that period. Scientific investigations of the most complicated nature have been successfully carried on, the ordinary beaten paths of research of the Chemist, the Engineer and the Electrician have been cast aside, and original methods of exploring the whole domain of science employed with indefatigable perseverance. The very text books and scientific literature on which others have relied, proving unreliable, were rejected, and Nature, at its fountain head, consulted in solving the these problems.

With such methods and indomitable will, and with the constant and valued co-operation of Mr. Charles Batchelor and Mr. Francis R. Upton, the great work has been successfully accomplished.

The arrival of Edison in New York with his corps of skilled electricians and engineers, occurs at an opportune moment. Deaths from suffocation caused by the escape of the ordinary illuminating gas have multiplied of late, and as we now write the bodies of two women who have died from this cause, await burial. During the last few days a building on Broadway suffered from a violent explosion of illuminating gas, making the second within a few weeks. In the first instance many persons were injured, and in the more recent case one hundred persons escaped death only by the force of the explosion taking a fortunate direction. With the acceptance of Edison's system of electric illumination, these dangers to health and life, to which we have been so long exposed, become as things of the past, except where voluntarily encountered, and to this extent Edison may claim to have conferred a benefit to which the whole world will be heir.

We are under obligations to the Marchioness Lanza for a fine translation of a paper by the renowned Professor Rudolph Virchow, of Berlin, entitled "*Organic Healing Power*." This paper, involving many points of general scientific interest, will be produced in our next issue.

Virchow is now in his 61st year, and it is 36 years since he was challenged by Count Von Bismarck to fight a duel, on account of Virchow (who was an advanced liberal) having defeated Bismarck's project to obtain money from the Parliament to create a German navy.

AMERICAN CHEMICAL SOCIETY.

The February meeting of the American Chemical Society was held on Friday evening, February 11, 1881. The meeting was called to order by Vice-President Leeds, after which the following gentlemen were duly elected members of the society, viz.: Messrs. N. Gerber, James F. Slade, Theodore M. Hopkey, Professor F. N. Venable, and E. K. Dunham. Dr. E. R. Squibb then took the chair and Professor A. R. Leeds read the following papers:

I. Upon the invariable production, not only of ozone and hydrogen peroxide, but also of ammonium nitrate in the ozonation of purified air by moist phosphorous.

II. Upon the action of ozone, oxygen and nascent oxygen upon benzine.

III. On a new class of aromatic sulphurous acids.

Mr. J. H. Stebbins, Jr., followed with some remarks on tetra-azo-compounds, substances to which he has paid particular attention, for it will be recollected that a whole series of the di-azo-colors were originally produced by him.

Professor W. G. Levison then gave the Society the results of some recent experiments by him on polarized light. On the conclusion of this paper, the society was adjourned. M. B.

New York, February 17, 1881.

NEW YORK MICROSCOPICAL SOCIETY.

The third annual reception of the New York Microscopical Society was held on February 14th, 1881, at the rooms of the Academy of Sciences. The annual address of the President was delivered by Professor R. Hitchcock, who selected as his subject: "The Relations of Science to Modern Thought," on the conclusion of which the meeting resolved into a *conversazione*, when a variety of interesting but familiar objects were exhibited.

THE annual meeting of the German Chemical Society took place December 22, 1880, on which occasion the following officers were elected for the present year: President, A. Baeyer; Vice-Presidents, A. W. Hofmann, L. v. Barth, F. Hoppe-Seyler, H. Landolt; Secretaries, F. Tieman, A. Pinner; Vice-Secretaries, E. Bauman, Eug. Sell; Treasurer, J. F. Holtze; Librarian, S. Gabriel. M. B.

THE SOCIETY OF TELEGRAPH ENGINEERS, (England).

On Wednesday, last week, Prof. G. C. Foster, F. R. S., president, read his inaugural address before the Society of Telegraph Engineers and Electricians, the principal thing dwelt upon being the practical importance of a trustworthy system of electrical measurements. The Society, he said, was not merely a professional one, but was concerned with the scientific principles which underlie the practical operations of electricity. The present practical applications of electricity owed their existence to scientific discoveries made just over 60 years ago. Reference was made to the investigations of Oersted in 1820, and Davy in 1821. Induced electrical currents enabled the electric light to cease to be a scientific marvel and become of practical interest to municipal corporations and limited liability companies. Davy first produced an electric light by the passage of currents from a battery of 2000 cells between carbon points. Oersted, Ampère, and Faraday traced out the fundamental laws of the phenomena of induction. In the ordinary course of scientific discovery, the qualitative aspects of phenomena first attracted attention. Quantitative knowledge followed later by degrees. "Absolute values of constants" could only be given when a phenomenon was sufficiently well known for its laws to be expressed in definite mathematical formulæ, or when methods for the determination of such values could be devised. But when definite results had to be produced as part of a commercial undertaking, that point became of the utmost importance from the very first. Examples were given. During the past 100 years an unknown large number of electrical machines had been made for more or less scientific purposes; but after all that experience it was a question as to who could draw up a specification for an electrical machine which should, with a given number of revolu-

tions, produce a known quantity of electricity, or which would charge a condenser of one microfarad capacity to a given potential. Knowledge as to the power of a galvanic battery was much more definite. Everything in that respect could be stated with exactitude. If knowledge of the practical uses of electrical machines were comparable with that in respect to the galvanic battery, knowledge as to the efficiency of the former would soon be equally definite. The necessity of proper standards based on numerical data was understood in more than one branch of physics; but the present remarks were directed only to electricity, which had in recent years undergone almost a complete transformation. After describing the principles upon which a system of electrical measurement should be founded, the steps taken by Ohm, Weber, Oersted, and others, in arriving at definite laws, were related and tabulated for comparison. Weber's system had been extended by Sir W. Thomson, and the practical applications of electricity in its early days produced the necessity of being able to express results upon a coherent system of standard units. For that purpose the committee of the British Association on electrical standards was appointed, and the B. A. unit resulted. The data upon which that unit was founded had subsequently been verified, and at the present time a redetermination of its accuracy was about to take place. The absence of any standard resistance coils was pointed out, and the suggestion made that it would reflect credit on the Society if it at once set to work with the view of establishing a definite standard resistance, with which instruments used for every-day practical purposes could be occasionally verified and adjusted. A paper on "Some Experiments on Induction with the Telephone," by Mr. A. W. Heaviside, was then read. In the discussion which followed, Prof. Hughes, Mr. Stroh, Prof. Ayrton, and others took part.

FURTHER NOTES ON THE BRAIN OF THE IGUANA AND OTHER SAUROPSIDÆ.

By Edward C. Spitzka, M. D.

I would add to the observations published in No. 7, Vol. I. of Science, relating to the brain of the Iguana, the following:

1st. The ganglionic intumescence upon the inner edge of the cerebral hemisphere, which I supposed to represent the homologue of the molecular basis of the Fascia dentata of Tarini in the mammalia, is more voluminous in the middle of the hemispheric length, than in the posterior third. The homologization of the entire inner wall of the hemisphere with the *Cornu Ammonis* of mammals gains strength from the fact that in the Opossum the Cornu Ammonis extends almost along the whole inner hemispheric wall, and is but slightly folded as compared with that of the Rodentia. That the elevation which I supposed to correspond to the *fascia dentata* and *tæniola cinerea*, might be interpreted as one of the thalamic tubercles, which I considered an open question at the time of my writing the first commmunication, and which I now hold to be disposed of definitely as well as the other supposition.

2nd. There is a molecular accumulation at the base of the cerebral hemisphere, in the common basilar gray, and beneath the elevation of the *corpus striatum*, which may correspond to the lenticular nucleus.

3rd. At and above the level of the emerging third pair of nerves, there is a beautiful nucleus of large multipolar cells, resembling the cells of the auditory nucleus (that is of the large celled division of that nucleus) in contour and in dimensions. This cell group in its situation corresponds to the *nucleus tegmenti* of mammals. I would here note that throughout the animal range, the cells of the *nucleus tegmenti* and the special division of the auditory nucleus referred to seem to keep step in development. This fact would add another link to the chain of evidence attempted by Meynert, who surmised that an auditory tract passed through the cerebellum to the *brachium conjunctivum*, (and therefore through this cell group) on its way to higher projecting fields.

4th. The so-called *nucleus dentatus* of the cerebellum, which should be termed simply *nucleus cerebelli*, since it is not dentated even in all the mammalia, is clearly present in the cerebellum of the Iguana. It can be found at the junction of the cerebellar peduncles with the main cerebellar mass, and consists of well marked cells of moderate dimensions.

5th. The "fasciculus from the habenulæ to the tegmentum" so-called by Meynert, but which Gudden and his pupils correctly state to run from the habenulæ to the *ganglion interpedunculare*, has not been yet identified in animals lower in rank than the mammalia. I find it well-developed occupying exactly the same relations and presenting the same histological peculiarities as with mammals in the Iguana.

6th. The fourth pair does not reach the valve of Vieussens in levels lower than those in which the root has its origin, as in the turtle (*Nanemys guttatus, Chelydra*) and the mammalia, but distinctly arises in the same level in which it reaches the valvule where it decussates. The nerve itself, however, emerges in levels superior to the latter.

7th. While the cells of the oculomotoriotrochlearis nucleus, and those of part of the auditory origin are of large dimensions, those of the abducens, facial, and motor-trigeminal origin are remarkably small. The reduction in size of the cells is as might be inferred accompanied by a reduction in size of their nuclei. This fact suffices to dispose of the recently advanced claims, that motor cells have larger nuclei than sensory ones. The reduction in size of these motor groups and their presenting such a contrast to the great development of the cells in other motor groups in the Iguana, has to my mind much of the enigmatical. The largest cells in the nervous system of the Iguana, are the multipolar cells of the reticular field, (my *ganglion reticulare* in mammals) those of the auditory origin and *nucleus tegmenti* are of the same or nearly the same dimensions.

8th. The mesencephalic nucleus of the fifth pair is represented as in other reptiles by round cells, sunk in the niche between the two optic lobes; they are not spread out on the contour of the central tubular grey, as in mammals, but concentrated more at the median line. Some of the cells can be identified beneath the inter-optic lobes.

9th. The cells of the substantia ferruginea of man are represented by a group of numerous small ganglionic bodies, whose connection with the fifth nerve is clearer than in the mammalia.

10th. The auditory nerve fibres send a powerful strand which decussates with its fellow in the raphe. In its course each strand traverses or circumscribes the posterior longitudinal fasciculus. This same strand is found in the mammalia, but in the latter it is deeply seated; in the Iguana it is more superficial, and the erroneous inference might be drawn that this strand in the reptile is equivalent to the *striæ acustici* of mammals. The latter are however, absent in reptiles, and although in some species visible eminences are formed at the floor of the fourth ventricle, crossing at right angles the longitudinal eminences of the posterior longitudinal fasciculi; these are the homologues of the more anterior and concealed part of the auditory decussation of mammals.

11th. In no reptile have the nuclei of the columns of Goll and Burdach been identified. In the Iguana I can readily identify them, although much smaller than the corresponding nuclei of the mammalia. Their demarcation is, however, distinct.

12th. In the Iguana as in the turtle there is an accumulation of numerous multipolar cells at the raphe in the