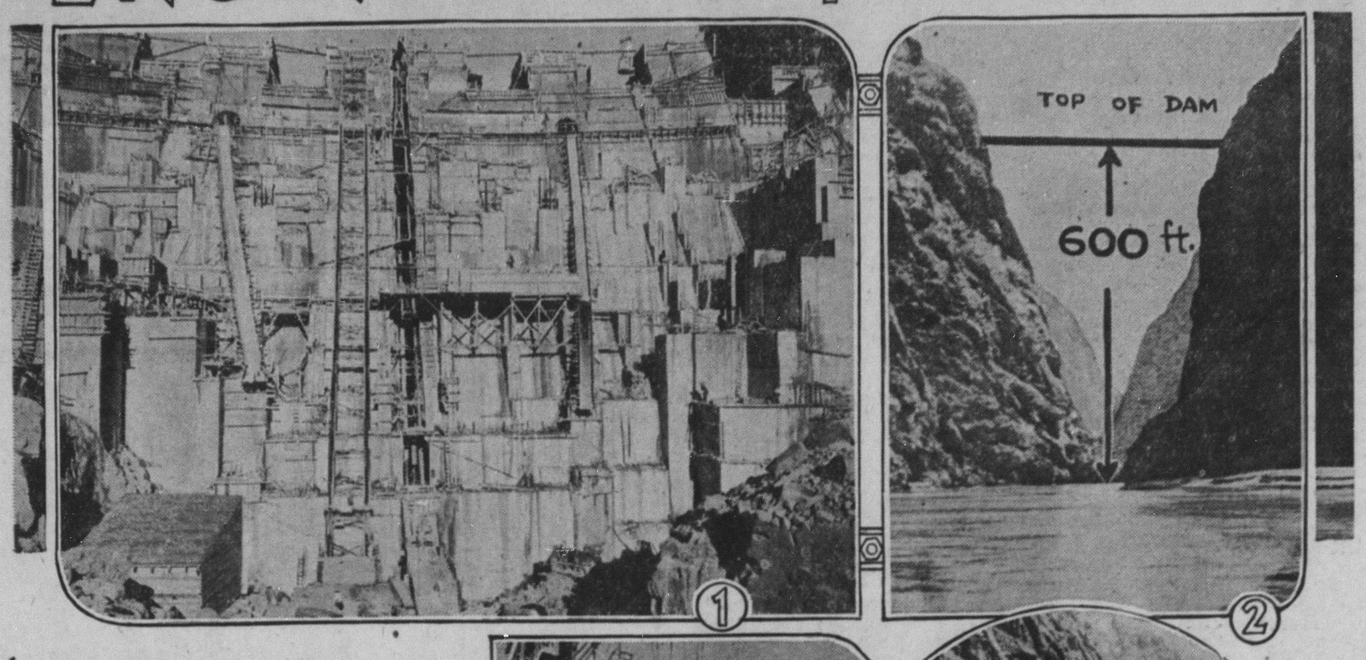
"THE WORLD'S GREATEST ENGINEERING PROJECT"



By ELMO SCOTT WATSON

SOME time late in 1936 or early in 1937 Uncle Sam will be able to say to the other nations: "If you want to see one of the modern wonders of the world, come down into the southwestern part of my country and take a look at a job that I've just finished on the Colorado river." And in saying that he won't be uttering any idle boast. For the completion of the Hoover dam will mark the conclusion of one of the greatest engineering feats of all time, greater even than another of the triumphs of Uncle Sam, engineer, —that of digging the Panama canal—and when this gigantic mass of steel and concrete is finished it will be the biggest structure of its kind in the whole world.

Not the least part of Uncle Sam's triumph will be the fact that the dam and its appurtenant works will be completed in record time. When the contractors began work on April 30, 1931, they were to be allowed seven years in which to finish the job. That would have meant its completion by April 20, 1938. Right now they are nearly two years ahead of schedule and it is estimated that at the present rate of progress the whole thing will have been done in six years or less.

Impressive as are the statistical data connected with the Hoover dam, the average person cannot get an adequate idea of the immensity of the project from abstract figures alone. Most of us are poor judges of distance so it would mean little to say that the dam will have a maximum height of 730 feet above its foundation rock, that the top of it will be approximately 600 feet above the level of the river and that it will raise the water surface of the river 584 feet.

But let's get at it this way: If the Washington monument were set up alongside the dam and you stood on top of that monument, some one standing on top of the dam would have to let down nearly 60 yards of rope in order to pull you up to where he stood.

Can you visualize 4,400,000 cubic yards of concrete? Probably not. But if some one told you about a tower that was 100 feet square and rose two and a half miles in the air, you could get some idea of the amount of concrete that's going into the Hoover dam, the power plant nearby and the appurtenant works. That amount of concrete would build a standard paved highway, 16 feet wide, which would extend all the way from Seattle, Wash., to Miami, Fla.

You'll admit that 10,000,000,000,000 gallons of water is a considerable amount of moisture. That means 80,000 gallons for every man, woman and child in the United States. That 10,000,000,000,000 gallons is the amount of water which the reservoir created by the Hoover dam will hold. They also figure it in acre-feet, an acre-foot being the amount of water that will cover one acre one foot deep. When this reservoir is full it will contain 30,000,000 acre-feet—enough water to cover the whole state of New York to the depth of a foot.

But enough of statistics for a moment in favor of some more general information about this gigantic project. The Hoover dam is being built in the upper Black canyon on the Colorado river about 25 miles southeast of Las Vegas, Nev., where the river forms part of the Arizona-Nevada boundary. The purposes of the project are flood control and general river regulation (for the Colorado has long been one of the most unruly and destructive of all the rivers in America), irrigation, silt control, domestic water supply and power development. For these purposes the project calls not only for the construction of the huge dam and power plant in Black canyon but also the construction of the All-American canal in southern California.

The total cost of the project is placed at approximately $165,000,000 divided up as follows: dam and reservoir, $70,600,000; All-American canal, $38,500,000; power development, $38,200,000; and interest during construction, $17,700,000. But lest anyone think, since this is a federal project, that its construction means that many millions out of the pockets of American taxpayers, let it be stated at once that Uncle Sam's investment in it (in the form of congressional appropriations) will be repaid in full within the next 50 years from the income derived from supplying irrigation water and from the sale of power generated in the power plant, a huge structure of steel and concrete, 1,260 feet long, which will stand just below the dam.

Although power development was a secondary consideration in planning this project, it promises to become a very important one in the future because of the effect which cheap power will have upon modernizing community and civic life in the Southwest. The plans for this power plant call for the installation of 15 turbines of 115,000 horse power each and two turbines of 55,000 horse power each with 15 generators of 82,500 kilovolt-ampere capacity each and two generators of 40,000 kilovolt-ampere capacity each. The larger units exceed in size the largest yet manufactured, the 83,000 horse power turbines and 76,500 kilovolt-ampere generators in the world-famous Dnieprostroy plant in Russia. One of these mammoth generators will weigh over 2,000,000 pounds, will measure 40 feet in diameter and stand 32 feet high.

This power plant will have a total capacity of 1,835,000 horse power, or four times the amount developed on the American side of Niagara Falls and nearly double the amount developed both at Niagara Falls and Muscle Shoals, even when the latter reaches the peak of its capacity. It will be operated and maintained by the city of Los Angeles and the Southern California Edison company, under the general supervision of a director appointed by the secretary of the interior. The city will generate power for the states of Arizona and Nevada, a large number of southern California municipalities and for the Metropolitan Water district, and the Southern California Edison company will generate power for company purchasers.

An essential part of the project is the construction of the All-American canal, so-called because it is entirely within the United States. It will begin about 15 miles northeast of Yuma, Ariz., where the new Imperial diversion dam will be built, and will connect with the present system of irrigation ditches in the Imperial valley, a distance of about 80 miles. At the same time, a 130-mile extension of this canal will pass east of the Salton sea and carry water to the adjacent Coachella valley.

From the beginning of the All-American canal near Yuma it will pass through a ridge of shifting sand and there the deepest cut will be about 100 feet deep. Huge siphons or culverts will be needed in many instances to carry the canal under numerous washes.

Plans call for ten of these on the main line and 79 on the Coachella branch. Siphons will also be used to carry the water under the Alamo and New rivers. The canal is expected to cost at least $27,000,000 and bids will be asked soon by the bureau. Plans contemplate a maximum canal capacity of 15,000 second-feet.

The Imperial dam, to be of the floating type, will be 1,700 feet long and will raise the river level 22 feet. The canal will provide irrigation water for 850,000 acres in the Imperial valley and an additional 150,000 acres will be brought under cultivation by the Coachella extension.

Some distance up the Colorado river will be located the Parker dam, intended both as a power plant and as a diversion dam. Designs for this hydroelectric plant are rapidly nearing completion. There, 265 miles directly across the state from Los Angeles, will originate the water supply for the Metropolitan Water district.

The Parker reservoir will be located approximately 150 miles downstream from the Hoover dam and is a natural site for a diversion barrier.

The first 113 miles extending west to Shaver's Summit will require heavy expenditure for construction and operation, as the line will make an ascent of 1,500 feet. Power from the Hoover dam will be used to operate pumping lifts.

Although the Metropolitan Water district is paying for the construction of the Parker dam by the reclamation bureau, the project will be of immense importance to the Southwest. Ultimately, it is proposed to build a power plant at the dam and then to extend transmission lines on down the river to the Imperial dam, using the power thus delivered to pump water for irrigation purposes in the vast undeveloped area in Arizona. This project will be known as the Gila development.

One unique and interesting phase of the gigantic Hoover dam project was the tremendous job of diverting the flow of the Colorado river before the construction of the dam could be started. To do this it was necessary to drive four tunnels, 50 feet in diameter, through the rock of the canyon walls, two on each side of the river and build a temporary earth and rock fill coffer dam to send 200,000 second-feet of water rushing through the tunnels which have a total length of 15,934 feet or three miles.

After their use for river diversion, these tunnels will be utilized in the project scheme as follows: After being plugged with concrete at locations approximately one-third their length below the inlet ends of the inner tunnels and about midway in the outer tunnels, the two inner tunnels will contain 30-foot steel pipes connecting intake towers in the reservoir with the penstocks to the power plant and the canyon wall outlet works and the lower portions of the two outer tunnels will be used for spillway outlets.

And these 30-foot steel pipes bring up again the phrase "world's largest" which must be used so often in connection with the Hoover dam. For they are the largest pipes ever constructed in the history of manufacturing. They are made by an Ohio company and because they are too big to be shipped by railroad from the company's plant in the Buckeye state, it had to build a fabricating plant near the dam. One length of this pipe, 12 feet long and 30 feet in diameter, is made from three steel plates, so heavy that only two plates can be shipped from the steel mill in Ohio to the fabricating plant near the dam on one railroad car. Two such lengths of pipe welded together comprise one erection section weighing 150 tons, which is heavier than many types of railroad locomotives.

And this is typical of the scale upon which everything is being done at the Hoover dam. To tell of any detail of the work there is to deal in superlatives, for it is there that Uncle Sam, the greatest engineer in the world, is working day and night, rushing to completion "the world's greatest engineering project."

1. A recent view of the dam, taken from a point downstream.

2. Showing the site of the dam before construction began. Its height of 600 feet is more than twice the height of any concrete dam now in existence.

3. This picture was taken before tons of water began rushing through these diversion tunnels.

4. This is how they "pick 'em up and lay 'em down" at the dam. A motor truck is lifted like a child's toy by the 150-ton crane, the biggest in the world.

5. The first completed tower for transmission of power from the dam. It is 109 feet high and stands near Kingston camp.

That Body of Yours

By JAMES W. BARTON, M. D.

Natural Defenses of the Body

ALTHOUGH man has a wonderful brain, there are a number of things done by the body to protect him that are not directed by man's will.

Something irritates the nose and a sneeze removes it. Something irritates the throat or bronchial tubes and a cough sends it up and out of the body.

Some food or other substance, placed in the mouth, is irritant (acid) or likely to interfere with free movements of the parts and immediately there is a great flow of saliva or the mouth digestive juice. This dilutes the substance so as to be less irritant, or if it disturbs movements it is washed away.

If an offending substance gets down into the stomach, it is usually quickly thrown upward and outward by the walls of the stomach.

Similarly with the eye. Although it is set in a bony socket, and has a quick acting curtain (the eyelid) to shield it from harm, little substances do get into the eye. When this happens the tears flow abundantly to wash the substance out.

However, as Dr. Walter B. Cannon, Harvard, points out, there are other processes going on in the body which, while they do not act as quickly as sneezing, coughing, vomiting, and the flow of tears, are protecting you all the time from various troubles.

Something rough rubs or presses the skin and a callous is formed which serves both as a cushion and as a shield.

If the skin is broken, little blood vessels appear in the clot which fills the gap, and the surrounding skin reaches out and fills the gap, with only a whitish scar remaining.

In a person living at or about sea level the number of red corpuscles is about 5,000,000 to the cubic millimeter, whereas if they go to live in high mountains, 14,000 feet, the number slowly increases to 7,000,000, thus providing more oxygen which is now needed.

If the need continues, the blood forming organs in the marrow of the long bones become more active and the blood is thus enriched until the individual comes down to the lower altitude again.

Then there are the white corpuscles of the blood which attack and kill harmful organisms that enter the body.

The above are just a few of the natural defenses of the body.

Surely we are fearfully and wonderfully made.

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Lesssening the Distress in Hay Fever

YOU are a hay fever victim.

You have tried the pollen extracts and find yourself one of the number not helped by them.

You have heard about the air chambers or air rooms where victims may spend a number of hours a day free from the irritation of the pollen that is in the air, but there is none of these chambers in your vicinity or you are unable to afford the time and money even if there were.

What can you do to lessen the irritation from hay fever?

There is no question but that some of the preparations sold by your druggist will give you some relief. Most of them contain adrenalin, and some have some pain killing preparations mixed with the adrenalin.

Is there anything else you can do to help carry you through this trying time until the frost brings relief?

Hay fever sufferers have found that if they keep themselves in good condition physically, paying strict attention to their diet and to intestinal movement, they get a great measure of relief from the hay fever symptoms.

Diet is most important. It has been found that an acid diet aggravates the symptoms in a great many cases, so that while acid foods must be eaten they should be eaten in smaller quantities during the hay fever season.

This means that cereals, meat, eggs, fish, coffee and tea must be cut down; butter and sugar kept at their usual amounts; and vegetables, fruits and milk increased.

The bowels must be kept active by the use of fruits and rough or coarse vegetables. In some cases very small doses of epsom salts—a half teaspoonful—every morning has been found helpful.

No one ever dies of hay fever but it is a very miserable ailment during the weeks it exists, and until a cure is found for each case, following the above suggestions may be of some help.

"A. M.," "A. H." and "A. D."

A. M. stands for Anno Mundi, in the year of the world, that is, dating from the traditional creation of the world in 4000 B. C. A. H. is a Mohammedan designation, meaning Anno Hegirae, or in the year of Hegira, A. D. 622. A. D. stands for Anno Domini, in the year of Christ, or in the year of our Lord, and is the usual designation of dates since the traditional date of the birth of Christ.

HARD TO LOOSEN ERROR'S GRIP ON POPULAR BELIEFS

Two eminent scientists at Atlantic City, taking stock of the state of knowledge, catalogued "eight popular beliefs that are not true" thus:

"A child is influenced by what its mother sees or thinks before the child is born; birth marks are caused by what a mother sees or touches before her child is born; in former times the average length of human life was much longer than now; fat people always are good natured; mental disorders are caused by overstudy; children of first cousins, though of good parentage, are likely to be feeble minded; heavy growth of hair on a person's limbs and chest indicates great physical strength; the theory of evolution implies that men are descended from apes."

This list of beliefs unbased in fact is particularly interesting because each of its items is a venerable cumberer of the human mind. None of these widely accepted errors is of recent origin; none of them arises from the life of today; even the youngest of them, that concerning the theory of evolution, is of a considerable age; and all of them have been contradicted by authority time and again. Yet they persist in vigor apparently unimpaired, and there is no sign that any of them is giving ground under the impact of denial.

A belief once accepted by the population at large has more lives than a litter of kittens. The earnest inculcator of sound doctrine who attempts to dislodge it undertakes an almost hopeless task. Nor does this mean that truth is mocked. The untruth is simply, often picturesquely, dressed; the exceptional circumstances that seem to support it are vividly related and remain in the memory, while the growth of truth is likely to be a drab garment stitched with ifs and buts.—New York Sun.

No Famine in Russia

Soviet Russia will have no famine similar to that of last winter when 4,000,000 died, according to reports from Moscow. The 1933 harvest was more evenly divided and peasants given more grain than in the previous season. This is expected to avert another calamity.