The Lisbon Earthquake

Have you ever had to wait at the drug store, watching a prescription being made up? The pharmacist measures out on a scale all the substances and powders that are needed for the finished medicine, using a finely calibrated set of weights, gram by gram or ounce by ounce. I feel like a chemist when I talk to you over the radio. My weights are the minutes, and I have to measure them out very accurately: so much of this and so much of that, if the final mixture is going to come out right. "How come?" you will ask. "If you want to tell us about the Lisbon earthquake, begin by telling us how it started. And then you can go on to tell us what happened next." But if I followed this advice, I don't think the description would be much fun. One house after another collapses; one family after another loses their lives. The panic created by the spreading fire, the flood of water, the darkness, the plundering, the groans of the injured, and the cries of people searching for their loved ones—to hear of all this and nothing else would please no one. And besides, those are the very things that recur in more or less the same form in every natural disaster.

But the earthquake that destroyed Lisbon on November 1, 1755, was not a disaster like a thousand others. In many respects it was remarkable, even unique. And this is what I would like to tell you about. In the first place, it was one of the largest and most destructive earthquakes of all time. Yet it is not for this reason alone that it excited and preoccupied the entire world like few other events in that century. The destruction of Lisbon in 1755 was roughly equivalent to the destruction of London or Chicago today. In the middle of the eighteenth century, Portugal was at the height of its power as a colonial empire. Lisbon was one of the most prosperous trading cities in

the world. Year in, year out, its port at the mouth of the Tagus was filled with ships, and its streets were lined with the great trading houses of English, French, and German—especially Hamburg—merchants. The city had 30,000 houses and well over 250,000 inhabitants, of whom roughly a fourth perished in the earthquake. The king's court was famous for its strictness and its pomp. The many accounts of the city that appeared in the period preceding the earthquake contain the most curious descriptions of the stiffness and solemnity that could be seen on summer evenings in the main square of the city, the Rucio, when the courtiers and their families congregated in their carriages and chatted together for a while without descending from their vehicles. Moreover, people had such an exalted conception of the king of Portugal that one of the many pamphlets which spread precise descriptions of the catastrophe throughout Europe was quite unable to come to terms with the fact that such a great king had been affected by it. This extraordinary reporter notes: "Just as the magnitude of a disaster can be fully appreciated only once it has been overcome, so too you can grasp the awful import of this dreadful catastrophe only when you reflect that a great king, together with his wife, spent the entire day in a carriage, in the most wretched state, abandoned by all." The pamphlets in which such accounts can be studied took the place of newspapers at that time. Whoever was able to do so obtained eyewitness descriptions in as much detail as possible, and then printed and sold them. In what follows, I shall read to you from such a report—one which records the experiences of an Englishman who was then residing in Lisbon.

There is a further, special reason that helps to explain why this event affected people's minds so powerfully—why countless pamphlets passed from hand to hand, and indeed why new descriptions continued to make their appearance almost a century later. The reason is that this earthquake was the most powerful on record. Its impact was felt throughout Europe and as far away as Africa. It has been calculated that, together with its most distant tremors, it affected two and a quarter million square kilometers—a huge area. Its most powerful shocks extended from the Moroccan coast to the shores of Andalusia and France. The cities of Cádiz, Jerez, and Algeciras were almost completely destroyed. An eyewitness in Seville claimed that the cathedral spires shook like reeds in the wind. But the most powerful tremors were transported by the sea. From Finland to the Dutch East Indies, mighty tidal waves were felt; and it was calculated that they moved with amazing speed—in a quarter of an hour!—from the Portuguese coast to the mouth of the Elbe. And these were just the events actually experienced at the time of the disaster. Even more significant is the way in which people's imaginations brooded on the strange phenomena of nature that had been observed in the weeks preceding the earthquake and that subsequently—and probably not always without justification—were regarded as portents of the catas-

trophe to come. In Locarno, in the south of Switzerland, for example, some two weeks before the disaster, steam was seen coming out of the earth; within a couple of hours it had transformed itself into a red mist, which, toward evening, fell as purple rain. From then on, people claimed to have observed terrible hurricanes, with cloudbursts and floods in western Europe. Eight days before the earthquake, the ground near Cádiz was found to be covered with a vast quantity of worms.

No one was more fascinated by these remarkable events than the great German philosopher Kant, whose name may be familiar to some of you. At the time of the earthquake he was a young man of twenty-four, who had never left his hometown of Königsberg—and who would never do so in the future. But he eagerly collected all the reports of the earthquake that he could find, and the slim book he wrote about it probably represents the beginnings of scientific geography in Germany. And certainly the beginnings of seismology. I would gladly tell you something of the route taken by this science from that description of the earthquake of 1755 down to the present day. But I must take care lest the Englishman whose first-hand account I still wish to read to you gets lost in the crowd. He is waiting impatiently, because after 150 years in which no one has taken any notice of him, he would welcome the opportunity to speak once again and hence will permit me to say only a few words about our present knowledge of earthquakes. A word to the wise: it is not what you imagine. I would wager that if I were to interrupt my talk briefly and ask you how you would go about explaining earthquakes, your first thoughts would be of volcanos. And the fact is that volcanic eruptions often are associated with earthquakes, or at least announced by them. And this is why people have imagined for two thousand years—from the ancient Greeks down to Kant, and indeed even longer, roughly until 1870—that earthquakes came from the fiery gases and steam arising from the interior of the earth and suchlike. But when people began to take measurements and to make calculations whose subtlety and precision you and I can scarcely conceive of—in short, when they started to look at the problem scientifically—the truth turned out to lie in quite a different direction, at least insofar as major earthquakes like the one in Lisbon were concerned. They arise not from the innermost core of the earth, which to this day is thought of as being liquid, or at least mudlike, a sort of seething sludge, but from events in the earth's crust. The earth's crust is a layer about 3,000 kilometers thick. It is in a state of permanent turmoil; the masses of matter it contains are constantly shifting and striving to achieve equilibrium. We know some of the factors that disturb this equilibrium, and are striving unceasingly to discover others. So much is clear: that the most important changes are caused by the constant cooling of the earth. This gives rise to huge tensions in the rock formations and ends up fracturing them, seeking a new equilibrium through a reconfiguration that we experience as an

earthquake. Other changes arise from the erosion of the mountains, making them lighter, and accretions in the seabed, which thus becomes denser. Storms that rage around the globe, especially in autumn, have an impact on the earth's surface. And last, scientists are in the process of establishing what effect the gravitational pull of extraterrestrial bodies might have on the surface of the globe. "But," you might say, "in that case, the earth can never come to rest. There must be a continuous series of earth tremors!" You're quite right about that. The extremely sensitive instruments that we have nowadays—in Germany alone, there are thirteen earthquake-monitoring stations in various towns—these sensitive instruments are never entirely still. In other words, the earth experiences tremors all the time, but for the most part not so violently that we notice.

All the worse if suddenly, out of the blue, we feel a tremor. This "out of the blue" should be taken quite literally. "For," says our Englishman, who has at long last managed to have his say,

> the sun now shone in its full glory. The sky was completely blue and clear, and there was not the least sign of any natural event. Then, between nine and ten in the morning, I was sitting at my desk when my table moved, and since I could not discern any reason, I felt some surprise. I was wondering what could possibly have been the cause when the house suddenly shook from top to bottom. From beneath the ground arose a sound of thunder, as if a storm were raging at a great distance. I put my pen down quickly and leaped to my feet. The danger was great, but I was still hopeful that the matter would pass without much ill effect; but the very next moment put an end to any doubts on that score. There was a shattering noise, as if all the buildings in town were collapsing at the same time. My house, too, was profoundly affected: the upper stories instantly collapsed, and the rooms I was staying in swayed so much that all the utensils came crashing down. I truly thought my last moment had arrived, for the walls were bursting apart and great stones were falling out of the joints—all the beams seemed to be supported by thin air. At this very moment the sky went dark, and it became possible to recognize any object. Everything was in Stygian gloom, either from the immeasurable amounts of dust caused by the collapsing buildings, or because of the volumes of sulphurous fumes that arose from the bowels of the earth. At last the night became light once more, and the force of the tremors abated. I regained some of my composure and began to look about me. I realized that my life had been spared up to then thanks to a trivial circumstance. Had I been fully clothed, I would surely have fled into the street, where I would have been buried beneath the buildings crashing all around. I threw on my coat and shoes and rushed out into the street in the direction of St. Paul's cemetery, convinced that the high ground on which it was situated would afford me some measure of safety. No one was able to recognize the street in which he lived; many were unable to describe what had happened to them. Everything was scattered, and no one knew what had happened to his family or possessions. From the heights of the cemetery, I now became witness to a terrifying spectacle: out on the ocean, as

> far as the eye could see, there was a throng of ships being tossed about by the waves and crashing into each other as if they were the playthings of a mighty storm. Suddenly the huge quay by the shore sank into the sea and vanished, together with all the people who had imagined that standing on it ensured their safety. At the same time, the boats and vehicles in which so many were trying to escape all suddenly became victims of the sea.

As we know from other reports, it was about an hour after the second and most destructive tremor that the vast wave—twenty meters high—which the Englishman could see from a distance came crashing down over the city. As the tide withdrew, the bed of the Tagus was suddenly left completely dry: the ebb was so powerful that it drained all the water from the river. The Englishman's account concludes as follows: "When evening settled on the desolate city, the landscape seemed to turn into a sea of fire; the brightness was such that you could have read a letter by it. At a hundred different points at least, the flames rose to the sky, and they blazed for six days. What the earthquake had spared, they now consumed. As if petrified by fear, thousands gazed at the flames, while women and children prayed to the saints and angels for help. The ground continued to tremble more or less violently, often for a quarter of an hour on end."

So much for that day of misfortune, November 1, 1755. The catastrophe it brought in its wake is one of the very few that can render men as impotent now as they were 170 years ago. But here, too, technology will find ways to combat it, even if in a roundabout way: by prediction. For the moment, however, the senses of some animals are still superior to our most sensitive instruments. Dogs, especially, are said to display unmistakable signs of agitation days before the eruption of an earthquake, so that people keep them as helpers in the lookout posts in earthquake-prone regions. This brings me to the end of my twenty minutes, and I hope they have not passed too slowly for you.

Children's narrative broadcast by Berliner Rundfunk, October 1931. *Gesammelte Schriften,* VII, 220–226. Translated by Rodney Livingstone.

The Destructive Character

It could happen to someone looking back over his life that he realized that almost all the deeper obligations he had endured in its course originated in people who everyone agreed had the traits of a "destructive character." He would stumble on this fact one day, perhaps by chance, and the heavier the shock dealt to him, the better his chances of representing the destructive character.

The destructive character knows only one watchword: make room. And only one activity: clearing away. His need for fresh air and open space is stronger than any hatred.

The destructive character is young and cheerful. For destroying rejuvenates, because it clears away the traces of our own age; it cheers, because everything cleared away means to the destroyer a complete reduction, indeed a rooting out, of his own condition. Really, only the insight into how radically the world is simplified when tested for its worthiness for destruction leads to such an Apollonian image of the destroyer. This is the great bond embracing and unifying all that exists. It is a sight that affords the destructive character a spectacle of deepest harmony.

The destructive character is always blithely at work. It is Nature that dictates his tempo, indirectly at least, for he must forestall her. Otherwise she will take over the destruction herself.

The destructive character sees no image hovering before him. He has few needs, and the least of them is to know what will replace what has been destroyed. First of all, for a moment at least, empty space—the place where the thing stood or the victim lived. Someone is sure to be found who needs this space without occupying it.