I am extremely glad that I have the opportunity of making the first publication of these researches before a scientific society, for it is from scientific men that my work of the last six years has received its earliest and kindest recognition. I gratefully remember the encouragement which I received from the late Professor Henry at a time when the speaking telephone existed only in theory. Indeed, it is greatly due to the stimulus of his appreciation that the telephone became an accomplished fact. I cannot state too highly also the advantage I received in preliminary experiments on sound vibrations in this building from Professor Cross, and near here from my valued friend Dr. Clarence J. Blake. When the public were incredulous of the possibility of electrical speech, the American Academy of Arts and Sciences, the Philosophical Society of Washington and the Essex Institute of Salem recognized the reality of the results and honored me by their congratulations. The public interest, I think, was first awakened by the judgment of the very eminent scientific men before whom the telephone was exhibited in Philadelphia, and by the address of Sir William Thomson before the British Association for the Advancement of Science.

At a later period, when even practical telegraphers considered the telephone as a mere scientific toy, Professor John Pierce, Professor Eli W. Blake, Dr. Channing, Mr. Clarke and Mr. Jones, of Providence, R. I., devoted themselves to a series of experiments for the purpose of assisting me in making the telephone of practical utility; and they communicated to me, from time to time, the result of their experiments with a kindness and generosity I can never forget. It is not only pleasant to remember these things and to speak of them, but it is a duty to repeat them, as they give a practical reputation to the often repeated stories of the blindness of scientific men to unaccredited novelties, and of their jealousy of unknown inventors who dare to enter the charmed circle of science. I trust that the scientific favor which was so readily accorded to the telephone may be extended by you to this new claimant—the photophone.

PLAN OF THE CEREBRO-SPINAL NERVOUS SYSTEM.

By S. V. Clevenger, M. D.

(Abstract from the paper (B 41) read before the American Association for Advancement of Science, Boston, August 28th, 1880).

The great French and German cerebral anatomists Luys and Meynert had endeavored to declare the architecture of the human brain from a multitude of microscopic sections, but so intricate were the relationship of fibres, nerve-cells, arteries, veins, connective tissue, etc., that it was at once seen to be necessary to study lower animal life anatomically and physiologically before the plan could be determined. Luys did nothing in this direction, while Meynert went as far as the brains of small mammals. Spitzka has carried the scrutiny still farther. The scheme of Meynert started with the upper part of the cerebrum as the seat of consciousness and, working downward, his "projection systems" ended in the periphery.

The nerve fibres composing the cerebrum and cerebellum were mainly considered. The presence of a multitude of nerve-cells and ganglia dispersed throughout this region was unaccounted for, and as these were of undoubted importance and all well known to anatomists, it was seen by pathologists that these schemes were insufficient.

No scheme can be correct which ignores any part of the nervous organization, or excludes any form of life as anomalous. The conclusion I have reached, is that the sympathetic system of vertebrata corresponds to the general nervous distribution of invertebrata above protozoa, presiding over the nutritive functions. The vaso-motor has been differentiated from the sympathetic distribution, whose office is to produce the vermicular motions of the intestines. Differentiation proceeds dorsally because that portion of the animal which is in most constant contact with the changing molecular motion of the environment would be precisely the portion to give origin to the higher series of nerve divisions. The endoderm, after the gastrula, stage remains under control of the sympathetic system. The so-called cerebral ganglia of Vermes, are homologous with the spinal segments which afterwards become coalesced in the vertebrata. This is the second system to be developed and *Amphioxus* has not acquired the third or cerebral system proper. In *Trigla Adriatica*, the third system series may be seen developed dorsally upon the second or spinal cord. This third system is the intervertebral ganglia. *Fusion of several of the higher intervertebral ganglia produces the cerebellum*, and accounts for the co-ordinating function of that organ. The several cerebral lobes, the tubercula quadrigemina, mammillary eminence, Gasserian ganglion, olfactory lobe, olivary body, etc.. are hypertrophied or atrophied (as the case may be) intervertebral ganglia. Projection systems and commissures, as the callosal, make their appearance in exact accordance with laws operative in the lower series.

The three systems develop gradually, and it may be said, commissurally one upon the other, and this scheme appears to account satisfactorily for physiological and pathological phenomena.

In adddition to its publication in the proceedings of the Association, the paper will be produced in full, in the *American Journal of Nervous and Mental Disease*, for October, 1880.

ANCIENT AGRICULTURAL IMPLEMENTS OF STONE.

By Hon. William McAdams, of Otterville, Ills.

In the rich, alluvial soil about the mouths of the Missouri and Illinois rivers are found many of these ancient stone implements used by the Mound-builders in their rude agriculture. Mr. McAdams exhibited a fine collection of these implements.

They are all chipped from flint, or a hard silicious limestone, and some of them beautifully made. Some are nearly a foot in length and six inches wide at the broader end.

Some are made to be fastened to handles, like our modern spades. Others resemble our modern hoes, having a deep, lateral notch, to facilitate the fastening to a handle. Some of these stone hoes are made with such ingenuity as to have been effective implements.

Mr. McAdams also exhibited stone implements which evidently were made to fasten to some kind of stock to be pulled through the ground like a plow. As these ancient people had no domestic animals for this purpose, it is probable that manual force was used to perform the work. The broad cutting edge of these stone implements was highly polished from long use by the attrition of the soil.

Mr. McAdams had found these implements of agriculture in the ancient graves associated with pottery, some of which contained carbonized corn. Cobs in a carbonized state were found, and the speaker is of the opinion that these ancient people lived principally on corn and vegetables, which they cultivated to a considerable extent.

The paper elicited much interest in the association.

A very interesting report addressed to the committee of public health in France by M. Wurz, describes a process for retaining the green coloring of vegetables which is generally destroyed by boiling. It consists in the use of an excess of chlorphyl obtained from spinach (spinacia oleracea) which holds in its cells a large amount of coloring matter. A watery solution of this rendered alkaline by soda, is added to the boiling vegetable which is slightly acidulated with hydrochloric acid. The chemical result is common salt and a deposit of coloring matter on the organic tissue. There cannot now be any possible temptation for the unwarrantable dyeing of preserved vegetables by salts of copper or the employment of adulterants for obtaining that vivid coloring so attractive to the epicure.