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## NEW YORK, SATURDAY, AUGUST 19, 1893.

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conducted in Africa for the establishment of a new point rations. COLUMBIAN EXPOSITION.—The Columbian Exposition.— The Builders from Foundry Exhibit of 15-inch Breech-loading Rised Mortars.—Exhibition of United States mortars at the World's Fair and details of the manufacture.—Itilustration..... The World'sColumbian Exposition.—The International Quarter, States on the government buildings at the Fair.—3 lingstra-Rin W 14696 Scientific American.

## RAISING VESSELS BY MEANS OF AIR SACKS.

The Glenola, a two-masted schooner, which was sunk about six months ago in Great South Bay, N. Y., has been successfully raised by means of air sacks. practically successful. Divers descended into the hold and adjusted huge canvas bags or sacks, which measured twenty by four and one-half feet. Each sack inflation of the bags with air slowly lifted the vessel to the surface. It required only about one hour to bags had been finished. The cost of raising vessels on this plan is quite small. In this case the expense was \$1,500 to \$2,000, and required the services of sixteen | future air ship, Dr. R. H. Thurston, director of Sibley men. The system has been used successfully in Puget Sound in raising the Premier, an 800 ton vessel.

## .... WATER POWER TRANSFORMED INTO LIGHT.

Among the notable industrial enterprises recently inaugurated in Mexico is the electric lighting of the city of Guadalajara. The plant utilizes the famous Juanacatlan waterfalls, which are situated about 18 miles from Guadalajara. The Thomson-Houston generators are actuated by Leffel turbines, the head of water being 58 feet. Three turbines of 550 horse The current strength is 10 amperes, and consequently the maximum voltage is 2,500. The incandescent dynamo consumes about 750 horse power and yields approximately 350 amperes at 1,000 volts, or say 350 kilowatts. The voltage is increased from 1,000 to 5,000 volts by means of ten step-up transformers. They transform the energy of the dynamo at an efficiency of about 98 per cent, delivering to the line, therefore, 98 is reduced to 1,000 volts by step-down transformers at Guadalajara, 17 miles away from the source of electricity.

The installation of the San Antonio Light and Power Company, of Pomona, California, possesses many features of interest. The current is carried twenty-eight miles under the enormous pressure of 10,000 volts. The generators are of the standard 120 kilowatt, 12 pole, 1,000 volt Westinghouse alternator, which delivers current at 7,200 alternations on being driven at 600 revolutions per minute. The generators are coupled direct to Pelton water wheels, the head being 395 feet. The 1,000 volt current is taken to the switchboard and from there to the bank of stepup transformers, from which the current is delivered under a pressure of 10,000 volts. One circuit is carried to Pomona, fifteen miles, and the other to San Bernardino, twenty-eight miles away. The wire used is No. 7 B. & S. hard-drawn, bare copper wire, and is carefully supported on poles by insulators specially designed for this plant. A potential of Bernardino. The potential on the city lines is maintained at 1,000 volts.

## AEBIAL NAVIGATION.

During recent sessions of the World's Congress Auxiliary at Chicago, a special branch of the department of engineering known as the aerial navigation confer. ence afforded the occasion for a most interesting presentation of facts and comparison of views of the most experienced experimenters and the best equipped scientists who have given this subject their attention. The conference was organized and actively promoted by Mr. Octave Chanute, the eminent engineer, assisted by Prof. A. F. Zahm, of the Notre Dame University, of Indiana, and the reading of papers and discussions occupied four sessions.

At the outset it was manifest that there was a gen-

is worthy of note to find that in two other papers presented at the second session the same kind of studies were recorded and similar conclusions presented by observers in Europe and Africa, one being on "Gliding Although the principle involved is old, Messrs. Grant, Flight," by J. Bretonniere, engineer and observer, Bros.' air sack system of raising vessels seems to be Constantine, Algeria, and the other on "Theory of Soaring Flight," by Chevalier de Louvrie, engineer, of Combebigu, France. Other papers bearing relation to the above were presented, one on "Observations of was connected by hose pipes to a powerful air Birds," by G. Crosland Taylor, F.R.G.S. and A.I. pump, and gradually inflated by air. The gradual E.E., of Helsby, England; another by the same author on "Theories of Soaring and Sailing," and another by A. M. Wellington, editor of the Engineerraise the Glenola after the work of adjusting the ing News, of New York, on a "Theory of Sailing Flight."

> In regard to the construction and propulsion of the College, Ithaca. N. Y., read a most interesting paper on "Materials of Aeronautic Engineering," in which he gave facts regarding the strength of metals, some of which were new even to the scientific men in his hearing. He showed that of all metals steel combined most strength with lightness, and was, therefore, better fitted for the construction of air vessels than any other.

The subject of kite flying was taken up, and the paper on "Experiments with Hexagon and Tailless Kites," by W. A. Eddy, experimenter, of Bayonne, N. power are used. The dynamos for arc lighting have a J., illustrated by drawings on the blackboard, was a capacity each for 50 arc lights of 2,000 candle power. most interesting one. He had succeeded by his method in flying kites to a height of over 4,000 feet.

> Papers on ballooning were read by Mr. C. E. Myers, aeronautical engineer, of Frankfort, N. Y. These were "Manufacturing Hydrogen Gas Balloons," "Natural Gas Balloon Ascensions," "Maneuvering of Balloons," and "Balloon Meteorology."

A paper on "Flotation vs. Aviation," by Prof. De Volson Wood, of Stevens Institute, Hoboken, N. J., in per cent of the energy supplied them and at five times which the professor advocated a departure from the the pressure. The high potential incandescent circuit bird method in flying machines, provoked some discussion, in which the bird method was ably advocated.

Gen. W. Hutchinson, of the British army, Silverdale, England, submitted a published paper on "De-sign of Navigable Balloons." This was an old idea of Gen. Hutchinson's, and related to the employment of balloons in warfare.

One of the most interesting of the papers read at the conference was by Prof. Mark W. Harrington, but it had reference rather to the work of the government weather bureau than to the navigation of the air, and advocated the establishment of special balloon and kite stations for observational purposes.

Prof. A. F. Zahm, secretary of the conference, whose subject was "The Stability of Aeroplanes," presented descriptions of a variety of models with which he has experimented with a view to securing automatic equilibrium and steadiness of flying machines in all circumstances of wind and calm. He defined the aeroplane as the supporting surface of a flying machine as distinguished from the propelling surface, and stated as some of its requirements, (1) that it 9,500 volts is received in Pomona and 9,000 in San should, when launched in any manner, automatically head to the wind and move rapidly forward; (2) that when displaced or overturned it should promptly recover its position of equilibrium; and (8) that it should maintain a prescribed and uniform average position and course in the air, as a boat does in the water. The models described comprised various forms of gravity kites. dirigible parachutes and simple and compound aeroplanes.

## Sweet Pickled Watermelon Rinds.

A writer in Harper's Bazar gives the following directions:

Peel the rinds with a sharp knife that will take off the green skin evenly. Trim off also every trace of the pink flesh of the fruit, because it is too juicy to make a firm, crisp pickle. Then cut the strips of rind into small pieces, two to three inches long, and placing eral indorsement of Mr. Chanute's views, that, diffi- them in a large earthen dish, sprinkle them lightly and cult as was the problem of aerial navigation, there was evenly with salt. Cover the dish and let it stand overstill enough of promise in it to lead men, through night. In the morning drain off the water that will patient and intelligent inquiry and research, to hope have formed, rinse the rinds in cold water, and cook

-Notes on the government buildings at the Fair3 Hustra-		for ultimate good results. The mere purpose of carry-	them in a steamer until a broom splint will readily
VII. BDUCATIONThe Ideal Engineering EducationBy WII-	-040	ing passengers and heavy loads of freight was dismissed	pierce them. Cooking the rinds by steam is an easy
paper read before the Engineering Congress in ChicagoWbat		as being quite impracticable, for it was not likely that	method, as they are less liable to burn than when
VIII. ENTOMOLOGYInsects Injurious to DrugsBy Prof. L. E.	90699	the railway and the steamboat would ever be com-	cooked in the spiced vinegar. When therinds are ten-
SAYREValuable contribution to applied entomology2illum- trations	1704	peted with successfully by air ships, however efficient	der, take them out carefully with a skimmer and put
IX. GEOGRAPHY AND EXPLORATIONS.—The Departure of Dr.		they might be. But there were many and important	them into a stone jan
ture of Nanseu's expedition from Norway1 Nustration 1470	1703	uses for an air vessel that could be sailed and con-	Take good cider vinegar for the basis of the pickle.
X. GEOLOGX.—The Geological Work of High Pressure Gas.—Most curious and interesting experiments on the action of enormously		trolled at the will of man, as in cases of war and in the	Allow a pound of sugar to a pint of vinegar, and add
high pressure gases on rocks	1703	study of meteorology.	also half an ounce of stick cinnamon broken into inch
Years AgoEarly steam carriagesThe predecessors of the modern railroad1 illustration.	6899	One of the most interesting papers presented at the	pieces, and a half teaspoonful each of wholecloves and
XII. METEOROLOGYA Rain of IceAn unprecedented storm in England in which some ninces of ice as large as an orticle age		first session was that by Prof. Langley, secretary of	blades of mace. The whole amount of vinegar, sugar,
fell1 illustration. 1470	4706	the Smithsonian Institution, Washington, D. C. (read	and spices used must, of course, depend on the quantity
hol and hydrogen fiame lamps for detecting traces of fire damp in	4770	by Prof. George E. Curtis of the same institute), under	of rinds to be pickled, but a quart of vinegar is usually
XIV. MISCELLANEOUSA Cocca Appeal CaseAdulteration of	4907	the title of "The Internal Work of Moving Air." In	sufficient for the rinds of a medium sized melon. Boil
XV. NATURAL HISTORYThe Medusa of Lake TanganyikaA		this paper Prof. Langley recorded his observations	the vinegar, sugar, and spices together vigorously half
XVI. NAVAL ENGINEER NGThe Japanese Cruiser YoshinoA	5700	during several years of soaring birds, such as the buz-	an hour, skimming off the froth, and pour the pickle
recent addition to the Japanese navy.—The fastest croiser allost. Data of speed trial	<b>1897</b>	zards, from which he draws the conclusion that flying	boiling hot over the rinds. Press the rinds down un-
XVII. PHOTOGRAPHY The Tele-photographic LebsBy W. K. BURTON, Imperial University, Tokyo, JapanDescription of the		machines can be made to imitate this flight and to sail	der the pickle by means of an earthen plate or saucer,
new Dailmeyer lens, giving wonderfol results in photography of distant objects	1701	in the air when the latter is in movement as easily and	fasten the cover on, and tie a cloth over the whole
XVIII. TECHNOLOGY Gilded Platinum The use of glided plati-	4730	with as evidently little effort as the soaring birds. It	These pickles will be ready for use in two weeks.