

Going to Excavate American Luxor

Neil M. Judd, director of the Pueblo Bonito Expedition of the National Geographic Society, left Washington, recently to resume exploration of the most important prehistoric ruin in the United States at Chaco Canyon, New Mexico.

By May 15, Indians will be swarming over the walls of the ancient village, teams will drag wagon loads of earth and stone away, and steel dump cars will scurry back and forth over a miniature railroad. Almost overnight a canyon which has been deserted since years before Columbus came, will become a beehive of industry.

Pueblo Bonito was an aboriginal apartment house of 900 rooms, four stories high, encircled by a single outer wall.

Viewed from the towering north cliff the ancient village is semi-circular, with the greater portion of its dwellings, or suites, grouped along the curved side.

A long row of one-story houses connects the extreme wings of the semi-circle. From the middle of the straight row a cluster of ceremonial chambers extended to meet the curved section, thus dividing the village, and

providing for each half an open court. In these courts sacred dances and religious ceremonies were performed.

Some ancient walls still stand more than 30 feet high. Its 400 ground-floor rooms occupy an area almost equal to that of the U. S. Capitol.

Rooms of Pueblo Bonito are grouped on suites as in modern apartment houses. If they were all occupied at the same time the resident population of this aboriginal family hotel was between 1500 and 2000 persons.

The National Geographic Society has been exploring Pueblo Bonito for three years, but many puzzling problems remain to be solved.

Where was the water supply for this prosperous community? What forests furnished the hundreds of beams used in this colossal village standing now 40 miles from any timber of comparable size? Extensive fields in which our earliest farmers grew corn, beans, squash and other food plants now are buried.

Mr. Judd is a widely known American anthropologist and, within the past ten years, has organized and directed twelve archeological expeditions.

How Cane Sugar Is Made

WASHINGTON, D. C.—When the price of sugar fluctuates every American home is affected.

The process by which this universally used commodity is obtained from sugar cane is described by William Joseph Showalter, in a communication to the National Geographic Society, as follows:

"In harvesting, the cane-cutters first strip the blades from the stalk; then they cut off the upper part of the latter, which is worthless except for replanting, since what juice it con-

tains possesses very little sugar. One of the strange things about sugar-cane is that the saw of the growing plant has little sugar, while in the mature stalk the juice is rich in sucrose. The action of the sun's rays seems to transform glucose into sucrose—a transformation that cannot be accomplished by human means.

Sugar By the Ton
"The main body of the stalk is cut down and loaded into the excarts. In these it is hauled to the field station and placed in the waiting cars.

Each car contains about twenty tons and each train is made up of thirty cars. This makes six hundred tons of cane to the trainload, and eight to ten trainloads a day are required to keep one of the bigger centrals in operation for twenty-four hours.

"When the cane reaches the mill in the most modern plants, the cars are run, one by one, into a cradle and made fast thereto. A button is pressed and the cradle rocks over on one side. The side of the car swings loose and the load rolls out into a deep trench, at the bottom of which is an endless steel belt.

"On this belt the cane is carried up to the crushing rolls. A man stands before a keyboard and by pressing the several electric buttons thereon regulates the flow through the crusher, which disrupts all the little sap cells and releases a great stream of foamy juice. Then the crushed cane is sent through sets of rollers, each time under heavy pressure.

"Each set of rolls the cane passes through presses it harder than the one before. The last set may exert a pressure of a million pounds, and when the 'bagasse', as the crushed cane is called, issues from them it is almost as dry as tinder. It is carried by conveyors to the fire-boxes of the boilers, where it is used as fuel in generating the steam that drives the big mills and big mills and boils the cane juice. The stream of crushed cane flows through the last set of rolls at a speed of seven miles a day.

Mixing Whitewash With Cane Juice
"I imagine big gear-wheels fourteen feet in diameter, with cogs sixteen inches long, three inches deep, and two inches thick on their face. Such are the trains of gears that transmit the power from the engines to the rolls.

"After the juice is pressed out of the cane it is thoroughly strained and pumped into big tanks at the top of the building, where a milk-of-lime solution—in other words, plain whitewash—is added.

"The mixture is then heated to a degree just above the boiling-point. The lime neutralizes the acid in the juice and finds affinities in some of the foreign substances. It pulls these to the bottom and plays the same role of purifier in the making of sugar that it plays in the making of iron. The heat causes the other impurities to rise to the surface as scum, so that when this preliminary process is completed in the big settling tanks there is a top layer of froth, a middle layer of clear juice, and a bottom layer of mud-like solid material.

"The clear juice is drawn off and passes through filters of excelsior. It is then pumped to the evaporators, where about half of the water is boiled out of it.

How the Evaporator Works
"In the more modern factories there is a chain of four evaporators working together. We all learned in our school days that the lighter the air pressure, the lower the temperature at which liquids boil. The sugar manufacturer makes use of that principle in his factory. By means of air pumps he reduces the atmospheric pressure in each evaporator to a point below that of the preceding one.

"The steam that boils the juice in the first evaporator must have a temperature of 215 degrees Fahrenheit. When this steam falls below that temperature it passes into the coils of the second evaporator, where the air pressure is so reduced that the partially cooled steam makes the liquid boil at 203 degrees. After it falls below that point the steam passes on to the third evaporator, where, with a still further reduced air pressure, it is able to keep the syrup boiling until it falls below 180 degrees. The fourth evaporator has the air pressure reduced to a practical vacuum.

"The steam that has lost so much of its heat as to be unable to maintain the boiling point in the third is nevertheless hot enough to keep the juice boiling in the fourth. Here only 150 degrees of heat is needed to maintain the boiling process. By this arrangement the juice is boiled to the proper consistency with only one-fourth of the heat otherwise required.

Drawn Into Vacuum Pans
"The next step in the making of sugar is to draw the thick juice into vacuum pans. Here it comes into contact with hot steam coils and boils at a very low temperature because of the absence of atmospheric pressure. As the boiling proceeds, the sugar crystallizes into small grains. The man in charge of a big vacuum pan is known as the sugar master. From time to time he adds fresh juice, and its sugar gradually settles on the crystals already formed, which thus are made to grow larger.

"Finally the vacuum pan becomes full of sugar and mother syrup. The sugar and the adhering syrup are then removed to a centrifugal machine that acts somewhat on the principle of a cream separator. Placed inside a perforated basket and whirled around at from 1000 to 14000 revolutions a minute, all of the syrup is forced out thru the perforations, while the crystallized sugar remains behind.

This syrup is boiled, again, after which a seed bed of crystals from the vacuum pan has been prepared. There it gradually deposits its sweetness on these crystals, and, when it has given up all that is worth waiting for, the mixture goes back to the centrifugal machines, where its adhering syrup is hurled out from this second lot of crystals. The process is repeated again, and by this time all the available sweetness has been extracted, and the remaining liquor is the 'black-strap' molasses of commerce.

"The principle of producing sugar is embodied in the fact that water can hold only a given amount of sucrose in solution. As the water is driven out of the cane juice the latter reaches a stage where there is not enough left to hold all the sugar dissolved, and as evaporation proceeds, the sugar, deprived of its water, is compelled to pass out of solution into crystal form."

Chautauqua, Medford, May 26-31

Famous Ballad Singer Coming to Chautauqua
Sam Lewis, Dramatic Tenor, Believes Americans Want Their Music in Language They Understand.



Sam Lewis, the prominent Welsh Tenor, and one of the most popular ballad singers in America, has little patience with the concert singer who tries to "foist foreign languages on Americans." Mr. Lewis says: "I believe the time is not far off when American audiences are going to demand more singing in a language they can understand. Personally I never sing even one group in a foreign tongue unless it is specifically requested." Mr. Lewis has made rapid strides in the music world of late years. He is appearing again this season at the head of his own company. Assisting artists are Marie Colliton, pianist and accompanist; Allen Ament, violinist; and Neil Adams, reader.

Musical Entertainment Feature of Chautauqua Assembly

Lombard Entertainers Give Well-Chosen and Novel Programs on Fifth Day.



A program sufficiently varied to interest everybody and still of such character that all receive the most wholesome and uplifting entertainment. This typifies the work of the Lombard Entertainers. Well chosen operatic selections, the best of popular songs, readings, monologues, pianologues, whistling solos, these all combine to build a program replete with good musical material and novel entertainment. Harry Lombard probably has few equals in music; comedy among Lyceum and Chautauqua artists. He has had long experience on the concert and operatic stage, having been for eight years baritone with the English Opera Company, and later with the Fairchild Ladies' Quartet, has a deep contralto voice and is also a talented reader and impersonator. With beautiful costumes and elaborate stage settings, they give a program of a quality seldom attempted by a company of two.

LOWELL PATTON TO ENTERTAIN CHAUTAUQUA FANS

Gifted Pianist to Appear Here on Opening Day.

Lowell Patton, Manager and Director of The Patton Brothers, is a well-known pianist. With the famous Flying Squadron a few years ago, he played in every principal city in the



United States. As a "gob" during the war, he was chosen song leader at Bremerton Navy Yard, where his work was phenomenally successful. He has appeared as pianist with many organizations, and as accompanist for such well-known Chautauqua favorites as Frances Sore and Frances Ingram. A part of this last winter was spent in London and Paris, for additional study and new material for his trio. Two programs will be given by The Patton Brothers on the opening day.

Secret of Human Happiness Given Chautauquans

Dr. Henry Gaines Hawes, Brilliant Speaker, Has Inspiring New Philosophy.



"I claim to have discovered the secret of human happiness," declares Henry Gaines Hawes. "I'm dead against concentration. Learn to be smatterers. Learn the alphabet of everything in God's universe." Mr. Hawes is one of those master personalities that leaves a community enriched and ennobled after a visit. A sympathetic, practical idealist, his constructive criticism clears the vision of those blindly accepted, utterly false standards that motivate so much of our thought and action. He is eminently qualified to present his subject, "The Soul of Things," in a masterly and attractive way. He is nationally known as an authority on the Speech Arts, and as an orator has few equals. Moreover, he is a man of unusual scholarly attainments. His lecture will be an outstanding intellectual treat of Chautauqua. Fifth night.



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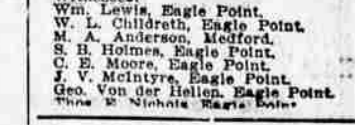
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Medford, Oregon, Jan. 12, 1917.
This is to certify that I, the undersigned, had very severe stomach trouble and had been bothered for several years and last August was not expected to live, and hearing of Gim Chung (whose Herb store is at 214 South Front street, Medford), I decided to get herbs for my stomach trouble, and I started to feeling better as soon as I used them and today am a well man and can heartily recommend anyone afflicted as I was to see Gim Chung and try his Herbs.
(Signed) W. R. JOHNSON.
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