

Science Senses.

In the past ten or fifteen years there has grown up a need for special training of the senses, in order to use properly scientific instruments, not in study or in any way applying to it, but as necessary adjuncts of business communication in every-day life.

First on the list will come the telephone. Most persons using one for the first time find themselves absolutely *hors de combat*, unable to recognize a familiar voice, and are only conscious of the most helpless hearing-deafness. After a short training the ear and mind adjust themselves with wonderful nicety to the new duty required of them, and learn to recognize a voice as unerringly as though talking face to face with the individual who is, perhaps, miles away.

Following closely in the wake of the telephone, which may be looked upon as the pioneer of the inventions which will later rely upon the auditory nerves or hearing for their use, is the graphophone, a marvelous little machine, whose fitness for the work it has to do is so wonderful that, were it not explained on purely scientific principles of natural laws, man would think the inventor of it in league with the "Buyer of Souls."

It records sounds by the vibrations of the air acting on a steel stylus, which is so placed that it cuts or traces fine lines on a cylinder of rubber coated with wax.

These lines are of varying depth, according to the force of the sound waves.

The vibrations or sounds are reproduced by the aforementioned cylinder being revolved under a small stylus to which is attached a pair of tiny ear trumpets which are so adjusted that they transmit with absolute fidelity every sound wave to the ear.

It is impossible to predict the boundary line of scientific discoveries, and the uses to which man may put them in the near future.

But to follow out the idea of the trained senses, take the vision, how the microscopist with his little instrument is every day opening new vistas.

It is only the supreme intellect of the human mind which renders what may be called the brute senses of man of use to him, because when untrained they rank far below the senses of the animal, though in the latter they are not so evenly balanced as in man.

The eagle and condor have wonderful vision. Of these birds it is said that the former can face with an unflinching eye the sun when shining with full noon-tide glory, and of the latter Prescott in his "Conquest of Mexico" says, "The sight of the condor of the Andes is almost beyond belief. When a horse or mule drops by the roadside, scarcely a moment passes before one or more of these huge birds may be seen hovering over the unfortunate animal, proving plainly that they are guided by sight alone."

The sense of smell in animals is perhaps found in the highest perfection known in the well-bred bloodhound. This animal will follow a trail hours after the man or animal has passed, and never lose it, even though it had been passed over by hundreds.

The sense of touch possessed by the clumsy-looking elephant is most wonderful. The tough-looking hide which covers him would never make one think he could lay claim to the sense of touch in any degree of perfection.

Man supplements what he lacks by using his knowledge of the laws of nature. Thus with the aid of the microscope and telescope he can compete with the eagle and condor.

Up to the present time he has not invented any instrument which will aid in distinguishing odors, but passing over that, he has covered nearly the entire range embraced by the five senses—sight, taste, touch, smell and hearing.

When we speak of trained senses, we do not for an instant mean to imply that the man of the present age is better equipped by nature with the senses than his ancestors were, but that by the aid of scientific instruments he has supplemented the use of these senses to an almost supernatural extent. However, beyond a certain point he cannot go, as it is only in his power to use intelligently the things that be, not to create.

Every invention of man thus far has only consisted in some new or perhaps forgotten application of a law of nature, and is not in any way dependent on the inventor personally, save in his ability to make his knowledge of practical use to the majority of mankind.

The man of science is the idol of the present age. His daring and success in the field of invention have blinded the eyes of the people to the fact that there can be a limit to his power, and make them lose sight of the reality that he is only a pupil in the school of nature, where the doors are open to all.

It is not probable that any special benefit will be done mankind physically by this training, for it does not demand any abnormal conditions. It is simply a better understanding of our physical capability of using our senses by intelligently applying them to obtain a result known to be as certain as the law, "water seeks its own level."

There is a vast change in the tendency of the inventors of the present age, and this generation specially. Force is guided rather than controlled, and the result

is that machinery has become more delicate and often more simple, but requiring by that very fact a more highly educated mind to operate it than did the crude machinery of the early inventors, where muscle was as much needed as knowledge. All that is changed. Ignorance is now often death-dealing, particularly when electricity is the motive power or where chemical compounds are used.

Every day adds to the necessity for a practical working knowledge of the numerous inventions which are now found in daily use in all civilized countries the world over.

No one who has ever read "John Halifax, Gentleman," can forget the masterly description given of the personal antagonism felt by the working men to the machinery which was placed in his mill by the hero.

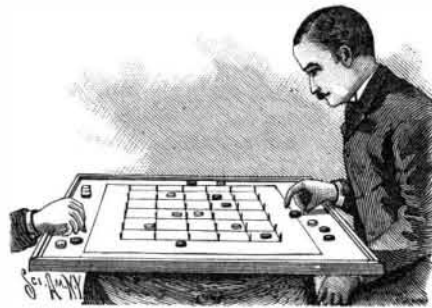
In their blindness they could not realize that mental labor placed them on a higher plane than manual labor, and that machinery at its best can only supply muscle, not mind, and that they were being given, by the very machinery which they were bent upon destroying, their one chance to be something more than mere machines themselves.

It is to be hoped as the world grows older it grows wiser, and that we are being carried to a "Golden Age" on the wheels of the inventions of the twentieth century.

DORSEY BARTON.

A SIMPLE FORM OF GAME.

The game board shown in the picture is not unlike a checker board, but it has a surrounding marginal flange, and upon the lines or at the intersecting points of the squares are upwardly projecting pins, so arranged that they will appear in aligning parallel rows. The game has been patented by Rev. Norbury W. Thornton, of Geneseo, Ill., and is styled by the inventor "The Race Problem." The players have twelve white checkers for one side and twelve black checkers for the other side, and the first play is made by snapping a checker inwardly from the outer side, with



THORNTON'S GAME.

the intent to lodge the piece behind one of the central pins, out of reach of a similar play from an opponent. It is the effort of each player, then, in this manner, to place as many of his pieces centrally on the board as possible, knocking outside of the area of the pegs or pins the pieces of his opponent. Two hundred points are designed to constitute a game, the highest count being for the central space, and the count diminishing proportionately toward the margin, all men outside of the pegs or pins counting ten for the opposite side.

The Borate of Soda in the Treatment of Epilepsy

was first proposed by Charles F. Folsom, of Boston, in 1881. Gowers reported four cases treated with the remedy, three of which were entirely cured.

Lately, *El Siglo Medico* reports, Senor Dijond has tried the remedy in 25 old cases in which the *bromides* had been employed without any real benefit. The duration of the treatment with the borate of soda was from four to seven months, the doses of the remedy varied from one to six grammes a day.

One case was completely cured, and all the others, except six, were much improved.

The experiments heretofore made prove that the remedy can diminish the frequency of the epileptic seizures in a very large number of cases which are not influenced favorably by the *bromides*.

The borate of soda may be given in doses of six grammes, daily, without any risk to the patient, but it is necessary to begin with one or two grammes a day and gradually increase the dose.

The following formula is recommended :

Sodæ borat. pulv.....	1 to 6 grammes.
Syr. aurant. carb.....	" 30 "
Aquæ destillat.....	" 100 "

M. S.—To be taken in two doses, one in the morning and one in the evening.

For doses larger than four grammes, one gramme of glycerine should be added for each gramme of borate in excess of four.

For the prolonged use of the remedy, Senor Dijond recommends the following :

Sodæ borat. pulv.....	grammes 10
Glycerini pure.....	" 4
Syr. aurant. carb.....	" 94

M. S.—To be taken in spoonful doses. An ordinary spoonful contains two grammes of the borate of soda.

An Automatic Photographer.

According to *The Electrical World*, the application of the nickel in the slot principle to automatic photographing is about to be accomplished. Mr. Matthew J. Steffens obtained a patent on the device December 11, 1888, and has others pending. The mechanism is operated by two separate and distinct electrical circuits. In securing a photograph, a quarter of a dollar is passed through a slot and the visitor takes the desired position, and then gives a slight pull to the cord in front of the case, when the shelter in front of the lens of the camera is automatically drawn aside, and the flashing of some magnesium in a brass pan, fired by the heating to incandescence of a platinum wire, throws the necessary lights, and a perfect negative is secured on a plate having a white background and made of flexible celluloid. This part of the operation, the writer says, requires but two seconds of time. The visitor then waits while the plate is rolled over two small wheels and gripped by two rubber tapes, which carry it through the developing, fixing and washing fluids, and finally pass it through a second aperture or slot, a perfected photograph. The entire movement of the second operation is controlled by an electric motor operated by a current from a primary battery. The necessary chemicals are each supplied separately from an airtight reservoir, and the flow regulated by a dial apparatus to correspond with the temperature of the atmosphere and the strength of the chemicals.

The machine will be placed in drug stores and other places where "slot" machines are found to pay. It is said that this device can be used in securing instantaneous photographs of criminals while they are being booked, and that it will be used by railway companies to prevent improper use of mileage tickets, though the success of this latter application is doubtful. The model of the machine was made by the Franklin Electric Company, of Chicago, for the inventor, who is a well known artist of Chicago.

To verify the statement of our valued contemporary before publishing it, we sent the article to the electric company who constructed the apparatus, to know if it worked satisfactorily, to which they reply as follows :

Chicago, Oct. 30, 1890.

Messrs. MUNN & Co., Editors SCIENTIFIC AMERICAN.

Gentlemen: In reply to yours of Oct. 24, the automatic photographic machine was built by our company for Mr. M. J. Steffens, the inventor.

Regarding the merit of the invention, would say that the first machine, as described in inclosed article, was a success, but the inventor was not satisfied, as the mechanism was too complicated.

Our company has built four different models for the inventor, and the last one, which has just been completed, is very simple and promises to be a great success.

As the patents are not yet issued, we cannot give you a description of the machine, but it seems to work perfectly, day or night. At night or in dark places a magnesium light is used. The inventor controls the magnesium or any artificial light used in automatic photographic machines, granted in former patent.

Pictures taken in daylight are very good, and the way the inventor uses magnesium light now seems as good as can ever be expected. Any one can work the machine, as there are no cords to pull or buttons to press, as the coin does it all. The time required to complete the picture is two and one half minutes. It is delivered with a metallic medallion-shaped frame, and the entire work is done by the aid of electricity. We will request the inventor to furnish you with the details of the machine, as we know him to be an admirer of the SCIENTIFIC AMERICAN.

As perhaps you are aware, Mr. Steffens is also the inventor of an aerial camera which caused some notice a couple of years since, and we are now constructing for him an improvement on the same. Trials with a small machine proved very successful, showing a distance of twenty-two miles distinctly.

The camera is attached to a small balloon, is regulated and the exposing done from the ground by electricity.

The negatives are made on celluloid films, and several hundred can be taken at each ascension.

Yours respectfully,

FRANKLIN ELECTRIC COMPANY,
Per P. R. H.

St. Clair Tunnel Celebration.

The St. Clair river tunnel commission is making great preparations for a celebration on the opening of the tunnel. It is proposed to serve the banquet in the hole itself upon a table 1,000 feet long, 500 feet on each side of the international boundary, the chairman to sit exactly on the line. On the Canadian side of him will be the President of the United States, and on the American side the Governor-General of Canada, these two flanked by a string of ministers of state and notables from both countries. The tunnel will be brilliantly illuminated by electricity and the decorations will be intrusted to a corps of special artists.