tion the contents of the first bottle will be found in a state of putrefaction and the microscope will reveal organic life, but no such change can be detected in the second.

Now, it is evident, that in the air which passed through the red hot tube, the vitality of the parasitic germs floating in the air were destroyed. The experiment thus proves incontestibly that these germs are absolutely necessary to give the first impulse to decomposition, also, that the rapidity is dependent on the quantity of germs present or introduced artificially, or the quantity of soluble albumen present and temperature. No germ is capable of retaining its vitality at the boiling heat of water, and where the albuminous substances have been coagulated or decomposed by a higher degree of heat, though not high enough to char the wood, the conditions for decay will be reduced to a minimum, and only a very long exposure to moisture will affect it, for the fiber is scarcely subject at all to decomposition unless in contact with decaying albuminoids. HENRY STURZ.

New York, Oct. 3, 1866.

A Universal Signal Code.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of September 1st, I had the honor to suggest a plan by which a simple system of signals could be obtained for general use. That article having attracted some attention, permit me to say a few words more on the same subject.

The plan proposed by Mr. J. Wyatt Reid, in your issue of September 8th, is, in my opinion, altogether too complicated for general use, however good it may be for the purpose for which it was originally intended. It requires four flags of different colors, a four-sheaved signal block and halliards, a flag-staff, and, in some instances, a dictionary. It might work well on shipboard or at permanent signal stations, but for adventurers, surveyors, builders, manufacturers, and others, it would be impracticable. What is wanted is a system of universal application, even if there are no flags or halliards within a thousand miles.

The plan proposed by Mr. Solon Robinson, in your issue of September 15th, is much better, but any one who has been connected with the Signal service would tell him that there is a much simpler method. Being compelled by an oath of secrecy to abstain from any explanations concerning how this is accomplished, I am anxious that the Government should confer a favor on the nation and the world by making public a code for general use. By means of a general dictionary containing the ordinary words of all languages this code could be made an international one.

Permit me to suggest, in addition, that the proposed system is entirely practicable, having been used during the late war with perfect success, and having been the subject of the praise of every General and Admiral in the United States service.

GEO. C. ROUND.

Binghamton, N. Y., Oct. 3, 1866.

[Probably the Government could, without detriment to its own interests, make public a system by which communication could be maintained between parties separated by distance, as a system of ciphers could be readily adapted for secret service. It seems as though a plan of this sort might be rendered useful and of great benefit in case of shipwreck, and in other situations where human life or property might be in danger.—EDS.

A New Way of Cutting Glass.

MESSRS. EDITORS:—It frequently happens that chemists and others wish to utilize some bottle or piece of broken glass apparatus, by cutting it in a certain manner. As some persons experience great difficulties in doing this, I will communicate to you, for the benefit of such, a very simple means by which glass can be easily cut in any direction.

Take of powdered gum tragacanth, one-eighth of an ounce, dissolve it in sufficient water to form a middling-thick paste, then dissolve one-fourth of an ounce of finely-powdered gum benzoin in the least possible quantity of strong alcohol; mix both solutions thoroughly and add to this a sufficient quantity of finely-powdered beech wood charcoal to form a doughy mass a little thinner than pill compositions. Out of the above mass roll little sticks about four inches long and three lines thick, and let them dry spontaneously. If, after being thoroughly dried, one of these sticks is ignited, it burns to a fine point until it is entirely consumed.

The glass to be cut is first scratched deeply with a diamond, then one of the above sticks is ignited and held, with a very slight pressure, on the crack, in the direction the cut is to proceed, and it will be found that the cut will follow in any direction the "taper" may be drawn. The taper must be withdrawn every few seconds and brought to a more lively burn by brisk blowing, as it is cooled by the contact of the glass.

This method is very successful. I have cut "spirals" two-thirds of a line in width, out of thin glass tubes, by this process. Lamp chimneys having cracks may be thus cut with rapidity and ease.

V. G. B.

Brooklyn, N. Y., Oct. 8, 1866.

Shot Guns.

MESSRS. EDITORS:—Your correspondent "J. Richards," of Ohio, wants to know "what will make a gun shoot close." I can tell him: Clean the muzzle inside down a quarter of an inch or more, then warm it over an alcohol lamp, and with a tinman's soldering iron and fluid, tin over the inside to the thickness of thin card paper. Trim it out smooth, leaving it of equal thickness all round, and he will be astonished at the improved shooting of his scattering gun. I have found, by experimenting, that the shooting qualities of a gun are mainly in the muzzle, and there perfection is wanted. I claim the above as my invention, though I never have asked for a patent. A gun treated in this way will not only shoot close, but will drive the shot with much greater force. S. M. BLAKE.

Bellows Falls, Vt.

EXPERIMENTS IN RAISING VESSELS.

[From our Foreign Correspondent.

MESSRS. EDITORS:—Not long since an important trial was made of an apparatus invented by M. Eyber, a Prussian engineer, designed for raising sunken vessels. The general appearance of the machine is that of an elongated ellipsoid, thirty feet in length by twelve feet high, covered with a waterproof pliant fabric, a square centimeter of which will sustain a tension of one thousand pounds. Around the whole structure is stretched a cord net, the ends of which are to be attached to the wreck. By this means the weight—which may amount to more than one hundred tuns—is distributed equally over the whole surface of the apparatus.

From official sources, we are safe in estimating the average number of trading vessels annually lost upon our coasts as high as fifteen hundred. The ocean has thus become literally paved with numberless fleets, lying for the most part not far from land, in comparatively shallow water. Independently of the cargoes, the recovery of the wrecks alone is an important work, for being usually imbedded in the mud, the wood-work remains uninjured by the sea worm, and the iron work suffers but little from rust or other causes. For recovering these sunken vessels hydraulic cranes, placed on rafts, are often employed, but the power furnished by any single crane would be quite insufficient for raising a small packet-boat weighing but 800,000 pounds, while the use of a system of cranes is not possible, for the least rough sea would destroy the whole structure. Chaplets formed of casks are also impracticable, for in such a system if a single cask is broken by the waves the equilibrium of the whole is destroyed, and the wreck, even if partly raised, will be again lost.

India-rubber bags have been tried and failed as did the casks; they are too lightly constructed; moreover, the cloth can never furnish sufficient resistance to the weight of the water, for if inflated when at a great depth, then re-ascending, the inside pressure will prove greater than the outside, and the bag will burst in consequence.

The use of iron boxes and, indeed, many other methods, have been resorted to, but for one reason or another they have failed in satisfactorily accomplishing the object sought.

After many years of study and investigation, M. Eyber has invented this submarine machine for raising vessels, pronounced by competent authorities in every way superior to any mode now in existence. The funds necessary for building the first *Narwal*, as the inventor has named it, were furnished by the Imperial Administration, the general Transatlantic Company, and a committee from the maritime insurance companies. The Emperor has granted M. Eyber an audience, and has also shown him special marks of favor.

The trial trip for testing the value of the invention took place as above, on Cazaua lake, in the presence of the Prefect of Puy de Dome, the Sous Prefect of Riom, the Commanding General, other civil military and naval officers, and a large concourse of people. The experiments were perfectly successful, the *Narwal* rising gracefully to the surface of the lake having attached an immense boulder weighing sixty tuns.

The Government was represented at this trial by a naval engineer, M. Lisbonne, sent by the Minister de la Marine. In his official report he speaks thus favorably of the working of the apparatus: The "results of the experiments made on Cazaua lake, prove the machine of M. Eyber in every way superior to any that have hitherto been devised.

The use of an elastic air and water-tight fabric, is peculiarly adapted for submarine apparatus. The regularity and easy working of the machine, and above all the immense power it is capable of exerting, have been demonstrated in these experiments, but so far as relates to the raising of vessels, actual trial alone can testify. C. D.

Paris, Sept. 18, 1866.

Notes and Queries

T. J. M., of Minn.—On account of the convexity of the earth, seven or eight inches of the lower part of an object is concealed from an eye at the distance of a mile, and looking from the surface. But it does not follow that at ten miles only seventy inches would be concealed. We refer you to the properties of secants in trigonometry.

M. M. B., of Del.—The method of finding the hight which a ball fired upward will reach is very simple. You only need to know the number of seconds of interval between the firing and reaching the ground again. Multiply the square of half the number by 16. Thus, if the interval be 10 seconds, the hight was

5^2 or $25 \times 16 = 400$ feet.

W. L. F., of Ill.—Iron to be coppered by the battery should be cleaned with very great care. If the work is important it is well to give it a preliminary coat of pure iron by the battery; this last is almost indispensable for cast-iron work. The coppering solution for iron is cyanide of copper dissolved in cyanide of potassium. After the object is covered, the coating is thickened in the ordinary sulphate of copper solution.

J. B. E., of N. Y.—A varnish made of Canada balsam is an excellent transfer varnish, equally effective on glass and other surfaces.

E. H. L., of Ohio.—Kinkel and Hubbe's propeller is in principle nearly the same as the well known Barker mill, and therefore does not require a lengthy discussion in this paper.

W. D. A., of N. Y.—We are not aware that any thing further than what you refer to has been published on the new bleaching process. You can procure the chemicals from any of our wholesale druggists.

J. B. F., of Conn.—To make permanganate of potash, take 10 parts caustic potash, 8 parts peroxide of manganese, and 7 parts chlorate of potash. Dissolve the soda in the smallest quantity of water, then add and triturate the other ingredients; evaporate to dryness; ignite at a low red heat, when cold dissolve in water, and you have a solution of permanganate of potash. To make permanganate of soda use caustic soda and chlorate of soda instead of potash and chlorate of potash in the above formula.

G. A. of Ill.—Receipt for black ink, 12 oz. bruised galls, 1 gallon cold water; after digesting a day or two, add 6 oz. copperas and 6 oz. gum arabic, and a few drops of creosote or oil of cloves. Let soak with occasional rousing up for two or three weeks, then strain from the sediment.

G. H. S., of Mass.—If the mold in which you cast your bronze is too tight, the result will be a porous casting. It should be permeable to the gases generated by the contact of the metal with the sand, or they will be confined and "blow", the casting. Possibly you use too much loam and not enough of sand in the composition of your molds. Perhaps your metal is not poured at the right temperature. When the zinc gives off a flame from the top of the crucible, the metal should be poured.

W. R., of N. Y.—The horse-power of stationary and portable engines is the same in this country and England, and is used to denote the estimated working capacity of the engines.