points to make room for a deposit of cave heart containing the remains of the rattlesnake, woodchuck, opossum, rabbit, and cave rat. and it is the important relation of this latter modern earth, with its bits of mica and Indian pottery, to the older breccia that will constitute the material for a final report.

Previous examination, in 1893, at the Lookout Cave (left bank of the Tennessee River, one quarter of a mile below Chattanooga Creek, Hamilton County, Tennessee), had revealed the bones of the tapir and mylodon in the lowermost zone of a floor deposit of Indian refuse, and upon the recent expedition the cave earth with its "culture layer" was entirely removed for 58 feet inward from the entrance to settle beyond doubt the relation of these fossils to the Indian remains resting upon them. At this significant spot, where again the Pleistocene and recent deposits lay in contact, and where the specimens found were labeled according to their position, whether from the black (modern) earth above or the yellow (ancient) earth below, a completed examination should decide whether man had or had not encountered the tapir and mylodon in the Valley of the Tennessee.

After a visit to "Indian Cave" on the Holston River, Carrol's Cave, and the Copperas and Bone Caves, near Tullahoma and Manchester, Tennessee, a new set of conditions was presented at Big Bone Cave (one mile from left bank of Caney Fork and about two miles above its mouth in Rocky River, Van Buren County, Tennessee).* There the bones of the gigantic fossil sloth (megalonyx), still retaining their cartilages, were exhumed from a dry deposit of the refuse of porcupines and cave rats, mingled with fragments of reeds used as torches by Indians in a gallery 900 feet from the entrance, thus presenting us in the final summing up of this strange evidence a new notion of the relation of the modern Indian to this extinct animal, whose remains outnumber all its fossil contemporaries at Port Kennedy.

Thanks are due to Dr. William Pepper, to the board of managers and to Professor E. D. Cope, for their kind co-operation in the expedition thus finished, which has presented the museum with the specimens now under examination. These, if not attractive, are important. For paleontology they mark in the bone breccia of Zirkel's Cave a distinct stage in the Pleistocene series, while for anthropology they represent data which account for the presence of man together with the bones of the extinct megalonyx. They explain the relics of savages and the remains of Pleistocene mammals at two caves situated in the Eastern Valley of Tennessee, at a height of about 600 to 700 feet above the sea and within earlier reach of a overwhelming ocean in Champlain time, and again at a third cave, which, 300 feet higher on the continental floor, and looking westward from the slopes of the Cumberland table land, stands for that part of the Appalachian region whither animals and man (if he existed) might have found convenient refuge when lower areas sunk, as is alleged, beneath the level of the invading waters.

* This cave was explored by Mr. Henry C. Mercer, curator of the section of American and prehistoric archæology, Museum of Science and Art, University of Pennsylvania, at the suggestion of Prof. James M. Safford, of Nashville, Tenn.

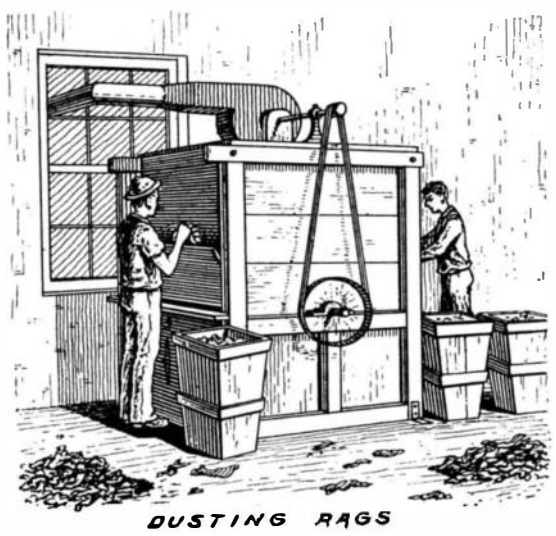
PREPARING OLD WOOLEN RAGS FOR SHODDY CLOTHING.

Shoddy consists of old woolen rags and shreds of stockings, flannels, and other soft worsted fabrics torn and reduced to such fragments as can be made by the operation. A similar preparation, called "mungo" or "mingo," is made in the same manner from rags and clippings of milled woolen cloth, being divided into new mungo from tailors' waste and old mungo from rags of all degrees of degradation. Where cotton and wool have been woven together into cloth, the former is burned out by treating the material with a solution of sulphuric acid, and heating it in a stove, the acid attacking and charring the cotton and leaving the wool unharmed. Shoddy cannot be used without a certain amount of natural length wool, usually about one-third being used in spinning shoddy yarn.

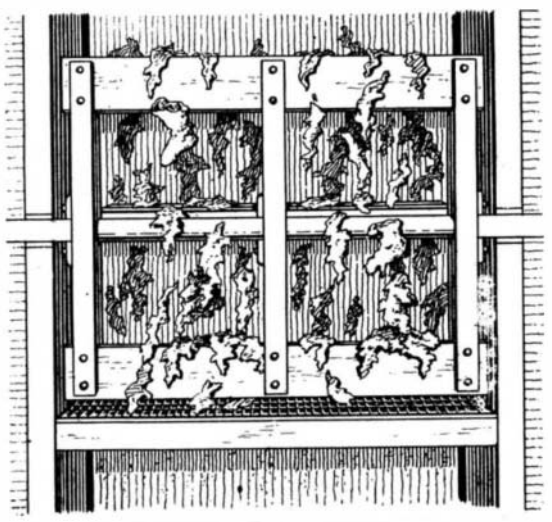
Large quantities of old clothes and rags of every description are imported into this country from England, Germany and France. The material comes here packed up tightly in bales weighing from 500 to 1,000 pounds each, the stock costing, if old and dirty, from 3 to 5 cents per pound; if of good quality, about from 8 to 10 cents per pound. When the wool is cleaned and in good order, it will sell from about 14 to 24 cents per pound. The cloth and rags are picked and sorted over by women and girls of different nationalities, such as Italians, Poles, Russians, etc. The material is placed upon tables for that purpose, the women picking out each rag and shred, carefully examining the color and quality. The pieces of cloth are then put into separate boxes, according to the color and quality of the material. The boxes are made of wood and are about 4 feet in height and about 18 inches square, and will hold about 50 pounds each. Each hand can sort about 90 pounds daily. After the stock is sorted it requires cleaning to free the material of dirt. This is performed by passing the stock through what is called a duster. This apparatus is a square boxlike structure, inside of which is a revolving wheel made of wood about 4 feet in diameter, containing four paddles, the blades of which are about 4 feet in length and about 8 inches in width. The material, to the amount of about 50 pounds, is placed in the apparatus; the paddles, which revolve at the rate of about 300 revolutions per minute, striking the rags and throwing them against the sides of the structure, which forces out the dirt, the dust being carried off at the top by means of a two-foot blower. The dusting operation takes about one minute. The stock, according to the quality and color, is then put into bins holding about 1,000 pounds each, ready for packing into bales. Where the stock is composed of old clothing or any material containing seams or patches, it is necessary to cut them out, so that the cotton can be burned out. The seams are cut out by women and girls with shears and knives, the operation for each suit taking about 10 minutes. The strips of cloth are then dusted and the cotton in the seams burned out with sulphuric acid, as stated above. The rags, when sold, are then pressed into bales weighing about 700 pounds each. The rags are thrown or dumped down into a boxlike structure having a movable bottom, which is raised by means of four movable iron arms. These arms, when in position to raise the bottom of the press, are diamond-shaped, the two upper ends of the upper arms being hinged to the press bottom and the two lower arms hinged in the same manner to the flooring below. The central ends of the arms are connected to a horizontal spiral screw, which passes across the center of the diamond, which, when set in motion, cause the arms to draw inward, straightening them out and causing the press bottom to move upward, which in turn presses the rags tightly together against a heavy movable wooden frame above, which is moved over the rags when the press is filled. The arms raise the bottom up about

CUTTING OUT SEAMS FROM CLOTHING

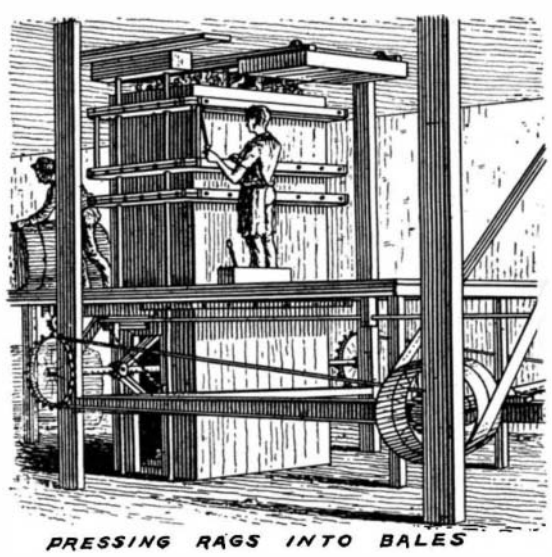
SORTING OUT DIFFERENT COLORED RAGS.



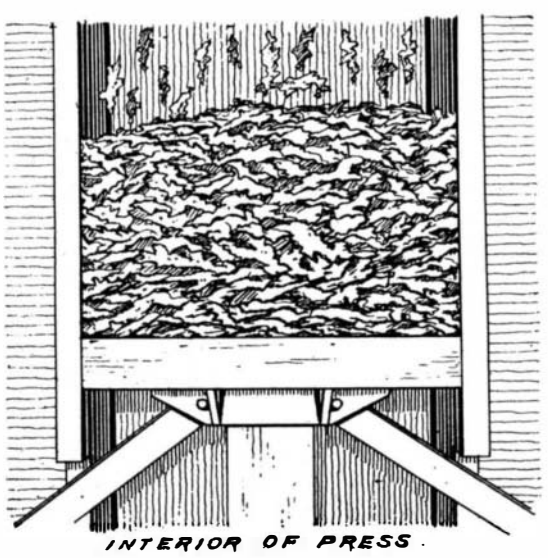
DUSTING RAGS



INTERIOR OF DUSTER



PRESSING RAGS INTO BALES



INTERIOR OF PRESS.

SEWING UP BALES.

PREPARING OLD WOOLEN RAGS FOR SHODDY CLOTHING.

4 feet, with a pressure of about 20,000 pounds, making a compact mass of rags that can hardly be pulled apart. A piece of heavy red sheathing paper and bagging is first laid on the bottom of the press before the rags are thrown in, and another piece across the top when filled. These are bound tightly around the rags with steel wire when the bale is formed, the attendants then rolling it out of the press to other operators, who even the ends with the same material, The bagging is then sewed up around the bales, which are then ready to ship to the shoddy clothing manufacturers. Forty-two bales can be pressed daily, the operation taking about 15 minutes for each bale. The sketches were taken from the plant of the Jersey City Wool Company, N. J.

Excavations at Corinth.

The work of excavation at Corinth has now been going on for over two months and will cease for this year after ten days more of excavation.

The work this year was necessarily of a tentative character, and was limited to the digging of trial trenches. We started in absolute ignorance of the topography of Corinth, the one monument of the city that was above ground—the ruin of one of the oldest temples in Greece—having been hitherto without a name.

The area within the city wall, which is still well preserved in a part of its extent, is very large, measuring about two miles from east to west. Where within this area lay the agora, around which most of the temples and other important buildings were grouped, was a question to which archæologists gave different answers. If some point of the agora or some building, particularly the theater, could be found, then we would know that we were on the track of Pausanias, who describes the city with considerable fullness. With this hope we dug twenty trenches, some with cross and side trenches. Most of them are fifteen feet deep, and some more than twenty, going down in every case to the original surface.

In the last week we have come to a result which deserves to be communicated to the American public. We have achieved success in the very form in which we would have preferred to have it come. We have found the theater! This is to us just now more important even than a masterpiece of sculpture, because it marks the end of the trial stage of our excavations, and makes a natural close of our first campaign at the same time that it crowns it with success.

If one takes down his Pausanias he will see that one temple is above the theater and another adjacent to it, with other important buildings near by. It is now clear that what must be done is to lay bare an area including the theater itself and all its neighborhood. The day of trial trenches being passed, the earth must no longer be carried out of deep trenches in baskets, but a narrow gage railroad, with dumping cars, must be employed to carry off the earth in quantity to some little distance, as was done at Troy and as is being done at Delphi. Land also must be purchased, either by us directly or by the Greek government for us.

Both these things will make a demand upon those in America who are interested in such an enterprise.

It is fortunate that nowhere near the theater is a single house. What is to be purchased is simply land, and, fortunately again, quite poor land, and a considerable area can be bought for $1,000. It would be better, however, to have a larger area. It would be well for some public spirited American to make the American School of Classical Studies at Athens a land owner in old Corinth, for in that case the finds of the excavators, according to a law which is now under discussion and likely to be passed, would go to American museums.

It is not at all strange that in the kind of work which we have done hitherto no conspicuous finds have been made. The misses of the trial trenches at Olympia and on the Athenian Acropolis were more conspicuous than their hits. It was only when large areas were laid bare that the soil yielded up its treasures. So, doubtless, it will be at Corinth.

Not that our work has not yielded objects of minor value. Several pieces of sculpture, the best of which is a group composed of a youthful Dionysos, accompanied by Pan and a nymph; a quantity of very old and interesting bases, which any museum would be glad to have; a considerable quantity of most interesting vase fragments of old Corinthian style; many archaic terra cotta figurines; and several Roman inscriptions—these make up quite an important result.

But, after all, it is the finding of the theater that enables us to appeal to the American public to support this work generously. In the excavation of a great city like Corinth, the first object must be the recovery of the buildings. We were glad to find a grave with interesting prehistoric bases, but this was something thrown in—an accidental discovery. The archaic terra cottas which are now coming to light (one might say in a mass) above the theater are to us most important, as indicating the proximity of some ancient temple, in which they probably served as anathemata.

For months we have been at the heart of this most interesting ancient city of Corinth in various spots, but at such a depth that even when we seemed near important things we were not able to proceed to the right or to the left. In one of our deepest trenches we seem to have struck the agora itself; but certainty will have to be deferred to another year.

The year, then, ends with a result which is an earnest of greater results to come, and which establishes a claim on the generosity of our friends in America, on whom all depends.—Rufus B. Richardson, in the N. Y. Times.

A PNEUMATIC INKSTAND.

The very convenient form of inkstand shown in the accompanying engraving has been patented by Mr. Rollo M. Badger, of Sayre, Pa. The device consists essentially of two separate parts: a base formed of glass, porcelain, or any preferred material, and an inverted reservoir, which is preferably formed of glass, and is provided at its lower end with a circular neck, which is perforated with three or more holes distributed evenly around the periphery and arranged at different heights above the lower edge of the said neck of the reservoir.

The base of the inkstand, which is circular in shape, is provided with an ink well, as shown, which communicates with an annular groove in the base. The inner wall of said groove is formed by a plug or stopper which fits the circular neck of the reservoir, the neck fitting snugly but loosely over said stopper, and being adapted to turn about the same. A vertical groove or slot is formed on the wall of the stopper, as shown, and extends from the top to the bottom. When the reservoir is turned so that either of the openings in the neck coincides with the vertical passage above mentioned, the ink will flow from the reservoir down said passage, and escape through said opening into the ink well, until the level of the ink in the well rises high enough to close the opening. The holes in the neck being located at different levels, it is evident that the amount of ink in the well may be regulated by placing the desired hole opposite the vertical groove. When not required for use, the ink in the reservoir may be shut off from the outside air by turning the reservoir so that the vertical groove will be completely closed.

BADGER'S PNEUMATIC INKSTAND.

The Cost of War.

The Christian Work gives the following figures regarding the cost of war and the casualties caused by it:

In the last two hundred years France has spent £993,000,000 in war. Even Belgium spends every year 46,000,000 francs on her army. In less than three hundred years Great Britain alone has spent £1,357,000,000 in war. At Bannockburn 135,000 men fought, and 38,000 were killed or wounded. Italy spends every year 14,000,000 lire (£560,000) on her army and navy. The French army costs every year 675,000,000 francs; the navy, 209,000,000. The peace footing in the Russian army calls for the services of 170,000 horses. The army of Bolivia costs the people of that impoverished country £360,000 a year. At Gravelotte 320,000 men were engaged, of whom 48,000 were killed or wounded.

In a late number of Comptes Rendus is a report of M. Flammarion that, in the month of April, three new divisions in Saturn's ring had been observed between the Cassini division and the Crape ring, thus separating the inner bright ring into four zones. One of the dividing lines was more conspicuous than the other two, which were observed with difficulty, because of faintness. Such divisions have been observed before, and some of them, if not all, are due probably to the attraction of the planet's satellites. M. Flammarion concludes that the fainter divisions are variable and due to the cause just named.

Science Notes.

The Zopherus melicanus is the only known species of the American beetle that has strength enough in its mandibles to cut metal—a fact that was accidentally discovered by F. W. Devoe, says the Medical Age. Some specimens of this insect were sent him from Brazil, and being busily engaged at the moment of their arrival, he simply provided them temporary quarters in a glass jar with a pewter top. Within less than forty-eight hours they had cut holes in the metal sufficient to protrude their heads, and would soon have escaped had not their operations been detected.

In connection with its work on clouds, the Weather Bureau has issued a sheet giving illustrations of the typical cloud forms. The accompanying text contains descriptions of the clouds, and also data as to their mean heights and velocities. The sheet was prepared as an aid to observers in their cloud work. Most of the types selected are good, and the reproductions excellent as a whole. The altostratus and stratus are, however, unsatisfactory. The International Cloud Atlas, which has just been issued, gives us the cloud types selected by the International Cloud Committee, and these will, of course, now be the standard for the world.—Science.

E. A. De Schweinitz and M. Dorset find that the amount of crude fat in tubercle bacilli (see Ph. J. [4], 1, 179) is about 37 per cent of the weight of the dried germs. The fat, about 3·5 gm. of which was extracted from the microbes, yielded a hard soap on saponification with sodium hydroxide, and proved to be principally a glyceride of palmitic acid. In addition, it contains a minute amount of the glyceride of a volatile fatty acid, to which tuberculosis cultures owe their characteristic odor, and very small amounts of lauric acid (?) and an acid with an unusually high melting point, having apparently a larger carbon content than any acid previously noted in plants (Jour. Am. Chem. Soc., xviii, 449).

Dr. Ferdinand Ranwez has made use of the X rays to detect mineral substances added to saffron as adulterants. Out of four specimens so examined, only one was found to be pure; another contained 62·13 per cent of barium sulphate, and a third 11·75 per cent of that compound, together with a certain proportion of potassium nitrate. The fourth specimen contained 50 per cent of pure saffron, and the rest consisted of some substitute for that drug, faced with barium sulphate to the extent of 28·6 per cent. The plan adopted was to wrap a gelatino-bromide plate in black paper, place the saffron upon this on the same side as the sensitive film, then allow the rays to act for four minutes, afterward developing and fixing in the usual manner. The foreign matter is very sharply indicated in the print illustrating the paper, which appears in the Annales de Pharmacie for May.

An interesting case of mimicry in plants is described in the Botanical Gazette, that of the seeds of the "Philippine Island bean" from the coast near Manila, which so closely resemble the quartz pebbles among which they fall, in shape, size, color, luster, hardness and stratification, as to be indistinguishable from them except by a very close examination. The size and shape of the beans are both very variable, ranging from four to nine tenths of an inch in length; some perfectly resemble well rounded beach pebbles, while others mimic pebbles which have been broken across. Their color varies from moderately dark to light drab, some giving a faint greenish tinge; others resemble pebbles of chalcedony or of crystallized quartz. Nearly all the specimens show a series of approximately parallel darker lines passing round, very suggestive of stratification. All are quite hard, cut only with difficulty with a knife, and give a clinking sound when shaken together in the hand. They are not affected by soaking in sea water.

The last number of the American journal, Modern Medicine and Bacteriological Review, draws attention to a report recently drawn up by Prof. Conn, of the Western University, on the bacteriology of milk, published by the United States Department of Agriculture. Examinations of milk made at various places yielded numbers varying from 330,000 to 9,000,000 microbes per ounce. The milk supply of Boston was found to be particularly rich in microbes, as many as 135,000,000 germs being found per ounce. The Boston Medical and Surgical Journal lately reported a case in which a young man contracted tubercular disease by drinking milk from a herd of cows, 59 of which were afterward found to be tuberculous, while two persons employed in making butter from the same herd, and who drank large quantities of milk, also became infected. Although much has been accomplished in our country of late years to improve the sanitary conditions surrounding our public milk supplies, yet a great deal still remains to be done, and there cannot be a doubt that the next important step will be the distribution by our dairies of "pasteurized" milk and butter. The example has already been set by one important London dairy company, and it is to be hoped that others will follow what is, after all, but a tardy imitation of what has been done for some time past by our more enlightened neighbors on the Continent.