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Contents.

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TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 528,

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ELECTRIC LIGHT ON CAPTIVE BALLOONS.

The trials recently made in England of electrical signalizing from captive balloons show that an important service may be rendered by this means, both in peace and war. Of course, it does not require the use of the electric light to signal from captive balloons, for such service has been had in recent wars by the aid of flags by day and colored lights by night. But balloons for this service must be large and cumbersome for carriage in an army train, and have sufficient buoyancy to sustain the weight of a man in mid-air with safety, whereas by the use of electricity the same service can be performed by a small and inexpensive balloon, and one that can be readily transported. The incandescent electric light is peculiarly adapted for this work. It can soon be made as powerful as the arc light, and can be fed by a wire, say of silicious bronze, so fine as to be lost from sight in the line holding the balloon, even though that line be an ordinary cod-line; and the wire is so light that a single man can carry several miles of it.

It requires, as we know, only two characters or visible movements to send the longest message. In telegraphy the dot and the dash or the short and long sound and their combinations are used. In the army wig-wag system, a flag moved to right and left during the day, and a white light moved over a stationary red one at night, are readily made to answer the same purpose. From this it will be seen that a flash light, that is to say, one which can be made to glow or disappear at pleasure, may be made to furnish the required number of movements. Thus the electric light, which may be controlled as rapidly as a telegraphic sounder makes and breaks the circuit, can be used as the medium of transmitting information.

The trained armies of to-day lay a military telegraph along the line of their communications as they march, and usually separate ones to various points of their advanced picket-line, but often they have no other means of communicating with supporting columns coming from various directions, or main lines, save that afforded by the uncertain courier. At established headquarters balloons are often used, but in marching columns they are too cumbersome, and require too much time to prepare for operation. The electric balloon, on the other hand, can be carried by one man without inconvenience, and all its apparatus stowed away in a corner of one of the caissons of the artillery train. Such a light as one of these balloons could support might be seen for a great many miles on a clear night; and by means of a constant variation of the signal code, the enemy kept in ignorance of the contents of the dispatches. These balloons might also prove of great value as an auxiliary to the Weather Bureau. In the vicinity of harbors the very earliest intelligence as to advancing storms might thus be conveyed to the masters of ships who have already cleared and are making their way seaward. The present arrangement of setting storm signals upon high buildings or staffs overlooking harbors is an excellent one as far as it goes, but it cannot always be seen far enough and every time it is set in a great port like New York or Boston or Baltimore, sailing vessels are already beyond its range of visibility in the open sea. Such a signal as could be furnished from a captive balloon could be seen far out on the coast; and should that signal warn them that a storm was approaching from the very direction in which they were bound, it would enable them to make a harbor or get under a lee where they could ride it out in safety.

Mechanical Substitute for a Horse.

Chambers's Journal mentions a gentleman who, being prevented, by physical disqualification, from continuing the exercise on horseback which had always been so beneficial to his health, was possessed with the singular notion that it would be possible to construct a machine which, when seated upon, could be made to evolve the same action as a galloping horse. The inventor made his machine; it answered its purpose to his complete satisfaction; and the device having been patented, it has recently been manufactured and brought before the public. Whimsical as is the purpose of the machine, it has, upon trial, been commended by many medical authorities, and won no little favor.

The "rider" seats himself upon an ordinary leather saddle, his feet being in fixed stirrups, and his hands grasping a handle attached to a metal projection. The saddle is firmly attached to a small wooden platform below by means of metal connections. This platform is suspended by leather straps from the topmost extremities of four semicircular steel springs, which are firmly attached at the bottom to the metal foundation of the machine. Seated upon the saddle, the operator can be swayed about in all directions.

Beneath the platform are four padded buffers—corresponding to the horse's feet—and by the weight and motion of the operator's body these buffers strike or bump, at each depression, upon the foundation below, so that, with a little practice, an automatic imitation of horse exercise can be produced. The movement can be made either very easy or very violent. By the full use of the handle, a good muscular action is given to the chest and lungs. For invalids and all of a weak bodily constitution, the machine is strongly recommended. It is adjustable for the use of persons of different stature and weight; and for those condemned to sedentary employment, its daily use is said to be attended with beneficial results.

Cheap Sodium.

The manufacture of cheap sodium by an electrolytic process has been announced in France. An engineer of Lyons, M. Lossier, states that he will soon be in a position to sell sodium in large quantities at a price of about 25 centimes per kilo, not much over one penny a pound. There would be no necessity for such an extremely low figure to be reached to insure a very large demand for the material. The process of M. Lossier consists, it appears, in decomposing, with an electric current, the chloride of sodium at a temperature of 900 deg. C., and it appears incredible that by any such process the price named is not absurdly low. In France, indeed, sea salt, which costs about 2½ centimes the kilo to obtain, is sold wholesale at 10 centimes the kilo, the duty being considerable.

It appears that 3 kilos of salt are required to produce 1 kilo of chloride of sodium. It follows that, at current prices, the sodium not extracted from the combination is worth 30 centimes the kilo, to which must be added the cost of fuel for melting and heating the salt, the expense of producing the current, general expenses, profits, interest, and depreciation, which would be extremely high. The price of 25 centimes appears therefore to be far too low, even if the salt be valued at the prime cost of production. It may be remarked that marine salt is at once one of the cheapest and most abundant materials known in commerce. *Engineering* says that if we assume a moderate area and depth of that portion of the globe covered by the ocean, the quantity of salt that it contains is estimated at six times the volume of the Alps. Unlike coal, the supply of which is being gradually but surely exhausted, marine salt is absolutely inexhaustible. It is therefore essentially a raw material of high value, for which many applications have yet to be discovered.

Uses of Sulphuric Acid.

Some of M. Pasteur's latest experiments have proved that water containing two per cent of concentrated sulphuric acid possesses the property of destroying bacteria, and this mixture of acid and water is recommended for disinfecting efficaciously the floors of stables, mangers, cattle stalls, courtyards, areas of dwellings, dust bins, etc. Sulphuric acid, properly diluted, is a valuable cooling and astringent remedy. It is used to acidify certain decoctions or infusions. Only the dilute acid (in most countries, one part pure acid, nine parts water) is ever used medicinally. Ten to twenty-four drops of this dilute pharmaceutical acid will give an agreeable acidity to one quart of the infusion or other liquid. As many fever patients are fed principally on milk, care must be taken never to give liquids containing sulphuric acid or acid lemonades of any kind too soon after milk has been given, otherwise it may produce unpleasant symptoms of indigestion. In France, an alcoholized sulphuric acid is sometimes used. It is made by adding concentrated sulphuric acid, 100 parts, to alcohol (of 85 per cent), 300 parts, and is generally colored red by the addition of 4 parts of the petals of the red poppy. Sulphuric lemonade is made from this according to the formula:

	Parts.
Alcoholized sulphuric acid	3
Simple sirup	60.
Water	1,000

This is also known as "mineral lemonade."—*Chemist and Druggist.*

A Dead Black Paint.

The Locomotive, issued monthly by the Hartford Steam Boiler and Inspection Company, gives the following receipt for painting brass tubes, and such articles as optical instrument makers produce, a "dead black." The writer says he has found all the formulæ and recipes given in the books unsatisfactory because of their vagueness, but that the following can be relied upon to give a first-rate dead black, and it is easily made:

Take two grains of lampblack, put it into any smooth, shallow dish, such as a saucer or small butter plate, add a little gold size, and thoroughly mix the two together. Just enough gold size should be used to hold the lampblack together. About three drops of such size as may be had by dipping the point of a lead pencil about half an inch into the gold size will be found right for the above quantity of lampblack; it should be added a drop at a time, however. After the lampblack and size are thoroughly mixed and worked, add twenty-four drops of turpentine, and again mix and work. It is then ready for use. Apply it thin with a camel's hair brush; and when it is thoroughly dry, the articles will have as fine a dead black as they did when they came from the optician's hands.