chitecture was made; two centuries and a half later this had grown into the architecture which we admire; from this it came to pass that Roman building was what it was, and from Roman building has come all that of later Europe." The history of architecture in Europe from 350 A.D. up to recent times is covered by nine chapters, in which is crowded a vast deal of valuable information and most interesting comment. The book is embellished with ten plates and 256 other illustrations.

A TREATISE ON ARCHES. By Malverd A. Howe, C.E. New York: John Wiley & Sons. Pp. 371. Price $4.

This is a book particularly designed to facilitate the work of the practicing engineer, saving his time in the making of many essential mathematical demonstrations, and furnishing formulæ and tables adapted to his wants for a wide variety of work. The author is professor of civil engineering in Rose Polytechnic Institute, and the demonstrations are designed to be such as may be readily followed by senior students in technical schools.

The large and valuable catalogue of manufacturers' and machinists' hardware, issued by Charles H. Besly & Company, of Chicago, presents an extent and variety of tools and supplies which one seldom finds in a single volume. It comprises 300 closely printed pages in fine type, with profuse illustrations and ample index, the articles catalogued including almost everything from an engine lathe to calipers or from a differential pulley to a scratch awl.

SCIENTIFIC AMERICAN BUILDING EDITION

JULY, 1897.—(No. 141.)

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Notes & Queries

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Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated: correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

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Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(7179) W. D. M. says: Is shellac considered a good bicycle wood rim cement? If so, how is it prepared for that purpose? Also, how should it be applied? A. Cements for Tires.—

1. Shellac	2 oz. av.
Gutta percha	2 " "
Red lead	90 gr.
Sulphur	90 "

Melt the shellac and gutta percha, and add, with constant stirring, the red lead and sulphur melted. Use while hot.

2. Isinglass	½ oz. av.
Gutta percha	½ " "
Caoutchouc	1 " "
Carbon bisulphide	4 fl. oz.

Mix and dissolve.

3. Caoutchouc	2 oz. av.
Resin	140 gr.
Shellac	100 "

Carbon disulphide, a sufficient quantity to dissolve the other ingredients.

4. Crude rubber	½ oz.
Carbon disulphide	4 "

Macerate twenty-four hours, and then add a solution of—

Resin	1 oz.
Beeswax	¼ "
Carbon disulphide	4 "

(7180) G. R. S. says: Will you kindly inform me through your Notes and Queries of a cleaner and polish for tan shoes that will not injure the leather? A. We have published directions for making preparations for cleaning and polishing shoes, in our SUPPLEMENT, Nos. 1063, 1073, 1078, ten cents each.

(7181) J. C. McK. writes: I have been constructing an induction coil along the following lines and would be pleased to have your opinion as to the spark we might reasonably expect from the same. Length of coil inside heads will be a little over 13 inches. Three sections of 4 inches each. Size of coil when finished, 7 inches. Size of core, 1⅛ inch. Wire on primary, No. 16, two layers. Wire on secondary, No. 38, 100 layers approximately. Winding, 116 to inch. No. 200 thread (cotton) between, making it a solid mass. Amount of wire on secondary, 5 pounds. Insulation between layers is two thicknesses of finely paraffined paper. The winding is very nearly perfect. We have one pound of wire on now, and a 10,000 ohm magnet, will not ring through it, although some current passes. As No. 38 wire has a resistance of a little over 10,000 ohms to the pound, the insulating must be very near perfect. We get quite a good shock by using a 10 volt battery, but it would seem to us that we ought to get more from No. 1 wire. We have no core, and no condenser, simply trying the coil in the winding apparatus. A. Your coil should give at the longest a 4 inch to 6 inch spark from its dimensions, though in a six inch coil as large a number of sections as eight are used in the secondary. The induced current would be very weak without condenser and core. Should say you would better have used No. 12 copper wire cotton covered in two layers of primary, but additional current can be used to overcome your larger resistance. In doing so more heat will of course be developed, and the coil cannot be run as long at a time. With an odd number of sections in secondary, one end of the wire will come out on inside of spool. An even number of spools should have been used. The larger the number of sections, the less the risk of breaking down the insulation between the turns of secondary, because there is less difference of potential between adjacent parts of the coil.

(7182) R. E. R. writes: I have made the caustic potash battery you describe in "Experimental Science." I used a cast iron kettle for the cell after heating the water. I added the potash (¼ pound), which was in stick form, and after this was thoroughly dissolved I put in a pound of black oxide. The sheet zinc is three feet long and six inches wide, rolled in spiral shape. The inside of kettle seemed to corrode to a considerable thickness. Can you account for it? Would not a copper pail be a good substitute for the kettle? A. The cell with oxide of copper in an iron dish, and a solution of caustic potash or soda, must have a thin layer of heavy petroleum oil on the top of the liquid to prevent the action of the carbonic acid of the air upon the potash or soda. You do not mention using this. In the action of the cell a dark brown or nearly black mud is formed from the black oxide. This may be what you have thought to be the corrosion of the kettle. If the kettle corrodes, it will be seen by the formation of holes or pits in the iron. This should not take place. The zinc of this battery, for best effect, should be amalgamated. This is difficult with ordinary sheet zinc; probably impossible with so large a piece as you use. This battery is properly to be used on closed circuit; that is, it should be left with current flowing through a large resistance when you are not at work with it. From your description it is difficult to see why you have had a complete failure. The suggestions above may lead you to better success. A copper pail would be more expensive. If you would use copper, we would advise a dish bent up from sheet copper to hold the black oxide. This set into a glass jar would form a good negative plate. Rivet an insulated copper wire to the copper dish, so that neither the liquid nor the zinc can touch the wire on its way out. Then, if you can get a plate of zinc such as is used in the gravity battery and amalgamate it, the result will be much better.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

JULY 20, 1897,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

(Continued on page 78.)