

the press through a vertical tube, and as each piece reaches the bottom of the tube steel feeders carry it over between the dies and place it in a steel collar, so that when the dies close upon the planchets it will make the obverse and reverse impressions on the coin. According to a description of the process in the Philadelphia Mint it is said that "double eagles" and "eagles" may be struck at an average rate of 80 a minute, while for the "half" and "quarter eagles" the average rate is 20 per cent greater. The pressure required in the stamping press to produce a sharp, clear impression of the "double eagle" is said to be 175 tons, while only 120 tons are required for the "eagle," 75 tons for the "half eagle," and 40 tons for the "quarter eagle." The silver dollar, half dollar, and quarter dollar are struck at the same average rate as the "double eagle" and "eagle," while the speed for the dimes is equivalent to that of the smaller gold coins. The pressure used in stamping the silver coins is 150 tons for the dollar, 110 tons for the half dollar, 80 tons for the quarter dollar, and 40 tons for the dime. From the stamping press the coins pass to the counting room, where they are put up in proper quantities for distribution. All coins but cents are counted in the usual way, the latter, however, are counted by means of a kind of screen. There are 1,000 depressions in it the exact size of a cent. The coins are brought from the machines in pails and a quantity are thrown upon the counting-screen, which is shaken until each of the depressions is filled. The cents are then tied up in coin sacks. In this very brief summary of the process by which the coin passes from the bullion to the finished money many of the important details have necessarily been omitted, but if there is any one thing more than another that is of conspicuous interest in the mints and assay offices of the government, it is the fact that nothing is lost. Every bit of metal is carefully accounted for, and defective blanks are promptly returned to the melter. Every kind of waste material that is likely to contain gold is preserved. The floor of the melting room is swept each day, and the gatherings are mixed with a suitable flux and thrown into a crucible. "Sweeps" consisting of broken crucibles and dipping cups, all ashes from the fires, burned gloves, aprons, sawdust, and packages in which bullion has been sent to the mint, settlings in catch wells and roof gutters are carefully preserved. It is reported that sales of such "sweeps" at the Philadelphia Mint have yielded a return as high as from \$18,000 to \$20,000 a year from the melting department alone.

**THE WRECK OF THE SANTOS-DUMONT BALLOON.**

All those who are interested in aerial navigation must welcome the news that M. Santos-Dumont is constructing a new balloon which will be ready early in September. It will have the same cubical capacity as the one which came to grief on August 8, but instead of being cylindrical, it will be ellipsoidal in shape, and the small interior balloon used for giving a greater or lesser inflation, instead of being at one end, will be placed in the middle. The illustrations which have come to hand of the unfortunate accident to Santos-Dumont's balloon on August 8 are very interesting, and they show how near he came to being seriously injured. On the morning in question he left St. Cloud at 6:12 and reached the Eiffel Tower in nine minutes. When half-way back, about fifteen minutes after he started, he noticed that the front of the balloon was collapsing, which seemed to indicate that gas was escaping. He at once attempted to drive air into the small balloon, or balloonet as it is called, but the motor refused to act. When the gas left the rear of the balloon, the silk hung in flabby folds which threatened to catch the screw. M. Santos-Dumont was afraid of an explosion, which would inevitably be followed by a fall, so he stopped the motor, and the balloon was at the mercy of the wind. It drifted about for a time and finally, after striking the chimney, went down between two sections of the Exposition Trocadero Hotel, where it hung suspended, as shown in our engraving, which is reproduced from the illustration.

The balloon lay at an angle of 60 degrees, the screw resting on the roof of one of the lower pavilions of the hotel. M. Santos-Dumont climbed up to the roof by means of a rope which was lowered to him and escaped without injury. When the firemen arrived he helped direct the salvage operations. He first ascertained that the motor had not been damaged. Ropes were then fixed to the framework and the balloon was finally lowered to the yard. The aero-

naut at once announced his intention of building another airship to compete for the Deutsch prize, the competition closing for the year on September 15. If the prize is not won within five years, beginning April 15, 1900, the offer of M. Deutsch will become void. Until someone succeeds in gaining the prize M. Deutsch will turn over to the committee of the Aero Club the sum of 4,000 francs each year for distribution among those most deserving of encouragement.

**The Ruby.**

In trade three classes of rubies are distinguished—rubies of the Orient, rubies of Siam, and spinel rubies.

The different varieties called balass rubies, Brazil rubies, rose rubies, rubace rubies, rock rubies, Siberian rubies, etc., cannot be compared at all with the preceding, of which they have neither the composition nor the constitution. Apart from the balass ruby, which from a scientific view-point does not differ from the spinel ruby, all the others are, properly speaking, only colored quartz or feldspar. The ruby of the Orient is the first of all colored stones in beauty, as in price. Its marvelous hue is that of the human blood, as it jets from an open artery, that of the red ray of the solar spectrum at its maximum intensity.

The ruby is one of the most exquisite products of nature, but it is becoming rare and more rare to find it perfect. It even causes astonishment to find an Oriental ruby as large in size as the topazes and sap-

age; they bore them constantly between their teeth, and laid them down only for eating and drinking. It is even claimed that the carbuncle emitted light in darkness, and that the thickest clothing could not stop its rays. Without all the exaggeration of such legends, it was believed for a long time that rubies contained luminous rays. The truth is that they have double refraction and send out the red rays with unequalled brilliancy. Traversed in a vacuum by an electric current they are illuminated with a red fire of extreme intensity. The greatest heat does not change their form or their color.

The most beautiful rubies come from Ceylon, India and China. The mines of Pegu are nearly exhausted, or but little worked to-day. The regions where they are situated are dangerous of approach; besides, in the states of the Grand Mogul the exportation of rubies is forbidden until they have been exhibited to the sovereign, who retains the most beautiful. The stone known under the name of the ruby of Siam is distinguished by its deep red color, somewhat resembling the garnet. But there is no need of being a connoisseur to note the difference between the ruby of Siam and the garnet.

The spinel ruby is much less rich in color, and contrasts visibly in tone with the other kinds. It is of a bright, poppy red. It is much less rare, especially of large sizes, and is not so hard. It is found in the same countries, in the midst of deposits of alluvium in the beds of the torrents. The finest come from Pegu and Cambay. The balass is a very inferior quality of the spinel, of which the color approaches a wine red or clear violet. It is cut with facility, but much skill is required for its polish. It is generally of little value, though large sums are paid for some balass rubies. A beautiful specimen belonging to the treasury of the crown cost 10,000 livres.

The large rubies of the Orient, being excessively rare, are so much the more celebrated. The largest known in Europe is said to be the one that the Russian caravans brought from China with other precious stones in exchange for their peltries, and which forms to-day one of the rarest ornaments of the Imperial Court of Russia. The one of which Chardin speaks with admiration was a cabochon, was of splendid color, and bore engraved the name of the sheik Lephy. That of the King of Persia, of which Tavernier made a drawing, weighed 175 carats. That of the King of Visapour, a cabochon, fetched in 1653 near 75,000 francs. The one possessed by Gustavus Adolphus was as large as a small egg, and of the most beautiful water. It was presented to the Czarina on the occasion of his visit to St. Petersburg in 1677.

It is seen by the inventory of 1791 that France possessed 81 Oriental rubies, of diverse forms and qualities. One of them remained for a long time in a rough state, in consequence of two or three points which could not be removed without sensibly diminishing the value of the stone; but a diamond artist was able to put these defects to use and transformed the rough stone to a dragon with outstretched wings. This is the most beautiful Oriental ruby known.—Le Diamant.

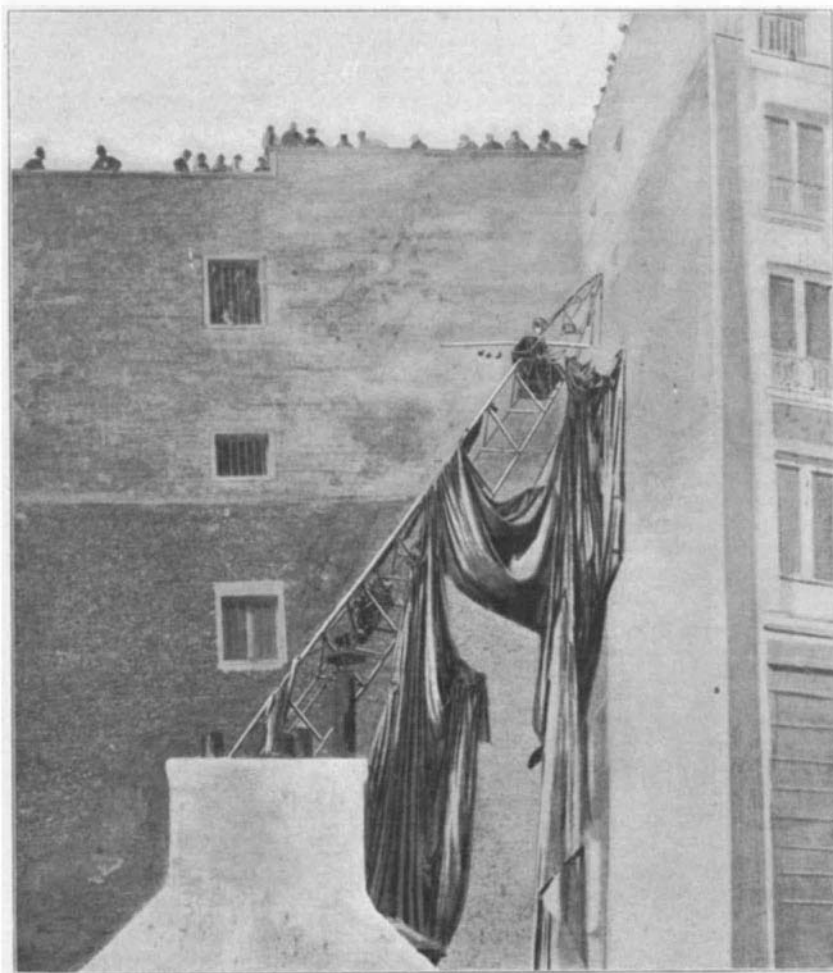
**The Current Supplement.**

The current SUPPLEMENT, No. 1340, is begun by a most interesting article upon "The Temples of Nikko," accompanied by six engravings. "Fossils and Their Teachings" is a lecture by Prof. Angelo Heilprin. "St. Paul's" gives a report of the official architect relative to the condition of the celebrated cathedral. "Smyrna Fig Culture in the United States" is by Dr. L. O. Howard, and is accompanied by a number of illustrations. "The Lighthouse Depot of France" describes the interesting museum connected with that institution. "Cements" is by Willett Pierson. The usual "Trade Suggestions from United States Consuls" and "Selected Formulæ" are included in this issue.

**Contents.**

(Illustrated articles are marked with an asterisk.)

Advancement of Science, American Association for.....	147	Gun, wire-wound*.....	152
Atmosphere Surrounding the Earth, Depth of the.....	150	Inventions, index of.....	157
Balloon trip, contemplated.....	148	Inventions, recently patented ..	156
Balloon, wreck of a*.....	155	Iron and steel, production of the United States.....	148
Books, new.....	156	Lathe, a simple home-made*....	148
Bridge, Willis avenue*.....	153	Matches, manufacture of.....	149
Chemical mysteries.....	146	Mint, United States*.....	154
Coal exports, our.....	150	Money, how it is made*.....	154, 145
Electric engineers, meeting of.....	147	Mosquito, extermination of the.....	147
Electrical energy, combined.....	150	Notes and queries.....	157
Electrical notes.....	151	Propellers, design of.....	146
Engineering notes.....	151	Ruby, the.....	155
Gas, apparatus for liquefying*.....	148	Science notes.....	151
Gun, promising type of.....	146	Supplement, Current.....	155
		Telegraphs, Marconi.....	146



THE WRECK OF THE SANTOS-DUMONT No. 5.

pires of the same countries. If it reaches a certain size it is almost always filled with defects.

Rubies of all sizes are put to use. The smallest, down to 20 or 30 to the carat, are employed specially for delicate jewels, for numbers, figures, etc. Many of the smallest are cabochons. When a ruby exceeds the weight of a carat it commands a high price. A ruby may fetch ten or twenty times the price of a diamond of the same weight if it is really of a superior quality.

It may be interesting to give the figures at which rubies were valued fifty years ago. They were much lower than to-day. A perfect ruby of one carat was priced at 240 francs; of two carats, 960 francs; three carats, 3,600 francs; five carats, 14,400 francs; and six carats, 24,000 francs.

In general the cutting as a brilliant is alone suitable for a fine ruby. The ruby is very hard, almost as high as the sapphire. It was but little used for engraving in ancient times, doubtless because of the difficulty of finding those offering a sufficient surface, a reason more plausible than the explanation that the wax adhered to seals made with this substance. The two engraved rubies seen at the Mineralogical Museum of the Garden of Plants prove that successful work of this kind is well nigh impossible.

The carbuncle, to which the ancients attributed fantastic properties, was no other than the ruby. It served, as is said, to give light to certain large serpents or dragons whose sight had been enfeebled by