Meteorit—A New Aluminium Alloy.

Mr. Walter Rubel, a German civil engineer, has been carrying on a series of promising experiments with a metal of his invention which is nothing more or less than an alloy of aluminium and phosphorus. The new metal (called "meteorit") is no mechanical mixture of aluminium and phosphorus, but a chemical compound. No disintegration can therefore take place in melting or casting. According to the quantity of phosphorus used, meteorit can be made in various grades of hardness. Later tests proved that the material is very dense and highly polishable. For scraping, the metal is in no way inferior to white, or to red metal. Meteorit is well adapted to planers and shapers. No smearing is noticeable. This is a special feature of meteorit, as all other known alloys of aluminium are likely to smear the shaper. The cutting velocity is very high, which, for economical reasons, is to-day of importance in machine construction.

Meteorit has the same low specific gravity as aluminium, viz., 2.6 to 2.8, which is of great importance in branches of industry where the material is employed in large quantities, especially in motor-car construction.

The new metal is well adapted to machine construction, as has been amply demonstrated by the tests made in the technical institutes at Charlottenburg, Munich, and Duisburg. The following are the results of comparative tests between meteorit, magnalium (an alloy of aluminium), and pure aluminium, made and officially attested by the Royal Mining School at Duisburg. Tests made with rods on May 13, 1901. Diameter 20 millimeters. Tensile strength:

		Contraction.
Cast meteorit	5,010 kilogrammes	43 per cent
Magnalium	3,150 kilogrammes	11.7 per cent
Aluminium	2,720 kilogrammes	7 per cent

Further tests made with regard to the various other requirements have given the following results:

	Rolled material.	Cast material.
Ductile strength	23 kg.	16 kg.
Tension	9.5 per cent	6 per cent
Pressing resistance per square millimeter	——	58.5 kg.
Gravity	——	31 kg.
Bending resistance	——	27.3 kg.
Contraction	——	43.84 kg.

The metal is acid-proof and non-corrosive in the presence of acetic acid.

Meteorit is, furthermore, in no way affected by the temperature, and is, therefore, specially adapted for many objects intended for outdoor use. Its durability in sea water, combined with its lightness, makes it an ideal material for shipbuilding. It must be stated that, wherever rolling material is used, meteorit is said to possess unsurpassed features of its own, and sheets have been made from 3 mm. (.118 inch) to 0.06 mm. (.002 inch) in thickness, of first-class quality, very hard as well as soft, the latter being intended for further manufacturing into tubes and for cutting and stamping. The German arms and ammunition factories in Karlsruhe, as well as the Swiss and Russian governments, are now making cartridge shells of meteorit.

Meteorit can be soldered and galvanized (nickel, silver, or copper) as easily as other metals, and therefore it can be given any coloring that may be desired. This has up to now not been possible with aluminium.

Information Concerning the Mexican Cotton-Boll Weevil.

The United States Department of Agriculture has just issued Farmers' Bulletin No. 189, "Information Concerning the Mexican Cotton-Boll Weevil." It was prepared by W. D. Hunter, special agent in charge of cotton-boll weevil investigations, division of entomology.

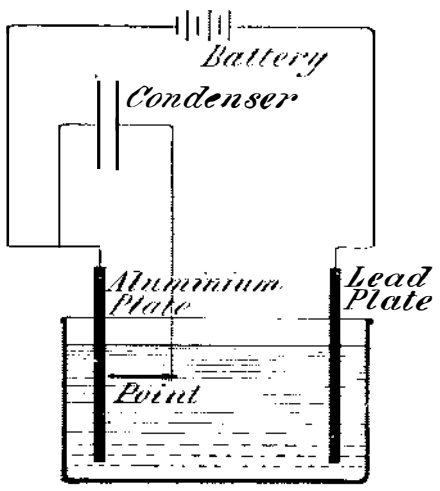
The work of the division of entomology for several years has demonstrated that there is not even a remote probability that the boll weevil will ever be absolutely exterminated. Although the very large yields of cotton of former years may perhaps no longer be possible, it is nevertheless entirely feasible to produce cotton at a margin of profit that will compare favorably with that involved in the production of most of the staple crops of the United States by what have become known generally as cultural methods. These methods consist of modifications of the system of cotton raising made necessary by the weevil. They were originally suggested by a careful study of the life history and habits of the pest, and naturally any improvement that may eventually be made will be the result of the continuation of that study. They have been tested successfully on a large scale by the division of entomology, as well as by many planters, during two very unfavorable seasons. These methods are in brief as follows: First. Plant early. Second. Cultivate the fields thoroughly. Third. Plant the rows as far apart as experience with the land indicates is feasible, and thin out the plants in the rows thoroughly. Fourth. Destroy, by plowing up, windrowing, and burning, all the cotton stalks in the fields as soon as the weevils become so numerous that practically all the squares and bolls are being punctured. Of greatest advantage is the reducing for the next year of the number of the weevils by the destruction of the plants in the fall. The advantage thus gained is followed by bending every effort toward procuring an early crop the following season. Fifth. While fertilizers are not now used to any considerable extent in cotton producing in Texas, there is no doubt that they should be; not that the land is poor, but that crops may be procured earlier so as to avoid a considerable degree of injury by the weevil, which is more destructive to later crops.

The bulletin contains a description of the weevil, the territory affected, and the plan of the investigations by the division of entomology, and gives some of the results of the field work and an experiment showing the damage resulting from favorable hibernating quarters.

The bulletin concludes with an account of the legal restrictions concerning the shipment of infested cotton seed and a warning to cotton planters against the inflation of prices of the seed of certain varieties, and the attempts of unscrupulous persons to dispose of common seed from various localities as that of early maturing varieties.

NEW ELECTROLYTIC PHENOMENON.

A rather curious phenomenon has been discovered by Julius Bing, a German scientist, during some experiments in electrolysis. A vessel contains an aluminium and a lead plate (see diagram) plunged in an electrolyte of tartaric acid. The positive pole of a battery is connected to the aluminium plate and the negative to the lead. The aluminium electrode is connected to one side of a condenser, whose other side has a wire dipping into the liquid. The wire is terminated in a point, which is approached perpendicularly to the plate. It is found that a discharge is produced between the point and the plate, which the author considers due to the capacity of polarization of the aluminium. The energy brought into play by the introduction of the



BING'S ELECTROLYTIC APPARATUS.

condenser is so great that when the point touches the plate, it becomes soldered at once. Therefore he uses a carbon point instead. The heating of the liquid is quite appreciable. The arrangement seems to act as a current interrupter, and the discharge seems to be of an oscillatory character, as the interruptions are accompanied by a high-pitched sound. The frequency of the discharges varies when capacities of different value are inserted. On putting in self-induction, the rate of the discharges is lessened and may be even stopped. The phenomenon is well observed with 150 to 200 volts and a capacity of 15 microfarads, and the interruptions are then regular. At the anode plate is seen a bluish light which disappears at the moment of discharge, but it reappears, on the contrary, when the charge is increased progressively.

Telegraphing Pictures and Handwriting.

In an address recently delivered at the Berlin Urania, Prof. Cerebotani presented a telegraphic apparatus for transmitting any kind of handwriting, drawing, etc. The fundamental principle is identical with the principle employed for instance by Elisha Gray, the novel feature being a highly sensitive system of electromagnets. In the case of the drawing pencil of the transmitter being moved upward in an oblique direction, the line obtained in the receiving apparatus of previously-invented systems is a broken one. In Cerebotani's system, the electromagnets are so sensitive as to produce nearly straight lines, even in the case of their being excited by extremely small currents. The telegraphic transmission of pictures and handwriting, as obtained by means of his apparatus, is therefore much clearer and truer than in the case of any previous apparatus. Some samples produced by Cerebotani were transmitted on the telegraph lines from Munich to Augsburg, from Milan to Turin, and finally from Berlin to Munich. A picture transmitted some weeks ago from Berlin to Munich over a distance of 403 miles is said to be the finest specimen of telegraphic transmission ever obtained in this direction.

Engineering Notes.

A 32-ton iron girder, the seventh of a number which are being used in the construction of a large department store in New York city, attracted no little attention as it was hauled through the streets on a truck 150 feet long. To drag the girder from its dock, twenty-one horses were required. The animals had to stop every few blocks for a rest. Every time that a new start was made, two powerful jacks were brought into use to move the heavy mass.

In the course of the James Watt dinner recently celebrated in Glasgow, the Lord Provost, Sir John Ure Primrose, Bart., described a new method for the raising of steam—a process that not only alters the existing plans of steam raising, but also solves the problem of the smoke nuisance in great industrial centers. The Lord Provost, who is a big manufacturer, had attached to one of the marine type of boilers at his works a furnace that appears to settle the smoke difficulty, introducing at the same time conditions under which, at a given rapidity of combustion, the maximum efficiency in steam is obtained from the fuel used. It is claimed for the patent that it is particularly suited for marine work. It can be used with cheaper and dirtier coal than is employed by the existing systems, so that shipmasters, when in foreign ports, would be in a position to effect the saving that would come from the purchase of local coal. Less boiler-room space is required, and the boiler-room weights are reduced by about one-half. Fuel can be taken either solid or liquid. Air and fuel are fed together, and combustion is effected under ideal conditions, no unconsumed gases escaping from the furnace, and no smoke or carbonic acid gas coming from the funnels.

It is almost the general impression that the late Sir Henry Bessemer was knighted in recognition of the steel process which bears his name, but such was not the case. The honor was bestowed in 1878, when he was sixty-six years old, as a tardy reward for a service rendered the British government about the time of his attaining his majority. The history of this, as told by James Dredge, is that at the time when, in his early years, Bessemer came into contact with some of the officials of Somerset House, the seat of the Inland Revenue Department, it was notorious that frauds on the government were perpetrated to an alarming extent by the repeated use of stamps affixed to deeds. It was estimated that an annual loss of £100,000 was sustained from this cause, and to devise a means for entirely putting a stop to this occupied Bessemer's attention. It is almost superfluous to say that he arrived at a solution by the simplest means, that of perforating the government stamps with dates. Now that this evident method has found a hundred uses throughout the civilized world to safeguard stamps or checks, and to divide postage stamps, being among the most common, it is a little difficult to realize the importance of this invention. To Bessemer it meant, in anticipation, vast things—assured fame, a retaining fee of £600 a year as a government official, and a great advance on the road to fortune. In reality, however, it meant nothing, for though the invention was at once adopted, the official promises were soon forgotten.—Cassier's Magazine.

The experiments described in a paper by Mr. Strahl (see Zeitschrift des Ver. Deut. Ing. No. 2) were made on behalf of the Breslau Royal Railway Department, two high-speed train locomotives being fitted with Pielock superheaters, and compared with two similar locomotives without superheater as to their consumption of water and coal. The main results arrived at may be summarized as follows: The temperature of the steam on issuing from the superheater being 260 deg., the saving as to water vaporized was about 16 per cent, and as to the consumption of coal; 12 per cent, whereas the steam saving proved equal to about 10 per cent for a mean steam temperature of 230 deg. in the dome. The consumption of steam in the different locomotives compared, proved the same for equal outputs. The weights of water vaporized are inversely as the specific volumes of the different kinds of steam, being directly proportional to the specific weight. The saving in steam obtained corresponded with the increase in the specific volume of the steam due to superheating. The saving in steam, being dependent only on the superheat, must be the same both in compound and twin locomotives for equal superheat, the comparison being relative to quite similar locomotives. Slide valves could be used up to the highest temperatures attained (272 deg. C.) provided sufficient oil was supplied to the sliding surfaces by means of lubricating presses. In order to fully utilize the advantage inherent in superheating for a higher efficiency of the locomotive, the cylinders should be increased proportionally to the higher consumption heat (coal) of the locomotive (in the case of equal outputs) without superheaters, as against locomotives with superheaters.