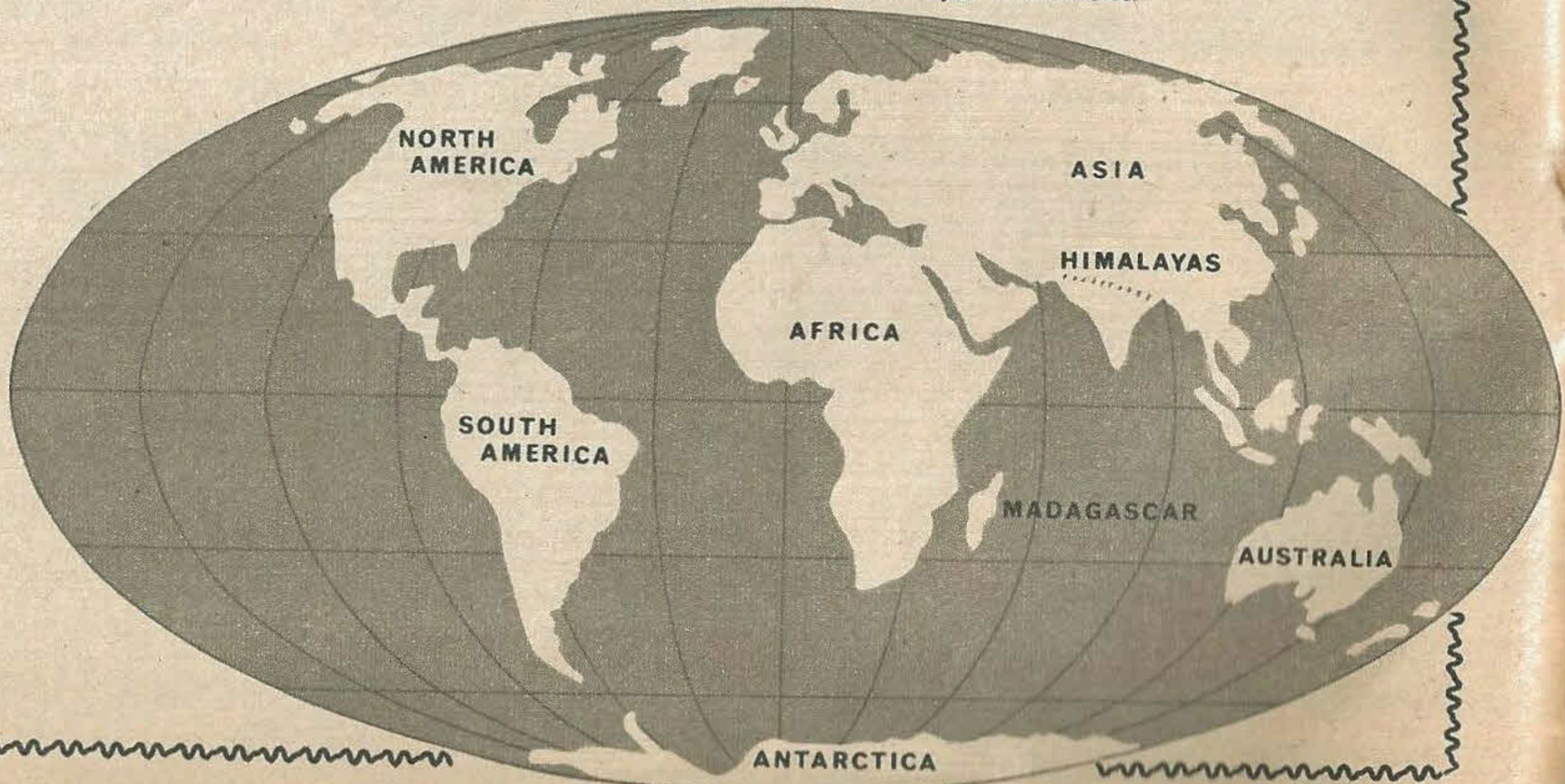
Part of Antarctica separated by another crack and drifted towards the north-east to form Australia. A small southern part of South America broke off and drifted all the way eastwards until it "collided" with southern Asia to form India and raise the Himalaya Mountains.



This deep crack in the road caused by an earthquake in Chile shows in miniature how the super-continent broke up millions of years ago.



The map above shows how well the world's continents fit together to form a giant jigsaw puzzle. This vast super-continent is believed to have existed two hundred million years ago. The arrows show the direction of the drift after the super-continent broke up. Below: A special projection allows us to see the whole world as it is today. The wide Atlantic is the final result of the first crack that appeared in the super-continent.



ORDEAL ON THE BEACH

STORY SO FAR

Kamuelo, a Hawaiian fisherman's son, and his friends, were thrilled when a baby dolphin appeared among the school of dolphins which used to swim offshore. As the children watched the baby grow they christened her Wiki-Wiki, meaning Hurry-Hurry. Wiki soon decided that human beings were friendly, and she and Kamuelo often swam together. The boy soon realized that he had won Wiki's trust and affection, and they became firm friends. But then came bad news: a great tidal wave was sweeping across the ocean! Kamuelo's family, with the others in Calabash Cove, quickly packed their most precious belongings and fled to the hills. When the tidal wave arrived, however, it receded before it reached the fishermen's houses, although several boats were damaged. The families were able to return, but Kamuelo was not relieved that the danger was over: he was wondering whether Wiki had survived the great wave.

WHEN all the grown-ups decided it was safe, Kamuelo's family gathered up their bundles. They climbed into their jalopy, and clattered back downhill with the other refugees.

"What a mess!" exclaimed Kamuelo's mother, as the old car squelched to a stop in front of the house.

Since the worst was over Kamuelo could not help thinking more of Wiki than of anything else.

He rambled along the beach, his eyes studying the ocean. The tide was going out; it looked very flat where the mighty wave had been. He could only hope and long for the sight of the frisky fin, the lively tail wig-wagging over the waves.

With Mary and Pikaki he walked around the curve of the cove. They were about to turn back when suddenly Kamuelo noticed something moving in the farthest hollow at the back of the beach. It was a long, slim shape.

It was—a dolphin!

Stranded

THE two girls stopped and stared. The dolphin had turned its head and was peering at them. Its sides were heaving.

Was it—? Could it be—?

Sure enough, there was the scar on the flank. Kamuelo flung himself on his knees and threw his arms round her neck.

"Wiki! Are you all right?"

Plainly she was not all right. Her eyes rolled at him appealingly, like a sick dog's.

The dreaded thing had happened—the accident about which he had been warned, when dolphins or porpoises found themselves too far up the beach.

"She's stranded!" he said.

"What does stranded mean?" squeaked Pikaki.

"The tidal wave must have swept her on to the beach," he explained, "and left her behind."

He ransacked his memory to recall what the older people had told him.

"We mustn't let her skin dry out, or she'll die!" he said.

"Won't she live till the tide comes in and floats her again?" Mary asked anxiously.

High above the waterline they found the missing dolphin, her sides heaving. Kamuelo knew that unless she was returned to the sea at once she would die. But she was huge and heavy—and there were no grown-ups to help them

"That's still several hours, and she's in the sun. Besides, while the tide's filling up the pool she might drown, because the water would be shallow for a while, and she couldn't move her tail and flippers enough to swim up to the surface and breathe. Let's see if it's possible for us to move her down the beach."

He and Mary struggled to hoist her from either side, while Pikaki tried to lift her tail. They toiled until they almost strained their backs. Wiki wheezed and watched them with anxious trust. Like a wounded dog, she knew they wanted to help her.

"It's no good!" he sighed. "Pikaki, run back and get some people to come and help us. Quick!"

Meanwhile Kamuelo ran and fetched the old rusty bucket which he had noticed among the flotsam drifting ashore. He and Mary hurried across the beach to the water's edge and filled it. At first it was so heavy that the two could hardly carry it between them. But it had a hole in the bottom, and some of the water leaked out. By the time they reached Wiki half had trickled down on to the lava. However they used the remaining half to douse her head and neck.

Her smooth hide twitched eagerly. She gave a little gulp.

To and fro they rushed, until they were almost exhausted. At each trip they wetted another part of her skin.

At length they heard the quack of several small children's voices. Pikaki was in the lead.

"I couldn't get any grown-ups to come!" she shrilled to her brother.

"So I brought some kids along."

"Good!" he called with relief. "Here, everybody—lend us a hand, quick! Poor Wiki's feeling awful. Let's carry her down to the water!"

They gathered round the suffering dolphin.

Up they hoisted her. Wiki winced and fluttered her head from side to side. She gasped—and her eyes were full of alarm and pain. But not once did she bite or even snap.

Over the black lava the group sidled with their large and gentle burden.

Once Pikaki stumbled and fell. But the child picked herself up.

Thank goodness, they had got past the rugged stretch of lava and were on the open beach. But the tide was very far out, and they still had a long way to carry the heavy animal.

Into the Water

"If—if—we can just—get her—to the edge of—of the water we'll be—all right!" puffed Kamuelo.

He felt desperate. It would be heartbreaking if they had to drop her half-way across the beach and she died after all.

At length the coral gravel grew firmer as it neared the water. Not many yards ahead they could see the tongues of the low tide licking out.

"One last pull!" gasped Kamuelo.

Though the children could hardly crawl any farther, they managed to totter the last few feet.

"O.K.!" whispered Kamuelo.

They tried not to jolt the dolphin

as they put her down. The touch of the cool sea on her belly must have felt delicious; she gave a grateful whimper.

"Ah! So far so good," muttered Kamuelo, wiping his brow. "Now the thing to do is to keep wetting her skin while the tide comes in!"

After some minutes Kamuelo looked worried again.

"Look," he said. "The water's getting deep enough to cover her blowhole; in a minute the poor thing won't be able to breathe. But it isn't deep enough yet to let her swim away. If we can't save her she'll just have to lie here and drown!"

"What can we do?" cried Mary.

"I think we'd better just hold her up in the water so she can breathe, until the tide gets deep enough to float her."

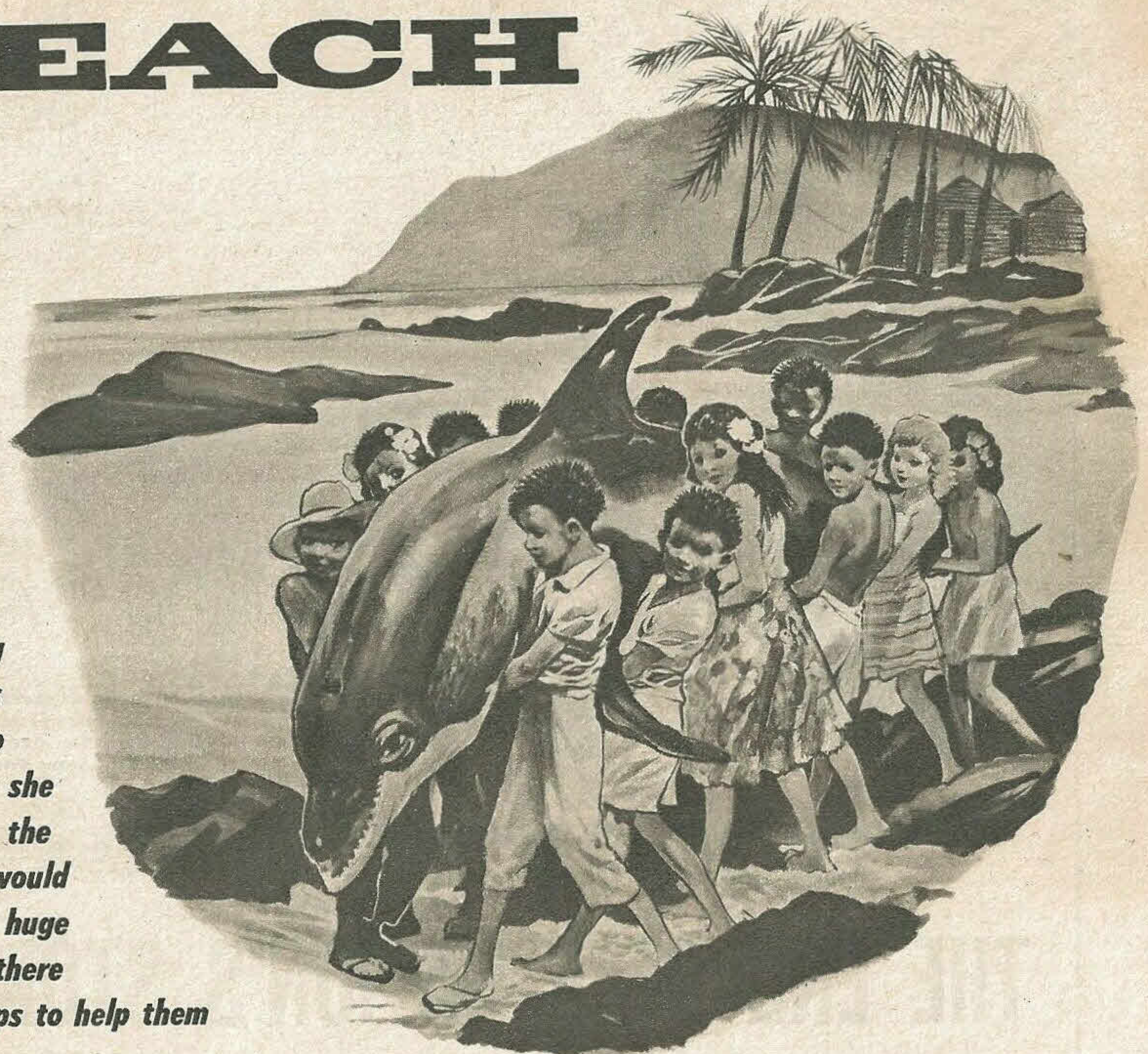
So all the rescuers stopped splashing Wiki's hide and put their hands under her body again. They held her up in the shallow water so that her blowhole could breathe the air.

Now, as the healing waves engulfed Wiki, they were deep enough to buoy her up. Her waning life began to revive. The rescuers could feel a thrill quiver through her flesh.

"Go on, Wiki!" urged Kamuelo.

As if obeying him she began to swim. Her snout disappeared, and she dived into the waves ahead. For a moment they could watch her dorsal fin like a flag above the surface. Then it vanished.

"To-morrow, Wiki," Kamuelo whispered. "To-morrow we'll have another ride."





Before the assembled people of Jerusalem, King Solomon dedicated the new Temple.

THE BOOKS OF THE BIBLE: CHRONICLES I and II
by The Reverend JAMES M. ROE, Look and Learn's Religious Adviser

THE END OF A NATION'S STORY

“CHRONICLE” is no longer a common word, although it used to be part of the title of some well-known newspapers and novels. It comes from a Greek word for “time”; a chronicle is simply a record of a particular time or times.

The first and second Books of Chronicles in the Bible cover much of the period which the earlier books of Samuel and Kings covered, but tell the story in a different way. The writer sometimes quotes long passages from the older books, but in addition mentions other books, such as the Book of Nathan and the Book of Gad (I Chron. 29, verse 29), which have not been preserved as separate writings.

Like the Books of Samuel or the Books of Kings, these two Books are really a single work divided in half. Together with the Book of Ezra and the Book of Nehemiah, they form a collection of three volumes on the history of the people of Judah, the small southern kingdom which was eventually all that remained of the great kingdom established in the reign of David.

The Chronicles were written round about the year 300 B.C., several centuries after the events which they concern. By that time the Temple at Jerusalem had been rebuilt and its worship restored, following the terrible destruction of the city by Nebuchadnezzar in 586 B.C.

Lists of Names

FROM later years the Chronicler looked back and in the complicated accounts of battles, famines, kings, prophets and much else, singled out those parts of the history which impressed him most. These were to do with the Temple, which was the centre of the life of the Hebrew people from the time when they were able to rebuild their shattered city, right down to the

days of its occupation by the Romans, at which time Jesus Christ was born.

Because the first nine chapters consist of practically nothing but lists of names, many people neglect the rest of the Books of Chronicles. The names are the “genealogy” or “family tree” of many of the Hebrew tribes, and particularly those most concerned with the Temple services.

Building the Temple

THE twenty remaining chapters of I Chronicles are all concerned with the reign of David, who appears in a much more favourable light than he does in the second Book of Samuel. There is a great deal about David's preparations for the building of the Temple (chapters 16 and 17; 21 and 22; 28 and 29). The last chapter contains a wonderful prayer in which David asked God to bless Solomon, his son, who became the next king.

Seven chapters of II Chronicles describe the completion of the Temple and its dedication by Solomon. Chapter 9 describes the visit of the Queen of Sheba, and the rest of the book deals briefly with the reign of each king of Judah until the destruction of Jerusalem put a temporary end to the existence of this little nation.

The Chronicles were never considered part of “the Law” or “the Prophets,” but belong to a third section of the Hebrew Bible called “the Writings” which included also the collections of wise sayings and the poetry found in such books as the Proverbs and the Psalms.

**NEXT WEEK:
WHEN WATER TURNED
TO WINE**

INTO BATTLE —Stories of the world's great conflicts

In the heather-covered valley
by the Pass of Killiecrankie
a tall, handsome Scotsman
prepared his Highlanders
for battle. He had made
himself a ruthless name
as “Bloody Claverhouse”
—why then should he fear
an enemy twice as strong?

THE Glorious Revolution men called it, the kind of revolution that, of all the countries in the world, could probably only have happened in England. For in the Glorious Revolution of 1688 not a drop of blood was spilled.

Englishmen in that memorable year finally decided that the short but tempestuous reign of the tyrant King James II must end, and that to prevent further similar tyrannical reigns holding up the development of their progressive country certain powers must in future be taken from the King and certain others must be given to the people.

The first outcome of these decisions was that James, a Catholic, was dethroned and William of Orange, a Protestant, was brought over from Holland and crowned. It was going to be a different England now, Englishmen said; the country was about to enter a new age.

Revolutions, however bloodless, may still breed discontent afterwards, and the Glorious Revolution was no exception.

The Scottish Highlanders were dissatisfied. King James, whom they preferred, had only recently made their warrior leader a peer of Scotland with the title of Viscount Dundee and now, with James forced to flee the throne, the eyes of the Highlanders turned upon the new Viscount, waiting for him to make a move.

Dundee, who was born John Graham of Claverhouse, was an amazingly brave man, a man of unequalled zeal and enthusiasm. In the years before the Glorious Revolution, and before he was made a peer, he had been sent by King James to suppress the Covenanters, those Scotsmen who were determined to stand by the traditional Presbyterian system of Church government and church doctrine in their own country. Graham had done his job with ruthless success—so ruthless, in fact, that in the Lowlands they still referred to him for years afterwards as “the bloody Claverhouse.”

A strong man, then, was Viscount Dundee, but even his strength was not enough to fire all of Scotland, and when the bloodless revolution came some of the Highland chiefs decided to side with the new look in England while others voted to sit back and see how things went before they took sides. So, with enemies both in England and in Scotland, Dundee had to retire to the Highlands, into countryside that he knew better than anyone, and where his opponents would not dare to follow him.

The situation, then, in the early months of 1689, saw Dundee wandering in Scotland's most desolate country, gathering a small band of

KILLIECRANKIE

—the tartan triumph



Into the valley of the River Garry came the Lowland army of General MacKay—to find itself face to face with lines of Highlanders drawn up ready for battle.

faithful followers and determined soon to fight to restore King James to the throne. Among his men were the Macdonalds, the Clanranalds, the Gengarrys, the Macleans and the Lochiels. In all there were about two thousand of them, but what they lacked in numbers they made up for in courage, for they were all valiant, chivalrous Scotsmen and some of the finest fighting men the world has ever produced.

What a sight they must have made, this gallant, kilted band, speaking to each other in Gaelic, singing the Highland songs of their forefathers, led by the handsome Dundee in his buff-coloured coat—and undaunted by the news that Lieutenant-General Hugh MacKay, commander-in-chief of the Scottish forces, was marching against them with an army nearly three times their number!

Sheer Drop

PICTURE, now, the Pass of Killiecrankie, fifteen miles north of the town of Dunkeld, where the towering grey mountains of Atholl rise with breathtaking suddenness on both sides of the valley of the River Garry. Here there was a path, wide enough for two men only, running along the precipitous mountainside. On one side of the path was a sheer drop to the foaming river; on the other, the sheer ascent of the mountain. In this valley on July 27, 1689, Dundee halted his Highlanders to await the arrival of General MacKay and his army of Lowlanders and Englishmen.

Over now to MacKay, toiling with his men up the Pass of Killiecrankie—a long, slow-moving line making its way cautiously over loose rock along the narrow path. By the time MacKay's army came through to the other side of the pass they, too, found themselves in the narrow valley of

the Garry river, almost face to face with the enemy they had come to seek. Suddenly it must have seemed to them that the whole valley was filled with clansmen, and as tartans fluttered in the breeze and the sun glinted on swords, there was a scurry to take up battle positions.

MacKay, surveying the lines of hostile Highlanders, pointed out the Camerons to Captain Lochiel, of the Scots Fusiliers, at his side.

“There is your father and his band of wild savages,” MacKay sneered. “How would you like to be with him now?”

“You be well prepared,” replied the captain archly, no doubt surprised to hear MacKay, a born Highlander himself, speak thus about his own countrymen. “Before nightfall, my father and those ‘wild savages’ may be nearer than is comfortable for any of us.”

MacKay was expecting unusual battle tactics. The Highlanders knew and cared nothing about all the finer points of war in which British officers like himself were so well versed. He knew therefore that if he made a tactical move the last thing he could expect from his enemy was the obvious tactical answer to it. Nor did he expect any real cohesion from the enemy, for they were clansmen born and bred, and they were expected to fight only with their own clan.

The Highlanders opened the battle. They charged to within fifty yards of MacKay's Lowlanders, fired a volley, then, with a fierce shout, closed in on their enemy with their terrible dirks.

The Lowlanders parried with a volley at the charge that dropped many of the clansmen as they ran forward. So it went like this, with volley after volley being fired from both sides, and charge after charge from the Highlanders, until at the end of the afternoon the valley of the Garry was thick with musket smoke and the air

heavy with the stench of powder and the cries of the wounded.

Then, as the sun began to set, a dramatic tragedy and a dramatic triumph came to the battered Highlanders all in the same few minutes after Dundee had given the signal for the final charge. Once more the Highlanders advanced; then, when they were again only fifty yards from the enemy, they fired a volley, threw aside their muskets and, dirks drawn, rushed MacKay's army amid the smoke and pother.

The tragedy came an instant before the charge, when there had been a moment's hesitation from Dundee's tiny band of cavalrymen. The viscount turned in his stirrups and raised his sword to indicate the direction of the attack and to encourage his men. Just then a shot struck him under the arm and he fell. His horse reared, the charge began, and the mortally wounded Dundee lay on the ground in the arms of one of his officers. Within minutes he was dead.

Meanwhile the triumphant Highland charge had completely overrun MacKay's army. Striking out with swords and dirks the Highlanders tore great gaps in the Lowland ranks. The Macleans cut MacKay's left flank to pieces; another MacKay battalion threw away their muskets in horror and fled before the assault. MacKay's brother was killed outright, while MacKay's nephew retreated, fighting desperately, despite eight severe sword wounds.

Most of MacKay's survivors decided that any further fighting was useless, and with shrieks of terror they turned about and fled, their red coats flying, pursued by the cheering, shouting Highlanders.

General MacKay, gaining a small hill, looked down on the battlefield of slaughter and saw that except for the English regiment and a few Scots who were continuing to fire on the Highlanders, the rest of his army had disappeared. Turning his horse he collected the remnants of his men and led them across the Garry.

Flight in Darkness

NOW MacKay was in a dilemma. He knew that the victorious Highlanders would be blocking his route through the pass and not knowing that Dundee was dead, he assumed that the viscount would order the Highlanders to pursue and annihilate his army. There was only one thing for it: under cover of the darkness he led his battered band across the Highland wilderness. When he finally reached Stirling MacKay commanded a mere four hundred men.

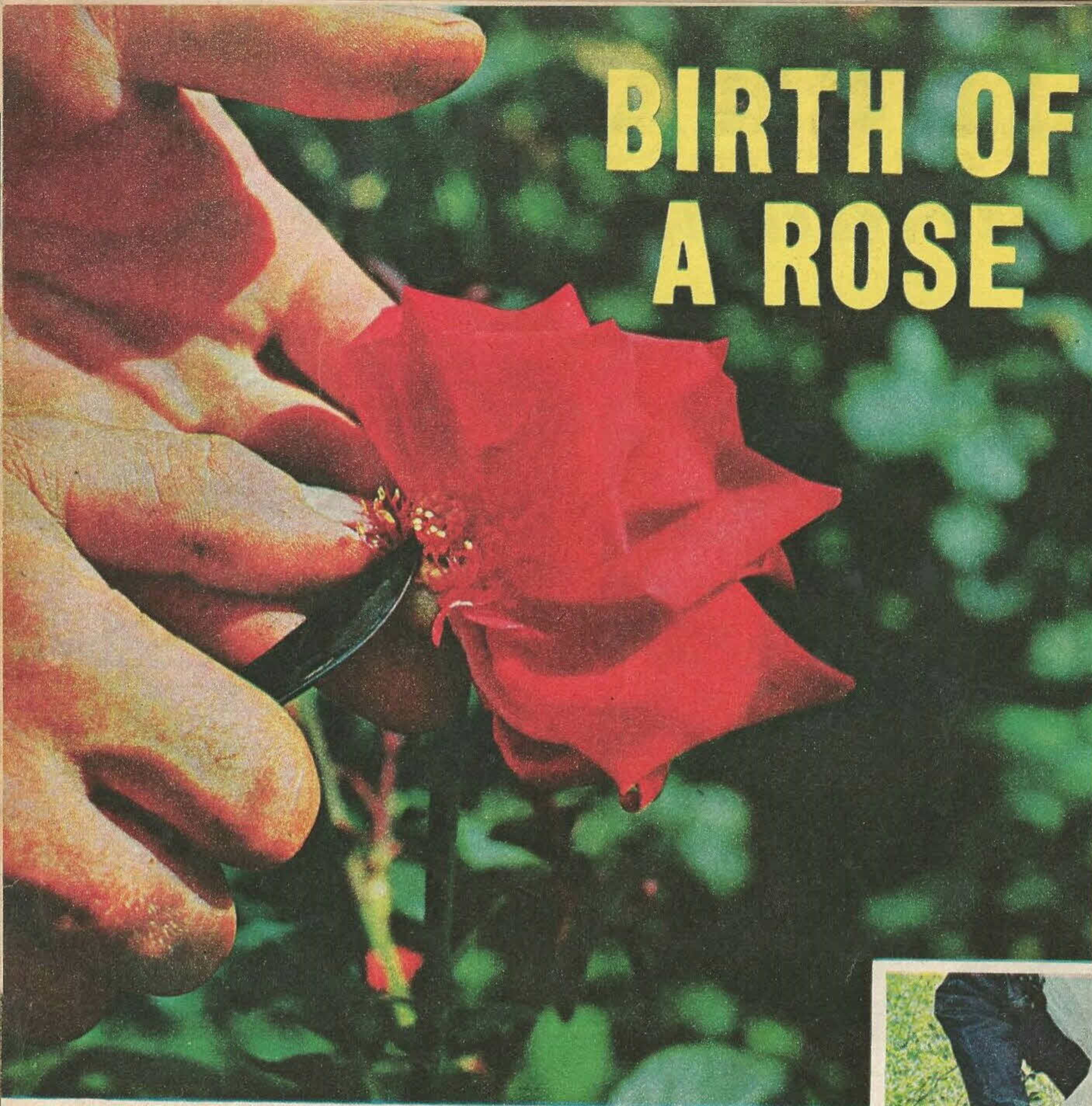
He had lost nearly everything he had set out with. Two thousand men were dead, five hundred prisoners. The rest, apart from the four hundred, slowly made their way back to their army headquarters. Behind them on the battlefield the heather-covered land from the river Garry to the Pass of Killiecrankie was choked with the cut and mutilated dead: men who had given their lives for the doubtful honour of deciding which of two Kings should reign in England.

Half an hour after they had won the battle the Highlanders took the body of their leader wrapped in tartan to Blair Castle. They buried him in a church at Old Blair, and with him was buried much of the cause for which he had fought.

For those in Scotland who sided with the aims of the Glorious Revolution the death of Dundee more than counterbalanced the triumph of his army at Killiecrankie. For Dundee alone was the only man who could unite the turbulent clansmen, and with his death the rebel Highlanders could no longer endanger King William and his government in London.

BIRTH OF A ROSE

OUR COLOUR CAMERA
IN NORTHERN IRELAND



One of the most delicate tasks in breeding roses is the hybridizing, or crossing. After the hybridizer has decided on the roses he is going to cross, he removes the stamens from the "mother" rose (left) and dusts pollen from the "father" rose on to it (above). Parentage of crossed roses is most important.

THE men who breed roses are a race apart—you could almost count them on the fingers of two hands. They are all after one thing—the perfect rose. Each man's views on this may differ in detail, but basically the perfect rose will be one which keeps a magnificent colour for a very long time, and which grows well.

It is not as simple as it sounds, for roses must be bred for their colour, scent, foliage, ability to resist disease, the manner in which they grow, the even distribution of flowers on the plant, and the number of times the rose will flower.

Throughout the world a handful of men experiment endlessly to produce new roses for sale to the growers, who in turn sell to the public.

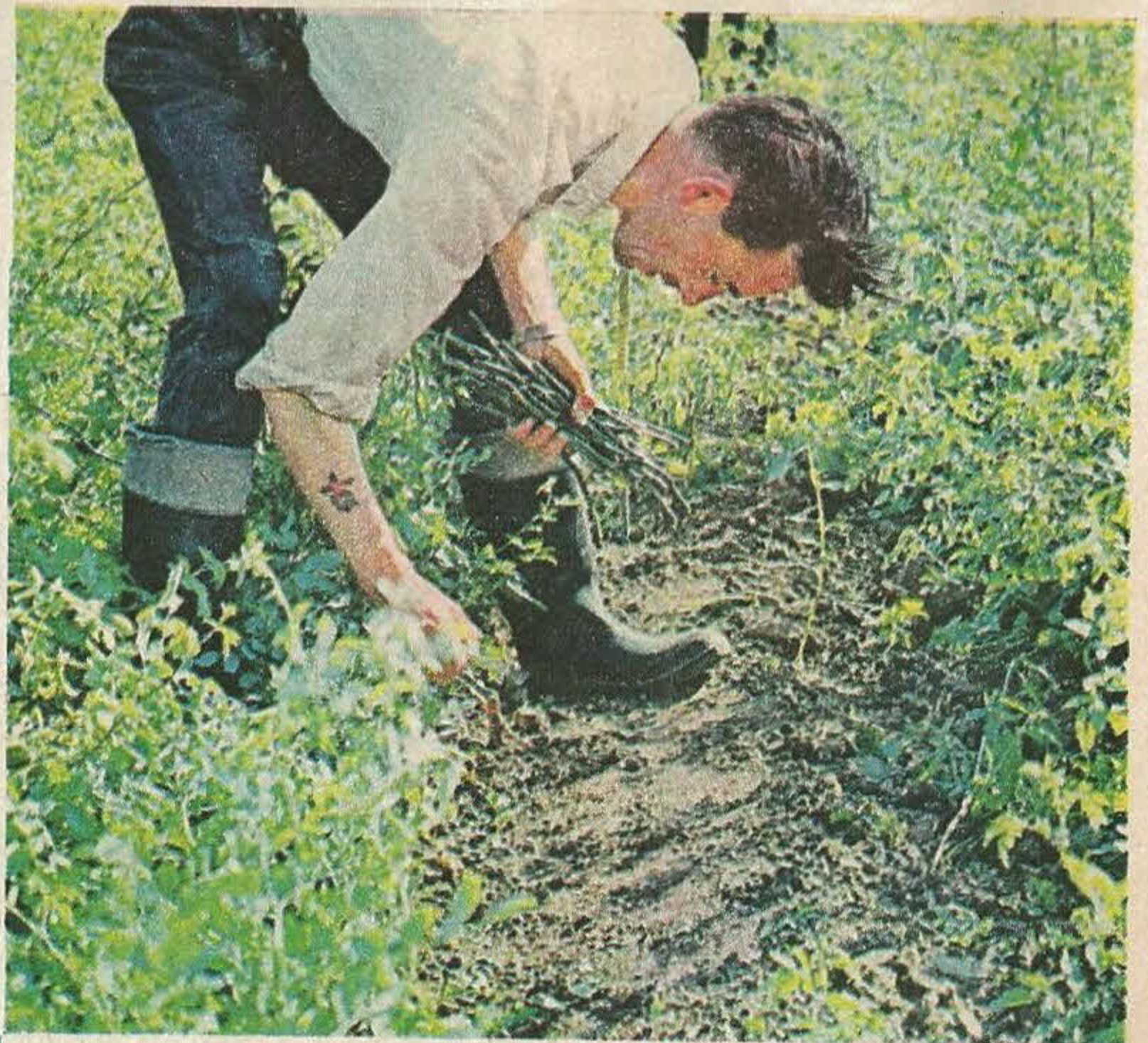
This is big business—a breeder may grow a quarter of a million seedlings in order to produce perhaps three new roses which are commercially acceptable.

Dicksons of Hawlmark in Northern Ireland do actually breed new roses, and on this page you can see how they go about making your garden brighter.



In the Autumn the resulting seeds (left) are harvested, and in December they are brought into warmer air, and are sown the first Monday in January.

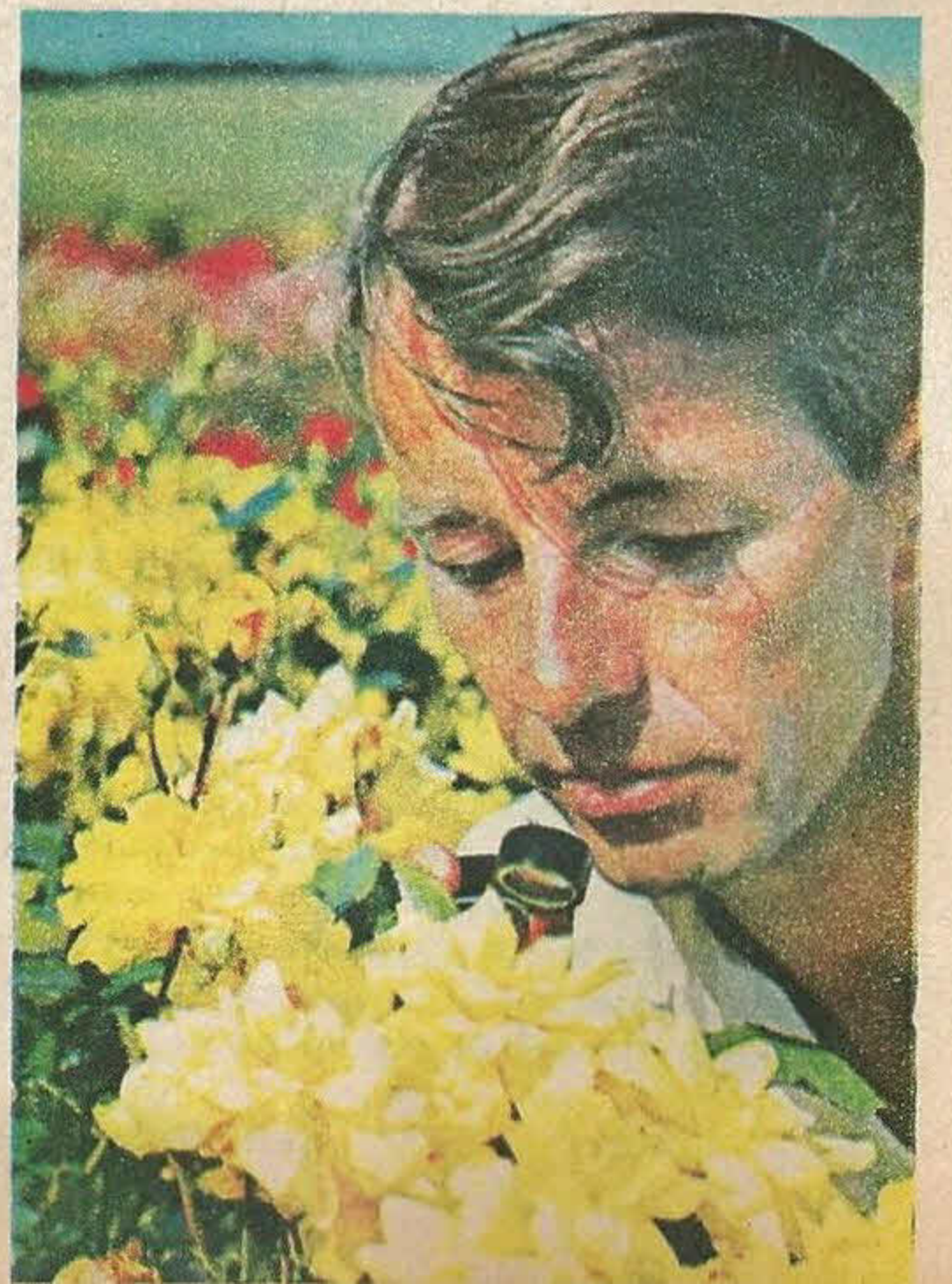
The seedlings grow, and buds from the likely-looking ones are transferred to the fields. A bud is taken from the seedling and placed in a cut in the root of a briar rose (right).



The bud grows, taking nourishment from the "understock" (the root to which it has been transferred). New plants are chosen or rejected, and the good ones are grown in quantity. Spraying (left) keeps down disease.



If a new rose passes all tests it is offered for sale to rose growers throughout the world. Here Pat Dickson examines a new rose through a magnifying glass for signs of disease.

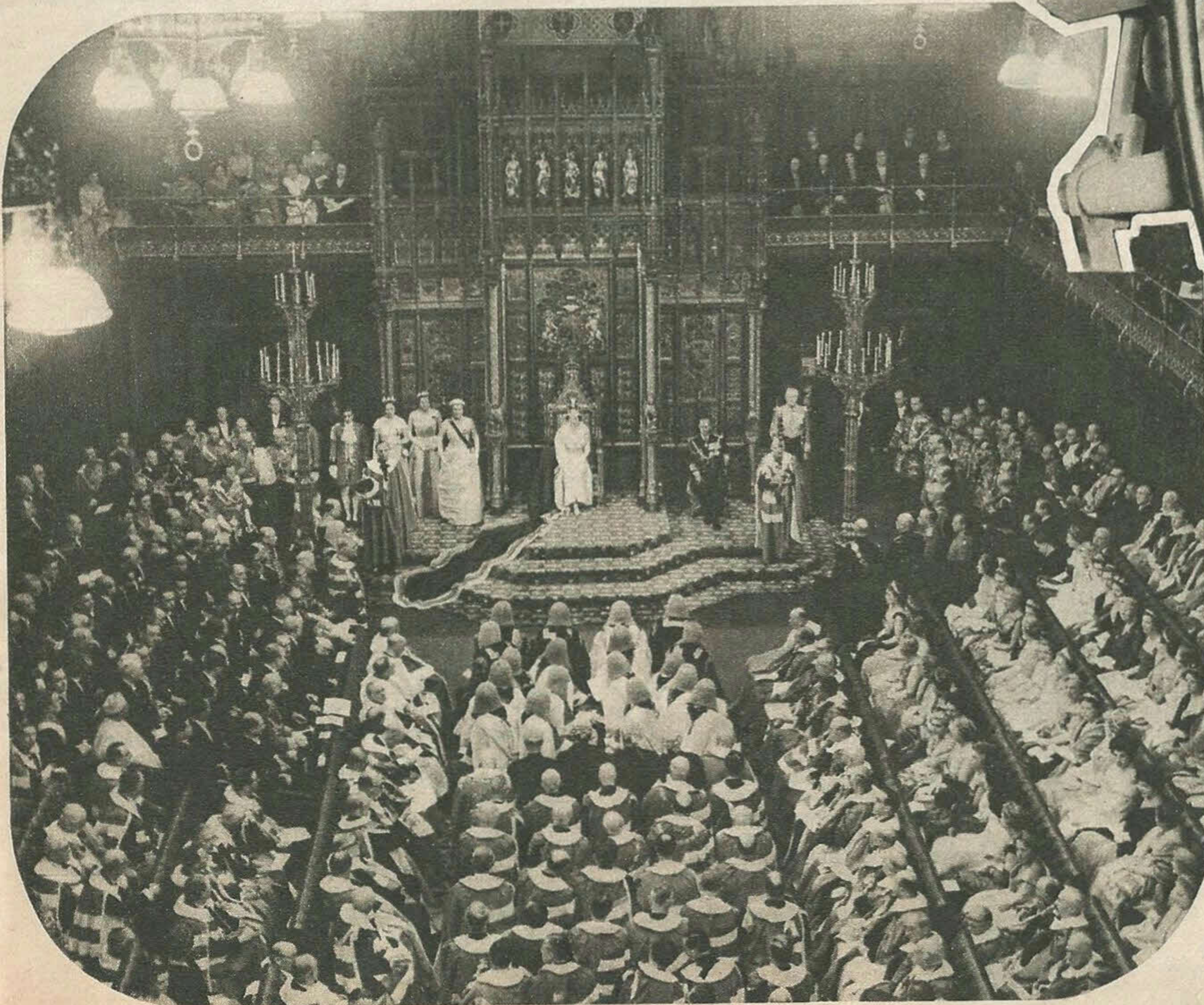


LOOK AND LEARN



FOCUS on TELEVISION'S WONDERFUL STORY

Britain can be proud of the fact that in 1936 she began the world's first public television service. Today we are part of a vast world network and there is no place on Earth which cannot be brought direct to our screens. Here is how it all began, how it developed—and why television can look forward to an exciting future



The televising of the Coronation ten years ago was a landmark in TV, and on the left is another great occasion—the opening of Parliament by the Queen in 1958, which was seen in millions of homes, when it was televised direct for the first time.

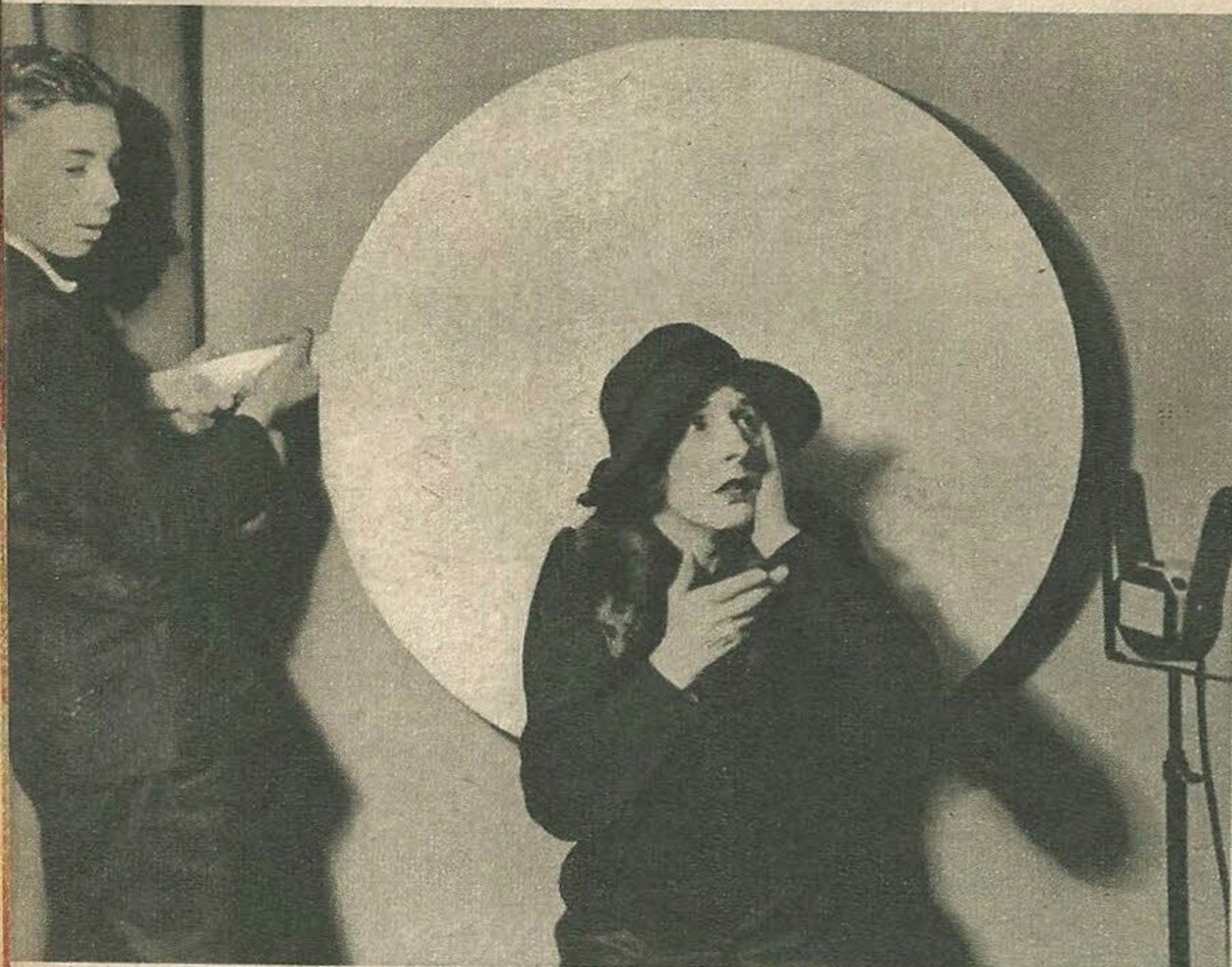
WHAT could a man build with an old tea chest, a biscuit box, the lenses of old bicycle lamps, electric motors due for the scrap heap, two old hat boxes, lengths of wire and other assorted odds and ends?

The people of Hastings, where these purchases were made in the early 1920s, did not know and certainly would never have guessed that it was the raw material for the world's first practical television transmitter—and that the tousle-haired spectacled young man who bought them was to become famous as John Logie Baird, TV pioneer.

Baird was a sick man—he had come to Hastings for his health—and he was poor. But he was determined to achieve vision by wireless.

Others before him had established some

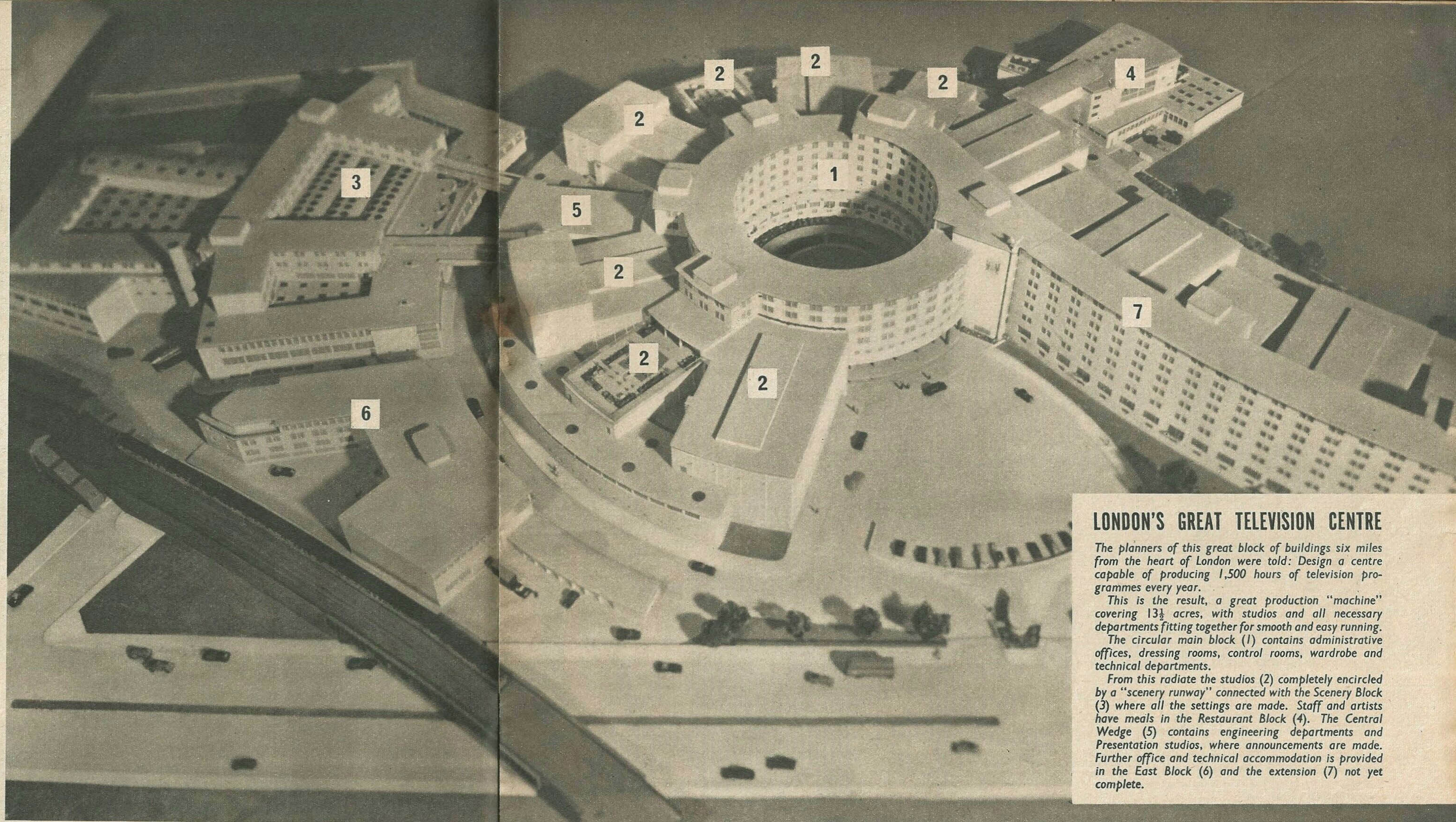
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Above: There is history in this 1928 picture. It shows Gladys Young in the world's first TV play. The boy holding the disc is George Innes, now famous as producer of the Black and White Minstrels.



Specially useful in outside TV broadcasts is this one-man TV station. The camera is a midget, and a complete transmitter and aerial are strapped to cameraman's back.



LONDON'S GREAT TELEVISION CENTRE

The planners of this great block of buildings six miles from the heart of London were told: Design a centre capable of producing 1,500 hours of television programmes every year.

This is the result, a great production "machine" covering 13½ acres, with studios and all necessary departments fitting together for smooth and easy running.

The circular main block (1) contains administrative offices, dressing rooms, control rooms, wardrobe and technical departments.

From this radiate the studios (2) completely encircled by a "scenery runway" connected with the Scenery Block (3) where all the settings are made. Staff and artists have meals in the Restaurant Block (4). The Central Wedge (5) contains engineering departments and Presentation studios, where announcements are made. Further office and technical accommodation is provided in the East Block (6) and the extension (7) not yet complete.

FOCUS ON TELEVISION'S WONDERFUL STORY

Continued from Page One

of the basic principles; he would put them into practice.

How do you send a picture through the air? You send it, strip by strip, in the form of radio signals, and at the other end you have a receiver which can take those signals and, again strip by strip, turn them into a picture again.

In 1884 a German scientist, Dr. Paul Nipkow invented a disc which was capable of "scanning" a picture. The disc had a number of holes in it arranged in the form of a spiral around its central hole, and as each hole passed an oblong scanning frame it took a different "path." When all the holes had passed the frame, the area, line by line, had been completely "scanned."

It is not to be supposed that John Logie Baird, carrying his load of junk to a tiny attic room, was able to put this principle into practice right away. Weeks of struggle produced, but dimly, the outline of a Maltese cross. When he moved to London's Soho he still had not succeeded in transmitting a recognizable human face.

Then, in October 1925, came the breakthrough. Day after day the face of an old wooden ventriloquist's dummy had stared with fixed gaze into the transmitter, but the receiver showed nothing at all. Then suddenly there it was—the face, in light and shade.

Baird excitedly ran to the floor below occupied by offices and bribed the office boy, William Taynton, to sit in front of the trans-

mitter. Baird dashed to the receiver, looked—and saw nothing! It was not failure, though—the boy had become scared by the bright lights and backed away. Reassured, he took his place again and on that October day in London, the face of William Taynton became the first human face ever to be seen by television.

Success? Not of the kind which you would imagine to follow such an achievement. There was no great rush to help John Baird along his lonely road of experiment.

Forgotten Chapter

THE great store of Selfridge encouraged him to show his apparatus to the public in January of the next year, and the press reported that television had undoubtedly arrived. From then on it made the headlines—but what were the basic facts? An image, recognizable as a human face (and sometimes even identified) was transmitted—so what? Even when, in 1928, Baird actually succeeded in transmitting live television to New York (yes, nearly forty years before Telstar!) the results were crude.

But people began asking how improvements could be brought about unless Baird was given official support. What was the B.B.C. going to do about it? They had been broadcasting sound radio for something like six years. Television was bound to come. Why not use their transmitters for the purpose outside ordinary

programme hours and give the public a chance to see for itself what had been achieved?

This was an unhappy chapter, for the technicians of the B.B.C. felt that when a practical television system was perfected, Baird's system would not be the one.

Nevertheless, the Postmaster General, who controls broadcasting in all its forms, decided that the B.B.C. would transmit television.

Thus began what has been called The Forgotten Chapter in the history of British television.

For something like eight years, from 1928 to 1936, regular programmes of TV were sent out from the heart of London. In the studio famous stars of stage and screen submitted to a frightening make-up process which made them look hideous, but at least it ensured that something of their features would be seen.

Seen by whom? Viewers at home, a few thousand people, who had paid £25 or so (quite a lot of money in those days) for a receiver called a Televisor. The picture was no larger than a postcard, it had a strange orange tone, and the detail was only a mere shadow of what we achieve today.

Over the years it did not improve—much. It could not improve. The B.B.C. engineers were right; this was not the system, this mechanical spinning of discs. But how could better detail be achieved?

Scientists began looking at the human eye

and wondering if they could imitate it electronically. The surface of the retina of the eye, on which images are focused by the eye's lens, is made up of a vast number of tiny light-sensitive rods. Each of these rods has its own tiny nerve fibre connected to the main optic nerve, which is like a cable made up of thousands of individual fibres.

When the lens of the eye focuses an image on the retina, each of the rods records a "picture element." Through the tiny fibres of the optic nerve the thousands of picture elements are conveyed simultaneously to the brain, which builds up a complete image from the multitude of separate images.

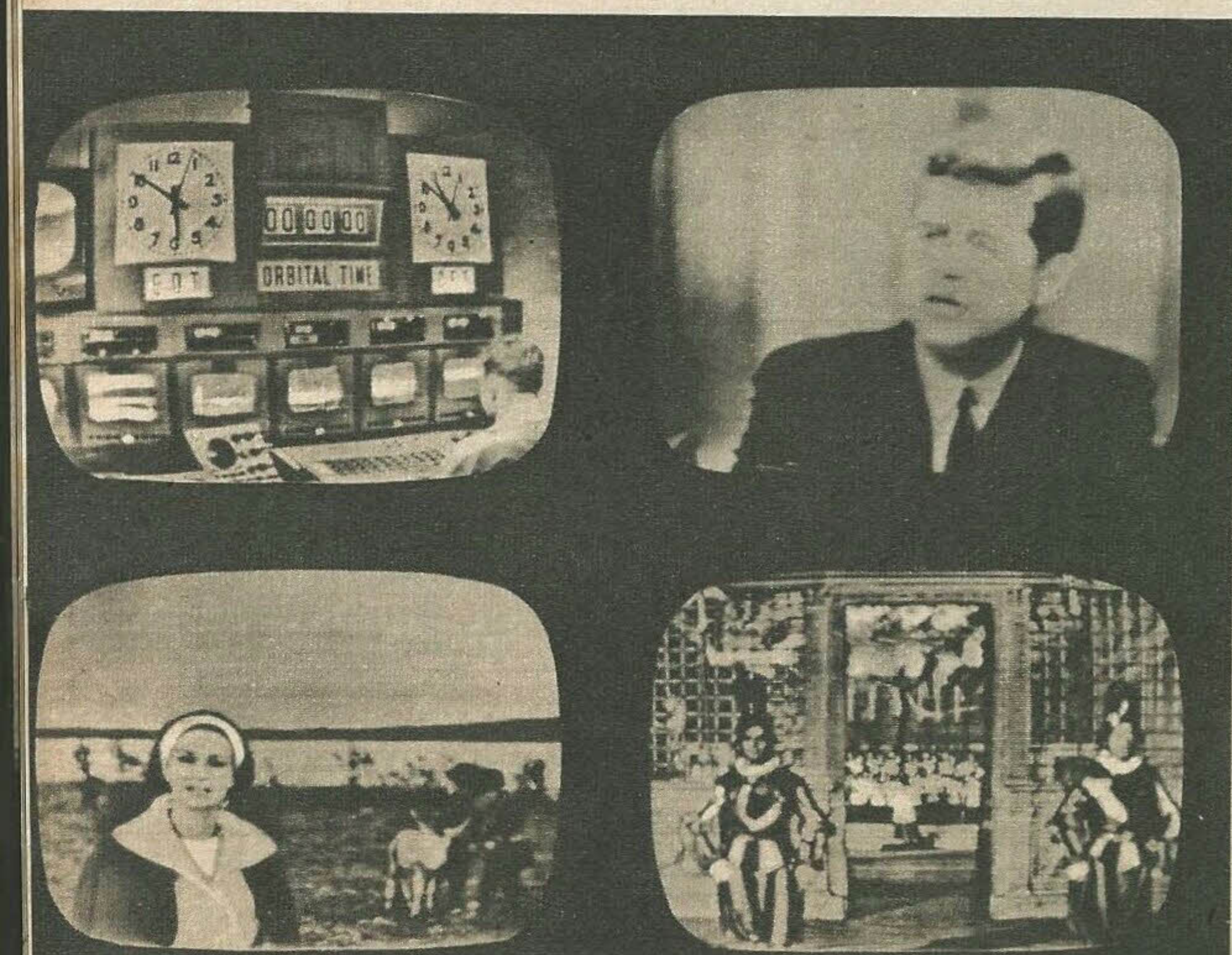
Breakthrough

How could this be copied electronically so that, in effect, the TV camera became the retina of the eye, the TV transmitter became the optic nerve, and the receiver in the home became the "brain" which saw the complete picture?

The first breakthrough was achieved with a metal called caesium, which shoots off particles of electricity when light shines on it. Tiny globules of this metal, combined with silver and coated on to a plate, became the imitation retina. Inserted in a TV camera, with the lens focused on it, each particle became charged with

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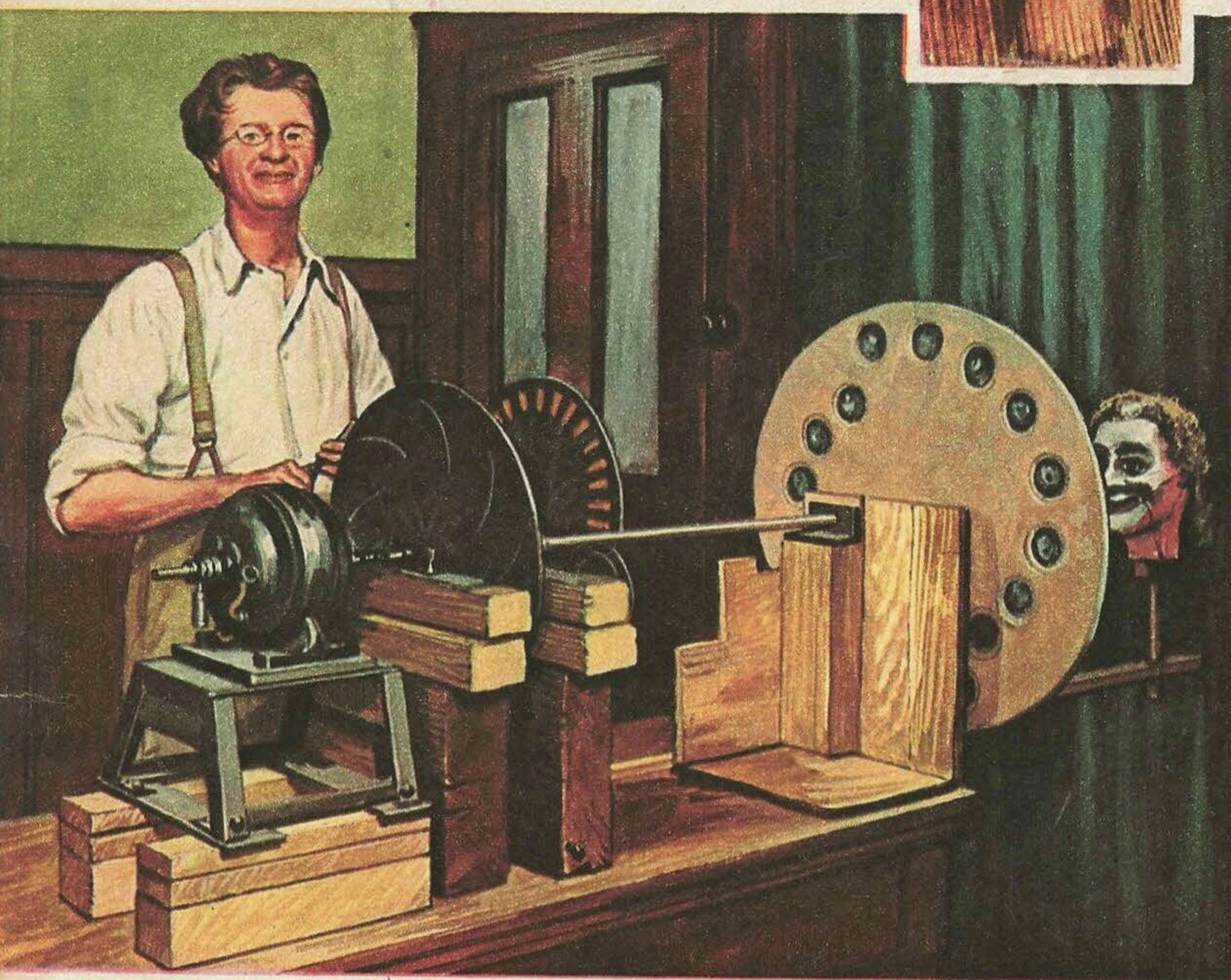
PAGE THREE



The Telstar satellite enables TV to cover an enormous range. Here you see (top left) the receiving station at Goonhilly Down, Cornwall, and pictures picked up direct from Washington, Sweden and Rome.

LOOK AND LEARN

FOCUS on TELEVISION



IN the picture above is triumph—and tragedy. **TRIUMPH** because it shows John Logie Baird, working in a tiny room in London in the early twenties, transmitting the first face ever seen by television—the head of an old ventriloquist's doll.

TRAGEDY because Baird worked hard and long, to the detriment of his health, on the wrong road of development. His system was *mechanical*. Both in transmission and reception it depended on moving parts, and even if improved upon could never hope to produce the high-definition picture we watch today. His first transmitted picture, seen at the top of the page, was made up of only 30 lines. Today we have 405 lines—and next year the B.B.C. will be transmitting on 625.

You will read the full story of development in this supplement—how the road to high-definition TV was opened when electronics swept aside all the earlier struggles with mechanical systems.

Continuous Movement

HOW far we have come since the first flickering image of forty years ago you can tell for yourself when watching at home, and in the illustration on the right we take you into one of the world's largest television studios, belonging to A.B.C. TV at Teddington, just outside London.

A television play, whether it is sent "live" to your home or recorded on tape for transmission later, is produced in non-stop action—unlike a cinema film, which is made in short "takes" and afterwards joined together.

Our illustration shows only one end of the studio, which in a big production is occupied entirely with different settings where scenes from the play can be staged.

The "nerve centre" of the studio is the control

gallery, and in rooms numbered 1 and 2 the play is produced and controlled. Monitor screens show what each camera below is "seeing" and these are selected one by one for transmission as the action proceeds. The sound is also controlled there. Room No. 3 is the Viewing Room, where the final result can be seen and heard. At position 4 is the lighting control engineer.

Down on the studio floor the cameras (5) are in various positions as required by the producer, and you will notice that there are different types. Some cameras work entirely at floor level, but others can be raised with a crane-like action to give a high-angle view of the scene. Each camera has a red light at the top, which lights up when that particular camera is actually transmitting a picture.

Press-button Control

THE microphones (6) are swung out on long "booms" so that they can be brought close to the actors as they speak.

The lighting units (7) are of various types, lowered by press-button control from the roof.

The floor managers (8) linked by headphones to the control room supervise the action.

Where a scenic background is needed, this is often "back projected" by a lantern on to a white screen from behind, and a typical example is shown at (9).

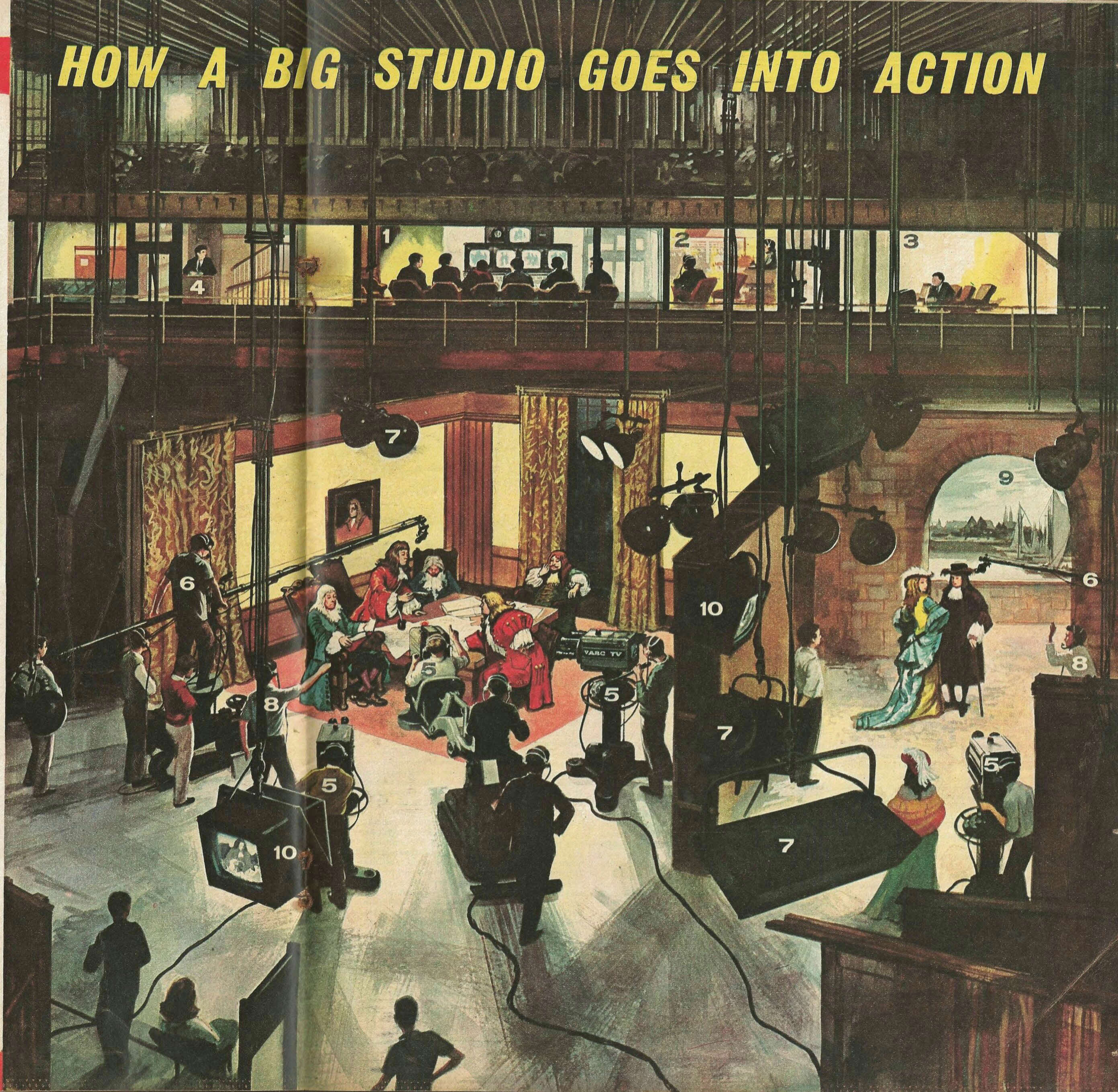
So that everyone in the studio can see the picture which is being transmitted, monitor screens (10) are placed at various points.

In our picture the scene at the table is being televised. When it is finished, the scene on the right, using a single camera, will begin at a signal from the floor manager.

The cameras and microphones in the first scene will then move quietly to another scene in a different part of the studio.

For the sake of clarity we show a rather simplified version of studio operation. There is actually a great mass of equipment available, and the total production staff handling scenery, properties and make-up is very large.

HOW A BIG STUDIO GOES INTO ACTION



FOCUS

on TELEVISION'S WONDERFUL STORY

Continued from Page Seven

not give very good picture quality, and the cinema-type film used had to be processed, developed and printed in the ordinary way. It also took time and money.

But a startling new idea was on the way. This was tele-recording on magnetic tape by electrical means, in other words the tape recording of picture and sound in the same way as we now tape-record speech and music on home sets.

Magnetic tape recording is a wonderful new weapon for TV. It can be played back immediately and the tapes can be "wiped off" and used again, or stored for future use. Plays and variety shows can be taped ahead when the stars are available. From the actor's or performer's point of view tape is a boon because a TV show is produced not like a film in disconnected bits and pieces, so to speak, but right through from start to finish like a theatre play, or a "live" show, so that the actor is at full tension all the time and giving a better performance.

New Channels

IN 1955 came the next revolutionary step in TV. Commercial TV arrived—paid for by the income from advertisements shown at intervals throughout the programmes.

Now began one of the most hectic, exciting and interesting periods in British TV history. Commercial TV could rightly claim that it sprang into being "in nine months from drawing board to first programmes."

Today fifteen programme companies serve twenty-two I.T.A. transmitters which bring 97 per cent of the homes of Britain in range of ITV. Additionally there is Independent Television News Ltd., a news gathering organization which serves the whole network and, starting from scratch seven years ago, has brilliantly challenged the mighty and experienced TV and radio news division of the B.B.C.

The fifteen programme companies provide a total of 187 hours of separate programmes each week. There is a networking arrangement, of



Sound and vision from outside broadcasts is usually sent by special Post Office cables to the transmitter, but a "radio link" can also be used. This is a typical "dish" aerial used to relay programmes. The operator turns it in the required direction.



course, whereby the companies, mainly the four major ones, supply programmes to each other and nationally for the whole I.T.A. network.

Today there are 12,500,000 TV licences in Britain. The audience is enormous. On an average day, according to B.B.C. research figures, more than 35 million people see some TV.

And now once again television in Britain is facing a big change.

As we have seen earlier, British television is on the 405 line scanning system, but in many other countries of the world they use the 625 line system, which has advantages in giving a better picture. As TV sweeps round the world and international hook-ups, even apart from Telstar or satellite relay, become more common, the use of 625 would help Britain, not only in world communication but in the export of TV sets and equipment by the electronic industry.

After years of discussion it has been decided that British TV will go over to the 625 line system. This obviously is a major step. The transmitting stations, the studio equipment, recording systems—and all our home sets, will have to be converted.

Next comes the opening up of second channels for both the B.B.C. and I.T.A. This will mean that home sets would ultimately have four channels to choose from every night. These second channels will be linked with the 625 line conversion plan. The new B.B.C. channel, to be called B.B.C.2 will go out on 625 lines next April. I.T.A. will follow later. Again, it will

begin in London and gradually spread through the regions.

Then comes the biggest question of all—colour TV. For ten years the B.B.C. has been working on colour test transmissions, and much has been learned.

America has a regular colour TV service with about 750,000 sets in use. Japan has a fine regular service. European countries on 625 lines can and probably will start colour soon. But it looks likely that three or more years will go by before we have any colour TV regularly in this country.

The next year or two are going to be interesting and fateful for TV in Britain. With 112 million TV sets in use round the world, in Europe, Russia, Africa, China, Japan, India, Australia, New Zealand, the United States, Canada, the West Indies, Latin America—the TV world is shrinking fast. But British TV is determined to have a big place in it.

◀ When the weather is bad, spare a thought for the Rigger, the man who must be prepared to climb to the top of a high television mast in order to keep the programmes going.

▶ Symbol of the new "BBC 2" programmes beginning next year and transmitted on 625 lines (instead of the present 405) are these cartoon figures of a mother and baby kangaroo.



Picasso, the famous Spanish artist, made many paintings of the popular pantomime character, and one of the finest shows his son Paul in the traditional diamond-patterned costume

THE LITTLE HARLEQUIN



THE Spanish artist Pablo Picasso is the greatest painter of our time; indeed, one of the world's greatest ever painters. He loves the company of children, and enjoys fancy dress and festive occasions.

All these interests come together in this painting of his young son Paul, made in 1924 when the boy was three years old. Paul is dressed as a harlequin, or clown.

During his lifetime Picasso has painted in several "schools," or styles, of art. The years 1901-4 are called his "blue" period, in which he painted harlequins, dancers and pierrots, as well as other pictures, with blue as the dominant colour. He also painted self-portraits of himself as Harlequin.

Colour and Shape

AFTER the "blue" period Picasso moved on to other forms of painting. He became one of the leaders of the "Cubist" school, whose painters paid great attention to colour and form, but did not paint subjects as the eye saw them.

Then, twenty years later, Picasso painted this picture of Paul in the realistic style of his earlier years. There is nothing "Cubist" here—the picture is clearly Paul as he appeared at that age. And you can see from the costume how colour and pattern appeal to Picasso.

The Artist's Son, 1924, from a Pallas Gallery print size 21 x 15 in. in the collection of the artist. © S.P.A.D.E.M. Paris 1963

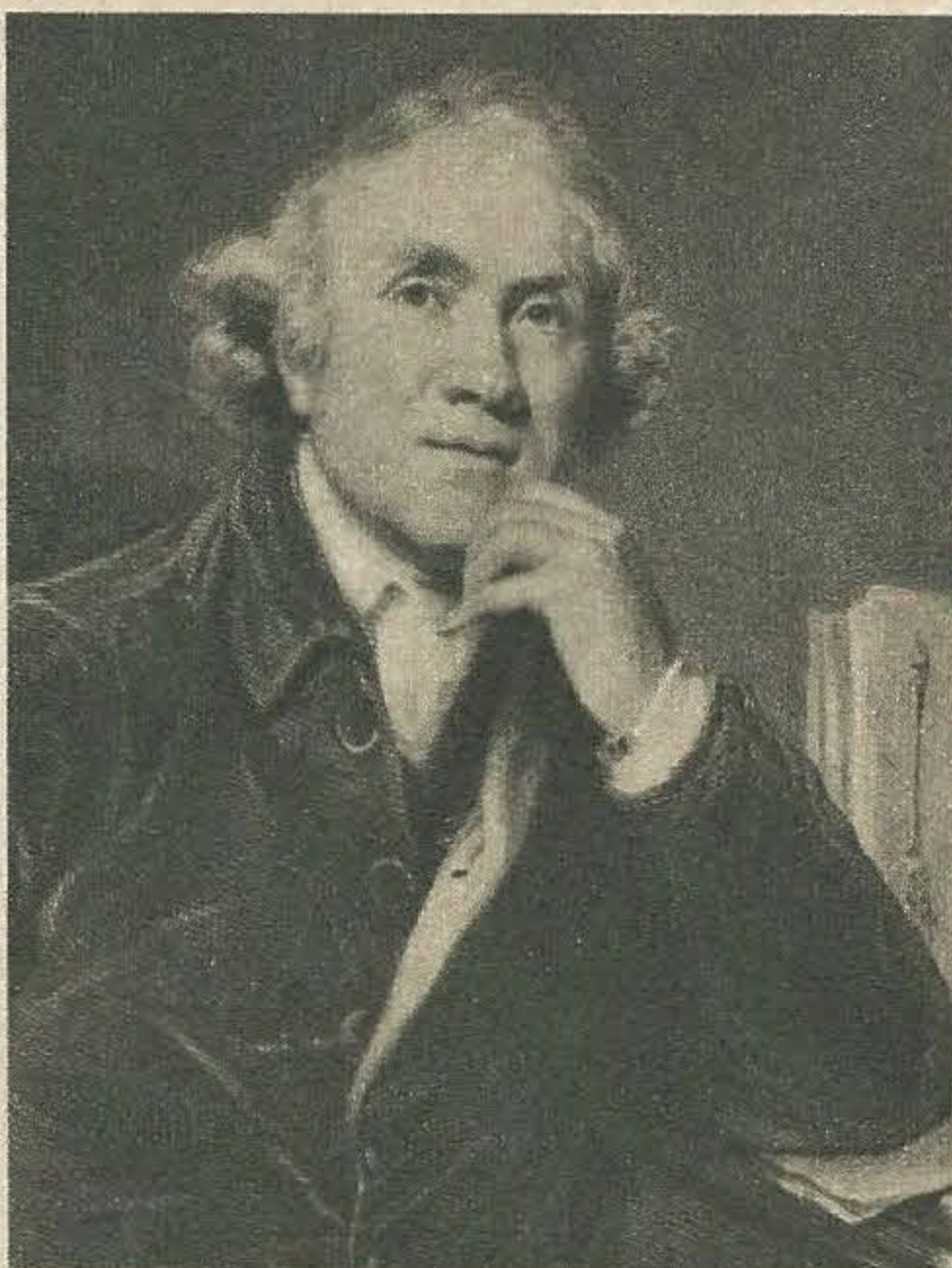


... the first electric railway in Britain was the line that still runs along the beach at Brighton. It was built to a gauge of 2 ft. 8½ ins. by Magnus Volk and opened on August 4, 1883. Brighton is also connected with another railway experiment. In 1881 the London, Brighton and South Coast railway was the first in the world to install electric lighting in trains. This was about twenty years before other companies adopted this lighting system.

HE PUT A COUNTY IN HIS DIARY

... And the diary, written by an unknown country curate, has become a classic of our literature, as well as immortalizing the tiny Welsh county of Radnorshire

Did You Know That...?



... the skeleton of one of the tallest men in the world is in the Royal College of Surgeons' Museum, London. The man was an Irishman, Charles Byrne, who was over eight feet tall. Byrne asked to be buried at sea when he died, but John Hunter (above), an eminent surgeon and anatomist, managed to buy the giant's corpse for £500 and preserve the skeleton. Hunter, who died in 1793 and is buried in Westminster Abbey, revolutionized surgery. A medical society was founded in 1819 to honour his work.

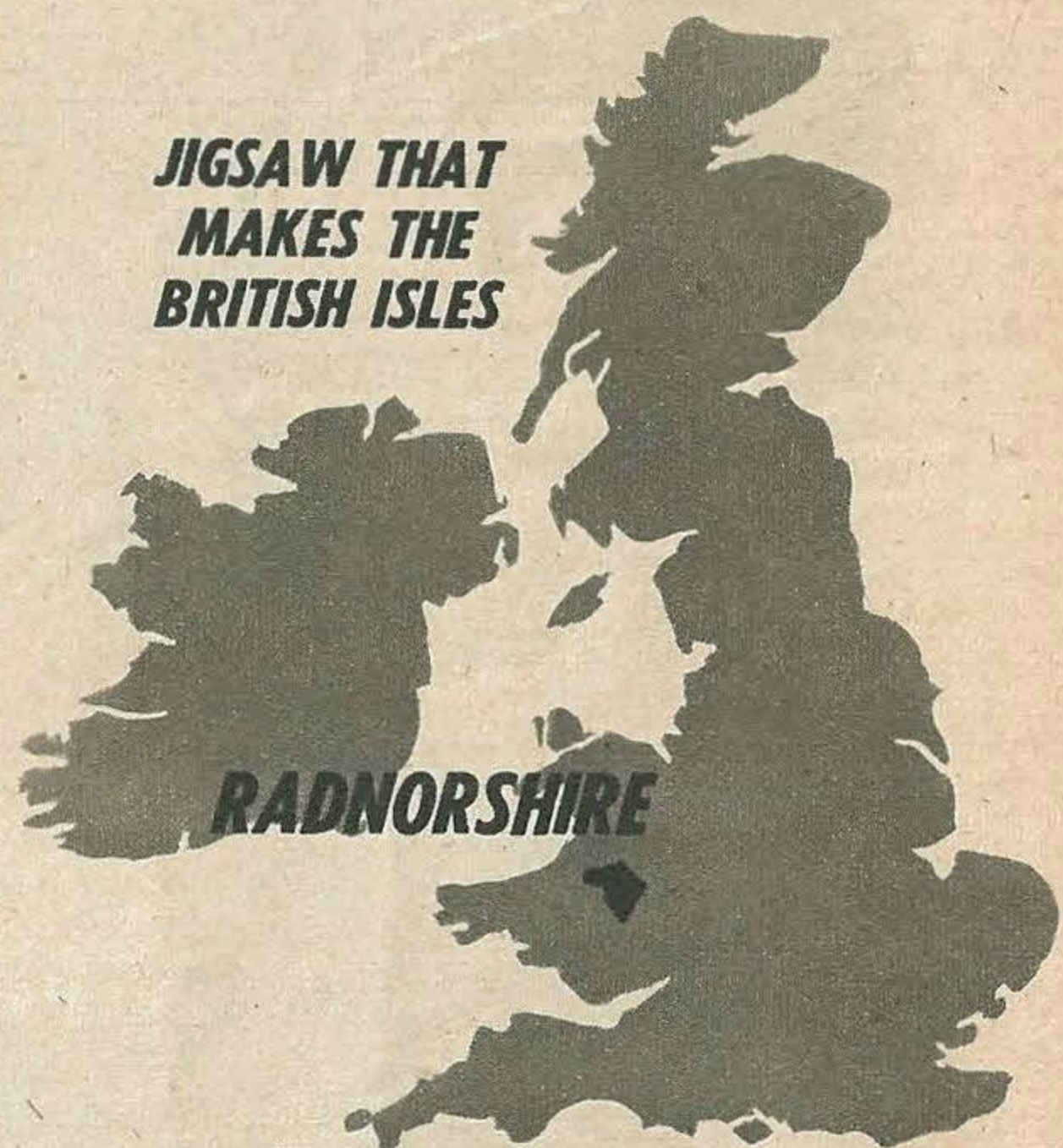


... in North America there is a small rat that can live its whole life without drinking. This is the kangaroo rat, found in deserts and plains. It gets its liquid by feeding on plants like cacti which themselves store water. The rat can store food such as grass seeds in its fur-lined cheek pouches.



◀ WHO IS THIS? See page 27

... there is a fish that walks. Called the mud skipper, this strange-looking creature gets its name from its ability to remain out of water for long periods, using its fins as legs to skip across swampy ground at great speed in pursuit of insects. It is one of many species of Goby fish found all over the world. Other varieties live inside shells, or sponges, or even in the gill cavities of larger fish.



JIGSAW THAT MAKES THE BRITISH ISLES

RADNORSHIRE

ON a bitterly cold February evening a young Welsh curate broke the key of his musical box while winding it up. At midnight he came down from bed to try again to turn the broken key barrel with tongs, but the tune remained obstinately hitched upon the spikes.

So he rose early next morning and walked swiftly across the frost-rimed fields to Hay village, where the local watchmaker repaired the precious box. Then he bought some Valentine cards, ordered some cheese, and walked briskly home again.

The curate wrote an account in his diary in 1870 of the whole incident, including his walk across the hills and vales of Radnorshire.

"Coming back the hills were lovely," he penned in neat, close lines in his notebook. "The morning spread upon the mountains, beautiful Clyro rising from the valley and stretching away northwards dotted with white houses and shining gleams of green."

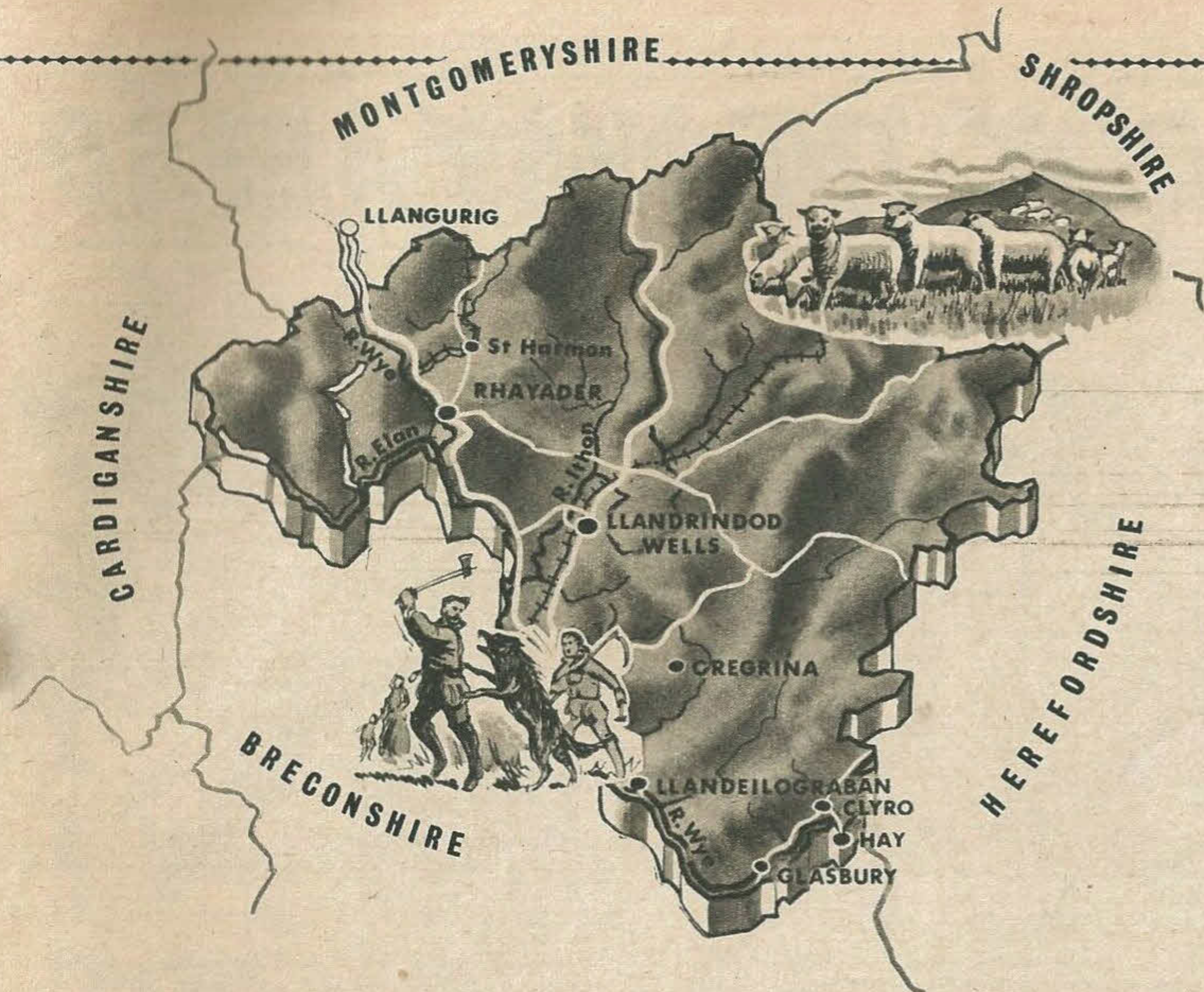
Francis Kilvert was curate of the scattered parish of Clyro in the valley of Marteg, Radnor-

COLLECTORS' CORNER

FIVE KINGS OF GREECE

THE centenary of the present Greek Dynasty has been celebrated by the issue of a set of stamps showing pictures of its five kings who have ruled. George, second son of the King of Denmark, was crowned king in 1863 (centre), and assassinated in 1913. His son Constantine (top left) succeeded him but was deposed by the Allies in 1917 because of his neutrality. Under his son Alexander (bottom left), Greece declared war on Germany, Bulgaria and Turkey. Alexander died in 1920, and Constantine was re-elected. He was replaced by George II (bottom right) in 1922. Paul I (top right) has been king since 1947, when George II died.





Born in 1840, the Reverend Francis Kilvert was curate of Clyro in Radnorshire for seven years. He kept his famous diary for most of the time that he lived at Clyro.

shire. Two days after the trip to Hay, he wrote in his diary on St. Valentine's Eve: "Very few people in church, the weather fearful. Went to Bettws in the afternoon, wrapped in two waist-coats, two coats, a muffler and a mackintosh. The baby was baptized in ice which was broken and swimming about in the font."

Kilvert loved nature and the countryside. Almost every day he jotted down in his notebook descriptions of the scenery he saw and the people he met as he strode from farm to farm in the Welsh hills, visiting his parishioners and collecting stories and songs from them.

Hill Country

FOR instance, in 1874: "I walked to Clyro by the old familiar fields and the Beacon stile. Hannah Whitney was going to the well as of old in her rusty black bonnet tilted on to the top of her head."

Today Kilvert's diary is a minor classic of English literature, giving brief, revealing glimpses of Victorian life in remote Welsh hill-villages from 1872 to 1879. To read the diary is to see the beautiful, wild scenery of Radnorshire not only through Kilvert's eyes, but as it has remained unchanged over the years.

Born in Wiltshire, Kilvert became curate of Clyro in 1865, when he was 25 years old. He lived there for seven years, and later became vicar of St. Harmon's, also in Radnorshire. Even when he became a vicar over the border in Herefordshire he still returned frequently to Clyro and wrote in his diary of his meetings with old friends there.

Radnorshire, where Kilvert spent most of his early years as a clergyman, is the smallest of the six southern counties of Wales. Most of it is hill country, over a thousand feet above sea level, divided by valleys with rushing rivers, like the Wye, which falls over rocks and crevices beyond Llangurig.

Kilvert wrote about Wye:

"... At Wye cliff they were doing archery. When three dozen arrows had been shot we left off shooting and went to tea. All through the hot burning afternoon how pleasant sounded the cool rush and roar of the Wye..."

There are very few castles or monuments in the county, for the Norman invaders who built most of the strongholds in Wales only just managed to force their way up part of the Wye valley. The castle built at Rhayader was stormed and destroyed in 1231 by the rebel Llewellyn in his fight against the English.

Kilvert mentions Rhayader:

"... Mrs. Venables went out for a drive on the Rhayader road, the carriage and cushions thoroughly aired and warmed with hot water bottles and warming pans..."

Without Norman help or money, most of the churches in the county were small and poor. The earliest chapel, built at Glasbury castle, dates back only to the seventeenth century.

Kilvert on churches:

"... The little by-station of St. Harmon is kept by a very handsome, pleasant-faced woman, very stout. The church stands close to the station. It was built in the Dark Ages of fifty years ago and was simply hideous..."

The county has never been well populated, and in the Middle Ages, many villages disappeared when the Black Death plague wiped out hundreds of farmers and their families. Even now there are no factories to attract newcomers to the mountainous valleys.

A quiet county, observes Kilvert:

"... I had the satisfaction of managing to walk from Hay to Clyro by the fields without meeting a single person..."

Most of the uplands are grazed by sheep, and the county has been celebrated for its wool and mutton from the small, tough sheep since Tudor



Tales of fairies and dragons lingered on in Wales long after the Dark Ages. The last dragon was supposed to have been killed in Radnorshire.

times, when the border counties of Wales were great weaving centres. The sheep roam the wide, grassy hills and the wastes of Radnor "forest," a treeless area of moorland which rises up to the heights of Great Rhos (2,000 ft.). The moor is called "forest" because in former days the word meant an uncultivated waste.

Radnor mutton was particularly famous, cooked in a suet crust and served with a special jelly of mountain ash and apple.

Even the mutton did not escape Kilvert:

"... Mrs. Venables sent some soup from the Vicarage and we had a leg of mutton roasted, a couple of boiled chickens and bacon, and a brace of pheasants from Llysdinam, an apple pie and apricot jam tart..."

Ghost Stories

IT is not surprising that in such a remote county tales of fairies, dragons and wolves should have lingered. The last dragon was traditionally supposed to have been killed on the tower of Llandeilo Graban church, and in Tudor times the last wolf was reported killed at Cregina. In Kilvert's day many Clyro people still believed in superstitions about hobgoblins and fairies:

"... Passing by Hawkswood and the ghost-haunted pond we told ghost stories until Mrs. Oswald was almost frightened out of the carriage..."

Ten miles from St. Harmon lies Llandrindod Wells, one of the biggest towns of Radnorshire. This spa was known to the Romans, and in 1749 it developed as a health resort because of its saline and sulphur springs. Its importance increased when the railways reached it in 1865, and since then it has become a centre of annual conferences of business organizations.

But away from the towns, the hills are much as Kilvert knew them when he wrote in 1874...

"... In the narrow green sunny lanes the nuts still hung from the hazel trees and a small farmer driving a herd of fat red oxen put us into the right way with the beautiful courtesy of Radnorshire..."

Only the Elan valley has changed completely. Here many of the houses now lie under water, for the valley contains the huge reservoir which provides a water supply for the city of Birmingham over the border.

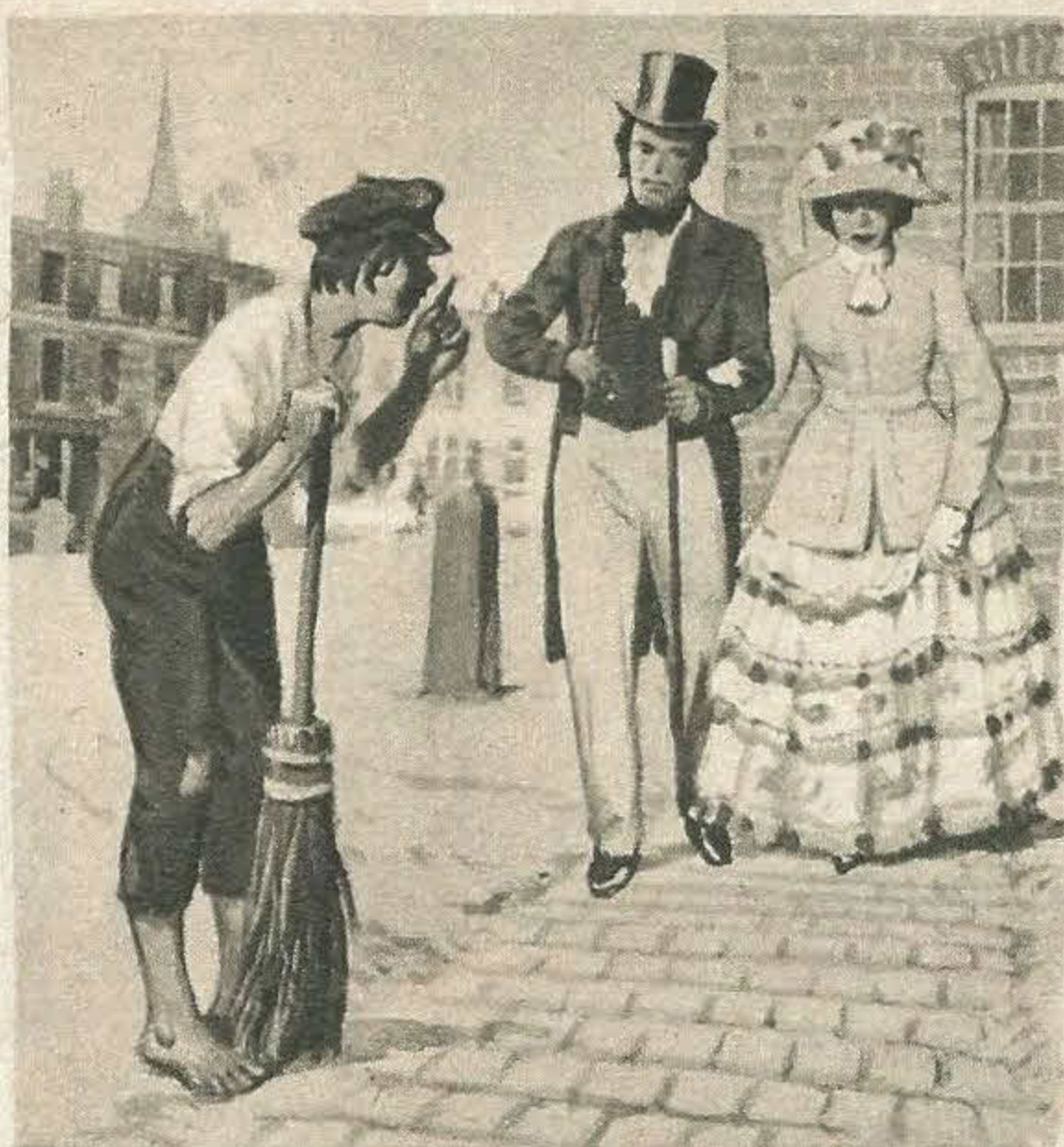
**NEXT WEEK:
SHROPSHIRE—THE BRIDGE
THAT 'IRON JOHN' BUILT**

FROM THEN
TILL NOW

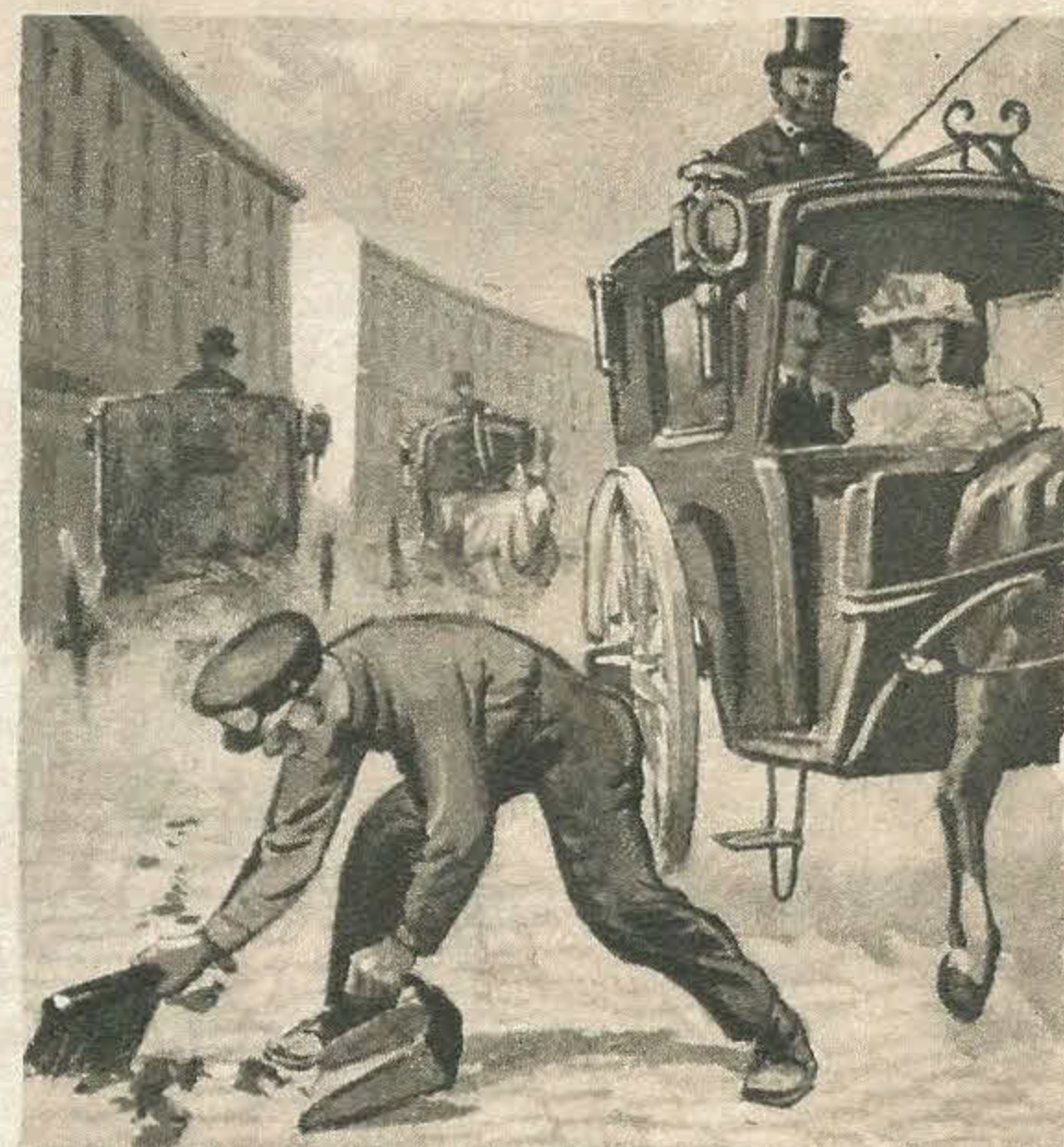
CLEARING THE WAY AHEAD



Before street cleansing was introduced people threw all their household slops and rubbish out into the gutter. Streets were filthy with litter, garbage and mud, and dogs were the main scavengers.



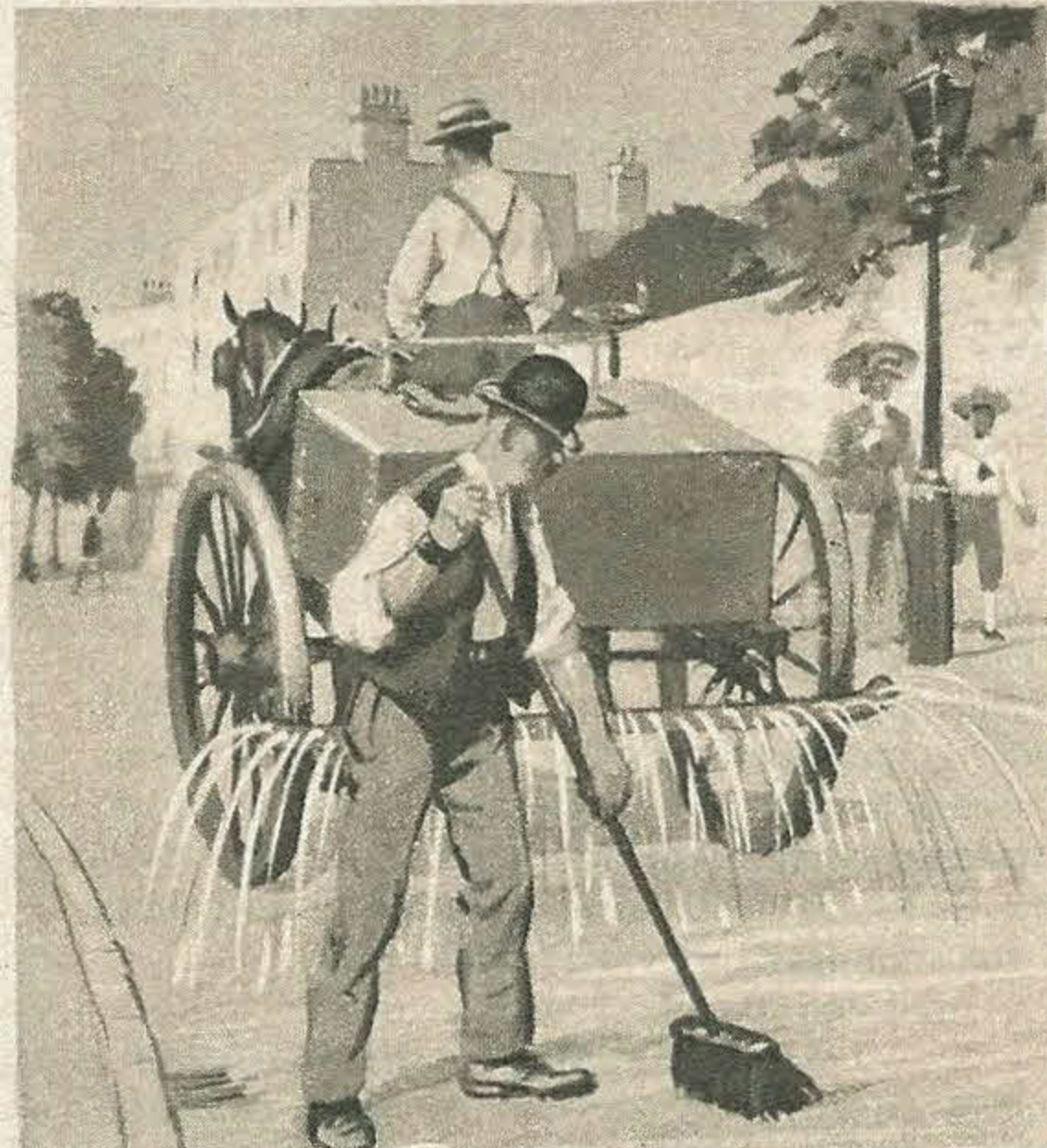
Roads were rough and ill-kept, muddy in wet weather and dusty in summer. In the seventeenth century, crossing sweepers were paid by residents or grateful passers-by for clearing a passage through the dirt.



At the beginning of this century roads were better paved, but still muddy or dusty. Boys were employed by city officials to clear the streets after carriages had passed and the refuse was put into large bins at the roadside.



The mud-cart, or "muck-cart" as it was called, was a familiar sight about 1910, carrying away mud and sweepings from the gutter. This cart was the first attempt at mechanized road cleansing.



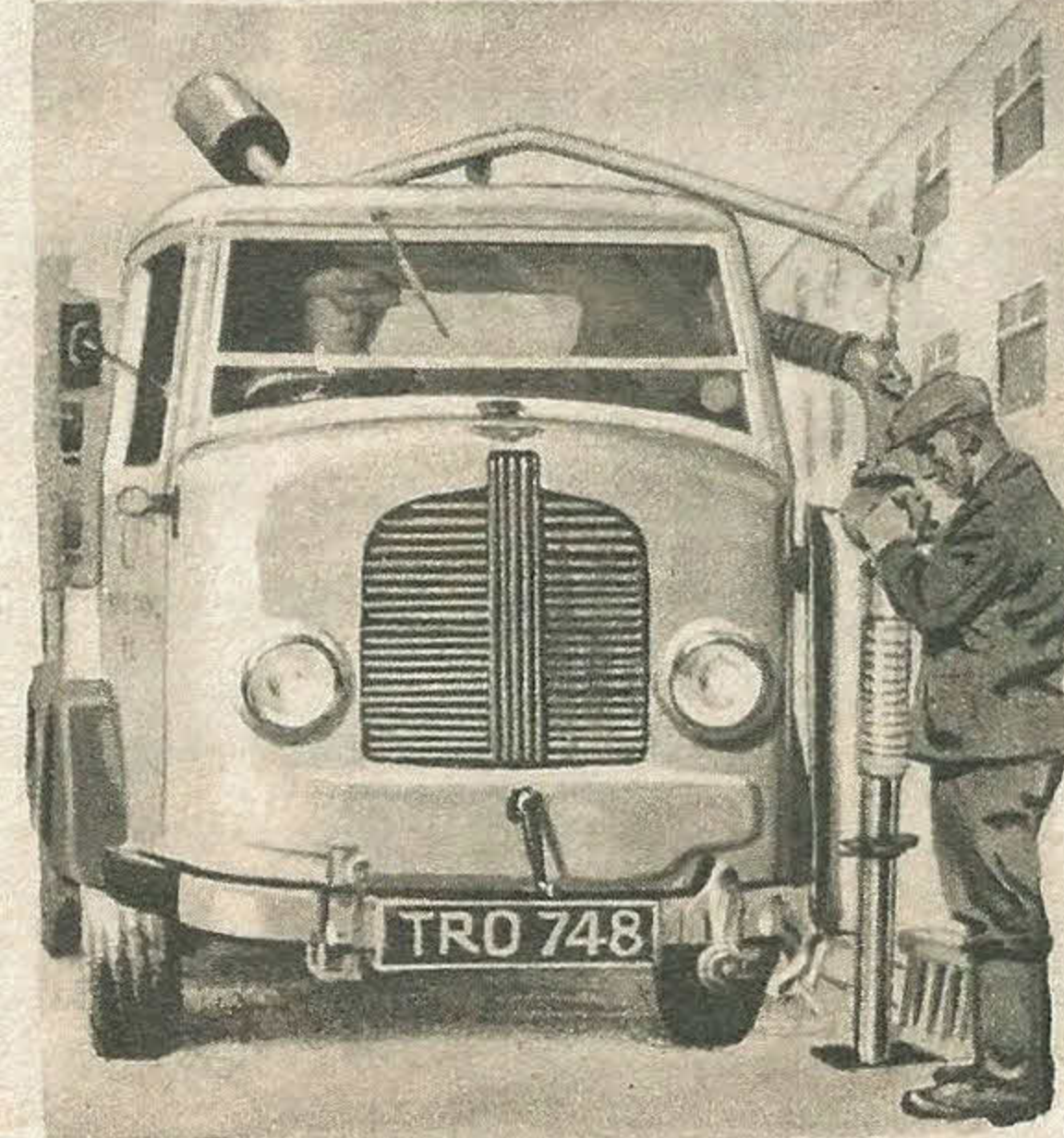
Later a water-cart was employed to "lay the dust." Water was sprayed from the cart to hold the dust down while the street was swept by a man following the cart.



About this time the official road sweeper with his barrow could be seen in almost any town, rattling along over the cobbles. This man was employed by the Westminster Council, London.



When better roads were laid, with tar macadam surfaces, dust was greatly reduced. But cleansing was still necessary and mechanized vehicles like the one above both watered and swept the streets, brushing the dirt into the gutter.



Today even the street drains are washed out regularly to prevent them silting up and overflowing. Dirt is sucked out by a pump into the tank on the back of a lorry, and fresh water pumped down to keep the drain flowing freely.



What becomes of the refuse collected? Some of it is burned, some is taken away and tipped on to low-lying marshland, to raise the level of the ground and make it suitable for building upon later. The refuse is sealed in with layers of earth.



WONDERS OF NATURE

WHEN THE PUMA POUNCES

*Argentina's cowboys call it the 'Christian's Friend'
—but to animals the puma is a deadly enemy*

TO watch a puma hunting its prey is to see nature at its most primitive. The slow stealthy approach, the pause into frozen stillness, the eyes focused sharply on the victim, the tensing of muscles . . . then the final leap through the air. Nothing has a chance against such an attack.

Yet to see a puma at a zoo, you wonder why it has the reputation of being such a deadly killer. It seems almost docile, and friendly to man.

It is friendly, and the Spanish-Indian cowboys of Argentina have named it "The Christian's Friend" because of its gentleness towards man.

The puma inhabits a wide area of the Americas, from Canada in the far north to Patagonia in the deep south. It lives in all climates, from the heat of the tropical forests to the extreme cold of northern limits.

Of all the cat family, it is one of the largest, measuring about 5-6 feet from its nose to the tip of its tail. Its head is small, its ears are large and rounded; a yellowish-brown coat covers the top part of its body and the neck and belly are a dirty-white colour.

Expert Climber

IT makes its lair in forests or on a rocky ledge or crevice. Two or four cubs are born in a puma's litter, 10-12 inches long at birth. They do not open their eyes until ten days old, and unlike the

adult puma their colouring is a dusky brown, with black spots which do not disappear until after six months.

In the ranching areas pumas attack cattle and horses, but in the forests wild moose, deer, elk, birds, rodents and even monkeys are eaten.

When attacking, a puma has been known to jump forty feet in one bound, or leap twenty feet into the air. It is an expert climber, more swift and agile than the jaguar and it kills its prey almost as quickly as a bullet.

Pumas are particularly fond of horse-flesh, and because of this it is impossible to raise horses in some parts of the United States.

The Indians of Lower California were once afraid to kill the puma, because they believed that they would be struck dead if they did so.

It was impossible to keep livestock, and the Indians could only eat meat when they saw vultures hovering over a puma's kill. When this happened, they would run quickly to the spot and feast on the remains.

When missionaries penetrated the country in 1700 they found it overrun by pumas, and were determined to disprove the Indian superstition.

One of their men went out into the woods, killed a puma and brought it back to show the Indians. He did not die, of course, so the Indians were no longer afraid of the animal.

Because of its threat to livestock, the puma is widely hunted down and killed.

NEXT WEEK: DO ANIMALS THINK? PART ONE OF A NEW SERIES

CROSSWORD

CLUES ACROSS

1. To eat one's food greedily, or make a noise like a turkey. (6)
4. The last English king of this name was never crowned. (6)
9. Special kind of hat worn by Roman Catholic priests. (7)
10. An underground strong-room where valuables are stored. (5)
11. The cereal from which porridge is made. (4)
12. In 1825, the first English passenger train ran from here to Darlington. (8)
14. An important subject studied at school. (11)
18. Joined one of the armed services. (8)
19. Mark left by a wound. (4)
22. Scout calls are blown on this. (5)
23. Kind of train that travels long distances with few stops. (7)
24. Another word for sleepy. (6)
25. "Full many a flower is born to blush —" (Gray). (6)



CLUE TO 9 ACROSS



CLUE TO 22 ACROSS

CLUES DOWN

1. A small ape with long arms nearly reaching the ground. (6)
2. Sort of hat worn by Girl Guides. (5)
3. What you may be if you dawdle on the way to school. (4)
5. A little wooden house for pigeons to roost in. (8)
6. This kind of sports includes swimming, diving, water polo, etc. (7)
7. Doing this to ancient pottery can be quite difficult. (6)
8. This sort of dog is apt to snarl and snap. (3-8)
13. A cat is supposed to use these to gauge the width of openings. (8)
15. An Italian word used in music; it means quick and lively. (7)
16. Swans and other water birds have — feet. (6)
17. There is a very well-known one on Dartmoor. (6)
20. An important railway centre in Cheshire. (5)
21. Part of a bridge between two piers. (4)



CLUE TO 2 DOWN



CLUE TO 5 DOWN

SOLUTION ON PAGE 27

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WOMEN WHO FOUGHT FOR

OTHER PEOPLE'S COUNTRIES—

FRANCE
Part Two

Their names are famous: Joan of Arc, the girl soldier who was made a Saint—Charlotte Corday, who altered the course of the French Revolution—and Madame du Barry, a King's friend who made and unmade great ministers at will. These women and many like them helped to change the History of France



FRANCE

EVER since the dawn of history women have influenced the destiny of France. Even to Englishmen, Marie Antoinette, Madame Curie and Joan of Arc have become household names.

Marie Antoinette had the doubtful honour of being the most hated woman in France at the end of the eighteenth century. She was hated for her extravagance, and despised for her indifference towards the plight of the common people.

She had ruled her weak husband and taken an active part in the government; for this she died at the hands of the Revolution.

After executing their legal rulers, the revolutionaries set up a new government, and power lay in the hands of the newly-formed Committee of Public Safety.

The leaders of the Revolution, those who had killed their king and queen, were mainly radicals who now demanded the wholesale slaughter of the nobility. Thousands of counts, dukes and barons died, and many people who had supported the Revolution at the beginning now turned against it. In July, 1793, the principal advocate of murder was himself murdered: Jean Paul Marat, the man who had demanded the deaths of 200,000 people guilty of "treason."

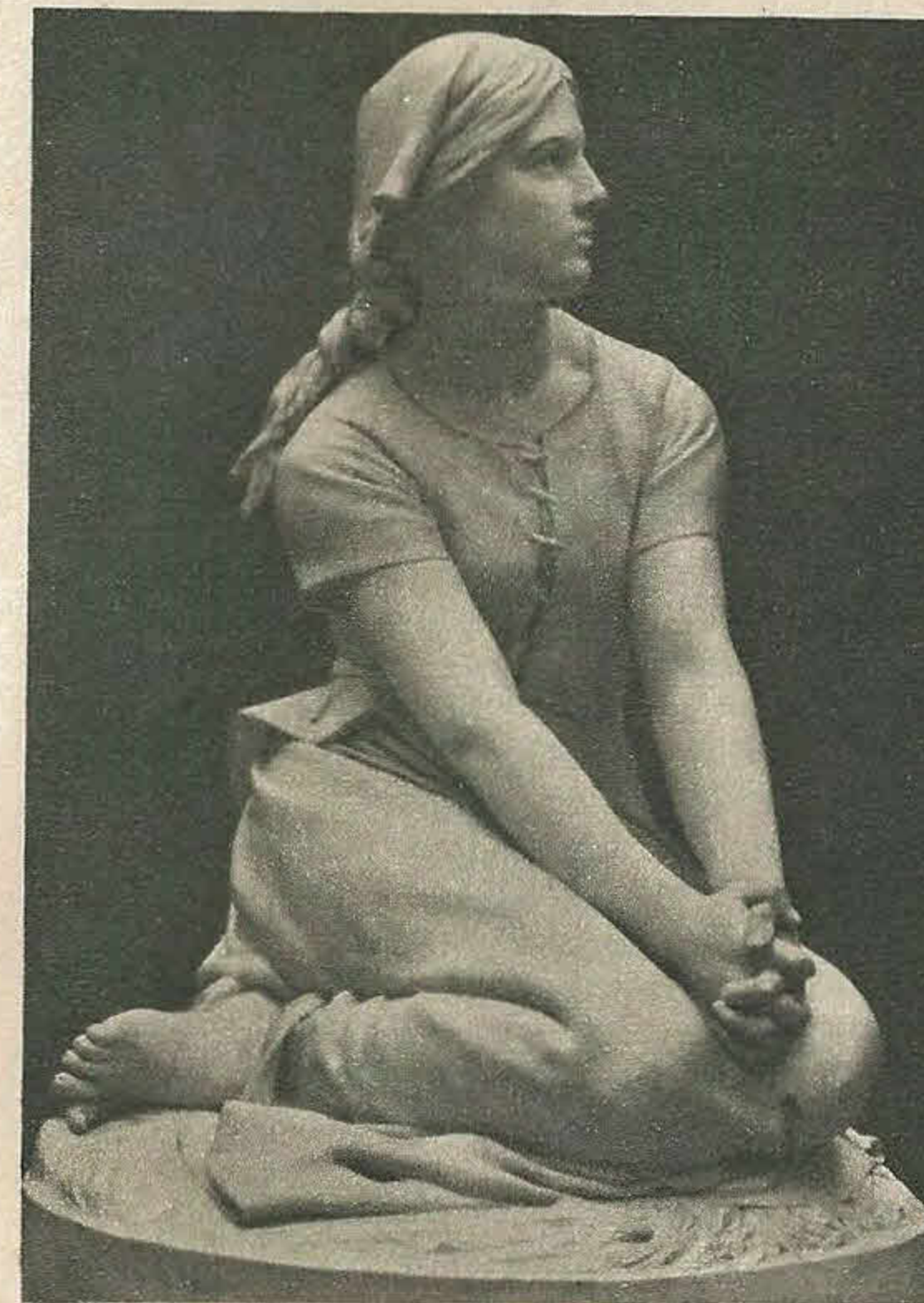
Symbol of Liberty

His assassin was Charlotte Corday, a girl of noble birth who had welcomed the Revolution at first.

This brave woman decided that Marat must be killed so, on July 13, 1793, she burst into the room where Marat lay in his bath and stabbed him. With him died some of the cruelty of the Revolution.

Charlotte Corday was executed, but she left behind a name which was to become synonymous with that of liberty.

The real symbol of the Revolution was indeed a woman, and her portrait can be seen on some French postage stamps today. Called Marianne, she was the figurehead of the battle for freedom, and her adoption by the government and the people underlined the great part played by



The first fighting woman of France: Joan of Arc, the young peasant maid who fought the English conquerors.

In 1789 the Parisians stormed the Bastille prison, symbol of Royal tyranny. Even the women fought to capture it.

Charlotte Corday on her way to execution after she had assassinated the Revolutionary leader Jean Paul Marat.



the women of France during those terrible years.

From the chaos of the Revolution one man at last arose: Napoleon Bonaparte, first a general, then First Consul, later Emperor. Again women occupied the centre of the historical stage, for Napoleon's wife during the years of the Republic and the Empire was Josephine Beauharnais.

Josephine had married Napoleon in 1796, when he was earning a name for himself as a general. When he made himself Emperor in 1804, Josephine became Empress. A woman of great personality, she spent millions on clothes alone, yet, unlike Marie Antoinette, she was never hated for it. The common people loved her, for she was a commoner herself.

At this time other women, too, became the centres of fashion and of politics. Madame Récamier, the wife of a rich banker, was one. For years she lived in Paris, receiving visitors at her salons, and the Récamier house became famous as a political debating forum. Eventually Napoleon, suspicious of her motives and her friends, banned her from the city—a tribute to the intelligence of a woman who had retained her freedom of mind in a country which was rapidly becoming a dictatorship.

For Napoleon would not be ruled by anyone—certainly by no woman. He was a man of war and a great administrator, and needed no woman to tell him how to govern his Empire. But French kings before him had listened to women's advice and borne their criticism. Louis XV was for ever turning an ear to the advice and requests of his friend Madame du Barry, who made and broke ministers at will. But again she, like Marie Antoinette, died in the Revolution.

With the collapse of Napoleon's Empire the great political women died away. France, however, brought others in their place: women who excelled in the Arts and Sciences.

Sarah Bernhardt, perhaps the greatest actress of all time, was a woman of many accomplishments: when she was not acting she wrote verse, painted pictures and made statues. She shared the stage of history with another great woman, Madame Curie, who left as magnificent a name in the annals of Science as Sarah Bernhardt did in Art.

A Pole by birth, Madame Curie discovered radium with the help of her husband, and received the Nobel Prize for chemistry in 1911.

Other countries boast women in their halls of fame, but in no other country have women had such an important part to play than in France, the birthplace of one of the most famous women of history—Joan of Arc.

Joan was the young girl who in 1429 persuaded Charles VII that a divine mission had been laid upon her to fight the English and raise the siege of Orleans. At the head of her troops she relieved the town, had other victories and witnessed Charles's coronation at Rheims. Joan was captured by the English and burnt at the stake, but her great spirit lived on in the people, who finally drove the English from France. Five centuries were to elapse before she was canonized as a saint, but she will remain for ever as the most famous of all the women who fought for France.

PET TALK

By EDMUND BURKE

TEST FOR A DOG

Have you ever heard of King Rufus's Stirrup? It is a very old iron stirrup, now kept in Lyndhurst, in the Verderers' Hall.

Many years ago, this stirrup was used to determine whether or not you could keep your dog in or close to the New Forest. After 1066 hunting became the sport of the Norman nobility, and commoners were forbidden to participate in any way.

Since dogs were used in hunting deer, the law said that only dogs small enough to pass through the stirrup could be owned by commoners in the area. If you wanted to have a larger dog you had to cripple its front feet so that it could not chase the King's deer.

To give you some idea of how small the dogs had to be, the stirrup opening measures ten and a half inches deep by seven and a half inches wide, just about large enough to let a toy poodle pass!



Come on, have a bite! Two tiny Yorkshire terriers, just eight weeks old, get rather a large meal from an outside bone.

DON'T SCORN THE PIG

Among the oddest of pets are pigs—but they are not as objectionable as you might think! A pig is clean by nature and I have house-trained two without any trouble. The pig is far more intelligent than you would imagine. In Italy they are trained to locate truffles and here in England, about one hundred and fifty years ago, there was a pig trained to work with the gun, just as our pointers, setters and retrievers do today.

ZOO CLUB

If you live in London or the Home Counties I would recommend a club for you, a rather special club. It's called the XYZ Club and it is actually part of the London Zoo and Whipsnade Park.

Membership is open to anyone between the ages of nine and eighteen, at ten shillings a year. For that you receive a membership card, a club badge and many other privileges. There are three free tickets every year for either the London Zoo or Whipsnade, the club publication *Zoo Magazine* comes to you three times a year and there is an Information Bureau to answer all your animal questions.

OUR
FRIEND
THE
HORSE
Part Five



Over we go! Miss Rosemary Neame on The Little Mermaid clears the water jump at Badminton Horse Trials earlier this year.

HORSES ON TRIAL

by ALAN OLIVER

Confidence, obedience, fearlessness—these are the qualities sought in a horse. Whether or not an animal has them can be proved in tests designed to give it the toughest three days of its life

TAKE a horse: any horse that is not afraid to gallop across country, that is absolutely obedient to commands given by its rider, that can face the jumps in a show-ring with perfect confidence—and what have you got?

The answer is—a Three Day Event horse. The Three Day Event is the most exacting competition in which a man (or woman) and a horse can take part. As the name implies, these Trials last for three days, and each day is given over to one particular aspect of all that a horse and its rider are capable of.

THE FIRST DAY is concerned with dressage. This is a test of obedience for the horse, and one of concentration and memory for its rider.

In an arena 66 yards long by 22 yards wide competitors ride a set dressage test, which requires them to vary their horses' pace, make them perform intricate movements (such as turning on the haunches), halt and move off again, each in its proper order.

This takes place under the eagle eye of the judges, who will award points according to the ease and grace with which the horse moves, and the style of the rider and the effectiveness of his commands to the horse.

ON THE SECOND DAY what is officially known as the "Speed and Endurance" test reigns supreme. Over a course as long as seventeen miles horse and rider must, within a set time, cover nine or ten miles on roads and tracks, jump a steeplechase course, and also go about 4½ miles over fences across country.

It is the cross-country phase that provides the most entertainment for non-competitors, and puts the strongest-nerved rider to a severe test. The main difference between this and show-jumping is that the ground is rarely flat. The obstacles have to be jumped up hill, down steep slopes, over wide ditches and even into deep water.

However, a horse that is well-trained should cope with these easily, for to him it is a jump only, and the form it takes is not important.

It is on this day that the skilled and courageous horses pick up their points.

THE THIRD DAY is show-jumping day—not over great international-class jumps but over a course stiff enough to show that in spite of his gruelling exertions on the previous day, the horse is still capable of giving his best.

After the jumping is over, the marks are totalled, and the winner of the Three Day Event (happy but thoroughly exhausted!) is announced.

How do you find your event horse? Colonel Frank Weldon, captain of the British Three Day Event Team in the last two Olympic Games, says that, like an athlete, your horse will be born, not made, although training helps a bit.

You cannot tell in advance whether he will make the grade. You may spend much time and patience in training what you hope will be a winner, only to find that you were wrong. Then you have to start all over again. It can sometimes be a very long business.

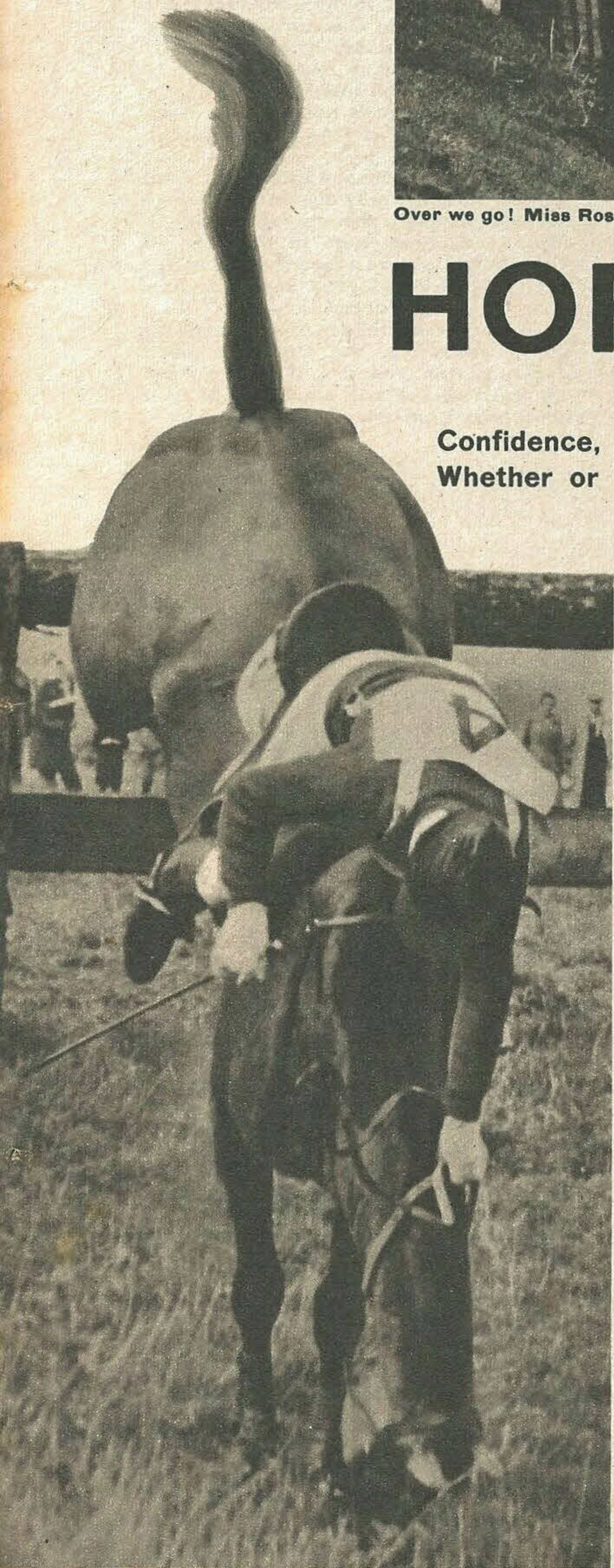
Humble Pride

BUT, on the whole, a good guide is to look for a horse that would not seem out of place in a racecourse paddock, not necessarily with a pretty head, but with a generous and courageous look, and no sign of meanness.

Colonel Weldon will also tell you that, as a competitor, you would not be human if you did not worry about the ordeal ahead of you. But once you have started, the thrill of overcoming and achieving things that appeared impossible makes you forget your fears, and the feeling of amazement at the ability of your horse gives you a humble pride that you should be associated with it.

So our story ends with what is perhaps the greatest height to which a horse and his rider can rise. As Colonel Michael Ansell, Honorary Director of the British Horse Society, has said, "The horse has ceased to be man's servant, and has become instead man's companion."

So as our companion, we salute him—in respect and in admiration, in gratitude and in comradeship: Our Friend, the Horse.



A nasty moment for horse and rider—Lt. J. D. Smith Bingham and By Golly come to grief at the European Three Day Event Championships.

FROM RETREAT TO VICTORY

1. During the First World War the ships of the Dover Patrol, disguised as merchant vessels, lured many German U-boats to the surface in the Channel and then destroyed them by gunfire. In this way the U-boats were defeated.

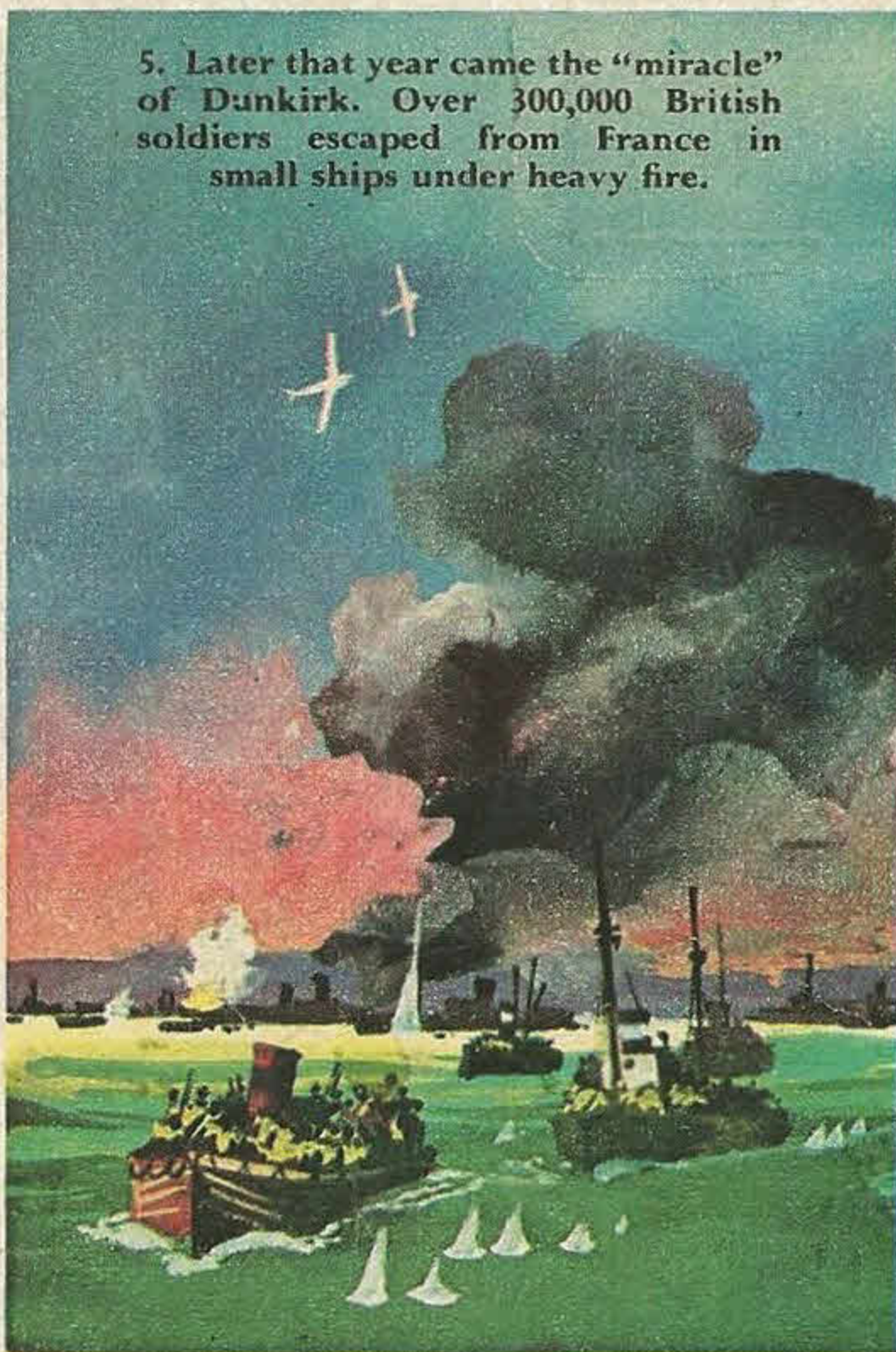


2. The war had developed aviation very rapidly, and when peace came in 1918 air routes across the Channel were organized. First was the Imperial Airways route to Paris. This Handley Page Hannibal flew for many years on the cross-Channel route, with a fine safety record.

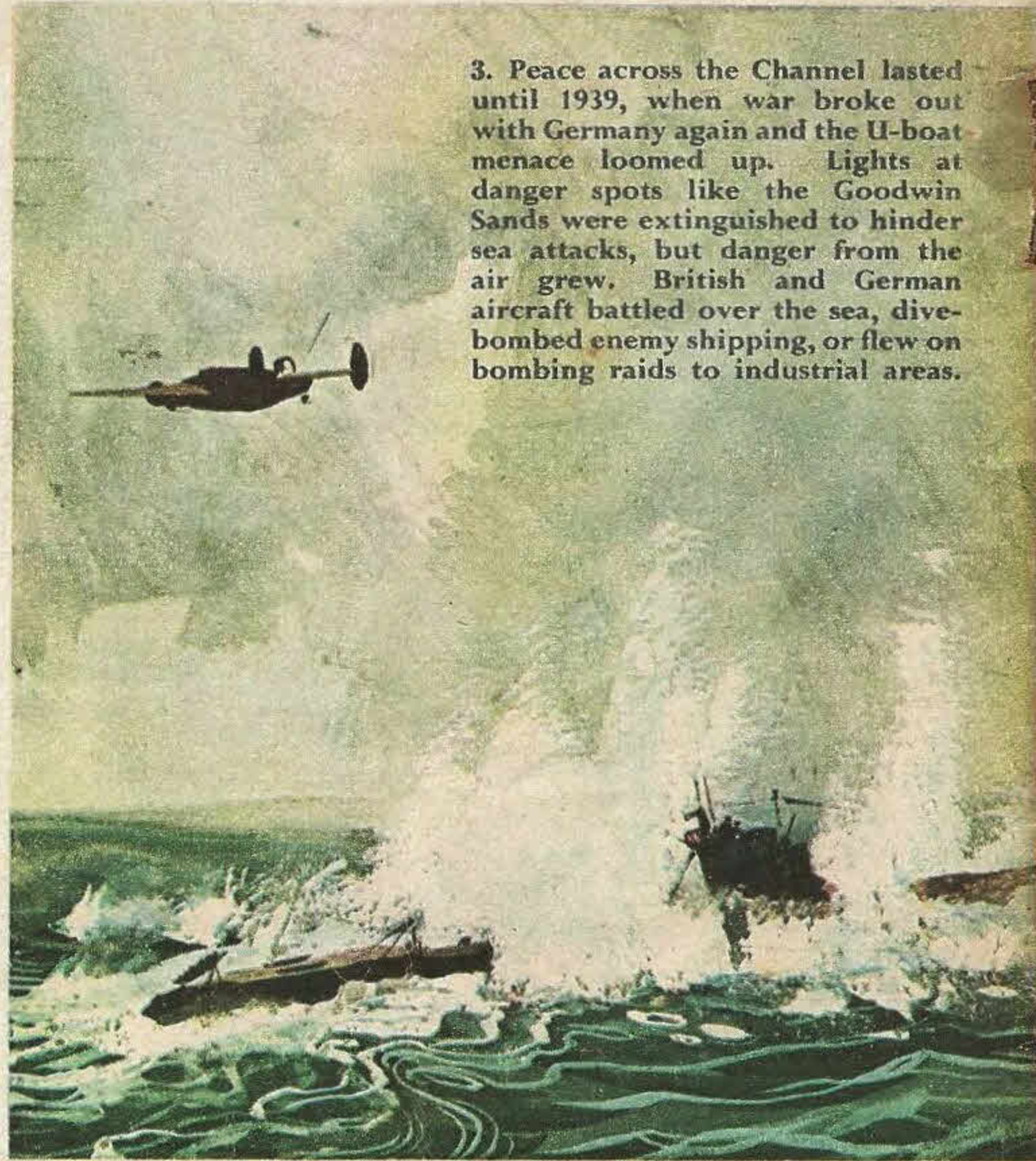
4. In 1940 France fell to the Germans, and refugees of England's one-time enemy, France, fled from Belgian and French ports in fishing boats and other small craft to seek refuge in England.



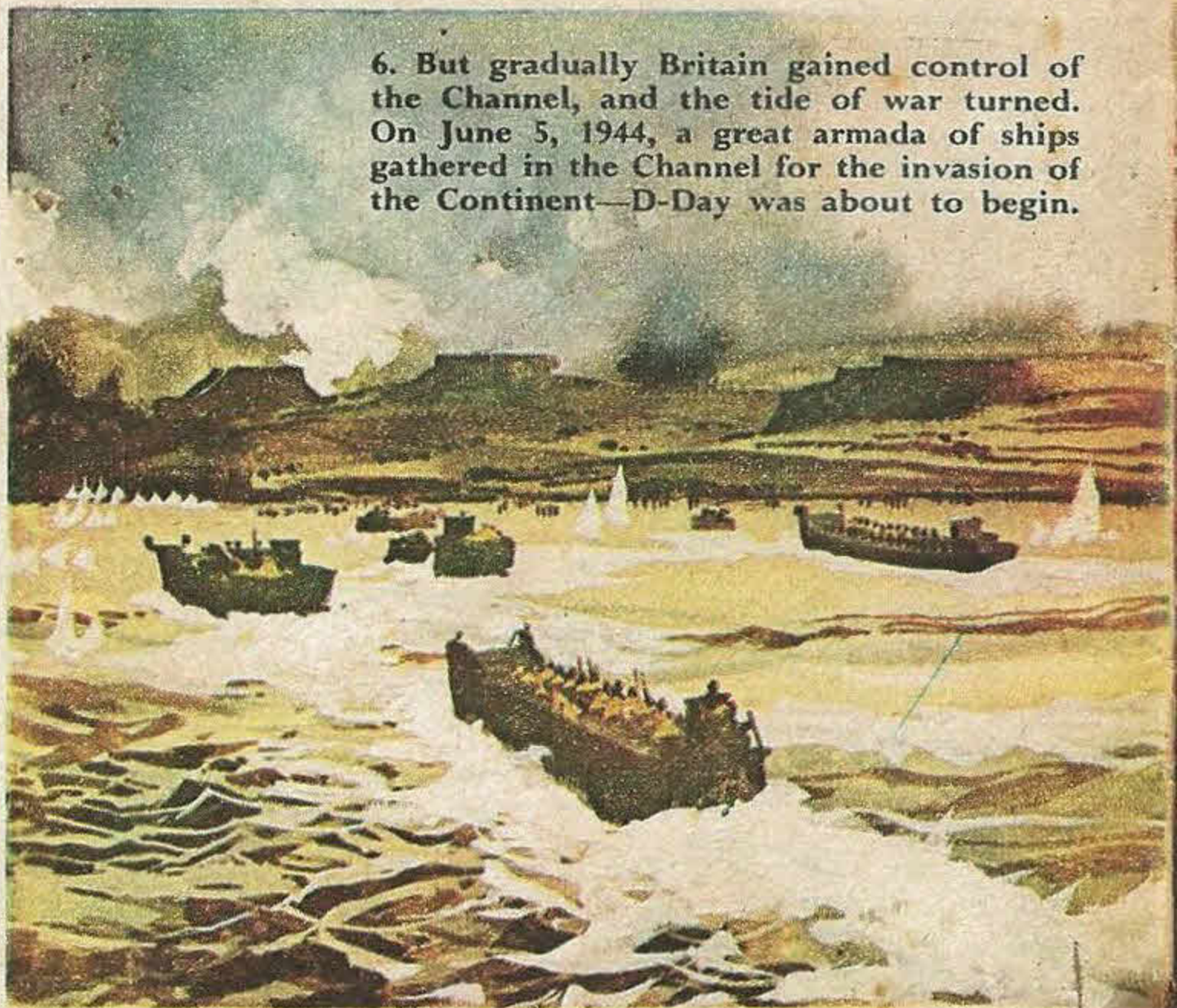
5. Later that year came the "miracle" of Dunkirk. Over 300,000 British soldiers escaped from France in small ships under heavy fire.



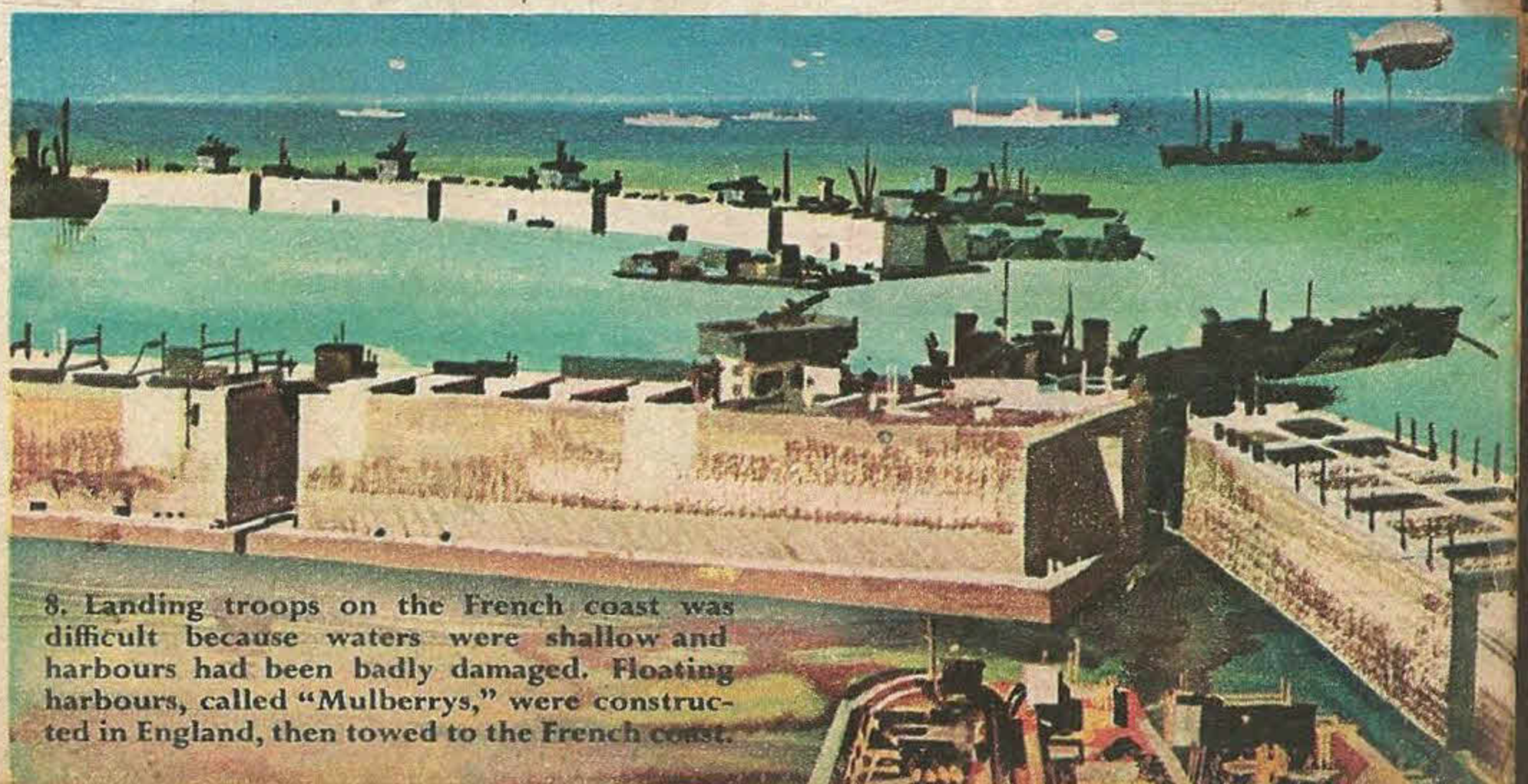
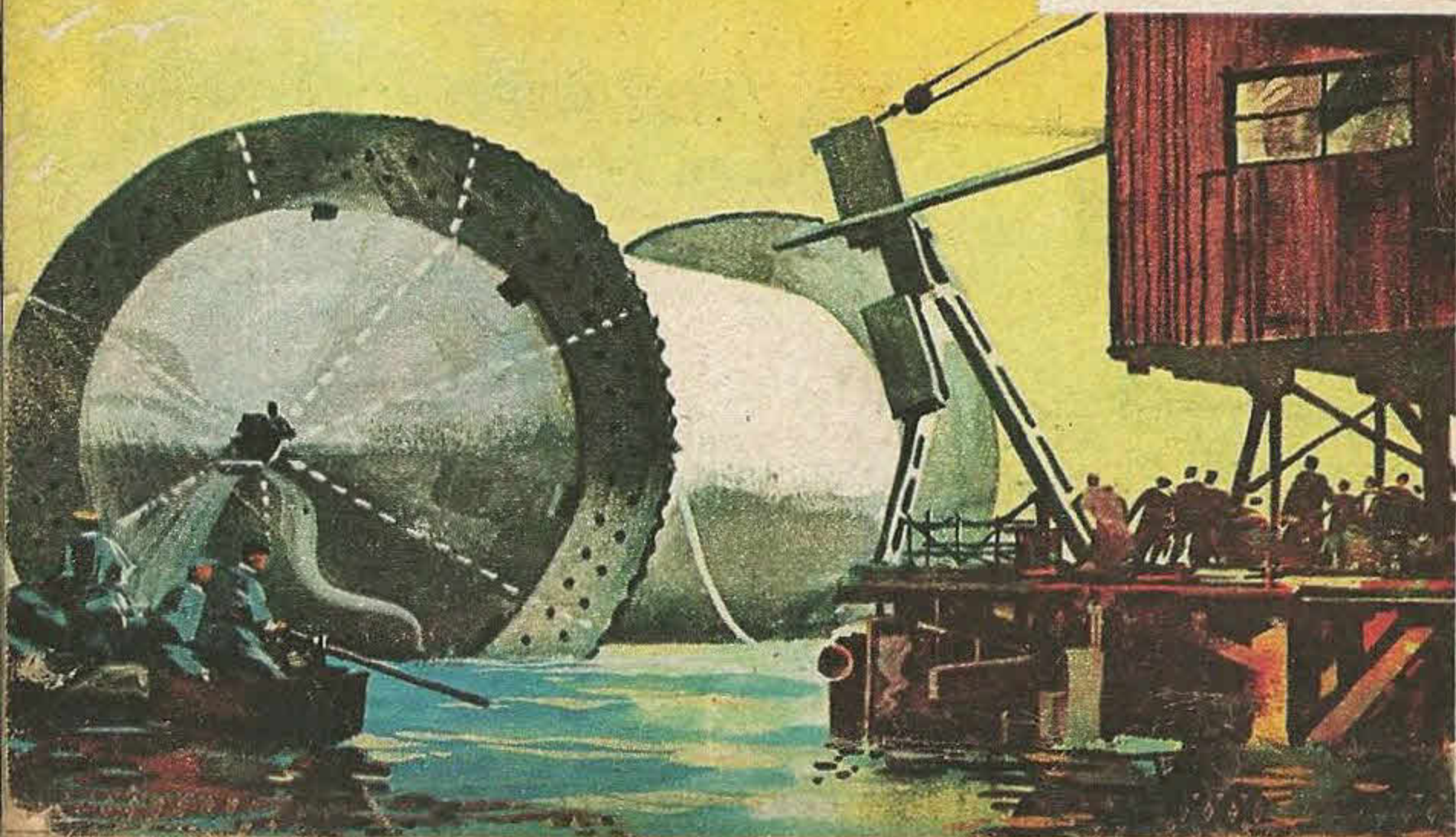
3. Peace across the Channel lasted until 1939, when war broke out with Germany again and the U-boat menace loomed up. Lights at danger spots like the Goodwin Sands were extinguished to hinder sea attacks, but danger from the air grew. British and German aircraft battled over the sea, dive-bombing enemy shipping, or flew on bombing raids to industrial areas.



6. But gradually Britain gained control of the Channel, and the tide of war turned. On June 5, 1944, a great armada of ships gathered in the Channel for the invasion of the Continent—D-Day was about to begin.



7. An oil pipeline "Pluto" (standing for "Pipe Line Under the Ocean") was laid beneath the waters to feed a constant supply of fuel to France for tanks and other fighting vehicles. This was the first pipeline to be laid across the Channel, and was a great feat of engineering.



8. Landing troops on the French coast was difficult because waters were shallow and harbours had been badly damaged. Floating harbours, called "Mulberrys," were constructed in England, then towed to the French coast.