tartrate by the same reagent. The methylthiophen, however, appears to be isomeric with that separated from coal-tar toluene by Victor Meyer. According to Volhard and Erdmann, thiophen, when cooled in a mixture of carbon dioxide and ether, crystallises like benzene. Paal's synthesis of methyl-phenyl-thiophen from aceto-phenone-acetone, and of thiophen-carboxylic acid—which is easily resolved into carbon-dioxide and thiophen—from mucic acid, may also be referred to here.

One of the most interesting of recent researches is that of R. Nietzki and T. Benckser on hexhydroxybenzene $(C_6HO)_6$ (*Ber.*, xviii. 499)), which they have succeeded in obtaining from nitranilic (dinitrodehydroxyquinone). They find the diimido body obtained from this when treated with nitric acid, yields a product of the composition $C_6H_{16}O_{14}$, which when treated with reducing agents, yields this substance. They also find that when heated with concentrated nitric acid, hexhydroxybenzene is converted into a body having the remarkable formula $C_6H_{16}O_{14}$. This decomposes when heated to 100°, or when boiled with water, carbon dioxide being given off, and on adding potash solution to the residue or the boiled solution, orange yellow needles of a potassium salt of the formula $C_5K_2O_5$ are obtained, which they have identified as potassium croconate, and they believe that the bodies obtained by Lerch (*Am. Chem. Pharm.*, cxxiv. 20) from the compounds of potassium carbonic oxide (formed during the preparation of the metal) were hexyhydroxybenzene, tetrahydroxyquinone, and the compound $C_6H_{16}O_{14}$, and in fact that the compound $C_6(OK)_6$ is present in "potassium carbonic oxide." From experiments on the remarkable substance $C_6H_{16}O_{14}$, they came to the conclusion that it is a compound of $C_6O_6+8H_2O$, and is a quinone which they call triquinoylbenzene. This appears to be confirmed by the production of the intermediate hydroxy compounds, the following being the series of products ;—

$$C_6(OH)_6,$$
$$C_6(OH)_4O_2,$$
$$C_6(OH)_2O_4,$$
$$C_6O_6.$$

In reference to agricultural chemistry Messrs. Lawes and Gilbert have contributed a most important and interesting paper to our Society (1884, pp. 305-407) on the ash of wheat-grain and wheat-straw. They gave the analyses of no less than ninety-two wheat-grain and wheat-straw ashes, every ash being of produce of known history of growth as to soil, season, and manuring, all the specimens having been grown at Rothampstead. Out of the many important deductions this paper contains, the following are extremely interesting :—It appears, in reference to the grain, that on the whole there is great uniformity in its mineral composition under different conditions of manuring, provided only it is perfectly and normally ripened. The influence of season producing a much wider range in the mineral constituents of the grain than the manuring. This, however, is not the case with the straw, as it is found that the amount of mineral ash constituents found in the straw, and therefore in the total crop, have a very direct connection with the amounts available in the soil, but the amounts stored up in the grain itself are little influenced by the quantity taken up.

Besides the researches just referred to there has been a considerable amount of good work done, but it would be out of place for me to refer to it more fully in this short review.

Last year I took occasion to refer to the comparatively small amount of original work which was being prosecuted in this country, notwithstanding the increased number of laboratories and the greater facilities which existed for the encouragement of research. It will be seen from the list of papers that the number brought before the Society during the past year has not increased, but if the papers themselves are examined I think we shall find that the amount of work done is somewhat larger, though certainly not so large as it should be ; and it is to be hoped that the spirit of research will be stimulated in the laboratories of the kingdom, and that men may be turned out who are not only more or less analysts, but thorough chemists. Let us not be contented with looking back with pride to what our ancestors have done, but let us follow their example.

SCIENTIFIC SERIALS

Annalen der Physik und Chemie, January 15, No. 2, 1885.—Determination of Verdet's constants in absolute units (2 figures), by Prof. Leo Arons.—On the formation of ozone hydrogen peroxide and peroxide of sulphur (S_2O_7) by the electrolysis of dilute sulphuric acid (2 figures), by Franz Richarz.—Reply to some statements by F. Kohlrausch, by H. Wild.—On the method of damping for determining the ohm, by Lord Rayleigh.—On the determination of specific heats and melting points at high temperatures (11 figures and 6 tables).—Inaugural address, by Otto Ehrhardt.—Two new methods of finding the angle of polarization of metals, by H. Knoblanch (tables).—The determination of the specific heat of uranium, by Ad. Blüncke.—Experimental research on laws of the emission of light from glowing bodies (5 figures and 7 tables), by W. Möller.—Remarks on J. Fröhlich's treatise, "Kritisches zur Theorie des gebeugten Lichts," by M. Réthy.—Observations on fluorescence, by E. Lommel.—On the double acetates of uranium (9 figures), by C. Rammelsberg.—Note on Kundt's dust figures (2 figures), by H. J. Oosting.

Journal de Physique Théorique et Appliquée, February.—Observations upon the corona now visible around the sun, by M. A. Cornu.—Researches on the combustion of gaseous explosive mixtures, with figures and tables, by MM. Mallard and Le Chatelier.—A new telegraphic system, by M. Estienne.—An experiment in hydrodynamics, by M. P. Parize.—A magneto-electric phenomenon, by C. V. Boys.—A new interference phenomenon produced by sheets of glass with parallel surfaces, and on a method of verifying the parallelism of the surfaces of these sheets, by O. Lummer.—Influence of change of condition from the liquid to the solid state on vapour-pressure, by W. Ramsay and Sydney Young.—Non-sparking key, by W. E. Ayrton and John Perry.—A new arrangement for measuring work, by C. F. Brackett.—Coloured dust particles, by H. H. Hagen.—The horizontal motion of small floating bodies, and the truth of the postulates of the theory of capillarity, by J. Leconte.—Method of registering the free vibrations of a tuning-fork, and the beats, by A. G. Compton.—The expression of electrical resistance as the function of velocity, by F. E. Nipher.—Contributions to meteorology : the reduction of barometric observations to the sea-level, by E. Loomis.—The influence of light on the electrical resistance of metals, by A. E. Bostwick.—On atmospheric absorption, by S. P. Langley.—On the absorption of radiant heat by carbonic acid gas, by J. E. Veller.—The duration of luminous impressions on the retina, by E. L. Nichols.—The relation between the electromotive force of a Daniel cell and the strength of the solutton of zinc sulphate, by H. S. Cattzart.

The Journal of the Franklin Institute, No. 710, February, 1885.—Electro-metallurgy, by Nathaniel S. Keith. A lecture delivered at the International Electrical Exhibition of the Franklin Institute, Tuesday, September 23, 1884.—The divining rod, by Rossiter W. Raymond, Ph.D. Conclusion of a lecture delivered at the International Electrical Exhibition, September 18, 1884.—Glimpses of the International Electrical Exhibition, by Prof. Edwin J. Houston. No. 5, Edison's telephonic inventions. Annual summary of engineering and industrial progress, 1884.—Report of the Franklin Institute ; items ; Japanese colony in Germany ; spontaneous decomposition of explosive gelatine ; a new refractory brick ; globular lightning ; solar phenomena in Switzerland ; supplement ; International Electrical Exhibition report on underground wires. The following systems are described : the American Sectional Underground Company ; the Anderson conduit for underground wires ; the Brook's underground conduit ; the Continental Underground Cable Company ; the Cosmopolitan Underground Telegraph, Telephone, and Electric Light Company of New Jersey ; the Electric Tube Company ; the National Underground Company of New Jersey ; Henley's conduit for underground lines ; Magner's underground conduit ; Philadelphia and Seaboard Telegraph and Cable Company (Pennock's) ; the Union Electric Underground Company of Chicago ; Woodward's curb conduit ; the Delany Cable.

Rivista Scientifico-Industriale, February 15-28.—Description of a new galvanometer, with illustration, by Aurelio Mauri.—Experimental researches on earth-currents and those of absorption, by Prof. Antonio Racchetti.—Variations in the electric resistance of solid and pure metallic wires, according to the temperature (continued), by Prof. Angelo Emo.—On an improved method of preserving butterflies' wings, by P. Milani and A. Garbini.

Rendiconti del R. Istituto Lombardo, February 26.—Report on soundings taken in lakes Orta and Idro, Lombardy, for the purpose of determining their mean depths, by Prof. Pietro Pavesi.

—On the analogy observed by Warming between Koch's comma bacillus and *Spirillum tenue*, Ehr., by Prof. Leopold Maggi.—On an integer more general than that of living forces, for the movement of a system of material points, by Dr. Giovanni Pennacchietti.—On the psychological action of *attention* in the animal series (continued), by E. T. Vignoli.—On Grimaldi's proposed agrarian credit to relieve the distress of the Italian peasantry, by P. Manfredi.—Remarks on the *legatum optionis* of Roman jurisprudence, by Prof. C. Ferrini.—Critical inquiry into the new Italian Penal Code, by Prof. A. Buccellati.—Meteorological observations made at the Brera Observatory, Milan, during the month of February.

SOCIETIES AND ACADEMIES

London

Royal Society, March 19.—"The Paralytic Secretion of Saliva." By J. N. Langley, M.A., F.R.S.

It has been shown by Claude Bernard and by Heidenhain that section of the chorda tympani nerve on one side, causes a slow continuous secretion from both sub-maxillary glands. Since the secretion which takes place on the side of the body on which the nerve is cut is called the "paralytic" secretion, that which takes place on the opposite side may be called the "anti-paralytic" or "antilytic" secretion. The author finds that the antilytic secretion becomes slower when the chorda tympani nerve is cut, and stops when, in addition, the sympathetic nerve is cut. It is, then, caused by nervous impulses sent out by a secretory centre in the medulla oblongata. This centre is in a state of increased irritability, for dyspnœa causes a much more rapid flow of saliva, and causes it sooner than it does normally. The paralytic secretion during the first day or two of its occurrence is also caused by stimuli proceeding from the central secretory centre; since the paralytic secretion is more copious than the antilytic secretion, and since dyspnœa causes a greater increase of the former than of the latter, it follows that the increase of irritability in the central secretory centre is greater on the side on which the chorda tympani has been cut than on the opposite side. In this state of increased irritability the central nerve-cells are probably stimulated by the blood supplied to them. The paralytic secretion in its later stages is probably brought about by a similar state of increased irritability in nerve-cells in the gland itself, *i.e.* of a local secretory centre. In its later stages the secretion continues after severance of all the nerve-fibres proceeding from the central nervous system to the gland; it is, however, increased by dyspnœa, stopped by apnœa, and by large doses of anæsthetics, which indicates that it is brought about by nerve-impulses. The peripheral end of the chorda tympani remains irritable for two to three weeks, which is a further indication that the secretory nerve-fibres are connected with some, at any rate, of the many nerve-cells present in the gland. Notwithstanding the continuous paralytic secretion, the gland-cells become slightly more mucous than normal; except for this and a decrease in size they remain normal. They secrete as usual when the sympathetic nerve is stimulated.

Geological Society, March 25.—Prof. T. G. Bonney, D.Sc., LL.D., F.R.S., President, in the chair.—Charles De Laune Faunce De Laune and William Hill were elected Fellows of the Society.—The following communications were read:—On the relationship of *Ulodendron*, Lindley and Hutton, to *Lepidodendron*, Sternberg, *Bothrodendron*, Lindley and Hutton, *Sigillaria*, Brongniart, and *Rhytidodendron*, Boulay, by Robert Kidston, F.G.S.—On an almost perfect skeleton of *Rhytina gigas* = *Rhytina Stelleri* ("Steller's sea-cow") obtained by Mr. Robert Damon, F.G.S., from the Pleistocene peat-deposits on Behring's Island, by Henry Woodward, LL.D., F.R.S., F.G.S. The author spoke of the interest which palæontologists must always attach to such animals as are either just exterminated or are now in course of rapid extirpation by man or other agents. He referred to the now rapid destruction of all the larger Mammalia, and expressed his opinion that the African elephant, the giraffe, the bison, and many others, will soon be extirpated unless protected from being hunted to death. The same applies to the whale- and seal-fisheries. He drew attention to a very remarkable order of aquatic animals, the *Sirenia*, formerly classed with the Cetacea by some, with the walruses and seals by others, and by De Blainville with the elephants. He particularly drew attention to the largest of the group, the *Rhytina*, which was seen alive and described by Steller in 1741. It was then confined to two islands (Behring's Island and Copper Island). In forty years (1780) it was believed to have been entirely extirpated. It was a toothless Herbivore, living along the shore in shallow water, and was easily taken, being without fear of man. Its flesh was good, and it weighed often three or four tons. The author then described some of the leading points in the anatomy of *Rhytina*, and indicated some of the characters by which the order is distinguished. He referred to the present wide distribution of the Sirenia:—*Manatus* with three species, namely, *M. latirostris*, occupying the shores of Florida and the West Indies; *M. americanus*, the coasts of Brazil and the great rivers Amazon and Orinoco; *M. senegalensis*, the west coast of Africa and the rivers Senegal, Congo, &c. *Halicore*, with three species, namely, *H. tabernaculi*, the Red Sea and east coast of Africa; *H. dugong*, Bay of Bengal and East Indies; *H. australis*, North and East Australia. The fossil forms number thirteen genera and twenty-nine species, all limited to England, Holland, Belgium, France, Germany, Austria, Italy, Malta, and Egypt, and to the United States and Jamaica. The author gave some details as to the dentition of fossil species, of which *Halitherium* and *Prorastomus* are the two most remarkable types. Lastly, with regard to the geographical area occupied at the present day by the Sirenia, the author pointed out that two lines drawn 30° N. and 30° S. of the equator will embrace all the species now found living. Another line drawn at 60° N. will show between 30° and 60° N. the area once occupied by the twenty-nine fossil species. He looked upon *Rhytina* as a *last surviving* species of the old Tertiary group of Sirenians, and its position as marking an "*outlier*" of the group now swept away.

Physical Society, March 28.—Prof. Guthrie, President, in the chair.—The President announced that the meeting on May 9 would be held at Bristol; further particulars would be communicated to the members.—Mr. Hawes was elected a member of the Society.—The following papers were read:—On calculating-machines, by Mr. Joseph Edmondson. Calculating-machines are of two classes—the automatic and the semi-automatic. The former were invented by Mr. Charles Babbage between 1820 and 1834, and were designed mainly for the computation of tables. The difficulties against which this inventor contended and the perseverance he displayed in the construction of part of the "difference-engine" he had imagined are now a matter of history. On account of the great cost and high degree of complexity of this machine it was never completed, and the calculating-machines of the present day belong to the semi-automatic class the first example of which is found in a rough and incomplete instrument by Sir Samuel Moreland in 1663. From 1775 to 1780 the Earl of Stanhope invented machines which were a great advance upon those of Sir S. Moreland. In these is found the "stepped reckoner," the basis of all modern instruments. This "stepped reckoner" was improved by M. Thomas de Colmar, who, in 1851 produced a machine which is now largely in use. This machine, somewhat improved in detail and construction, is now made by Mr. Tate of London, and Mr. Edmondson has patented a modification in which the form of the instrument is circular, by which means an endless instead of a limited slide is obtained. A collection of various valuable instruments, which had been kindly lent for the occasion, were exhibited. A discussion followed in which Gen. Babbage, Mr. Tate, Prof. McLeod, Dr. Stone, the Rev. Prof. Harley, Mr. Whipple, Prof. Ayrton, and other gentlemen took part.—On the structure of mechanical models illustrating some properties in the ether, by Prof. G. F. Fitzgerald. The author had recently constructed and described before the Royal Society of Dublin a model illustrating certain properties of the ether (NATURE, March 26, p. 498). This model was one-dimensional, but the author now showed how a tri-dimensional model might be imagined, though probably mechanical difficulties would render its actual construction impossible. Each element of the ether is to be represented by a cube on each edge of which there is a paddle-wheel. Thus on any face of the cube there will be four paddle-wheels. Now, if any opposite pair of these rotate by different amounts, they will tend to pump any liquid in which the whole is immersed into or out of the cube, and if the sides of the cube be elastic there will be a stress which will tend to stop this differential rotation of the wheels. If however the other pair rotate by different amounts, they may undo what the first pair do, and thus the stress will depend on the difference between the differential rotations of these opposite pairs of wheels. If η represent the angular rotation of one pair, and ζ that of the