VENTRILOQUISM.

All have heard and read of the art of ventriloquism. How it came to receive such an inappropriate name would be an interesting inquiry, but foreign to our present purpose. Nothing in the derivation of the word gives the least clue to the means by which the effect is produced, or the true nature of the effect itself. The word is derived from the Latin *venter*, the belly, and *loquor*, to speak. The Germans have it *das Bauchreden*, belly-speaking. The old idea that the voice came from the belly has been so long exploded that a more philosophical name ought to have been adopted ere this.

The analogies between light and sound are so remarkable that the most eminent modern scientists make great use of them for purposes of illustration in the lecture room; yet much as we have read upon the subject of sound and light we have never seen these analogies applied to the elucidation of the phenomena of ventriloquism. We purpose to make such an application in the present article.

Ventriloquism bears the same relation to other phenomena of sound that perspective does to optical phenomena. The art of perspective consists in portraying upon a flat surface the appearance of objects at a distance from it, so that the same effect shall be produced upon the eye by the picture as would be produced by the objects themselves In order to do this, the form, tints, and shadows are reproduced, not as they really are, but as they are modified by position and distance. Or it may be said to consist in making and arranging a group of objects so that when *viewed* at a given distance they shall produce the same optical effect produced by another set of objects arranged in different positions and at different distances

Ventriloquism consists in making and arranging sounds so that when *heard* at a given distance, they shall produce the same effect upon the ear that another set of sounds produce arranged in different positions and at different distances

It was formerly supposed that some peculiar conformation of the vocal organs was necessary to the ventriloquist, but such is not the case. The means by which sounds can be imitated, are not solely confined to voice. In an article entitled "Possibility of Speech to those hitherto Considered Mutes," published on page 389, Vol. XVI'I., of the SCIENTIFIC AMERICAN, we gave an account of a case in which the larynx was entirely closed, breathing being performed by means of a tracheotomy tube inserted in the windpipe, audible speech not being prevented, although voice, properly speaking, was not possible. Nevertheless the tones produced by the vibrations of the vocal chords may be modified so greatly in pitch and quality, that many sounds differing widely from the tones used in speech and in singing may be imitated.

A good illustration of the action of the vocal chords may be obtained in the followieg manner. Take a short hollow tube, glass or metal, or even a piece of elder with the pith punched out will do Cut it off smoothly, and stretch a piece of elastic rubber over it winding it with a cord to keep it stretched. Now cut with a sharp knife a slit lengthwise in the rubber slip, so that it shall traverse the entire internal diameter of the tube. Blow through the opposite end, and a sound will be produced by the vibrations of the rubber. The tighter the rubber is drawn the higher will be the pitch of the sound emitted. The larynx is composed of five cartilages, the upper one being attached to a bone shaped like the letter U, called the hyoid bone. This organ may be distinctly felt from the outside, and it constitutes the prominence called "Adam's apple." It has two bands of ligamentous tissue—vocal chords—the edges of which are tightened and brought nearer together at will by a set of beautiful and delicate muscles. These bands are illustrated by the slitted rubber above described, the tube upon which it is stretched representing the windpipe. The forcing of air from the lungs sets these bands into vibration. The sounds thus produced are varied in pitch by the tightening or slackening of the vocal chords, and otherwise modified by the shape of the cavity of the mouth.

Sounds from a distance are of course weakened, and they also have another quality which may be compared to the indistinctness of outline in objects seen at a distance. As the colors of objects are partially obscured by the color of the medium through which they are viewed, so sounds coming from remote places are partially obscured by the sounds which pervade even the stillest atmosphere. In proportion as the fine ear of the ventriloquist can appreciate these modifications will be his success in imitating distant sounds. For as to see correctly is the first essential to success in drawing, so is hearing correctly the first essential in ventriloquism.

There are many sounds which cannot be imitated by voice merely, such as the singing of birds, the strident noise of a saw, the whistling of a plane, etc. Such and similar unmusical sounds are imitated by means of the teeth, the lips or the soft parts of the mouth Thus the noise of a saw is like that produced by hawking, only much prolonged, and modified by the cheeks; singing of birds may be imitated by whistling through the teeth. The foaming of soda water by breathing with open lips into a tumbler, etc. To persons having a fine ear this amusing art is not difficult, but we object to the name applied to it. It ought to be called *sound-painting*.

New Galvanic Exciting Liquid.

M. Delamier in a communication to the Academy of Science, states that the followiag mixture forms an exciting liquid for galvanic batteries of great energy and economy, disengaging no deleterious fumes or gas. Dissolve twenty parts by weight of proto-sulphate of iron in thirty six parts of water. Then stir in seven parts of a solution of sulphuric acid (equal parts); then in the same manner add one part of diluted nitric acid (equal parts).

MANUFACTURE OF WHITE LEAD.

White lead, or cabonate of lead, is extensively used in the arts. As a pigment, when pure and mixed with linseed oil, it produces a beautiful white. It is also the base and vehicle for colors used in painting. Cements for metals are composed mainly of it, and in the preparation of vulcanized rubber and liquid gutta percha it enters largely. In medicine it is employed mixed with linseed oil as an ointment for burns, scalds, ulcers, and excoriations. Of all the different preparations of lead the carbonate is the most poisonous to the human system, inducing what is know as the painter's colic in those engaged in its manufacture and in painters. This terrible disease, even if not fatal, frequently produces local paralysis, and the victim becomes a permanent cripple.

The method of manufacture is simple. The material, usually in pigs, of the purest quality, is melted in a fixed kettle and then run into very thin sheets. When made by hand, the process of casting these sheets requires considerable skill. The operator holds in his left hand, by a suitable handle, a sort of shovel of sheet brass, the sides turned up, and dipping up a small quantity of the melted metal, he dexterously throws it over the surface of shovel, when it almost instantly cools in a thin sheet, the superfluous portion of the metal running back into the kettle. A number of these sheets are loosely coiled, forming a sort of cylinder to be submitted to the after action of the acid.

In large concerns, however, this hand casting has been superseded by a method very much superior, the invention of Mr. Augustus Graham, of Brooklyn, N Y. A series of molds, corresponding to the shovel just mentioned, and connected to an endless chain, are successively presented to a current of melted lead, forming sheets in the shape of grates, called "buckles" from their resemblance to the large shoe and knee buckles worn in former times These buckles are discharged at the further end of the apron and placed in earthen pots, their edges resting on inward projecting ledges about three inches from the bottoms of the pots Each pot contains a small quantity of acetic acid, not however reaching the lead buckles. The pots have holes near the top and they are set on a floor covered with tan, the holes of the pots opposite each other to insure a free passage, from one to the other, of the acidulated gases. The first layer of pots is covered with boards over which is spread another layer of tan and on this another layer of pots, and so on to the hight of perhaps twenty feet. The whole is covered with a thick layer of tan.

Then the process of decomposition begins. The tan ferments, generating heat, which causes the vinegar to evaporate and its vapors to circulate among the lead. This goes on for several weeks and the white carbonate falls down in snowy heaps. When the process is supposed to be completed, or the action of the acid ceases, the pile is taken down, the carbonate removed, and those portions of the lead which have not been reduced, called "blue lead," are cleansed of their white coating and returned to the melting pot.

The carbonate or white lead in the form of powder is then washed in tanks with water. These tanks are placed high enough to draw off the lead paste from their bottoms to immense pans called drying kilns, which have false bottoms, between which and the true bottoms steam is admitted to hasten the evaporation of the water. When dry the powdered lead may be packed ready for market, but usually it is ground in oil in which form it is generally sold.

It is seldom, however, that it is offered pure; sulphate of barytes being extensively used to adulterate it. This substance is nearly as heavy as white lead, and is perfectly white but not so brilliant. It has not the body of white lead, but is not so easily affected in color by noxious gases, white lead being soon discolored by sulphureted hydrogen gas.

THE MANUFACTURE OF STRAW BOARD.

The manufacture of straw board is a growing industry in this country. Notwithstanding it is comparatively modern, its increase has been so great, that it has nearly trebled the price of straw during a period of twenty years. Although based upon the same general principles as paper making, it differs from the methods employed for fine papers, in several important particulars, some of the processes being omitted and others not required in the latter being necessary.

The first process consists in boiling the straw with quicklime. This is done in a wooden digester which takes steam from a boiler. The straw is packed in layers with the lime between them, and the whole boiled for from ten to twelve hours according to circumstances. The rationale of this process is based upon the nature of the material. Straw is composed of a tube of woody fiber and cellular tissue, having upon its outer surface a cuticle composed of silicates of potassa and soda with some free silica. The woody fiber also contains some silica. To the silicious cuticle the straw owes in great part its strength. The same cuticle also covers the leaves of the different grains and grasses, and gives them the sharp cutting edge often observed in the coarser varieties. The boiling process is therefore chemical in its effect. The reaction which takes place is the combination of the lime and the silica, which leaves the straw in a soft and pulpy state. The mass is now ground by a machine similar in principle to that used for grinding the ordinary paper pulp, namely: a revolving cylinder upon which knives are fixed which play between a series of fixed knives on a bed plate. The straw is not chopped by these knives but is gradually disintegrated until it is reduced to a uniform pulp.

The entire mass is now drawn into a vat, which contains water and is kept constantly agitated by a series of revolving arms. A wire gage cylinder is so adjusted that it will revolve partially beneath the surface of the fluid mass. The pulp adheres to the gauze, and is carried around to another cylinder around which an endless belt of felt runs. The latter cylinder presses upon the gauze and by this means the pulp is made to adhere to the felt, and condensed so as to give it enough consistency to be taken up by another cylinder called a forming cylinder. This cylinder is one of a pair made of polished metal, and by them the pulp is strongly compressed. The pulp is wound around the former until the proper thickness is reached; this is determined by an indicator. Along the forming cylinder there is a groove planed out, through which the operator now rapidly passes a wooden knife thus severing the soft board; and at the same time he unwinds the sheet and removes it. These sheets are cut so as to form other sizes, and then dried which completes the process. Woolen rags are sometimes ground and mixed with the straw pulp. This makes a much darker colored and heavier board, which is worth considerably more than the pure straw board.

The boards as thus manufactured are applicable to a great variety of useful purposes, among which bookbinding, button making, and paper box manufacture are most prominent.

WEALTH AND ITS SOURCE.---A GRACEFUL RECOGNITION.

It may be fashionable to decry the decadence of the age, the facilities of getting rich by the circumstance of our latest (and may it be our last) war, and to harp upon the selfishness of war contractors, and capitalists, but while such men as George W. Childs, and many others we might name exist, they, by their acts, give the lie to these unfounded calumnies on the present generation. It is but a short time ago that we noticed the generous act of Mr. Childs, in providing each of his employés with a life insurance policy, and now we find the same generous spirit manifested in providing a resting place for the remains of the members of the Philadelphia Typographical Society, in the donation of a plot, in the Woodlands Cemetery, Philadelphia, comprising an area of two thousand superficial feet inclosed with a marole wall, and having a handsome marble gateway.

On Saturday, Oct. 17th, this plot was dedicated by proper ceremonials, and accepted, in a series of resolutions, by the Philadelphia Typographical Society. Among the distinguished guests and speakers, who took part in the ceremonies, were Hon Ellis Lewis, late Chief Justice of the Supreme Court of Pennsylvania, who is the oldest member of the New York Typographical Society, and one of the oldest practical printers in the United States; Hon Morton McMichael, Mayor of Philadelphia, the oldest newspaper publisher in the city; Henry C. Carey, LL D., the oldest book publisher; Louis A. Godey, the oldest magazine publisher; Col. John W. Forney; William Prescott Smith, of Baltimore; Anthony J. Drexel, F. J. Dreer, Joseph Harrison, J B Lippincott, and others.

Mill on Co-operation.

John Stuart Mill, the celebrated political economist, has written a letter to the Illustrated Weekly News, upon co-operation. He says:

"I am quite of the opinion that the various forms of co-operation (among which the one most widely applicable at present to production, as distinguished from distribution, is what you term the system of small per centage partnerships) are the real and only thorough means of healing the feud between capitalists and laborers, and while tending to supercede trade unions, are meanwhile a natural and gradually increasing corrective of their operation. I look also with hope to the ultimate working of the foreign comoination.

"The operatives are now fully alive to this part of the case, and are beginning to try how far the combination principle among laborers for wages admits of its becoming international, as it has already become national, instead of only local, and general, instead of being confined to each trade, without help from other trades. The final experiment has thus commenced, the result of which will fix the limit of what the trade union principle can do. And the larger view of questions which these considerations open up, and which is already visibly enlightning the minds of the more advanced work people, will dispose them more and more to look for the just improvement of their condition, rather in becoming their own capitalists, or allying themselves on fair conditions with the owners of capital, than in their present uncomfortable and often disastrous relations with them."

Double Propellers.

We find in a daily cotemporary—always enterprising and interesting, and generally correct — the following item of *news*:

"The latest marine contrivance is the double propeller about being introduced by the French Transatlantic Company. Instead of a single screw resting on the keel of the ship, there are two screws placed one on each side of the Stern with the rudder between. It is claimed that the new arrangement will increase speed, work more easily, produce less strain and wear on the vessel, and give a new impulse to the movement by which propellers are slowly crowding sidewheels from the ocean."

It would not be inappropriate to, advise our cotemporary, and its thousands of readers, to take the SCIENTIFIC AMERICAN, and learn that double propellers have been used for years. Terms of subscription, three dollars per year in advance.

WHEN Mr. Darwin was at Valparaiso, he found beds of mussels and limpets at a hight of 1 300 feet above the level of the sea, and he expresses his conviction that these beds of shells had been raised to their present elevated position by a series of such earthquakes as those which have been experienced in recent times.