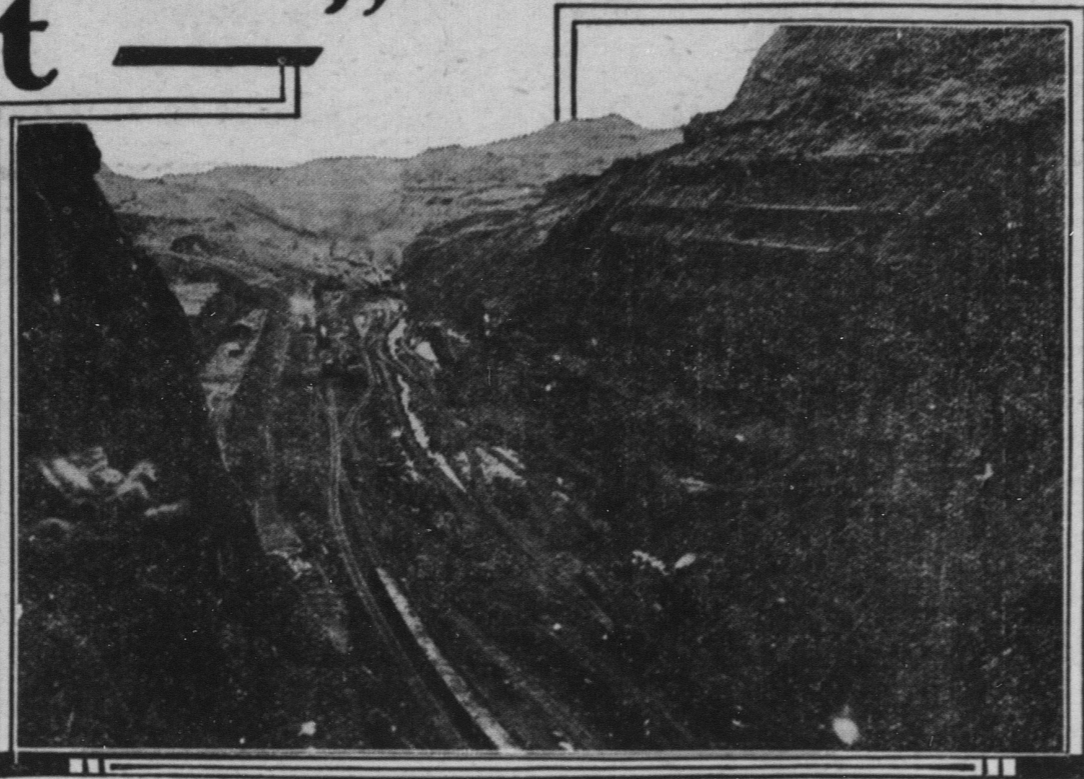


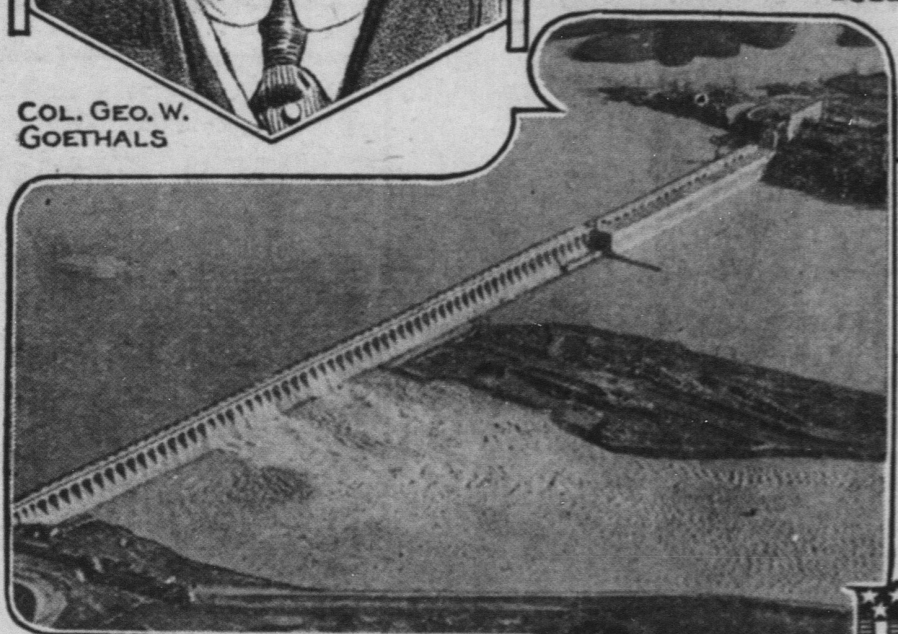
"The Army Engineers Built It"



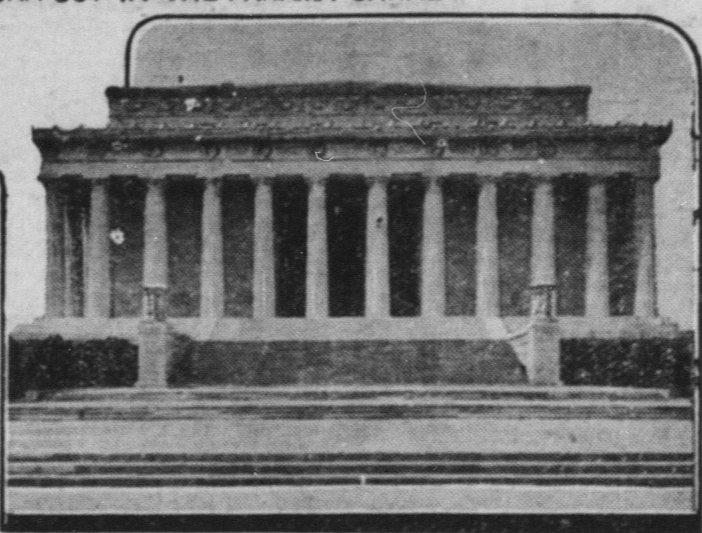
COL. GEO. W. GOETHALS



CULEBRA CUT IN THE PANAMA CANAL



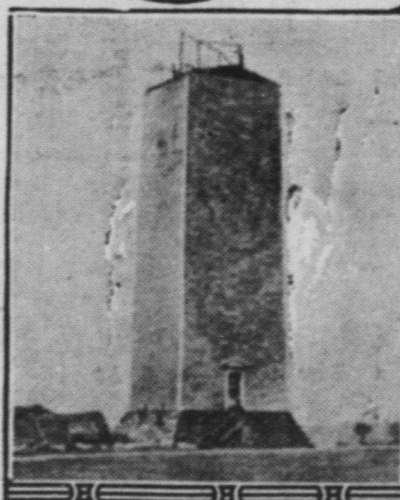
WILSON DAM



THE LINCOLN MEMORIAL



WASHINGTON AQUEDUCT-CABIN JOHN BRIDGE



WASHINGTON MONUMENT UNDER CONSTRUCTION IN 1867

By ELMO SCOTT WATSON

FROM the earliest days of the Republic, in speaking of some great construction project, to say that "the army engineers built it" has been equivalent to saying that here was a piece of work accomplished with the utmost in efficiency, economy and honesty. Therefore, during the last administration, when it was proposed to transfer river and harbor improvement projects from the corps of engineers in the War department to a division of public works in another executive department, there was an immediate protest from those who had the best reason to know how valuable were the services of the army engineers in this work and what the result of such a transfer might be upon those very factors of efficiency, economy and honesty.

To many Americans "rivers and harbors work" is synonymous with "pork barrel legislation" by congress. What they do not realize is that for more than a quarter of a century the corps of engineers of the United States army has been the watchdog which has kept rivers and harbors projects from being just that. Its board of engineers on rivers and harbors functions as a sort of supreme court in waterway matters submitted to them by congress. From June 13, 1902, to March 31, 1923, this board of engineers has reported on 2,377 waterway projects. Of these only 805 reports were favorable as compared to 1,572 that were unfavorable. In other words, these army engineers turned down two out of every three projects submitted to them. And the degree of confidence which congress has in the integrity and judgment of the army engineers is shown by the fact that during the last 10 years in less than half a dozen cases has congress authorized the projects upon which the board of engineers on rivers and harbors had presented an adverse report.

Perhaps one reason why the corps of engineers stands so high in the estimation of both government officials and the public lies in the fact that the efficiency and the honesty of the army engineer has become proverbial. Millions and millions of dollars of public money have been expended under their direction without the slightest breath of scandal or question as to their ability. And perhaps another reason for this confidence lies in the close association of the corps of engineers with the United States Military academy at West Point where the motto is "Duty-Honor-Country"—Duty—the bedrock upon which their character is founded and their careers are built; Honor—the barrier, invisible but invincible, which sets the bounds to their activities; Country—that august, god-like mistress to whose service their lives are dedicated and for whose safety they would lay down their lives in case of need.

The academy at West Point was founded in 1802 as a school for engineers of the United States army, it being the first engineering school in this country. And from the beginning it has been those who have won honors, "the cream of the crop" of new officers, who have been given the privilege of entering the corps of engineers in the army. So there has grown up a set of traditions and an esprit du corps that is difficult to duplicate anywhere in the world. Of the corps it has been said "One of the most wonderful records in the history of the human race is that out of all the thousands of men who have served in the corps of engineers during its century of existence, only one man has ever broken through that invisible barrier of honor."

The contribution of the corps to public service covers a multiplicity of things: Mapping, explorations and surveys; public buildings and city engineering; roads; railways; bridges; siege works; explosives; camouflage and decorative art; chemical engineering; mechanical and elec-

trical engineering; power plants; field engineering; seacoast defenses and shipping; marine design and operation of boat lines and waterways. It would be impossible within the space of this article to list all of the projects which stand as enduring monuments to the engineer corps of the army, but here are some of their outstanding achievements:

The Panama canal—At first it was under the control of civilian engineers but the men who conquered difficulties which seemed almost insuperable and pushed through to a triumphant conclusion the greatest engineering project the world has ever seen were army engineers. In the minds of Americans there will forever be associated with the name of the Panama canal the name of an army engineer, Col. George W. Goethals, who organized the work, solved complicated engineering problems and problems of supply, personnel and finance and completed the construction of the canal ahead of the estimated time.

The work was organized in three divisions as follows: the Atlantic division under Silbert where was built the Gatun dam, the world's largest earth dam, and the Gatun locks, also the world's largest; the Pacific division under Williamson, which included three locks of the same size but requiring less concrete; and the Central division under Gaillard, which included the Culebra (now Gaillard) cut, the world's largest single excavation.

The total cost of the Panama canal was \$370,000,000. The total amount of concrete placed was 5,000,000 cubic yards, the equivalent of a wall 8 feet high and 3 feet wide running clear across the continent, from New York to San Francisco. The total excavation work was 240,000,000 cubic yards.

Another big job which the army engineers did and did with their accustomed thoroughness was in connection with the American Expeditionary Force in the World War. Under the leadership of Langfit, Taylor, Patrick and Jadin, here are some of the enormous engineering problems of construction and supply which the corps was called upon to solve: the building of 907 miles of railways; the construction of 600 miles of light railways and the operation of 2,000 more miles of the same class; the maintenance and repair of 1,750 miles of roads; building and operating 107 lumber mills, producing ties, poles, cord wood and over 1,000,000 board feet of lumber per day; erection of 16,000 barracks, equivalent to 311 miles and providing space for 250,000 beds in hospitals, of which 147 miles of wards were new construction; building storage warehouses, covering the equivalent of 500 acres under roof; building wharves the equivalent of seven miles of berthing space for ships; making improvements and additions to existing water supplies and sewerage, among

which was a system supplying 4,000,000 gallons of water per day; receiving, storing and issuing 3,250,000 tons of engineer supplies.

The famous epitaph of Sir Christopher Wren, builder of St. Paul's cathedral, might well be paraphrased for the corps of engineers, and the visitor to the National Capital might well be told "if you would see their monument, look around you." The City of Washington was laid out by Major L'Enfant of the French engineers, but it was surveyed by Andrew Ellcott, professor of mathematics at West Point, and the development of the city plan was continued thereafter by army engineers. One of them was T. L. Casey, who in 1867 found the Washington monument 156 feet high and unfinished by civilians in charge. He put a new foundation under the existing monument—an intricate and difficult job, albeit—and finished it to its full height of 555 feet. But the Washington monument is not the only work of the army engineers in Washington. The public buildings there which they constructed include the Capitol, the Library of Congress, the Government Printing office, the State, War and Navy building, the Post Office building and the Lincoln memorial. Moreover the water supply of Washington (the Washington aqueduct) was built and is now being operated under the direction of army engineers.

In the vicinity of Washington are three bridges which are outstanding engineering accomplishments, all built by this corps. They are the Cabin John bridge, completed in 1855, by Meigs which was the longest masonry arch bridge in the world (single span, 228 feet) for nearly 50 years; the Francis Scott Key bridge, built in 1920 by Tyler to replace the old Aqueduct bridge connecting Georgetown with Virginia, and the Arlington Memorial bridge, which is being constructed under the direction of Mehaffey, which is to cost \$15,000,000 and which will connect the Mall with the Virginia side leading to the Arlington memorial.

The imprint of the army engineers is strong upon both the highway and railway systems of the country. The famous old Cumberland road, from Cumberland, Md., to St. Louis, the first national highway, was constructed and maintained by officers of the corps of engineers, from 1824 to 1840. The Alaska road commission, consisting of three army officers, has constructed and maintained 1,100 miles of wagon roads, 600 miles of sled roads and 4,400 miles of trails.

Mention of river and harbor work at the beginning of this article recalls the fact that this work was begun by the corps of engineers in 1824, when West Point was the only engineering school in the country. On this account and also because there was then no continuing civil service and because fortification construction was already an organized service of the army, these works were put under the charge of army engineers. From that time to this they have been in charge of the development of this work and up to the present time the investment of the government in these projects is over \$1,000,000,000; their upkeep requiring \$20,000,000 a year. The corps of engineers now has charge of 200 harbors, 201 rivers and 53 canals.

(© by Western Newspaper Union.)

Save Fertilizer, Expert's Warning

Muck Soil Growers Can Cut Some Applications at Least One-Half.

By J. E. Knott, Cornell University Experiment Station, New York.—WNU Service.

Muck growers who have accumulated a fertilizer bank account in recent years can save money in 1933, if they are sure that the supply of nitrogen is maintained. However, similar savings on fertilizer cannot be made for different types of muck soils.

Newly-cleared woody muck soil is low in phosphoric acid and potash, but has a liberal supply of nitrogen. Savings cannot be made in phosphoric acid and potash and a fertilizer of 0-10-10 analysis should be used. Newly-cleared muck that bore a heavy growth of sedges, reeds, and rushes needs nitrogen in addition to the phosphoric acid and potash, as, a 4-8-10 or a 4-8-12 analysis.

Mucks that have been cultivated for five or ten years and that have been liberally fertilized do not show much crop response to potash and phosphoric acid, but need applications of nitrogen. Ordinarily, the grower who has used ample applications of fertilizers in the past, and whose land has been flooded, has a reserve of potash and phosphoric acid, especially for the late-planted crops. Early crops such as onions, lettuce, and potatoes which are planted when the soil is cold, need all three of the fertilizer elements in at least half the usual amount.

The lower rate of fertilization cannot be continued indefinitely. Ways to save this year are: to apply less of the usual fertilizer analysis, but apply more nitrogen as a side-dressing; or to shift to an analysis which contains more nitrogen for instance, if the customary application has been 1,500 pounds of 2-8-10 for onions, use instead 750 pounds of a 4-8-10, applying the same amount of nitrogen but half as much phosphoric acid and potash. Similar changes can be made to suit other conditions. Such changes are especially easy to make in home-mixing fertilizers. Sulfate of ammonia is cheaper than nitrate of soda and has proved equally effective on the New York state muck soil tests.

Best Conversation in Commingling of Souls

The very best conversation can only occur between two persons who have proved each other worthy of trust. It can then abandon the shallows of intellect and plunge into the depths of personality. Life is too short for beating around the bush. When at last I meet a soul so rare that it can be trusted in deepest consequence, I am wasting my time, and his also, if we do not fling off all disguises and talk, not about life as people pretend that it is lived, but about life as it is lived really. Such conversation almost disqualifies those who have enjoyed it for any far less rich. This is why old friends are such gold mines of ideas. Intellectually they may not strike casual acquaintances as being stars of the first magnitude; actually they are the only persons with whom we can be completely ourselves and to whom we dare say exactly what we think. Hence with them conversation begins with an immeasurably victorious head start over that chilly mental interchange with which comparative strangers are obliged to content themselves and which may send one home with a full head but an empty heart.

For really good conversation, give us an old friend. Then there are no rules.—"Uncle Dudley," in the Boston Globe.

To keep clean and healthy take Dr. Pierce's Pleasant Pellets. They regulate liver, bowels and stomach.—Adv.

Founded in Judgment
Good taste springs more from judgment than from intellect.



3 RULES big help to BOWELS

What a joy to have the bowels move like clockwork, every day! It's easy, if you mind these simple rules of a famous old doctor:

1. Drink a big tumblerful of water before breakfast, and several times a day.
2. Get plenty of outdoor exercise without unduly fatiguing yourself.
3. Try for a bowel movement at exactly the same hour every day.

Everyone's bowels need help at times, but the thing to use is Dr. Caldwell's Syrup Pepsin. You'll get a thorough cleaning-out, and it won't leave your insides weak and watery. This family doctor's prescription is just fresh laxative herbs, pure pepsin, and other helpful ingredients that couldn't hurt a child. But how it wakes up those lazy bowels! How good you feel with your system rid of all that poisonous waste matter.

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Swarm Control Problem Bothers Most Apiarists

In the spring, the apiarist can make an effort to correct the mistakes which have taken their toll in the fall and winter. It is never possible to make up for all the mismanagement up to this time. When the items of fall and winter management have been taken care of properly, then spring operations are merely a matter of proceeding toward the money flow—a period of anticipation.

The chief concern during the spring is room for colony development. A Langstroth frame will accommodate stores and supply room for development of 5,000 bees. It will require many frames, even when used two or three times during "brooding up," to bring out a colony of 70,000 to 90,000 bees.

Swarm control is the outstanding problem for the average producer during the spring. This is primarily a matter of furnishing ample room. The first impulse to swarm is received from a crowded feeling. Bees will swarm from a three-frame nucleus; they will swarm from a honey-bound and pollen-clogged brood chamber. It is true that a colony headed by a young queen is less inclined to swarm than a colony headed by an old queen.—Iowa Beekeepers' Bulletin.

Economical Dairying

The backbone of economical dairying, outside of the productivity of the cows themselves, is good roughage and plenty of it. Economy in production depends more upon the nature of the roughage supplied to the cows than upon the grain fed. Too many farmers consider it to be the other way around. That is, they stress the need of a well-balanced grain ration—one that contains a relatively high percentage of protein. Roughage is often considered as a filler rather than a carrier of valuable nutrient matter.

Agricultural Squibs

More than 200,000 goats and sheep are being raised on the Aegean Islands.

Colored lights are being used to protect California's crops against insects.

Brood sows that will produce litters this spring should have plenty of exercise. They should be in good flesh but not too fat at farrowing time.

It is estimated that if the purchasing power of agriculture could be restored, the farmers of the United States would immediately purchase no less than \$500,000,000 worth of paint alone.

Cull potatoes can be utilized by feeding them to hogs, cooked and fed to replace part of the grain.

On the average, German workers eat 24 bushels of potatoes to the person a year; the worker in the United States eats about 3 bushels of potatoes a year.

Compressed air machines have been pressed into service of tree pruners. It is said that one machine can do the work of 30 men in an orchard and of 6 in a vineyard.