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Contents.

(Illustrated articles are marked with an asterisk.)

Albert Weber
Alum in baking powders.
Alum not in English bread.
Antiquities from Chiriqui.
Arsenic in water colors.
Azeres, geysers of the
Balloon, captive, at Coney Island
Battery, gravity [3]
Betts, oil for [24].
Boats, motors for [41].
Boats, motors for [41].
Camelia Japenica, seeds of.
Cavern, inscribed, in Wiscon in.
Chemistry, molecular.
Coal, formation of.
Coal on the Pacific Coast.
Coal art, to remove [33].
Consumption [42].
Cotton goods, Am., quality of.
Diseases, new
Divining rod [38].
Iraghismen, caution to.
Drilling Soow, United States
Electro-plating [31].
Emery wheels, solid [30].
Engine for boats [24].
Falure, threatened, of silk crop
Farming [upplements in Morocco
Fluorescence.
Gear, compounding [37].
Gersers of the Azores. Geysers of the Zores.
Glossing photos, heliotypes [6].
Gold, to reduce [25].
Gutta percha, to dissolve [9].
Ice box, to make [1]
Inventions, agricultural, new.
Inventions, mechanical, recent Inventions, mechanical, recent Inventions, miscellaneous..... Inventor, successful..... Inventor, successful....
Joinery, machine made, export of
Labor, free, in the South...
Lathes, milling attachment for '.
Lime juice 35. alcohol

TABLE OF CONTENTS OF THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 185,

For the Week ending July 19, 1879. Price 10 cents. For sale by all newsdealers.

ENGINEERING AND MECHANICS.—Car Bulleting, Resume of the Proceedings of the Master Car Builders' Association at Chicago. Improved Shaping Machine. Illustrated.

The Conversatione of the Institution of Civil Engineers, London. Higgins electric lamp (illustrated).—Sheemen lamp.—Electric motors.—Three cylinder engines.—Measuring instruments (illustrated).—Association of Civil Engineers, London.

The Excelsion Disintegrating Middlings Furilier. 4 figures.

TECHNOLOGY AND CHEMISTRY.—Alum in Baking Powders. Details of Experimental tests by Prof. G. E. Patrick.
Manufacture of Spirit Varnishes from Shellac. Varnishes for leather.
—Polish for furniture.
Annatto Yellow on Cotton By M KIELMBYER.
On the Componds of the Terapenes with Hydrochloric Acid. By. W.
A. TILDEN.

TILDEN.
Indellible Ink.
Preparation of a Chemically Pure Tartaric Acid. By Ficinus.
Viscosity. By ANTONY GUYARD.
Precipitation of Lime by Alkaline Carbonates. By E. DRECHSEL.
New Organized Ferment of Urea. By P. MIGUEL.
Ultramarine. By MM. KNAPP and EBELL.
Improvements in Coating Mirrors.
Colored Pencils.
Colored Photographs.

III. METALLURGY.—Some Experiments on Alloys of Silver with Embrittling Metals. By A. E. OUTERBRIDGE. Jr. (Made at the U.S. Mint, Philadelphia.)—Silver with arsenic.—With antimony.—With Bismuth.—With silver bismuth alloy.—With silver and lead.—Tables.

Crystals Extracted from Cast Iron by means of Ether or Petroleum.

By J. LAWRENCE SMITH.

THE CAPT

IV. ELECTRICITY, LIGHT, HEAT, ETC.—Refraction of Dark Heat. By P. DESAINS

By P. DESAINS
Theory of the Telephone.
The Electric Light. By. J. JAMIN.
Electric Inscription of Words. By M. BOUDET de Paris.
Relation between the Temperature of the Earth and the Depth Below
the Surface. By P. VAN DIJK.

URIGATORY.—Plant and Animal Life. By A. R. GROTE, A.M. (continued from SUPPLEMENT, No. 179). 13 illustrations.

Suspended Animation. By Br Berry WARD RICHARDSON. The philosophy, methods, and means of suspending animal life. Mandragora, anny Intrite, woorali, chioral hydrate, cyanogens, alcoholoxygen. Silk worms. An account of the native and foreign silk producing bombyces bred in France, in 1878. By ALFRED WAULLY, of the French Acclimation Society. (a) Silk producing bombyces with closed cocoons. (b) Silk producing bombyces with open cocons.

Reducation. President Eliot's idea of the essentia part of a liberal education.

VI. SURGERY AND MEDICINE.—Extirpation of the Kidney. Description by Dr J. MARION SIMS, of a remarkable operation performed by in ant Remedy for Toothache. New use for the compound tinc-

VII. BOTANY.—The Eucalyptus. The source of its curative influence.
Its aromatic oils and resins. Uses of eucalyptus oils. Eucalyptus soap. Flowers and their Unbidden Guests. The fertilization of flowers and of the control of the

▼III. THE FARM AND STABLE.—Worn out Pastures. Hogs as farm

ALUM IN BAKING POWDERS.

In the current issue of the Scientific American Supple-MENT will be found a communication from G. E. Patrick, Professor of Chemistry in the University of Kansas, giving hydrate of alumina is dissolved by the gastric juice. The question has a vital bearing on the discussion as to the safety of using alum in baking powders. Professor Patrick attacks it without prejudice, by strictly scientific methods, and arrives at results which are certainly gratifying in view of the wide use of alum powders in our kitchens.

Professor Patrick takes his text from the published opinion of a prominent physician, who says, after stating the difficulties attending a thorough mixture of the ingredients of alum baking powders:

"But even if the exact proportions were maintained, the salts formed would retain their injurious properties, as they would dissolve in the gastric juice. The gastric juice contains not only lactic acid, but a large amount of hydrochloric acid, and both the sulphate and hydrate of alumina would be dissolved."

After testing by reference to authorities the statement that the gastric juice contains a large amount of hydrochloric acid, and finding the weight of evidence to be that the quantity is in reality extremely minute, and that little not free, Professor Patrick proceeds to describe his examination of the practical question whether the hydrate of alumina as it exists in bread after baking, when made with alum by a sharp crack or by a succession of taps. This occurred powders, will be dissolved in the fluids of the alimentary

with living animals. Professor Patrick found cats to be most available. Having made biscuits with an acknowledged alum baking powder, using twelve times the proportion of powder directed on the labels, and employing for each experiment a distinct sample of powder, he fed the biscuits to cats that had fasted from one to two days. The verse, and often a single crack. amount eaten in each case was enough to give at least half a teaspoonful of powder to each experiment. After allowing for digestion 20 minutes, 45 minutes, 1½ hours, 2 hours, purpose. Special apparatus might be devised, having a and 21% hours, respectively, the cats were killed, and the good ground, and a series of points for gathering the eleccontents of the stomach and small intestines were carefully tricity from the air, but in using apparatus of this kind there examined for dissolved alumina. In each case undissolved is always more or less danger. hydrate of alumina was found, but of dissolved alumina there was never a trace.

Surprised at the uniformity of these results, and thinking that the organic matter of the flour might have interfered with the solution of the alumina or his detection of it, Professor Patrick made two crucial experiments. In each, two teaspoonfuls of the powder were mixed with water and baked at the ordinary temperature of the oven. The mass was then fed to a cat (under compulsion) and after a furnished by the Hay Steel Co., of Chicago, and while the specified time the stomach and intestines were examined as before. In neither case was a trace of dissolved alumina discovered.

Similar experiments were then tried with unbaked (gelatinous) hydrate of alumina, and in both cases a trace of dis- | sions: solved alumina was found; the inference being that it is not safe to eat dough made with alum powder-it should always be baked. Another important practical point was also suggested-namely, that if bread is carclessly mixed or with insufficient water, some of the powder may remain dry and the alum not changed to the hydrate; in which case the effect would probably be injurious.

on the other experiments with biscuits, Professor Patrick length of bridge and approaches, 3,577% feet. had a batch made in which the mixing was less thorough than usual and with less water. These were fed to cats, and subsequent tests developed in every case a trace of dissolved alumina. These experiments, while proving the rethin at first, and stiffen it by the addition of pure flour.

theory; and if there is no radical difference between the road gravel, yellow and red ocher and gray sand. Chlorides gastric juices of cuts and men, it seems to be conclusively of silver are frequently visible in the hard carbonates. The established that alum baking powders may be used without usual size of a shaft is 31/2 feet by 7 feet, and is substantially

THE CAPTIVE BALLOON AT CONEY ISLAND.

is Mr. King's captive balloon, "Pioneer," the first first, a deposit of gravel or through the center of which runs a telephone wire. An in silver. end of this rope is carried through a trench to the center of! The generally accepted theory is, that this region was once the inclosure, where, after passing around a pulley, it is covered with a lake, the waters of which held in solution workers.

The Care of Horses. How to choose a horse, and how to care for fastened to the balloon. The pulley is attached to the silver, lead, and iron, which were in time precipitated on the foundation by a universal joint of iron, so that, in whatever bottom of the lake. The porphyry, gravel, etc., were subdirections of the English race horses "Sir Bevys" and "The wheel of Fortune." fastened to the balloon. The pulley is attached to the silver, lead, and iron, which were in time precipitated on the direction the balloon may pull, there will be no side strain sequently deposited. After the precipitation came the age

on the pulley. A good hold on the sand is secured by the use of four sticks of yellow pine, each 12 feet long and 12 inches square. These are planted horizontally nine feet below the surface, and above them is a well, made of concrete. details of a series of practical tests to determine whether the Across the top of the well lie two other similar timbers, which are strongly fastened to their fellows below by long and thick iron bolts. Mr. King says this foundation will resist a strain of 100,000 lb., while the utmost strain that wind and gas united can exert on the connecting rope of the balloon will not exceed 22,000 lb.

On its trial trip the balloon ascended three or four hun dred feet, and shortly afterwards a second trip of seven hundred feet was made. At this height the view was pronounced magnificent by the small party making the first venture. All the ocean approaches of New York harbor were at their feet for a radius of thirty miles; and inland they could see the numerous towns and cities about the bay of New York. Along the Sound to Flushing, up the Hudson River as far as Tarrytown, and the Orange Valley, and other parts of New Jersey as far as Paterson, Perth Amboy, and Long Branch.

THE TELEPHONE AS A LIGHTNING INDICATOR.

Mr. George M. Hopkins, of Brooklyn, N. Y., during a recent thunder storm connected the gas and water pipes of his dwelling with an ordinary Bell telephone, and discovered that the electrical discharges were plainly indicated, either when the discharge was so distant that the thunder was inaudible. The sound also seemed to be perceived by the ear This question could be determined only by careful tests before the lightning could be seen. There was a marked difference in the character of the discharges, some that appeared single to the eye were really multiple. Often the discharges would consist of a series, beginning and ending with discharges larger than the rest, thus: sometimes it would be thus: ----, sometimes the re-

The gas and water pipes were used, being the most convenient and at the same time the safest conductors for the

New Steel Railway Bridge.

A new and splendid railway bridge over the Missouri River, built wholly of steel, has lately been completed and opened for traffic by the Chicago and Alton Railway Co. The bridge is located at Glasgow, Mo. The constructing engineer was Gen. Wm. Sooy Smith. The material was structure is stronger than an iron bridge its weight is thirtythree per cent less than it would have been had iron been employed. The time of construction was only one year. The cost, \$450,000. The following are the principal dimen-

Five spans, 3143 feet each, from center to center of piers, three above and two below grade; all steel; depth of truss, 36 feet center to center of pins. Height of through spans above high water, 50 feet. East approach, iron trestle, 210 feet; two deck spans of iron, 140 feet each, 280 fect; west approach, iron deck span, 140 feet; west approach, iron trestle, 510 feet; west approach, wooden trestle, 864 feet In order to test this question, and also to furnish a check total length of the bridge proper (steel) 1,573 teet; total

---The Silver Deposits of Leadville, Colorado.

Says a correspondent of the Boston Advertiser: The ore beds vary from one to forty feet in thickness. They are liability of those first described, go to show, Professor Patrick generally undulating like the waves of the ocean, so that the thinks, that to insure the entire absence of alum in the distance from the surface varies with the undulations. The bread, the mixing must be done with plenty of water. As size of a mining claim is in most cases 300 feet inside by a simple precaution it might be well to mix the batter too 1,500 feet long, being about ten acres in area. The ore known as "hard carbonates" consists of silver mixed with Tests of this nature are obviously worth any amount of iron or lead. The soft or sand carbonates resemble common timbered. After the ore deposit has been penetrated, the "main entry," "parallels," and "cross cuts" are excavated, leaving the remaining ore in blocks while the work of explo-Not the least of the many attractions of Coney Island this ration is going on. In sinking a shaft we usually penetrate, "wash" from 20 to 100 feet in ascension of which was made on the afternoon of July 1. thickness, frequently containing bowlders which have been This balloon is not as large as the Giffard captive balloon at subjected to abrasion. Not unfrequently a stratum of Paris, but is said to be much more perfectly constructed. It "cement" a few inches in thickness is encountered, resemis sixty-five feet in diameter, and has a capacity of 150,000 bling Roxbury pudding stone or an old cemented cellar floor. cubic feet. The material is Irish linen in two thicknesses. Next we come to calcite, or porphyry—sometimes soft like The basket or car of wicker work weighs 476 lb. Above "fire clay," either pure white, gray, or red—the latter showthe balloon is white, to reflect the sun's rays; below it is oring an iron stain. The soft porphyry runs from one inch to namented with dark red and green, to make it a conspicu- several feet in thickness. The hard porphyry is often "pickous object against the sky. It is inflated with hydrogen, ing ground" (i. e., porphyry rock, which can be excavated and in calm air shows on the dynamometer a lifting strain by means of a pick), but frequently it is blasting or "shootof 1,400 lb. The gas is made on the spot by Mr. A. O. ing rock." Following the porphyry is iron ore, varying in Granger, by passing steam over hot iron. Wound about the thickness and sometimes containing a few ounces of silver. drum of a very large windlass is 1,215 feet of 11/2 inch rope, Following the iron we find the "pay ore," more or less rich