

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 25.—“Some Remarks on the Mechanism of Respiration.” By F. Le Gros Clark.

The author commences his paper by narrating some experiments on recently slaughtered animals, in the course of which the remarkable tension of the diaphragm was noticed; and the varying condition of that muscle, and of the lungs and pleura, with their mutual relations, are commented on.

The importance of this passive tension of the diaphragm is indicated and exemplified both physiologically and pathologically. It is essential in retaining the supplemental air within the lungs, in restoring the equilibrium of repose, in economising active muscular power, and in maintaining the pericardial space, &c.

The action of the diaphragm in relation to the walls of the chest and to other muscles is next discussed; and the influence of the diaphragm in drawing in the chest-walls, under certain circumstances, is pointed out, and illustrated by cases of injury to the spinal cord.

The action of the intercostal muscles, as necessary adjuncts to the diaphragm and as muscles of inspiration, is insisted on and illustrated by diagrams; and a summary of their action is given.

The agency of the serratus magnus is then discussed; and reasons are advanced, supported by observation and experiment, to show that it is only under special conditions and to a limited extent that it can be regarded as taking any part in the act of inspiration.

The mobility of the different costal regions and of the sternum is exemplified by observation and experiment.

Lastly, the question of abdominal and thoracic breathing, severally in the male and female, is considered; and reasons are adduced for concluding that the received opinions on this subject are erroneous.

“Spectrum of Comet I.” By Dr. William Huggins, F.R.S.—On April 7 a faint comet was discovered by Dr. Winnecke. I observed the comet on April 1 and May 2. On both days the comet was exceedingly faint, and on May 2 it was rendered more difficult to observe by the light of the moon and a faint haze in the atmosphere. It presented the appearance of a small faint coma, with an extension in the direction of the sun. When observed in the spectroscope, I could detect the light of the coma to consist almost entirely of three bright bands. A fair measure was obtained of the centre of the middle band, which was the brightest; it gives for this band a wave-length of about 510 millionths of a millimetre. I was not able to do more than estimate roughly the position of the less refrangible band. The result gives 545 millionths. The third band was situated at about the same distance from the middle band on the more refrangible side. It would appear that this comet is similar in constitution to the comets which I examined in 1868.\*

“Researches on the Hydrocarbons of the Series  $C_nH_{2n+2}$ ” —By C. Schorlemmer.

In a former communication I have shown that the paraffins, the constitution of which is known, may be arranged in four groups. The first group, which I called *normal paraffins*, contain the carbon atoms linked together in a single chain. Of these I have obtained some new ones, which I shall describe more fully in a further communication. The normal paraffins which I have so far studied are given, together with their boiling points, in the following table:—

	From petroleum.	From the acids of the series $C_nH_{2n+2} - 2O_4$	So-called alcohol radicals.
$C_5H_{12}$	37° - 39°	—	—
$C_6H_{14}$	69° - 70°	69°·5	Dipropyl. From Mannite. 69° - 70°
$C_7H_{16}$	98° - 99°	100°·5	—
$C_8H_{18}$	123° - 124°	123° - 124°	Dibutyl. From methyl-hexylcarbinol. 123° - 124°

That these paraffins have really the constitution which I have ascribed to them follows partly from their mode of formation; thus dipropyl was obtained from the normal propyl iodide, and dibutyl from normal butyl iodide. The constitution of the others was determined by converting them into alcohols and studying the oxidation products of the latter; thus the hexyl hydride from petroleum, as well as that obtained from mannite, was transformed into secondary hexyl alcohol, which on oxidation yielded acetic acid and *normal* butyric acid.

\* Phil. Trans, 1868, p. 555; and Proc. Roy. Soc. vol. xvi. p. 386.

In the communication above referred to, I placed the hydrocarbon  $C_8H_{18}$  from methyl-hexyl carbinol amongst another group; but I have found now that this body is identical with dibutyl and also with the hydrocarbon, which Zinke obtained from primary octyl alcohol. This chemist prepared also dioctyl,  $C_{16}H_{34}$ , which consequently is a normal paraffin; and it appears probable that dibexyl, which Brazier and Goslett obtained by the electrolysis of cenanthic acid, belongs to this group too.

We are now acquainted with the following normal paraffins:—

	Boiling-points.		
	Found (mean).	Calculate.d.	Difference.
$C_4H_{10}$	—	—	—
$C_5H_{12}$	—	—	—
$C_6H_{14}$	—	—	—
$C_7H_{16}$	1°	1°	—
$C_8H_{18}$	38°	38°	37°
$C_9H_{20}$	70°	71°	33°
$C_{10}H_{22}$	99°	100°	29°
$C_{11}H_{24}$	124°	125°	25°
$C_{12}H_{26}$	202°	207°	4 × 19°
$C_{16}H_{34}$	278°	278°	4 × 19°

From this it appears that the boiling-point is not raised 31° for each addition of  $CH_2$ , as I formerly assumed, but that, as the calculated numbers show, the difference between the boiling-points of the lower members decreases regularly by four until it becomes the well-known difference of 19°.

Chemical Society, May 18.—Prof. Frankland, F.R.S., president, in the chair. Messrs. T. Greenish and J. E. Mayall were elected Fellows. The following papers were read:—“On a new double salt of thallium,” by R. T. Friswell. The author wishing to prepare thallic platino-cyanide, mixed hot solutions of thallic carbonate and potassic platino-cyanide, and obtained on leaving the mixture to cool masses of splendid crystals, which appeared by transmitted light of a magnificent crimson red, whilst their reflected colour was a bronzy green of strong metallic lustre. Analysis showed that they are a compound of thallic carbonate with thallic platino-cyanide,  $Fl_2PtCy_4, COFlO_2$ . On treating this salt with acids carbonic acid is set free, and a pale pink residue left, which on examination was found to be thallic platino-cyanide.—The next paper read was “On the action of nitric acid on dichloro-phenolsulphuric acid,” by Dr. Armstrong.

Geologists' Association.—The excursion of this Society to Oxford took place on the 12th and 13th inst. On the first day the numbers assembled at the beautiful new University museum at noon, and were introduced to Professor Phillips, who commenced a descriptive lecture on the museum, its arrangement and contents. There is a peculiar double arrangement of the palaeontological collection by which the student may with equal ease make himself acquainted with the organisms derived from any one geological formation or devote himself to the study of the fossil remains of a single class or order of the animal or vegetable kingdoms. The museum is not crowded, but contains good specimens of those species which are most typical or characteristic. These, too, with the fossil remains of saurians and mammals are the complete skeletons of analogous living genera, an arrangement most advantageous to the student. The speciality of the Oxford museum is the unique collection of the remains of *Cetiosaurus*. A most interesting description of the enormous bones of this genus was given by Prof. Phillips, who, by means of corresponding crocodilian bones, gave a clear idea of the vast size to which these huge creatures attained. The estimate made by the Professor was that the *Cetiosaurus* was 40 feet long and 12 feet in height, the femur being fully 60 inches long, while the femur of a crocodile, with which it was contrasted, being no more than nine inches in length. In the afternoon the party proceeded to Shotover Hill, examining by the way the excavations in the Oxford clay near the city, and the exposures of the coral rag and the Kimmeridge clay on the side of the hill. Near the top of Shotover, Portland sands and a thin band of Portland rock are seen, and above these beds and forming the summit of the hill are the “Iron Sands,” which have been the subject of much dispute. These highly ferruginous beds were considered to be lower greensand, but the finding of a considerable number of fresh-water species of Mollusca has induced Prof. Phillips to conclude the “Iron Sands” to be of Wealden age. From these sands at the summit of the hill ochre is obtained in large quantities. In the evening a soirée was given by Mr. James Parker, of Oxford, who most hospitably entertained the members of the Association. The magnificent collection

of reptilian remains and other fossils from the neighbourhood of Oxford was shown to the visitors, and described by Prof. Phillips and Prof. Morris.—Saturday's proceedings were commenced by an early visit to Merton College, for the purpose of inspecting the very fine collection of fossils which Mr. Earwaker of that college has brought together. Afterwards the party, with Profs. Phillips and Morris, started by carriage for Islip, Enslow Bridge, and Kidlington. At Islip a very fine section of the Forest Marble and Cornbrash is exposed, and the usual fossils of these formations are here found. The village of Islip is, however, interesting to geologists on other grounds, for here lies Buckland. Around the tomb of the great geologist with his distinguished successor at their head the party assembled. The tomb is of polished Aberdeen granite, and the inscription briefly records the fact that there lie the remains of Dr. Buckland, Rector of Islip, Dean of Westminster, and First Reader in Geology in the University of Oxford. The quarries at Enslow Bridge, which have yielded a large number of the Saurian bones in the University Museum, was then visited, and here the visitors were highly gratified to find that during the morning a very fine *Telesaurus* had been found, and the head, taken out of the bed in which it had lain for untold ages, was exposed to view. This quarry is in the great Oolite, the lower and uppermost strata of which in Oxfordshire yield remains of *Megalosaurus*, while in the middle beds we find *Telesaurus*. A very remarkable bed of about twelve inches thick occurs a little above the Telesaurian cave, crowded with *Terebratula maxillata* to the exclusion of every other species. Several other sections of the Great Oolite, Forest Marble, and Cornbrash were examined, and the weather being very fine the drive through the beautiful country was much enjoyed, and the return to Oxford effected in time to allow of the party taking their departure for London by the evening train.

DUBLIN

Royal Dublin Society, May 13.—Dr. J. Emerson Reynolds, analyst to the Society, delivered the concluding lecture for the session 1870-71. The subject of the lecture was the "Chemistry of Milk." The lecturer, referring to cow's milk more particularly, described the constituents of the fluid at considerable length, and showed the precise quantities of butter, casein, sugar, and salts obtained from a known amount of milk of good quality. A number of new facts bearing on the chemical constitution of the different substances present in milk were then stated, and the relations of casein and sugar to the several parts of the animal organism were pointed out. It was proved by a large number of analyses of milk taken from cows fed in various ways in different parts of the country, that milk is naturally subject to very wide variations in the proportions of its constituents, and hence that it is extremely difficult, if not impossible, to state with precision that a given sample of milk had been adulterated with a certain amount of water. Under these circumstances the lecturer suggested that milk should in future be judged according as it might reach or fall below a certain standard quality, fair alike to the vendor and the purchaser, but that milk falling below the standard should not necessarily be stigmatised as adulterated, but simply have a lower commercial value attached to it. Dr. Reynolds stated, as the result of his experience, that milk sold at the present price per quart may fairly be expected to have the following composition in one hundred parts:—

Water	87.0
Butter	3.5
Casein	4.0
Sugar	5.0
Salts	5

The proportion of fatty matter can be easily ascertained by the rapid methods of Sir Joseph Banks or Dr. Minchin, and the sugar determined in a few minutes by the aid of the polariscope; but it has been hitherto impossible to speedily measure the proportion of the valuable casein of milk without recourse to elaborate chemical analysis. By means of a very simple contrivance, which was exhibited at the lecture, the proportion of casein can, however, now be speedily ascertained; we are, therefore, for the first time in a position to form quickly a sufficiently precise estimate of the nutritive value of a given sample of milk. The lecturer concluded by expressing a hope that the public would now use the means placed in its hands for guarding against imposition on one side, or the hasty condemnation of the honest trader on the other.

May 22.—Prof. Dyer in the chair. Prof. R. Ball read notes on Kater's Pendulum and on a new Hydraulic Press.—Dr. J. Emerson

Reynolds read notes of Experiments on the flow of Liquids through Capillary Tubes.—Mr. W. F. Kirby communicated a list of the species of *Papilionida* or Swallow-tailed Butterflies in the collection of the Society, and exhibited specimens in illustration. Among these were a long series of *P. cymochles* Gray and *P. idalion* Felder, which Mr. Kirby believed to be sexes of one species. He also called attention to a remarkable variety (?) of *P. polymnestor* Cram., in which the blue colouring of the hind wings was reduced to a band.—Prof. Dyer read a paper on Bud scales, in the course of which he objected to the word mimicry being used for the resemblance borne by a plant belonging to one natural family to a plant belonging to a different natural family, except in such cases as where the plants were found living side by side.—Mr. A. G. More exhibited for Dr. Cartt a number of additions to the museum, and told some of the more remarkable stories known about each species. Among the more interesting specimens exhibited, one of the American Goshawk shot in Tipperary and one of *Cygnus bewickii* may be mentioned.

DIARY

THURSDAY, JUNE 1.

LINNEAN SOCIETY, at 8.—On Some Plants from Northern China: Dr. Hance.—On South American *Hippocrateaceae*: Mr. Miers. CHEMICAL SOCIETY, at 8.—On Ozone: Dr. Debus, F.R.S. ROYAL INSTITUTION, at 3.—On Sound: Prof. Tyndall, F.R.S.

FRIDAY, JUNE 2.

GEOLOGISTS' ASSOCIATION, at 8.—On Flint: M. Hawkins Johnson, F.G.S. ROYAL INSTITUTION, at 9.—Gaseous and Liquid States of Matter: Prof. Andrews.

SATURDAY, JUNE 3.

ROYAL SCHOOL OF MINES, at 8.—Geology: Dr. Cobbold. ROYAL INSTITUTION, at 3.—On the Instruments Used in Modern Astronomy: J. N. Lockyer, F.R.S.

MONDAY, JUNE 5.

ENTOMOLOGICAL SOCIETY, at 7. ROYAL INSTITUTION, at 2.—General Monthly Meeting.

TUESDAY, JUNE 6.

ZOOLOGICAL SOCIETY, at 9.—On Dinornis (Part XVII). Containing a description of the sternum and pelvis, with an attempted restoration of *Aptornis defossor*. Ow.: Prof. Owen, F.R.S.—On a Seal new to the British Fauna: Prof. Flower.—On Riss's Dolphin: Prof. Flower. SOCIETY OF BIBLICAL ARCHAEOLOGY.—On the Early History of Assyria and of Babylonia, from Contemporary Inscriptions (part 1): G. Smith.—On the Date of the Nativity: J. W. Eosanquet. ROYAL INSTITUTION, at 3.—Least Action in Nature: Rev. Prof. Haughton.

WEDNESDAY, JUNE 7.

GEOLOGICAL SOCIETY, at 8.—Notes on the Geology of part of the County of Donegal: A. H. Green, M.A., F.G.S.—On the Persistence in the Deep-seas of the present day of *Caryophyllia cylindracea*, Reuss, a cretaceous coral: Prof. P. Martin Duncan, F.R.S.—Note on an *Ichthyosaurus* (*I. enthihiodon*), from Kimmeridge Bay, Dorset: J. W. Hulke, F.R.S.—Note on a Fragment of a Telesaurian Snout, from Kimmeridge Bay, Dorset: J. W. Hulke, Esq. ROYAL MICROSCOPICAL SOCIETY, at 8. LONDON INSTITUTION, at 2.—Distribution of Prizes and Certificates by Mr. T. Baring, M.P., President.

THURSDAY, JUNE 8.

SOCIETY OF ANTIQUARIES, at 8.30. MATHEMATICAL SOCIETY, at 8. ROYAL INSTITUTION, at 3.—Sound: Prof. Tyndall.

CONTENTS

	PAGE
SOCIETY LECTURES FOR THE PEOPLE . . . . .	81
CROOKES'S CHEMICAL ANALYSIS. By Prof. T. E. THORPE . . . . .	82
LETTERS TO THE EDITOR:—	
The Sun.—PADRE SECCHI: R. A. PROCTOR, F.R.A.S. . . . .	82
Rain after Fire.—G. P. SEROCOLD . . . . .	83
Alleged Daylight Auroras.—Dr. G. F. BURDER . . . . .	84
Aurora Australis.—Dr. A. D. MEYER . . . . .	84
The Eclipse Photographs.—D. WINSTANLEY . . . . .	85
Eozoon Canadense.—Prof. WILLIAM KING . . . . .	85
THE INEQUALITIES OF THE MOON'S MEAN MOTION . . . . .	85
THE HELIOTYPE PROCESS. By W. H. HARRISON . . . . .	85
PARIS NEWS . . . . .	87
DREDGING OF THE GULF STREAM . . . . .	87
THE SPECTRUM OF URANUS. By Dr. WILLIAM HUGGINS, F.R.S. (With Illustration) . . . . .	88
NOTES . . . . .	88
PROF. WYVILLE THOMSON'S INTRODUCTORY LECTURE AT EDINBURGH UNIVERSITY . . . . .	90
MR. BENTHAM'S ANNIVERSARY ADDRESS TO THE LINNEAN SOCIETY . . . . .	92
SOCIETIES AND ACADEMIES . . . . .	95
DIARY . . . . .	96