To Dig For Earth's Secrets?

British Scientist Would Sink a Shaft 12 Miles Deep

Sir Charles A. Parsons

Keystone Photo

Where Drills Go Deep

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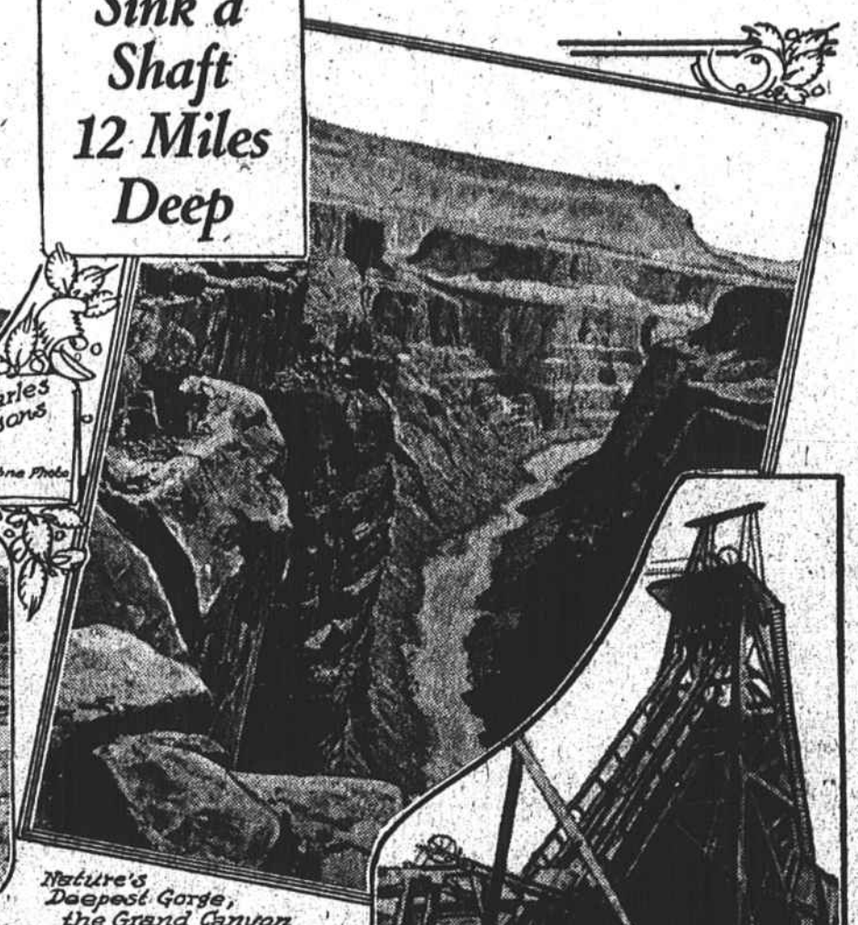

Nature's Deepest Gorge, the Grand Canyon

At the Mine Shaft (Underwood & Underwood Photo)

By JOHN DICKINSON SHERMAN

WANTED: An American multi-millionaire philanthropist to dig a hole ten or twelve miles deep right down towards the center of the earth! What for? So as to find out what's there. And why? Well, science says a systematic study of the earth's crust is one of the most pressing needs of the day. To what end? That all mankind may be benefited by increased knowledge of the sources of energy.

Sir Charles A. Parsons of England is the man who makes the suggestion about financing the project. "It would be an admirable thing," he says, "if some American multi-millionaire—we have few of them left in Great Britain now—would donate the money for the work. Otherwise the work will have to be done through international effort because of the tremendous expense."

What is the expense? Well, something like $100,000,000. How long will it take? Oh, something like 50 years. Can it be done? Sir Charles says he's made experiments that prove it can. Given the money, the engineers will do the rest.

Now, this man Parsons is an engineer whose reputation makes it worth while to pay attention to what he says. He's Sir Charles Algernon Parsons, K. C. B. (1911), C. B., M. A., D. Sc., F. R. S., etc. He was born in 1854, the fourth son of the third earl of Rosse. All the engineering world knows him as the man who has probably had most to do with the adaptation of the steam turbine engine to commercial purposes on a large scale. He is the head of several big engineering and electrical works at Newcastle-on-Tyne and is doubtless able to contribute liberally to the project which has largely occupied his attention for twenty years or more.

It's a fascinating notion, this boring into the crust of old earth to see what old Dame Nature is holding out on us. The scientific sharps have figured and figured until they now think that the whole mass composition of the whole envelope of the earth is about like this: The lithosphere or rocky portion about ten miles thick and forming about 93 per cent of whole; the hydrosphere or seas, nearly 7 per cent, and the atmosphere about 0.08 per cent. Now, about 95 per cent of the surface rocks is igneous or volcanic. These preponderant rocks solidified from a fused condition and are evidence that the interior of the earth whence they came is in a molten condition. How deep down is this molten core? That's unknown of course, but volcanic activities in various parts suggest that it is not many miles deep and also that the rocky crust is not everywhere of the same thickness.

The newest volcanic field is the Katmai National monument in southwestern Alaska. In 1912 Mount Katmai blew off its head and covered a large part of the world with ashes and dust. The explosion created the "Valley of Ten Thousand Smokes"—where the earth is hot and superheated steam issues in thousands of hissing columns. The geysers of Yellowstone National park show an older volcanic ground, partly cooled off and much eroded. Halemaumau, "Lake of Everlasting Fire" in the crater of Kilauea in the Hawaii National park, is always a mass of molten lava, always in motion like a great boiling spring, apparently a direct connection with the liquid center of the earth.

Offhand the thickness of the rocky crust of the earth would seem to vary greatly. The highest spot on the earth's surface is the summit of Mount Everest, India-China, 29,000 feet above sea level. The lowest is the Dead sea in Palestine, 1,290 feet below sea level. The corresponding points in Continental United States are Mount Whitney in California, 14,502 feet; Death Valley, California, 276 feet. The mean depth of all the oceans and seas is estimated at about two and one-half miles. The Pacific averages 12,960 feet, the Mediterranean 4,560.

The deepest natural hole in the earth's surface is the Grand Canyon National park in Arizona. Here the Colorado river, a stream 300 feet wide and 30 deep, has carved a canyon ten miles across and 6,000 feet deep. Crater lake, in Crater Lake National park in Oregon, in the crater of Mount Mazama, is more than 2,000 feet deep, with 1,000 feet of cliffs surrounding it. The East Face of Longs peak, "King of the Rockies," in Rocky Mountain National park, presents an almost vertical front of 2,200 feet.

Man has been industriously digging into the earth for treasures of various kinds, but his deepest hole is not much more than a mile. The deepest shaft is stated to be the St. John del Rey gold mine in Brazil, 6,500 feet. There are shafts in India and the Transvaal which fall about 500 feet short of this depth.

Oil wells have been driven deeper than mine shafts. The deepest is stated to be at Fairmount, W. Va., 7,579 feet. There are others over 7,000 feet deep in California, Pennsylvania and Germany.

Under present conditions the limit to the depth of a mining shaft is set by the heat of rocks. This heat varies, but in general a rise of one degree in temperature follows a drop in level of 40 feet. At the depth of a mile men can work with difficulty, if at all. In some of the shafts of the Comstock Lode, Virginia City, Nev., the waters at 600-800 feet are boiling.

So it appears that man has not got very far into the earth's surface, as compared with the proposed 12-mile hole. And his experience to date gives hint of the difficulties he will encounter. Apparently every 100 feet below a mile is a good deal like an inch on the end of a man's nose.

These things, however, do not daunt the modern engineer, as personified in Sir Charles. He has been advocating this 12-mile hole project for a long time. In his presidential address in 1904 to the engineering section of the British association he said, in part:

"A most important investigation needing attention is the exploration of the lower depths of the earth. At present the deepest shaft is, I believe, at the Cape, a little over a mile in depth, and the deepest bore hole is one made in Silesia by the Austrian government, which is about the same depth. What would be found at greater depths is at present a matter for conjecture, founded on the dip and thickness of strata observed at or near the surface. Much money and valuable lives have been devoted to exploration of the polar regions, but there can be no comparison between the scientific interest and the possible material results of deep earth exploration and a great engineering attack on deep-seated geology.

"There would be some departure from ordinary engineering practice in sinking the proposed exploratory shaft. It would be sunk in a locality to avoid as far as possible water-bearing strata and the necessity of pumping. It would be of similar size to that of a modern colliery shaft: It would be sunk in stages of about half a mile in depth, and at each stage there would be placed hauling and other machinery, to be worked electrically, for dealing with the operations in each stage. The depth of each stage would be restricted to half a mile, in order to avoid a disproportionate cost in the hauling machinery and the weight of rope, as well as increased cost on the cooling arrangements arising from excessive hydraulic pressures.

"At each second or third mile in depth there would be air locks to prevent air pressure from becoming excessive owing to the weight of the superincumbent air, which at from two to three miles would reach about double the atmospheric pressure at the surface. A greater rise in pressure than this would be objectionable for two reasons—first, from the inconvenience to the workmen; second, from the rise in temperature due to the adiabatic compression of the circulating air for ventilating purposes. The air pressure immediately above each air lock would thus reach to about two atmospheres and beneath to one atmosphere.

Sir Charles, in 1904, estimated the cost of sinking at $1,000,000 for the first two miles, which would require ten years to sink. He expected a rock temperature of 122 degrees Fahrenheit at that depth. The cost of sinking eight miles he placed at $1,250,000. It would require fifty-five years to sink and the rock temperature at the bottom he expected to be 212 degrees Fahrenheit.

Sir Charles was in New York the other day. The Engineers' club gave a luncheon to him and Senator Luigi Luiggi, president of the Society of Italian Engineers, and Sir Charles made an informal address, in which he talked about his favorite project. He said an exploration of this character might reveal the existence of new chemical elements and of metals heavier than any known now.

"We know nothing of what is below our feet," said Sir Charles. "Instead of sending out polar expeditions, wouldn't it be better to go down and see what we come to? It would be a great bond of union for the various nations to combine on such an enterprise. We have evidence from earthquake waves that it is hot 20 miles below the earth's surface. It would take 20,000,000 pounds sterling to finance a big company to do the work. It could be done in 50 years."

Discussing his project after the luncheon, Sir Charles said British scientists, as well as officials of the Royal observatory at Greenwich, were greatly interested in the scheme.

"We don't know what is down there and we ought to; that's the point," he said. "I have been doing preliminary experimentation for eight years and I am certain that such a shaft is a practicable engineering project and that the only thing necessary to make it a reality is the money. It might be possible to go deeper than 12 miles.

"I would have the shaft 20 feet in diameter and lined with granite, which experiments have shown would not fall in. The shaft would be sunk to different levels, in the same way that mining shafts are sunk, and it would be necessary, after we got down to a sufficient depth, to have the heat pumped out. At 12 miles the temperature is probably as high as 272 degrees Fahrenheit."

Dr. Arthur Selwyn Brown discusses Sir Charles' project at considerable length in the New York Herald-Tribune. He says in part:

"Engineers who have worked in mines candidly admit that a deep exploration shaft properly managed would be of inestimable value to science. There should be one in every continent equipped with a full scientific staff of observers and instruments, like an observatory. But when such a great depth as Sir Charles Parsons suggests is mentioned, they do not at all share his sanguine views. A depth of about three miles is the best they would admit, under present experience, to be possible for a shaft. There are numerous difficulties in deep sinking which are cumulatively felt every foot that is sunk when the hot zone is met at depth. Ventilation, water bailing, hauling would all present difficult problems at the depth of two miles and there would be the difficulty in getting the granite shaft-lining blocks down and set in position.

"Nevertheless, the proposal is one that merits attention. A shaft properly sunk to the greatest attainable depth would be of far greater scientific value than a large number of polar and equatorial explorations. We desire to know more of our earth's crust than we do, of its physical composition, its periodic changes, its temperature, magnetic and radio variations and its volcanic movements. We need a number of underground observatories to secure data for a number of unsolved problems of science and to shed further light upon geology, mineralogy and chemistry. The cost of sinking and equipping a number of deep shafts would be abundantly repaid by accurate studies on the earth's magnetism and radio activities alone. These are among our most powerful sources of energy. Little is known about them. There can be little doubt, however, that when they are fully understood they will become the most potent factors in our industrial and social lives.

"A thorough, systematic study of the interior of the earth's crust is one of the greatest and most pressing fields for exploration today. It will need the establishment of a number of deep underground scientific observatories where observations may be made every hour of the day and night over a series of years. There should be one of these on every continent. They need not be sunk to the great depth suggested by Sir Charles Parsons. That appears to be an impossible depth. They should be as deep as they can be sunk. Subterranean observatories would be such valuable national assets when properly established that it seems only a question of time when this is realized by the world's governments."

HOW TO KEEP WELL

Dr. Frederick R. Green, Editor of "Health."

What Is an Infection?

THERE are good and bad citizens in the invisible world. Just as there are good and bad men, wild dangerous animals and tame useful animals, so there are good and bad germs.

The good germs are those which help man do his work. The yeasts that raise the bread, the germs that sour the milk, the "bugs" that flavor the different kinds of cheese, the "mother" that turns cider to vinegar, the germs that sweeten the soil—all these and many others are good germs.

The bad germs are those, which, when they grow in or on the human body, make some poison which harms the body and may kill it.

The diphtheria germ, which grows on the mucous membrane of the child's throat, just as mold grows on bread, makes a poison as it grows, which the child's throat absorbs. It is the poison the germ makes, and not the germ itself which kills the child.

The tuberculosis germ, which grows only in the dark and which dies in the sunlight in a few minutes, is breathed into the lungs, where, in growing, it forms a little cheesy lump, which softens and breaks down, forming a little hole or cavity in the lung. Tuberculosis of the lung was called "consumption" because the lung was literally consumed.

What is an "infection" and what happens when a cut place in the skin becomes infected?

When the skin is cut, the blood oozes out of the torn blood vessels. If kept clean and let alone, the blood thickens and hardens, forming an air-tight scab over the wound. Under this cover the torn fibers are brought together, the gap between the cut ends closed up by the white blood corpuscles, the repair men of the body, and, as we say, healing takes place. The scab shrinks, dries up and falls off leaving a little red spot, which later becomes white and which forms a scar.

But suppose some one of the four or five germs which are called "pus germs" get into the wound. What happens then? The blood is exactly the kind of ground on which they grow best. They begin to grow, just like yeast germs in warm dough. They break down the skin and flesh around the wound, to form pus or matter. The wound becomes red, swollen, hot and painful. The germs may get into the lymphatics and be carried to the nearest glands, where they form abscesses. They may get into the blood and be carried all over the body, causing blood poisoning. The poisons they produce in the wound are absorbed, causing general poisoning.

Paint any cut or wound with iodine. Tie it up, if necessary, with a clean, soft cloth. Don't put anything else on it. Keep it dry. Keep all kinds of dirt out of it. Nature will take care of it if you give her a fair chance.

Drying Out in Winter

AS SOON as cool weather begins, we put on heavier clothes, close up our houses and start our stove and furnaces. The outside air can't get in and the inside air soon has all the moisture dried out of it by the stove or furnace heat.

The result is that by the middle of the winter most of the furniture is loose in the joints and most of the people in the house are suffering from colds. This is due to living in dry, hot air. Human beings weren't made to live in dry air. A great zoologist once said, "Man came from fishes and he still retains some of the sea in his body." A reasonable amount of moisture is necessary for health.

When we live, day after day, in stove, furnace or steam-heated air, the dry air takes up the moisture from our bodies, instead of giving up moisture to us as it should.

This constant drying out shows in two ways. Our skin becomes too dry. Our heavy clothes and hot rooms keep it too warm. "Winter itch" is usually caused by too heavy clothes and too dry air.

The other result is that the dry air parches our throat and lungs. It takes up all the moisture in our nose, throat and bronchial tubes.

Our throats are too dry, our skin is too dry. We are sensitive to the least change of temperature. We chill easily. We "sit in a draft" and then we say we "catch cold." Of course we do. We've been kiln drying our bodies for weeks and everything is ready for a conflagration.

All living and working rooms which are artificially heated should have a reasonable amount of moisture in the air. All properly constructed furnaces have a water pan to moisten the hot air. Fill it every day. You'll be warmer and healthier. Moist air at 60 degrees Fahrenheit is warmer than dry air at 75 degrees Fahrenheit and much healthier.

If your house is heated with stoves, keep an open pan of water on the back of the stove. You'll be surprised to see how fast the water goes.

If you have steam or hot water heat, keep a pan of water in every room. This will not only keep your furniture from falling to pieces but it will keep your lungs and skin from drying out.

Real "Infant Industry"

Australia has one cotton-spinning mill, equipped with about 20,000 spindles, which is operated on an average of 20 hours daily throughout the year. It is located at Wentworthville, about 26 miles from Sydney, and has been running slightly more than a year. Its output of yarn is sold to a small weaving mill and a hosiery plant in Sydney.

Humility is the light of understanding.—Bunyan.

Time spares nothing that has been done without him.