Correspondence.

Estimating Distances.

To the Editor of the Scientific American:

The "Methods of Estimating Distances," which appeared in your issue of Dec. 6, seems to require a slight explanation. I gave, as I supposed, the correct formula heretofore used by me in estimating distances. Substantially it was the same as that which appeared in *La Nature* and in the SCIENTIFIC AMERICAN during July last, and should have read

$$x = H\frac{l}{h}, \text{ where}$$

x = distance sought.
H = known diameter of distant object.
l = focal distance of the eye (10 inches).
h = micrometrical measurement of object.

Taking the examples given, they should have read as follows:

$x = 5{\cdot}5$ feet $\frac{10}{84} = 650$ feet.
$x = 2{\cdot}162$ (moon's diam.) $\frac{10}{90} = 240{,}000$ miles.
$x = 850{,}000$ (sun's diam.) $\frac{10}{9188} = 92{,}391{,}000$ miles.

G. R. C.

Head Downward.

To the Editor of the Scientific American:

In the SCIENTIFIC AMERICAN of Nov. 29 is an article describing how Dr. Albert I. Garland, an English physician, restored a patient from syncope produced by chloroform, by inverting her, consciousness being restored as soon as she was placed head downward.

It was reported (perhaps in the SCIENTIFIC AMERICAN) more than a year ago that a French vivisectionist, who had put rabbits under the influence of chloroform, found them restored to consciousness as soon as he hung them against the wall, head downward.

H.

Frost Bitten Feet.

To the Editor of the Scientific American:

Your correspondent, T. B. E., No. 26, on page 330, Nov. 22, asks for a cure for frosted feet. About fifty years since mine were so bad that during warm days toward spring of year I was almost wild from the itching, but was completely cured by thoroughly rubbing them every night with a cloth dipped in alcohol, for about ten days; rub well in until the foot is dry, and then hold the foot as close to the fire as can be borne, for a minute or more. BURDOCK.

Westchester, N. Y., Dec. 6, 1884.

The Tehuantepec Ship Railway.

To the Editor of the Scientific American:

In your description of the ship railway project for crossing the Isthmus, SCIENTIFIC AMERICAN of December 27, you state that the idea was originated by Captain Eads; this is a mistake.

Dr. Wm. F. Channing, of Providence, R. I., proposed a ship railway for the Isthmus some thirty years ago, and in 1865 he secured a patent for transporting vessels on a multiple railway. His method included the ship car and cradle, tilting tables for overcoming grades, and turntables to effect changes in direction; and in May, 1871, James Brunlees, of London, England, submitted to the Honduras Government full details of a ship railway, together with drawings and estimates of cost.

Those wishing further information on this subject are referred to a report issued by the Bureau of Navigation, Washington, on the "Problem of Interoceanic Communication."

A. P. HOWARD.

Boston, Dec. 28, 1884.

[As we understand the matter, Captain Eads has never claimed that he was the first to suggest the idea of transporting vessels overland. In addition to the references suggested by our correspondent, he might refer back to very ancient times for examples, for instance, to the transportation of ships over the Isthmus of Corinth by the Athenians. Coming down to modern times, and to this country, it has been common for the past forty years or more to carry large loaded boats overland on railways. As to American plans for ship railways, one of the earliest, illustrated by engravings, is that given in the SCIENTIFIC AMERICAN of December 25, 1845—near forty years ago.

Captain Eads, we believe, is the first to present full, complete, and practical plans, approved by many distinguished engineers, for the easy and rapid lifting of large ships and safely transporting them by rail over the Isthmus of Tehuantepec. These plans exhibit a vast amount of study, and contain various features of striking originality and genius. Some of these points were illustrated in the series of ship railway engravings given in the SCIENTIFIC AMERICAN of December 27 last. Others may be found described in various patents which Captain Eads has taken out. If there is any one individual who has done more than Captain Eads to establish the fact of the practicability of taking ships over such places as the Isthmus of Florida and Tehuantepec, it ought to be made known, so that no injustice may be done.

Many able engineers believe that the Ship Railway will ere long be an accomplished fact, and then the world will wonder why it was that so many useless millions of money were wasted, and so many thousands of lives sacrificed, in the attempt to build a canal.—ED. S. A.]

Polishing Materials.

The following account of materials used for polishing is for the most part extracted from Holtzapffel's Turning and Mechanical Manipulation:

Buff Leather, glued to a flat surface, or to the edge of a revolving disk, is used with emery, crocus, rottenstone, and other powders.

Charcoal is much used by steel and copper plate engravers. That made by burning elder without access of air is considered the best, but willow and elm have also been recommended.

Diamond, in the form of powder, is used by lapidaries and engravers and watch jewel makers. The latter obtain the diamond *bort* that is rubbed off stones in faceting, and they separate it into various degrees of fineness by decantation.

Diamantine, sapphirine, rubitine, etc., are names given to various chemical preparations for polishing, to be obtained at the tool shops. They must not be assumed to consist in any way of the jewels from which their names are derived.

Emery.—At the present day oilstone dust is very frequently replaced by emery with oil or water, especially in clockwork. Any required degree of fineness can be obtained by decantation. Emery dust is sometimes used in place of rouge for polishing. The solid emery wheels and sticks, that are now common to the trade, work rapidly, but they have the disadvantage of heating steel, and many of them soon become pasty. The heating renders them less suitable for grinding gravers, but they are very convenient for roughly shaping steel work, or removing the hard surface caused by the application of heat.

To Make Emery Paper.—If occasion requires it, this can be done as follows: Fix a sheet of stout blotting paper on a board, gluing it round the edge. Having put emery powder into a sifter the mesh of which has the requisite degree of fineness, and rapidly covered the paper with thin hot glue, shake the sifter lightly over the paper until it is evenly covered, and leave to cool. When dry, detach the paper and shake it vigorously to detach loose grains.

Hone Slates.—Under this heading are included a great variety of stones used for smoothing and polishing.

Blue Polishing Stone is much used by jewelers, clockmakers, and others. It is recommended for use in spotting and for polishing wheels.

Oilstone.—This forms the quickest cutting whetstone known. Oilstone slips are used by watchmakers after the manner of files. Oilstone powder or dust is much used in the earlier stages of polishing, and is preferable to emery in that it does not leave particles embedded in the surface of the metal. On pewter laps it may also be employed for polishing steel work.

Oxides of Iron.—Under this head are included the several materials known as crocus, rouge, red stuff, colcothar of vitriol, etc. It is advisable to remove gritty particles from these materials before using, by decantation.

Pumice Stone is extensively used for polishing cut glass, and is applicable to brass and other metal work.

Putty Powder is oxide of tin, or more commonly, of tin and lead in varying proportions. The whitest kind, provided it be heavy, is considered the best.

Rottenstone.—This variety of tripoli is of the greatest value for polishing brass work, silver, glass, and even the hardest stones.

Tripoli is of a grayish yellow or red color, and consists mainly of silica. Its principal use is in the polishing of hard woods.

Whiting is common chalk ground, washed to remove sand, etc., and dried in lumps.

Polishing Stones.—The following method is described by M. Cadot for preparing these stones, which are very useful for polishing a wheel that is not riveted to its pinion. Carefully select a blue stone. After dressing its surface, smooth it with emery paper of gradually increasing fineness. Saturate the surface with oil, and rub it with a common piece of rough sapphire, one face of which is flat and partly smoothed, until the surface of the stone is hardened.

Such a stone is used dry. The wheels must previously have been carefully smoothed, since the stone does not abrade the metal. If care is taken to avoid scratches, the surface will last for a long time, although, of course, it is only serviceable for gold, brass, nickel, or metals of a similar degree of hardness.

The several materials used for polishing must be kept carefully packed (glass stoppered bottles are preferable), as a few grains of dust or foreign bodies will suffice to prevent the operation of polishing from being successful. Polishers should be filed very smooth with a perfectly clean file that is not quite new. Files that are dirty or new will deposit small hard particles of dirt, or cause pieces of the points of their teeth to become embedded in the surface of the polisher.

PREPARATION OF POLISHING MATERIALS.

Decantation.—This consists in causing a material in a fine state of subdivision to fall slowly through a liquid with the view to separate particles of various degrees of fineness by taking advantage of their different rates of descent.

The watchmaker should prepare all his smoothing and polishing materials, etc., by decantation. He will by this means obtain them in grains that are much more uniform in size, of any degree of fineness, and free from hard or large particles.

The operation is exceedingly simple. The material having been pounded under a hammer or otherwise, is thrown into a vessel more or less filled with a liquid —water, oil, etc. After being thoroughly stirred, it is allowed to partially settle, and the liquid is carefully poured into another vessel. All the coarse heavy grains will be found as a residue in the first vessel. They are collected and used for coarse work. After again stirring and leaving to settle for a longer period, the liquor is again poured off, and the powder thus separated will be the second degree of fineness, so that it may be termed No. 2. By successive operations in which a gradually increasing interval of time is allowed, Nos. 3, 4, etc., can be obtained, that is to say, a series of powders of the same material, but presenting a greater degree of uniformity in the size of grains and of gradually increasing fineness. It may be observed that when the powder of the requisite degree of fineness is nearly attained the mass should be left to settle until the following day, or rather until the fluid is clear; then decant carefully, so as not to lose any of the deposit.

When treating a material that is soft and friable, it should be crushed between the fingers, as by using a hammer hard grains of foreign matter might be accidentally intermixed.

Oil may be used for decanting diamond powder or oilstone dust for smoothing; water for rottenstone or tripoli; alcohol for hartshorn, etc.

Swiss Watches for the American Market.

United States Consul Gifford, of Basle, writes that for the fiscal year ended June 30 last there has been a net decrease of exports of $740,612.72, or nearly 15 per cent as compared with the preceding year. This decrease is chiefly attributable to the diminished exportation of watches and watch materials from the consular agency of Chaux de Fonds, which was $500,000 less than during the preceding year. That this branch of exportation will continue to decline in consequence of the rapid development of the corresponding industry in the United States, until it ceases altogether, cannot be assumed with entire confidence. As is well known, the Swiss have once recovered their lost ground in this direction. Having seen their American market almost escape them after the Centennial Exhibition of 1876, they were able, by the employment of the greatest energy, perseverance, and skill, to regain what they had lost, and even to increase their export of watches to a point never before reached. In 1882 this amount was $2,268,731.79 in this district alone.

This point may never be reached again, but the Swiss will not surrender their American market without a renewed struggle. They will in this be seconded by many circumstances which are favorable to their supremacy in this branch of production. The principal advantage is the low rate of wages which must be accepted by men occupying the sterile valleys of the Jura, where agriculture is impossible, and where they have been from their childhood devoted to this one calling. They must make watches; if not for good wages, then for poor wages.

It might be supposed that only the higher priced merchandise and timepieces of special construction and extraordinary precision could now find a sale in the United States, considering the immense numbers of low priced articles produced by our manufacturers. But such is not the case. Very large shipments of so-called watches, invoiced as low as 10 francs each, and even lower, still go forward. A suspicion of gross undervaluation naturally arose under these circumstances; but a personal investigation and examination of the books and original accounts of manufacturers led to the conclusion that watches can be, and are, produced at these seemingly impossible prices.

The Spanish Earthquakes.

Commencing on December 25, a series of earthquake shocks was felt during several days over a considerable portion of Spain, which were attended with great loss of life and destruction of property in the southeastern provinces of Granada and Malaga. The inhabitants in many cases fled from their houses and camped in the fields. In the province of Granada over 900 lives were lost, and in the town of Alhama, in that province, fourteen hundred houses were destroyed. In many other towns houses were thrown down and walls cracked, with more or less loss of life. The shocks continued intermittently for ten days, the people being greatly terrified, and resorting to prayers, religious processions, and Te Deums throughout most of Andalusia.