

(24) Dr. F. A. R. asks: Will you please inform me through the Notes and Queries column of your next issue, with what should bone ash be mixed, and also directions for making a bone ash cupel, as shown in SCIENTIFIC AMERICAN, May 28, 1881, page 339? Can bone ash, good enough for making cupels, be prepared by burning bones and grinding? By passing a stream of  $H_2S$  into  $(NH_4)OH$  (spec. gr. 0.96) until saturated, and then adding an equal volume of  $(NH_4)OH$ , will it not give  $(NH_4)_2S$ ? What is the difference in the preparation of  $(NH_4)SH$ ,  $(NH_4)_2S$ , and  $(NH_4)_2S_2$ ? I noticed in the tests for metals of the different groups in a qualitative analysis which I have, that some of the tests require one of the above reagents and some require another, and I wish to ask if it is necessary to have all of the reagents, or will the ammoniacal sulphide answer in place of the others? A. Take bones or bone black and calcine them in an open crucible until all the animal and carbonaceous matters have been destroyed and the residue becomes whitish; cool and empty the contents of the crucible into clean water, and give it repeated washings in fresh waters to remove all soluble matters. Drain on a filter and dry. When required for use moisten with water (or beer) in about the proportion of eight of ash to one of liquid. It is then ready for the mould. When moulded the cupel must be dried slowly by the stove, then heated in the muffle to bright redness before it receives the charge. There are two or three points to be observed in making the best cupels: First, the powdered bone ash must be of a certain degree of fineness; secondly, the paste must be neither too soft nor too dry; and thirdly, the pressure must be made with a certain degree of force. A coarse powder only slightly moistened and compressed furnishes cupels which are very porous and break on slight pressure, and which allow small globules of metal to enter their pores occasioning loss. When the powder is too moist and too strongly compressed the cupel does not absorb readily—soon becoming choked or clogged—and requires too high a temperature to complete a cupellation. The action of hydrogen sulphide upon ammonia gives rise to the formation of  $(NH_4)_2S$ ,  $[2NH_4(OH) + H_2S = (NH_4)_2S + 2(H_2O)]$ , then of  $NH_4SH$ ; upon addition of the same quantity of solution of ammonia as has been saturated, the ammonia decomposes with the ammonium hydrosulphide and ammonium monosulphide is formed thus:  $NH_4SH + NH_4OH = (NH_4)_2S + H_2O$ . The rule is, however, to add only two-thirds of the quantity of solution of ammonia, as it is better the preparation should contain a little ammonium hydrosulphide than that free ammonia should be present. To employ ammonium hydrosulphide instead of the monosulphide is unnecessary.

(25) F. R. E. asks: Will you inform me why it is that the water always rises in all the small streams in the fall? A. We think you are mistaken in your premises. Streams rise in the fall and spring after rains; but we think that during this fall the drought has diminished the streams.

(26) G. E. T. asks: 1. What is the battery power required to run an Edison lamp? A. From 100 to 140 cells of carbon battery. 2. Will any part of the secondary battery need renewal after continued use? A. The acidulated water is liable to become decomposed. In other respects we think the battery is permanent.

(27) A. F. W. asks: 1. Is the current generated by a dynamo electric machine always of exactly the same strength for the same speed of the machine? A. Any variation in the resistance of the external circuit will change the strength of the current. 2. Can the difference in strength be made noticeable for a change in speed of five revolutions? A. Yes. 3. What is the most practical and reliable instrument for observing the changes in strength, due to changes in speed? The generator is supposed to be one of the smallest sizes that can be had. A. A galvanometer placed in a shunt circuit.

(28) C. B. B. writes: I made a Holtz electrical machine from directions in SUPPLEMENT, No. 278, and am unable to charge it. I used tin foil, well insulated about the edges, for inductors, and the revolving plate does not turn quite true. If you can give any information that will help matters you will greatly oblige. A. A Holtz machine will not work in sultry summer weather. If your machine is made according to directions given in the SUPPLEMENT it will work well most of the time from now until warm weather in the spring.

(29) W. M. B. asks: Why is it that some banks do not take gold and silver coin that has holes punched in it, or is mutilated in any manner? What is the value of it in that case? A. There is no provision for the redemption of mutilated silver coin, and as it is not a legal tender, and has a value as bullion only, bankers and others are justified in refusing to redeem it. Mutilated gold coin is a legal tender at a valuation in proportion to its actual weight, according to Section 3585 Revised Statutes, which provides that: "The gold coins of the United States shall be a legal tender in all payments at their nominal value, when not below the standard weight and limit of tolerance provided by law for the single piece, and when reduced in weight below such standard and tolerance shall be a legal tender at valuation in proportion to their actual weight." This section seems to have been overlooked or ignored by the banks and treasury officials, but we presume now that so much interest is taken in mutilated gold coins that arrangements will be made to retire mutilated gold coins.

(30) E. L. C. asks: Will you please inform me where I can obtain any knowledge concerning the liquefaction of the so-called permanent gases O, H, N, by Cailliet of Paris, and Pictet of Geneva, in 1877. A. See pp. 2030-31, SUPPLEMENT, No. 128, also SUPPLEMENTS, Nos. 116 and 118, and SCIENTIFIC AMERICAN, vol. xxxviii, pp. 64 and 73, 111 and 186.

(31) R. L. N. writes, in answer to O. R. M.: I have effected nearly a complete cure for dandruff, by washing with a solution of borax once each tenth day, and using bay rum each alternate day. At first use it every day.

(32) H. H. W. asks: Is there any method of closing an electric circuit through the agency of light? A. It can be done by means of a selenium cell, or by some modification of the radiometer.

(33) J. W. K. asks: What power in tons will it take to punch one inch round hole through one inch iron? A. From fifty-five to sixty-five tons, depending upon the quality of the iron.

(34) W. R. M. writes: My residence is about 200 feet from telephone office. I desire some arrangement by which I can, while at my residence, hear the ring or call on the call magneto bell at the office. 1. Can I attach an electric bell placed in my dwelling to the telephone line wire outside my office and thus catch the call? A. Yes, by cutting the wire and inserting a call adapted to the line. 2. What would such bell cost, and name of bell? A. It is probable a bell with a polarized armature would be required. You can obtain particulars by addressing electricians who advertise in our columns. 3. Would an extra cell of battery be necessary? If so, what kind? A. If the call is made by means of a magneto machine a battery will not help you. We cannot give you practical advice without knowing more of the detail of your line.

## [OFFICIAL.]

## INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were  
Granted in the Week Ending  
October 4, 1881,  
AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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 Blowers, rotary, F. M. Koots, Connerville, Ind.  
 Cartridgefeeder, Gatling Gun Company, Hartford, Conn.  
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 Fireplaces, J. M. Cook, Cincinnati, Ohio.  
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 Knitting machinery, W. H. McNary, Brooklyn, N. Y.  
 Paper pulp, manufacture of, M. L. Keen, Experiment Mills, Pa.  
 Printing machinery, R. Hoe & Co., New York city.  
 Printing wall paper, machinery for, C. E. Benedict, Buffalo, N. Y.  
 Pyrites, treatment of, H. Wurtz, New York city.  
 Score of opera, mode of exhibiting to audiences, T. L. Jones, St. Louis, Mo.  
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