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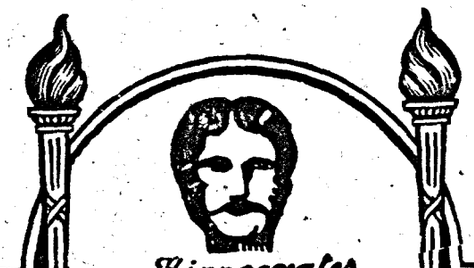

Hippocrates
FATHER OF MEDICINE

MEDICAL SCIENCE

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THUNDER UNDER THE EARTH

By Frank Illingworth.

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After years of quiescence, Mount Vesuvius has erupted again, engulffng villages and fields in devastation far more destructive and lasting than the worst of total war.

Writers have described how they have watched from roofs the advancing lava, a black tide of smouldering, semi-liquid, cinder-like material exuding sulphurous smoke, flowing down a village street, sometimes at the rate of three hundred yards an hour until the edge of it has reached the building where they stand and they have had to leave to avoid being cut off. British troops have been "under fire" from cinders and ashes—the "black snow" which covers and destroys crops for miles around—and have given their help in saving the inhabitants from the holecaust.

What is this thunder under the world?

There is a probable explanation. Gases born in the seething under-world must have an outlet; and where their power is greatest they burst through the earth's crust.

This is what happened in Mexico in 1943. The peasants of the Uruapan district did not realise that they were literally "sitting on a volcano" Certainly there had been earth tremors, and a wisp of smoke curled from a fissure in the middle of a perfectly flat maize field. But no one could foresee that on February 20 of that year a miniature volcano

would spring from that field to grow into a fire-belching cone destind to spread ashes over an area half the size of England.

WHITE HOT ROCKS

Yet with a rattling roar Paricutin was born. White hot rocks, tossed seven thousand feet into the air, rained down, and, from the newly formed crater, moltan lava bnbbled into slow moving rivers of destruction. And even today, in Urupan, a town some thirty miles distant, the grumblings can be heard like thunder.

Time and again fair cities have suffered complete destruction by such mighty convulsions. Well might one ask why man is so foolish as to build his home in the shadow of latent fury. One reason is that the flanks of volcanoes are sometimes exceedingly fertile.

As recently as November, 1928, Mount Etna, towering 10,700 feet over the Sicilian plains, spread lava across the Messina-Catania railway (the scene of bitter fighting last year) and destroyed the towns of Hascati and Nunziata. But Etna's, rich soil raises as many as five crops a year; so man continues to crowd round the valcano's flanks. So it was after Vesuvius wiped out San Giuseppe and Ottajano in 1996.

Stabiae, Herculaneum and Pompeii knew a similar fate. Prosperous, glittering seats of learning, their peoples were still busily engaged in restoration work following an earthquake when, in August of the year A. D, 79, Mount Vesuvius buried the city beneath a layer of cinders and ashes in places sixty-five feet deep.

The younger Pliny tells how on August 24, Pliny the elder, commander of the Roman fleet, set out to rescue people at Herculaneum. Arriving too late—for with the only available harbour filled with ashes escape by sea was impossible—he went on to Stabiae, there to be suffocated by the poisonous fumes.

The death roll was heavy, and so effectively were the cities wiped out that, by the Middle Ages, their very sites were forgotten. Excavations carried on at various times have disclosed the cities in a remarkable state of preservation, and no doubt British troops are still able to see in Naples Museum the loaf of bread which was baked in Pompeli 1,800 years ago, and was still warm when it was unearthed in 1860!

FURTHER ERUPTIONS

For nearly 1,500 years following this convulsion, Vesuvius remained comparatively quiescent. Then, on December 16, 1631, the volcano erupted so suddenly and with such violence that eighteen thousand people were overwhelmed. Since then Vesuvius has belched fury at iutervals ranging from a few weeks to a few years. There was the great eruption in 1872, and June, 1900, saw a mighty explosion which literally blew the top off the mountain, reducing its height from 4,275 feet to 3,668 feet. Six years later the volcano once again spread devastation. Since then there has been only one major eruption which took place in 1929.

The disintegration of Krakatoa in the East Indies shows the power of volcanic eruptions. At one moment in 1883 this island, covering eighteen square miles, toward 1,400 feet above the Sunda Straits. In the next moment Krakatoa blew asunder. As sea water invaded lava-filled fissures further explosions, heard in Rodriguez, three thousand miles away, saw a tropical island transformed into a few knolls surrounding an erupting subterranean crator a thousand feet below sea level.

THE SEA BOILED

For two days the sea-boiled. More than thirty-six thousand people perished in a succession of tidal waves which inundated the flanking shores, and, just as ripples from a stone expand towards the edge of a pond, so sea-waves born in Krakatoa's paroxysms travelled as far as Cape Horn 7,818 miles distant.

The heavens, too, told their tale of disaster. The black columns which soared to a height of seventeen miles over Krakatoa's bubbling marine grave and turned day, into night. At Batavia, a thousand miles away, birds tucked heads under wings and Dutch housewives lit their lamps at midday. Ultimately the wind carried ashes to the farthest corners of the earth—to North and South America, Asia, Africa, Australia, Europe, and into Arctic Scandinavia.

In 1902 the eruption of Mount Pelee, in the West Indian island of Martinique caused even greater loss of life. St. Pierre, the island's capital, cast anxious glances at the smoking mountain when on April 23 of that year it showered the city with ashes. St. Pierre had reason to remember, previous eruptions, and when, a week or so later, a hundred and fifty lives were lost in a mighty upheavel Martinique sighed with relief. They considered that the affair was over. The islanders found further relief from worry when, a few days later, the Souffreire, on the nearby island of St. Vincent, erupted the opinion being that this would lesson the pressure within Mount Pelee.

But the affair was not over. Inside the mountain Nature's forces were piling up and by May 8 the volcano could contain itself no longer. The molton fury which Mount Pelee erupted into the shuddering heavens was relieved by vivid lightning and an inky torrent of superheated gas and incandescent dust extinguished the sun. Through this rolling canopy billowing fire cascaded on to St. Pierre, and in its wake, came all-consuming rivers of lava. There was no time to flee. Some forty thousand people perished in that ferocious hour.

Of all the inhabitants only one, a native named Joseph Sautout, remained alive. He saved himself by taking refuge in a concrete cell shaped like the modern Nissen hut. Even the ships in the harbour were destroyed, only one, the "Roddam," managing to escape.

From the riven rocks of Arctic Jan Mayan Island to New Zealand, from Alaska and Russia's frozen Kamkchatka Peninsula (the home of fourteen volcanoes) to Erebus in the Antarctic, the world is dotted with Craters. They range from small cones to Kilauea's 1,300 feet deep pit comprising one hundred and ninety acres of molten lava. Some are comparatively docile monsters and puff nothing but steam, but who can tell when their pent up energy will fling as much as 2,982 billion tons of rocks into the heavens—as did Japan's Bandai-San in 1888.

CRATERS BELCH FIRE

The Pacific area is rich in volcanoes. From the smoking Aleutians to Japan, craters belch fire at frequent intervals, with the Dutch East Indies and Hawaii the focal points.

How puny are the flames of a Japanesesmade war compared with the upheaval of Sumbawa island, in 1815—the most terrific eruptian on record in any part of the world. The Japanese attack on Hawaii appears insignificent beside the fury of the island's volcanoes, Kilauea, Mokuaweoweo, and Mauna Loa.

Every so often in undulating waves the lava rises from these pits to slide over the crater's lip and down the mountainside. So it is with Mauna Loa. Not long ago she sent a stream of lave towards the sea and the village of Hoopulou. The fisherfolks' prayers and sacrifices to the fire god Pele proved of no avail and Hoopulou was obliterated.

British troops have seen all the volcanoes in Europe. But it is in the Pacific that they will see their most impressive sights when they follow the chains of volcanic isles to the East's most eruptive islands—Japan herself.

Horseplay

Aberdeen, Washington: Having shot an elk; Harry Long hiked several miles to camp and got a horse on which to carry the meat. While he was carving up his kill, preparatory to loading it, another hunter—this one slightly near-sighted—crept and shot the horse.

Automatic Postman

The "mailomat," a sort of automatic letter-box, has appeared in New York.

To post a letter the user drops coins into a slot, twists a dial to select the postage value, and puts the letter in.

The machine stamps and postmarks the letter.

*Wartime discoveries in dehydration and other food processes have great significance for after the war.

FOOD OF THE FUTURE

By Earl N. Bressman.

Director of Agricultural Division, Office of Inter-American Affairs

Condensed from Foreign Commerce Weekly, Washington, D.C.

Recent scientific discoveries are making possible the development of many food products which have lain dormant or neglected in the past. The lessons being learned in the United States war programme, in supplying the needs of the United Nations, point the way towards wider utilization of many products when opportunity permits. These may provide a better diet for thousands of persons who live in the South American republics, and for others.

Among the most important of the new developments is the work now being done in the conservation of meat, eggs, milk, fruit, and vegetables, through dehydration methods. Human beings have always faced the problem of how to preserve food from times of abundance for the time of scarcity—how to prepare food so that it can be transported from the point of production to the point of consumption. In temperate zones, where the time of scarcity is invariably a time of cold, Nature has helped by providing natural refrigeration. But in the latitudes of the tropics and cub-tropics, as in many parts of South America, such a natural asset does not exist. In this large section of the Western Hemisphere, where Nature produces abundant agricultural resources, three exists the anomaly of inadequate diet in the midest of plenty. The reason is lack of technical and scientific equipment to preserve the food products that Nature yields so lavishly. For in tropical climates, not only meats and milk, but fresh vegetables spoil almost overnight.

Thus we have the circumstance of millions of people living on corn, dried beans, imported dried cod-fish, and rice, when their own fields and waters could provide a more balanced diet at less cost. There are pampas with thousands of cattle, but (too often) no way to get fresh meat and milk to distant centres of population. *Tasajo*, or *charque*, has provided a partial answer, but anyone who has eaten this crudely dried beef knows that it is a poor substitute for fresh meat.

Recently much progress has been made in preserving basic foods—meat, milk, eggs, fruit and vegetables—by the process of dehydration. This new process expels the water which forms 80 to 90 per cent of the foods we eat. War has forced attention to the need for tremendous quantities of condensed and preserved foods. Until recently it was possible to produce only dried skim milk-that is milk with the butter fat removed. Then a process was discovered for drying the whole milk, including the cream. There are now in the United States 280 factories producing dried milk by the new process.

There are also 85 egg-drying plants in the United States. A standard box of eggs contains 30 dozen eggs and weighs 58 pounds. The same number of eggs when dried weigh only 11 pounds, and occupy less than one-quarter of the space. This year huge quantities of dried vegetables are to be produced, including potatoes, onions, carrots, beets, sweet potatoes, cabbages, spinace and turnips. Other vegetables expected to be on the dehydrated list are tomatoes, green peas, squash, beans, green corn, celery lettuce, peppers, and cranberries.

Methods have been perfected for concentrating the juice of oranges, lemons and grapefuit. One standard box of oranges weighing 90 pounds will yield 4½ gallons of fresh juice, which can be concentrated to a volume of 52 liquid ounces. Each gallon of concentrate equals three boxes of fresh fruit. One truck-load of concentrate equals 30 truck-loads of oranges. But that is one the end of the story. After the juice is squeezed out of the pulp there remains a large amount of juice in the thick outer peel. The juice from the peel is used to produce pectin, a chemical used in making jellies, jams and marmalade. Orange oil can also be pressed from the peel. The oil is used in flavouring beverages, ice-cream and confections. Waste citrus-fruit juice from these operations can be used to make alcohol. The residue of peel and pulp is ground, dried and used for cattle feed. One of the most important food developments to come out of the war is the advance in the knowledge of drying meats. Dried beef is made from lean portions, with bones and fat removed. Dried meat has only one-quarter the weight and one-half the volume of the original meat. It can be eaten months after it has been prepared. The carcass of one average steer will produce about 75 pounds of dried beef.

So the prospects unfold of new products and new markets for food produced in such abundance in the Americas. These new methods of preserving should benefit the trade of the producing countries, besides improving the standard of living. Proteins of meat, eggs and milk, so often lacking in the diet of those who live in the tropics, can now be supplied cheaply in convenient and transportable form. Surplus crops of oranges and the market-gardening, dairying and poultry industries may provide employment for millions. The increased production of dehydrated products will greatly simplify transport. When this war is over the aeroplane will assume an important role in the transport field, and will move cargoes of powdered beef, dried and condensed vegetables over great regions where other forms of transport are inadequate.

The rubber tappers in the remote forests of the Amazoon Basin will no longer be restricted to a diet of rice and beans. They can have orange juice, green vegetables (in dehydrated form), meat, milk and fish that need only the addition of a little water to restore them to a form approximating that in which they were produced by Nature. Millions of tons of cargo space will be saved in moving the products to the markets of the world, for sometimes these dehydrated foods can be reduced to one tenth of their original bulk.

PENICILLIN - A WONDER DRUG.

/By Dr. C. M. Fletcher.

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One of the most important advances ever made in medical science has been the discovery during the past 10 years of the group of drugs known as the sulphonamides. These substances have the power of preventing the multiplication within the body of the microbes that cause many serious diseases. The lives that are being saved every day throughout the world by use of these drugs must be numbered in many thousands. But these drugs have one great disadvantage. Although they are far more poisonous to microbes that cause disease than they are to man, they can produce unpleasant and even dangerous results if given to a patient in large doses.

During the past three years scientists have brought into use a drug far more powerful than the sulphonamides, but which is quite harmless to man. The discovery of this substance was due to the keen observation of a British bacteriologist, Professor Fleming, in 1929. He was cultivating in his laboratory the microbe that causes boils. To do this, he had placed the microbe on the surface of a jelly in a shallow dish. He had meant it to grow alone, but, as any housewife who has made jam knows, it is not easy to prevent a mould from growing where it is not wanted, and on Professor Fleming's jelly a mould gr-

Mould was free from microbe

His experiment was spoilt and he might have thrown the jelly away, but he noticed an important thing. The microbe had grown all over the jelly except where the mould was. The mould had apparently prevently prevented the microbe from growing. He took a sample of the mould and set it to grow on the surface of some broth and then examined the broth after a few days. He found it had acquired from the mould the property of preventing the growth of microbes.

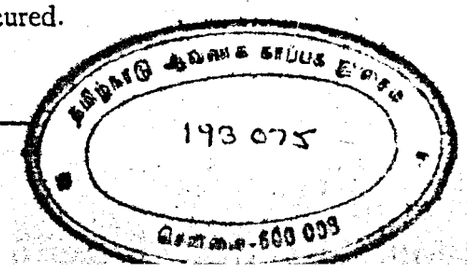
Fleming supposed that the mould had secreted into the broth some substance which could stop the growth of microbes, and since the mould was found to be a common one called Penicillium Notatum, he called this substance penicillin. He realised that penicillin might be used to treat infections in man, but his attempts to extract pure penicillin from the broth failed, and his crude extract proved poisonous to animals when injected into them.

No further progress was made until 1940, when a team of scientists at Oxford, headed by Professor Florey, again attacked the problem of extracting the penicillin from the broth. It proved to be very difficult to do so, but eventully a much purer specimen of penicillin was isolated. It was a yellow powder, easily soluble in water. Tested against disease micbores growing in artificial culture, it was found to be at least a thousand times more powerful in preventing their growth than the most powerful of the sulphonamide drugs, and when it was injected into mice that had received a fatal dose of microbes, it cured the infection rapidly, without harming the mice.

Intruder Microbes

The next step was to try it out in infection in man. For this, much larger quantities of penicillin were needed, and here another problem was encountered. Although the mould was easy to grow on a large scale, it sometimes refused to produce any penicillin. This failure was found to be partly due to the fact that the large culture bottles which were employed became contaminated by other moulds and microbes, some of which destroyed the penicillin as soon as it was formed. Eventually, means of excluding all such intruders were devised, and at last enough penicillin to treat a patient was produced.

The earliest trials on man were made in 1941. Five cases of serious infections, in which sulphonamides had been given without effect, were treated by the injection of penicillin continuously into the patients' veins by day and night. The first two did not receive adequate amounts, and were only temporarily benefited. The other three were all cured.



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