Facts for the Ladies.—Mrs. E. A. Mac Rae, Shoe Heel, N. C., has used her Wheeler & Wilson Lock-Stitch Machine since 1857 with perfect success in every respect, stitching the clothing for 30 colored servants and a large family of whites, and army clothing and hospital bedding during the war, without the slightest repair. It is now as good as when bought. See the new Improvements and Woods' Lock-Stitch Ripper.

"Burnett's Cooking Extracts.—The best kinds extant."—*Sears' National Review.*

Answers to Correspondents.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 1·00 a line, under the head of "Business and Personal."

ALL reference to back numbers must be by volume and page.

A. C.—It would not be a bad idea for you to advertise your articles in the SCIENTIFIC AMERICAN. You will find it to be a good investment.

MINERAL SPECIMEN.—To W. M. F.—Your specimen is sub-acetate of lead with some carbonate.

UNIT OF MEASURE.—To L. W. S.—Your suggestion, that a measure derived from the diameter of the sun should be used, can hardly be called novel. The French metric system is based upon the magnitude of the earth, the meter being the forty millionth part of the estimated circumference measured over the poles; and all the French measures of surfaces and solids, as well as the weights, are calculated from the lineal meter, which is 39·37079 inches, nearly.

PHOSPHATE OF CHALK.—A. H. C., in SCIENTIFIC AMERICAN, May 4, asks how the phosphate of chalk, used in Holmes' signal, is prepared. No such thing as a phosphate of chalk exists; nor is phosphate of lime, which, perhaps, he means, capable of being used in this signal. The substance used is phosphide of calcium. It may be prepared by kneading slaked lime into small sticks like a lead pencil, igniting them, and passing phosphorus vapors over them, at the same time heating the lime. Care is required in this, as in all experiments with phosphorus, to prevent a conflagration.—J. S.

POISONOUS COLLARS.—S. K. should burn the collar and test the ash with sulphuretted hydrogen, or sulphide of ammonium. If much lead is used, as on many business and visiting cards, a drop of sulphide of ammonium produces a black stain.—J. S.

PARIS GREEN OR SCHWEINFURTH GREEN.—This is aceto-arsenite of copper. Mr. Charles Schofield, of Indianapolis, formerly a student in Swarthmore College, Pa., died last summer from inhaling a minute quantity of Paris green, while putting it on potato vines. The composition given in Dingler's *Polytechnisches Journal*, Vol. LII, page 271, is oxide of copper, 31·29 per cent; arsenious acid, 58·65, and acetic acid 10·06. It is thus written:

$3CuO, AsO_3+CuO, C_4H_3O_3$.—J. S.

BLACK BOARD.—Query 17, May 4.—Take shellac varnish, lampblack, and flour emery, mix and apply with a camel's hair varnish brush. If too thick, thin with alcohol.—P. J. D.

POISONOUS COLLARS.—To S. K., query 1, page 330.—Boil a piece of collar in diluted nitric acid. Lead will be indicated by a yellow color on the addition of iodide of potassium, and by a black, on addition of hydrosulphuret of ammonium, or solution of sulphuretted hydrogen.—E. H. H., of Mass.

STAINING HORN.—E. C. S., query 7, page 330, may do this by immersing the horn in a solution of nitrate of silver, and then exposing it to sunlight. Or it may be steeped in a hot dilute solution of bichromate of potash, and then in a decoction of logwood. Staining the hands will entirely depend on their coming in contact with the dye or not.—E. H. H., of Mass.

DISSOLVING WOOL OUT OF MIXED FABRICS.—To J. S., query 12, page 330.—Muriatic and sulphuric acids are nearly useless for this purpose. Boil the rags in a mixture of one part of nitric acid and ten of water, or a little stronger. The cotton fiber, after drying, can be shaken out as dust in a willowing machine, leaving the wool behind ready for dyeing. This is the plan adopted in England and Germany for making "extract," and is used for mixing with wool in many manufactures. This prepared wool, however, will be found to have lost, to a great extent, its felting property.—E. H. H., of Mass.

CEMENT FOR TEXTILE FABRICS.—To E. F., query 18, page 330.—Use a solution of gun cotton in ether, that is, collodion.—E. H. H., of Mass.

REMOVING INK STAINS FROM PAPER.—To R. W. A., query 14, page 330.—The ease with which this is done depends on the composition of the ink. If, besides being a mere tanno-gallate ink, it also contains indigo, as most really first class inks do, it will be an impossibility to remove the stains without destroying the paper. Moreover, printing paper is sized very differently from writing or cheque paper. If the surface is well sized, it may be comparatively easy to obliterate the stains, but in the case of thick spongy printing or book paper, the ferruginous particles of the ink will be so incorporated with the substance as always to leave some stain, whether containing indigo or not. Best English inks contain indigo; hence their value as indelible writing fluids.—E. H. H., of Mass.

SUPERHEATING STEAM.—To R. H. E., query 1, page 354.—Steam cannot be so superheated in metal pipes without decomposition.—E. H. H., of Mass.

ANNEALING STEEL.—To U. E., query 5, page 330.—The best way I have found to anneal small pieces of steel is to take a piece of gas pipe, two or three inches in diameter, and put the pieces in it, first heating one end of the pipe and drawing it together, leaving the other end open to look into. When the pieces are at a cherry red heat, cover the fire with saw dust. Use a charcoal fire, and leave the steel in over night. H. C. R., of O.

HYDROGEN LAMP.—To L., query 13, page 330, current vol. 1st. If the tube emitting the gas does not point upwards, attach another piece of rubber tubing or an elbow of any other tube so as to allow a jet, of the gas to be tested, to flow into the uppermost part of an an inverted wide mouthed two or four ounce bottle. If the gas is making rapidly, or you can see from the lowering of the water in the outer jar that your bottle is probably full, still keeping the bottle inverted, as from the lightness of the gas it will stay in the inverted vessel, remove the bottle gently from the pipe or tube, and apply a lighted match to the lower open mouth of the bottle. If the gas explodes loudly, and no flame remains in the bottle, it is dangerous to light the lamp. If it merely takes fire, and a very light bluish flame plays about the bottle or in it for a few seconds, it is pure hydrogen, and then it is safe to light the lamp. 2d. If you make your hydrogen in a simple bottle or jar, allowing it to pass through a tube inserted in the cork, you cannot stop the formation of the gas by closing the tube. If you make it as J. S. directs on page 298, the apparatus is self regulating, making gas only as you use it out of the inner jar, though the cover of the outer jar must not fit air tight, and there had better be free communication from the surface of the liquid in the outer jar to the open air. 3d. An apparatus of the size J. S. describes, if used often, will need renewing in a very few days—in one or two days—unless you make the cork much tighter than can usually be done. It takes a very close joint to confine hydrogen.—S. H. B., of N. H.

NITRIC ACID STAINS.—To S. H. F., query 2, page 354.—These cannot be removed from cloth, though, if the acid was diluted, the color may be modified by the application of an alkali—say ammonia.—E. H. H., of Mass.

ACIDULATION OF ALE.—To W. H. C., query 4, page 354.—This is the result of the acetous fermentation. The alcohol in the ale, absorbing oxygen from the atmosphere, is converted into acetic acid. The prevention may be effected by excluding the air by a tight bung.—E. H. H., of Mass.

ELECTRO-DEPOSITION OF IRON.—Query 5, page 354.—I quote from Napier's "Electro Metallurgy": "Iron may be deposited from a solution of its sulphate in water with a few drops of sulphuric acid added. Use a weak solution and a small battery.".—S. G. S., of N. Y.

NITRIC ACID STAINS.—Query 2, page 354.—Apply very carefully, to the nitric acid stain, *aqua ammonia*. Do not use the ammonia stronger than is necessary to remove the stain.—S. G. S., of N. Y.

VACUUM IN CASKS.—E. H. H., in reply to J. A. P., query 6, page 233, says the weight of the air is more than sufficient to hold up liquor in casks, if the liquor would only stick together; but the liquor slips sideways, and so, although the lighter of the two, comes to take the lower place. And does E. H. H. hold that a viscid liquor, like molasses, can be held suspended in pumps to better advantage, and of course at a higher level than water? The power of the air to resist the descent of the liquor can surely not be at a disadvantage from want of mobility of the particles upon one another, as compared with the particles of liquor. Is it not, rather, that what we call gravitation, as exemplified conspicuously in fluids, is a tendency to a vertical movement—that the air does not seek to enter in, but is forced up by a screw motion of the liquor, which screw motion is prevented when paper or other like firm material intervenes? The liquor, that would otherwise be upheld, descends by dint of a mechanical power, the screw, which is made up of the tendency to vertical motion and viscidity conjoined. The old doctrine that terrestrial gravitation takes a bee line towards the earth's center has, moreover, other phenomena opposed to it; witness the course in its descent of a bullet shot from an exactly vertical rifle. What if we add the variation, from a perpendicular, of the plummet suspended from the collar of a deep shaft?—X.

WIND MILLS.—In answer to several enquiries on this subject, I wish to say: The direct force of the wind acting on windmill sails is resolved into two forces, one acting in the direction of rotation, the other in that of the axis. This latter gives no mechanical effect, but, on the contrary, increases the pressure on the pivot of the wind shaft and causes loss of effect. Your mathematical readers can easily resolve the primary force into its resultants, and calculate the best angle of impulse for the maximum effect, etc. For the benefit of the general reader, who is not so fortunate as to possess these advantages, I give the results of theory and practice, sufficiently accurately for general purposes. In especial cases, requiring care, a competent person should be consulted. A mathematical and practical view of the case can be found in Weisbach's "Mechanics," Vol. II, from which the following *data* are condensed: A windmill sail consists of the arms or whips, the cross bars and clothing. The arm is divided into seven equal parts. The sail commences at the first point of division. The cross bar at this point is made equal to one of these divisions, or sometimes one sixth the length of arm. Each successive cross bar increases in length to the last or outermost, which is made from one third to two fifths the length of arm. The arms are not generally made the center line of the sail, but they divide them so that the part next the wind equals from one fifth to one third of the entire width of sail. Owing to the greater velocity of the sails at their outer ends, the angle of impulse here should be greater than near the center. If the cross bars are put on the arms, commencing at the first division next the center, so as to make the following angles with the direction of the wind or, which is the same thing, the axis of rotation, 63½°, 70°, 74½°, 77½°, 79½°, 81°, 82°, the result will approach a maximum sufficient for ordinary cases. The best velocity at their periphery is 2½ times that of the wind. The power of the machine will vary so greatly that no definite area of sail can be given for a certain power. If actual work is to be done, it is better to always have power enough and to spare, in this as in everything else where power is required. I would suggest no less than 150 square feet of sail to each horse power.—C. A. L., of Tenn.