

Thomas Graham



Born in Glasgow 21st December 1805

Entered High School of Glasgow 1814
Entered University of Glasgow aged 14.
MA 1826

University of Edinburgh etc. 1826 – 1830
FRSE 1828
Anderson's University 1830 – 1837
FRS 1836

University College London 1837-1855
Co-founder of Royal Society of Chemistry
1841

Master of the Mint 1855-1869

Died 16th September 1869

Glasgow from Glasgow Green, 1830



Experience in Edinburgh

Edinburgh, June 10, 1826,

To Mrs. Graham. The Professors here are all at logger-heads with each other. Leslie calls Hope in his class-room 'the showman in the other corner,' while Dr. Hamilton has just received £500 from Hope for defamation.

Edinburgh, 7th July, 1826

How are the Miss Campbells? How are all the Glasgow young ladies? Alas, the want of them is felt most sensibly here; as Miss Brown (Mitchell's landlady) says, the gentlemen turn savages when they go out to the West Indies for want of them. Alas, that I should become

Your most loving *Indian Savage*

Tho. Graham

Edinburgh, May 27th 1827

My dear Mother, I think that I will be home for certain within a week. Indeed I would have come off with Mr Mitchell had it not been that the whole of my pecuniary interest in this sublunary world amounts to three sixpences ...

May 30th 1827

I look forward with great pleasure to my visit to Glasgow, as notwithstanding that I have now been a whole year in Edinburgh, I feel as much as ever all the solitude and desolateness of being in a land of strangers, which, from my retiring habits, will always be the case wherever I go.

Andersonian University, George Street



Photograph 1902, shortly before demolition. Original building 1831.

Major Contributions from the Andersonian

There is a very pretty experiment illustrative of some of the preceding observations, which is easily made. Place two candles at the distance of *three* or *four* feet from the eye, and about *one* foot from each other, and having closed one eye, fix the other intently upon either of the candles, as if it were examining with attention some point of the wick. The other candle will be seen by indirect vision, and after a little time it becomes much brighter and bluer than the first, in consequence of the part of the retina on which its light falls being more susceptible than the more frequently used portion in the axis of the eye, upon which the light of the second is incident. The higher degree of excitation of the retina produced by the candle seen indirectly, renders that portion of the membrane less sensible to the red rays; and if the excitation is continued, the image will become actually *blue*, and will be surrounded with a halo of *yellow* nebulous light. The blue image, indeed, will sometimes disappear, and leave nothing in its place but a nebulous halo.

Allerly, Jan. 30th, 1833.

XXVII. *On the Law of the Diffusion of Gases.* By THOMAS GRAHAM, Esq. M.A. F.R.S. Ed. Professor of Chemistry in the Andersonian University, Glasgow*.

IT is the object of this paper to establish with numerical exactness the following law of the diffusion of gases:

“The diffusion or spontaneous intermixture of two gases in contact, is effected by an interchange in position of indefinitely minute volumes of the gases, which volumes are not necessarily of equal magnitude, being, in the case of each gas, inversely proportional to the square root of the density of that gas.”

These replacing volumes of the gases may be named *equivalent volumes of diffusion*, and are as follows: Air, 1; Hydrogen, 3.7947; Carburetted hydrogen, 1.3414; Water-vapour, 1.2649; Nitrogen, 1.0140; Oxygen, 0.9487; Carbonic acid, 0.8091; Chlorine, 0.6325, &c.; numbers which are inversely proportional to the square roots of the densities of

* Read before the Royal Society of Edinburgh, December 19, 1831; and now reprinted from the Edinb. Phil. Trans., with an Appendix.—Communicated by the Author.

0	0.04	1.0	0.0387	2.5	0.0324
1	0.04	1.1	0.0384	2.7	0.0312
2	0.0399	1.2	0.0381	2.9	0.0300
3	0.0398	1.3	0.0378	3.1	0.0287
4	0.0397	1.4	0.0375	3.3	0.0274
5	0.0396	1.5	0.0371	3.5	0.0261
6	0.0395	1.7	0.0363	3.7	0.0248
7	0.0393	1.9	0.0355	3.9	0.0236
8	0.0391	2.1	0.0345	4.3	0.0208
9	0.0389	2.3	0.0335	4.7	0.0182
				5.1	0.0156

It will be seen that the intensity of the light is a maximum at the centre of the spectrum; or when x , the distance from that centre, is equal to 0.

I have supposed $a = 30$ inches, and $b = 21$ inches, simply because these appear to have been about the distances of the knives, from the window-shutter and from the paper respectively, in Newton's observation. But if any other values are assigned to these latter, provided the interval between the two blades is very small, the same conclusion will be found to hold good.

I might refer to other phenomena, which appear to me no less irreconcilable with the undulatory hypothesis than those here considered. But this seems unnecessary; for if the preceding reasonings and computations involve no error, they are surely of themselves sufficient to overthrow that hypothesis.

XLIV. *On the Law of the Diffusion of Gases.* By THOMAS GRAHAM, Esq. M.A. F.R.S. Ed., Professor of Chemistry in the Andersonian University, Glasgow.

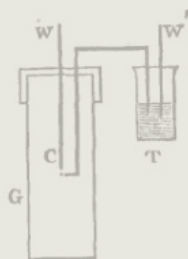
[Continued from p. 190.]

2. Diffusion of Carbonic Acid Gas.

THE most satisfactory experiments with carbonic acid gas were performed by confining it over a solution of common salt, saturated in the cold, which absorbs this gas very slowly, and, instead of the diffusion-instrument with bulb, a long diffusion-tube was found most suitable.

Experiment 1.—Thermometer 64°: dew-point 53°. Barometer 30.13. Left in diffusion-tube 17 air, and filled up over brine to 197 with carbonic acid gas, which gives 180 carbonic

to it and passing through the cap in the top of the glass tube, the lower end of the wire being flattened and bent at right angles as in the annexed figure, in which G is the glass tube, W one of the wires resting on C, which is connected with the brass tube T. The other end of the coil, W', dips into the tube T, filled with mercury. The ends of the wires and the flat piece at C should be well amalgamated and covered with a clean surface of mercury. If the end of the lever be struck rapidly with the palm of the right hand, the left pressing on the short end at D, the sparks at C may be made to follow each other in rapid succession.



If a mixture of two volumes of hydrogen and one of oxygen be introduced into the tube by means of a bent or flexible tube, and the spark made to appear at C, the mixture will be exploded. If the lever be gently struck, the spark still may be made to strike off in the mixture without exploding it, whereas with a smart blow the experiment never fails.

XXII. Reply to Mr. Phillips's Observations on the Use of Chemical Symbols. By THOMAS GRAHAM, Esq., M.A., F.R.S. E., Lecturer on Chemistry in the Andersonian Institution, Glasgow.

To Richard Phillips, Esq., &c.

Dear Sir,

IN reference to your objections to the notation employed in my paper on phosphoric acid, allow me to make the following observations.

The system of notation which I follow is that last proposed by Berzelius; and convenient as that system is, and as it is generally adopted on the Continent, I think the introduction of any other at present calculated rather to retard than to advance the progress of chemistry. You are therefore entitled to ask why, in the paper referred to, one atom of water is represented by \dot{H} , while in the tables of Berzelius it is represented by \underline{H} . My answer is, that in common with Gay-Lussac, and all the chemists of this country who have lately published, I consider water as composed of one atom of oxygen and one atom of hydrogen, a constitution expressed by \dot{H} in the symbolic language of Berzelius. Berzelius himself uses the expression \underline{H} ,

1834.

ANNALEN

No. 3.

DER PHYSIK UND CHEMIE.

BAND XXXII.

II. Untersuchungen über die arsensauren und phosphorsauren Salze, so wie über die Abänderungen der Phosphorsäure; von Thomas Graham.

Professor der Chemie an der Universität in Glasgow.

(Philosoph. Transact. f. 1833, pt. II p. 253.)

Keine Salze sind belohnender für die Untersuchung gewesen als die arsensauren und phosphorsauren. Davon zeugen: Berzelius's Entdeckung der ungewöhnlichen phosphorsauren Kalke; Mitscherlich's Beobachtung der Einerleiheit in der Form der entsprechenden arsensauren und phosphorsauren Salze, und die daraus hervorgegangene Lehre von der Isomorphie; desselben Chemikers Entdeckung zweier Natron-Biphosphate von übereinstimmender Zusammensetzung aber abweichender Form; und endlich die Entdeckung der pyrophosphorsauren Salze durch meinen Freund und Mitbürger Clark. Dessenungeachtet bleibt noch viel für die Vervollständigung der Geschichte dieser interessanten Salze zu thun übrig.

1) Basisch arsensaures und basisch phosphorsaures Natron.

Wohl bekannt ist die Neigung der Arsen- und Phosphorsäure zur Bildung von Subsesquisalzen, wie das braune arsensaure und gelbe phosphorsaure Silber, die gewöhnlichen Subarseniate von Kalk, Blei u. s. w. Es giebt aber auch entsprechende Alkalisalze, welche die Aufmerksamkeit der Chemiker verdienen.

Zu einer starken Lösung von arsensaurem oder phosphorsaurem Natron setze man eine Lösung von Aetzna-

Poggendorff's Annal. Bd. XXXII.

3

An International Figure

Germany

Hotel de Rome, Dresden, September 27, 1836

My Dear John,

I have this morning arrived here, having travelled from Jena by way of Leipsic (sic) ... After you left me at Frankfort (sic) I went down to Giessen and spent two days with Liebig. He is a most delightful fellow, and I was glad to find him in very fair health. ...

(About a scientific meeting in Jena)

Between 300 and 400 *Naturforscher* had arrived, and the business of the meeting had fairly commenced. The arrangements were satisfactory although, there was not the same ostentation and amount of treating as at British meetings. In the mornings sectional meetings – the Chemical and Physical Sections meeting together; a general meeting from 11 to 1, at which memoirs, or rather essays, of general interest were read. Dinner from 2 till 4, and sectional meetings again at half past 4 to 6 for those who had not taken too much champagne; and the evenings concluded very rationally with a ball at which there was a good turn-out of Jena beauties. As for the communications, they were interesting enough, but nothing strikingly important. Of the savans who had assembled, Humboldt was the great star, but to me Mitscherlich (*crystal isomorphism*) was the most interesting.

France

Hotel de la Couronne, Muelhausen, Alsace,
1st September 1836.

... but the Institute is a coterie, all the members are familiar with each other, and unwilling to give each other cause of offence. Gay-Lussac likewise, who is chemical editor of the *Annales de Chimie*, is an exceedingly mild man, and is certainly carried too far by the fear of offending his brother academicians. There is one of my papers which he has promised to publish (on Phosphuretted hydrogen), but which I would not be surprised to find him restrained from doing when he finds that I give more credit to Henry Rose than will be agreeable to M. Dumas. Dumas surprised me much the first day I met him by a hasty and unfair criticism on Rose, whom I defended. But afterwards, on reflection, he was at pains to undo the impression which his remarks might have produced, and finally transmits through me sentiments of respect to Rose, so that I hope to be the means of reconciling them.


The move to University College

Leicester Square, London, May 6, 1837.

Dear William,—At this moment I am in considerable doubt as to my movements. I had intended to start by the steamer for Leith to-night, and may very likely do so still, but the applications, &c., of the candidates having been lodged yesterday, and a meeting of the Council taking place to-day at 4, ...

In case I remain here, - would you make a point of seeing Mr. Young and request him to begin the Practical Course, and get on with it till the end of the week, assuring the students of my return at the beginning of the week following.

I remain. My Dear William,
Yours affectionately,
(Signed) THO. GRAHAM.



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Messrs. THOMSON, Irving & Co., 21 Lombard Street, London.
THOS. DOWIE, Manager,
Leith, Upper Newbridge.

In London – University College

London, Saturday Oct. 21st, 1837

My dear Margaret (*his sister*)

I have today completed the third week of my course, and am as well and comfortable as at the beginning of it. My number today is 221, which I have no doubt is the largest class on chemistry in the United Kingdom. ...

We are doing well at University College this season. I am very much pleased with the attention and respectful behaviour of my students, more than 120 of them have put down their names for examination.

36 Keppel St., Russell Square,
Nov. 24, 1837.

Mt Dear Margaret,—I have after all left myself very little time to write to you. I had a very long and agreeable letter from Liebig a few days ago, conveying the information that his University have made me a Dr. of Philosophy *causa honoris*, but this is a profound secret, and to be kept like all such, as I am doubtful whether I shall make any immediate use of it, although it is very flattering. He has been reconciled to Dumas at Paris, and has a grand project of publishing a chemical journal in three languages, to be edited by Liebig, Dumas, and myself, but not before summer.



○ Underground Stations

- LSHTM buildings:
1. Keppel Street
2. 15-17 Tavistock Place
3. 9 Bedford Square

- Key University buildings:
A. University of London Union (ULU)
B. Birkbeck
C. School of Oriental & African Studies (SOAS)
D. Logan Hall, Institute of Education



The life of an eminent professor – from his letters

Aug. 31st, 1850.

To Miss Graham,—I started from London on Tuesday night, and in twenty hours reached Cologne very much cut by sea-sickness and fatigue. But after a night at the Hotel Hollande I was quite recovered, and enjoyed the sail up the Rhine in a very fair day, the voyage to Biberich near Mayence lasting from 6 to 7 evening and reached Frankfort by railway about ten: when I got to a good hotel, "The Roman Emperor," the town being crowded from the fair. The peace people had left. Cobden had been most admired, and the people here had been gratified by the discursive style of English addresses which they take as a lesson in public speaking. Next morning I went on by railway and diligence to Giessen, from 9 to 2 p.m. ; and after dining at the Rappen called on the Professor. He appeared to me in better health than the reports, indeed I would imagine quite as well as when I first saw him thirteen years ago.

Dec. 13th, 1855.

To Miss Graham, Rome,— . . . Dr. Hoffmann had an accident to his eye which was at first a little alarming, and got, I believe, into the newspapers. The Rev. Mr. Barlow had caused an explosion of sulphuric acid, a small drop of which found its way past the glasses into the Dr.'s eye. He was confined to a dark room for a week or ten days in consequence of the inflammation, but is now going about again without having suffered any permanent injury. You may imagine what a vexation the accident was for poor Mr. Barlow, who attended at Fitzroy Square like a nurse.

4th Nov., 1861.

My Dear Master,—I am very glad to be able to inform you that Lord Palmerston has sanctioned the appointment of your brother to the office of senior clerk and assistant coiner in the Mint. This may be attributed not only to the testimonials of superior fitness for the office which your brother possesses, but I hope that you will also consider it a mark of the estimation in which, for your services and the economy you have introduced into the department over which you preside, you are held.

Believe me.

My Dear Master,

Very truly yours.

The wider world – from his letters

Thomas Graham to his sister in 1826:

Sir Walter Scott will get on ; he has been made King's printer — a situation worth £3,000 a year, chiefly in salary. Sir Walter must have been rather a calculating genius. It turns out that he was almost sole proprietor in the printing establishment of James Ballantyne & Co., who have failed; so that he intended not only to profit by writing the novels, but also to have a good share in the profits of printing them. Ballantyne was little more than his servant. I have not had time to read 'Woodstock' yet. Sir Walter has in some measure satisfied the cravings of his creditors by binding over to them 'Napoleon', and several forthcoming novels.

Scott had debts of over £130k

1862

You refer to the sad coal-pit accident. ... It was an old idea of mine, but the material should have been kept in store in all mines liable to choke-damp. But still, it is the old story, the life-boat not to hand when wanted. The surest guarantee against such accidents is the Scotch law, which gives to friends of the miners an action against the mine proprietor. In Scotland each of the widows would thus have received, at least, £250.

To Miss Graham, Pau., 14th February 1862, from London

He (*Mr John Graham*) is very much engrossed with our bronze issue, which is truly a considerable affair, but goes on prosperously.

Last Friday evening we had an interesting lecture from Professor Huxley, at the R. Institution. The great point was producing a human skull from the bone cavern – the skull of the man who made the flint implements found in the drift ...

Next Friday evening Dr. Odling is to illustrate "Dialysis". Calvert, of Manchester, lately gave a lecture there on the same subject.

Saturday was the private view of the picture exhibition of the British Institution, which I would not like to miss.

The Chemical Society

From the published record of the Jubilee, 1891

The account of the first meeting on 23rd February stands thus in the first minute book of the Society :—

“1841, Feb. 23rd, Society of Arts, John Street, Adelphi.—A meeting of gentlemen, convened by Robert Warington, was held in the rooms of this Society for the purpose of taking into consideration the formation of a Chemical Society. Present : A. Aikin, Esq., Dr. Thos. Clark, [W.] J. Cock, Esq., J. T. Cooper, Esq., D. Cooper, Esq., Thos. Everitt, Esq., Wm. Ferguson, Esq., J. P. Gassiot, Esq., Professor T. Graham, W. R. Grove, Esq., Henry Hennell, Esq., T. H. Henry, Esq., C. Heisch, Esc., G. Lowe, Esq., [W. H.] Miller, Esq., Apsley Pellatt, Esq., Richard Phillips, Esq., Dr. Lyon Playfair, Robert Porrett, Esq., Dr. G. O. Rees, E. Solly, Esq., J. Tennant, Esq., E. F. Teschemacher, Esq., Dr. R. D. Thomson, Robert Warington, Esq.

“Mr. R. Phillips moved that Professor Graham do take the chair.

“On the motion of Mr. J. T. Cooper, Robert Warington was requested to act as Hon. Secretary *pro tem*.

“It was then put from the chair, and carried unanimously—That it is expedient that a Chemical Society be formed.

“Moved by Dr. Thos. Clark, and seconded by Dr. R. D. Thomson—That the following gentlemen constitute a Provisional Committee for carrying this resolution into effect :—Messrs. A. Aikin, W. T. Brande, H. J. Brooke, J. T. Cooper, J. Cumming, J. F. Daniell, Thos. Everitt, Thos. Graham, W. R. Grove, H. Hennell, G. Lowe, R. Phillips, R. Porrett, R. Warington.

“Proposed by Robt. Warington, and duly seconded—That the thanks of the meeting be given to the Society of Arts for the very liberal and handsome manner in which they had allowed Mr. Warington the use of their rooms for the purposes of the meeting.

“The thanks of the meeting were moved by [Mr.] J. P. Gassiot to Professor Graham for his kindness in taking the chair.”

“PROPOSED OBJECTS.

“The promotion of Chemistry and those branches of Science immediately connected with it, by the reading, discussion and subsequent publication of original communications.

“Also the formation of a Chemical Library and Museum.

“Proposed annual subscription for Members resident within twenty miles of London, £2, beyond that distance £1.”

A Text-book of Chemistry - 1842

ELEMENT

CHEMIST

INCLUDING THE APPLICATIONS OF THE ARTS.

BY THOMAS GRAHAM, F.R.

PROFESSOR OF CHEMISTRY IN UNIVERSITY COLLEGE OF THE CHEMICAL SOCIETY; CORRESPONDING MEMBER OF THE ACADEMIES OF SCIENCES OF BERLIN AND

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1842.

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of Professor

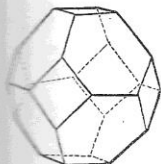
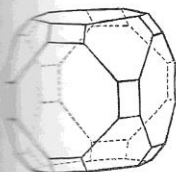


Fig. 59.



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and tube *f*, a
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form, cannot
condensed by
of condensing



Water rises
ebullition, at
increases as the
sphere, or ea

OLEFIANT GAS AND BODIES DERIVED FROM IT BY THE ACTION OF CHLORINE.

Olefiant gas	. . . . .	$C_4H_5 + H$
First product, Dutch liquid	. . . . .	$C_4H_3Cl + HCl$
Second product	. . . . .	$C_4H_2Cl_2 + HCl$
Third product	. . . . .	$C_4HCl_3 + HCl$
Last product, perchloride of carbon	. . . . .	C_4Cl_6

HYDROCHLORIC ETHER (CHLORIDE OF ETHYL) AND BODIES DERIVED FROM IT BY THE ACTION OF CHLORINE.

Hydrochloric ether	C_4H_5Cl
Monochlorinated ditto	$C_4H_4Cl_2$
Bichlorinated ditto	$C_4H_3Cl_3$
Trichlorinated ditto	$C_4H_2Cl_4$
Quadrichlorinated ditto	C_4HCl_5
Perchloride of carbon	C_4Cl_6

It appears from the second table that hydrochloric ether is affected at once by two atoms of chlorine, one of which seizes an atom of hydrogen and removes it in the form of hydrochloric acid, while the second atom of chlorine enters into the compound remaining, which Regnault distinguishes as monochlorinated hydrochloric ether, the name having reference to the mode of derivation of the compound and not its composition.* The latter body when exposed to chlorine is likewise affected by two atoms, one of which seizes and withdraws an atom of hydrogen, while the other unites with the remaining elements, forming bichlorinated hydrochloric ether. The trichlorinated and quadrichlorinated compounds, and the perchloride of carbon, which follow, have the same mode of formation; and as one atom of chlorine is communicated for each atom of hydrogen withdrawn, the entire number of constituent atoms remains the same, or ten, throughout the series, and the last member differs only from the first, in having 5 atoms of chlorine instead of 5 of hydrogen. To exhibit the complimentary function of

* "Chlorinated" appears to be a preferable term to *chloruretted*, to apply to such a compound, as the last is already used in a different sense.

CLASSIFICATION O

to which the isomorphous rel
on reviewing the groups or natural
and observing the links by which
these classes not being abruptly se
characters, like the classes created by t

Class.—This class comprise
arsenicum, tellurium. The three last
in their own properties, in the
properties of their analogous con
of hydrogen, and powerful acids with



Tho. Graham

THE
JUBILEE
OF
THE CHEMICAL SOCIETY
OF
LONDON.

RECORD OF THE PROCEEDINGS
TOGETHER WITH AN ACCOUNT OF
THE HISTORY AND DEVELOPMENT
OF THE
SOCIETY,
1841—1891.

LONDON.

1896.

International Recognition - 1891

M. GAUTIER responded as follows:—

Monsieur le Président, my Lord, Messieurs—

Lorsqu'il y a trente années, un peu plus peut-être, je commençais à étudier, avec M. Chancel, le successeur de Gerhardt à Montpellier la chimie de ce temps, les noms de Davy, Graham, Dumas, Liebig, Berzelius, revenaient sans cesse, et l'on nous apprenait alors comme des nouveautés, devenues classiques, les belles recherches de Williamson sur l'éthérification et de M. Frankland sur les composés

ADDRESS

OF THE

GERMAN CHEMICAL SOCIETY.

UNTER den zahlreichen gelehrten Körperschaften und wissenschaftlichen Vereinen, welche heute, dankerfüllt und Glückwünsche darbringend, an den Vorstand der

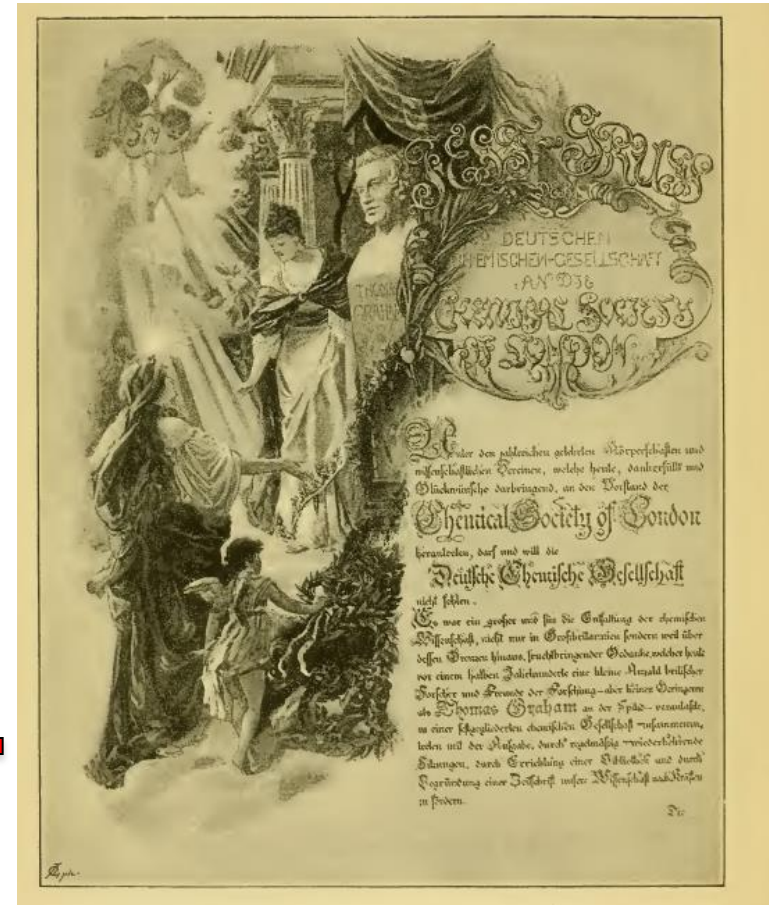
CHEMICAL SOCIETY OF LONDON

herantreten, darf und will die

DEUTSCHE CHEMISCHE GESELLSCHAFT

nicht fehlen.

Es war ein grosser und für die Entfaltung der chemischen Wissenschaft, nicht nur in Grossbritannien sondern weit über dessen Grenzen hinaus, fruchtbringender Gedanke, welcher heute vor einem halben Jahrhunderte eine kleine Anzahl britischer Forscher und Freunde der Forschung,—aber keinen Geringeren als Thomas Graham an der Spitze—veranlasste, zu einer festgegliederten chemischen Gesellschaft zusammenzutreten mit der Aufgabe, durch regelmässig wiederkehrende Sitzungen, durch Errichtung einer Bibliothek und durch Begründung einer Zeitschrift unsere Wissenschaft nach Kräften zu fördern.



MEMOIRS
AND
PROCEEDINGS
OF THE
CHEMICAL SOCIETY
OF
LONDON

FOR
1843-1844 AND 1844-1845.

VOL. II.

LONDON:

PRINTED BY RICHARD AND JOHN E. TAYLOR,
RED LION COURT, FLEET STREET.

1845.

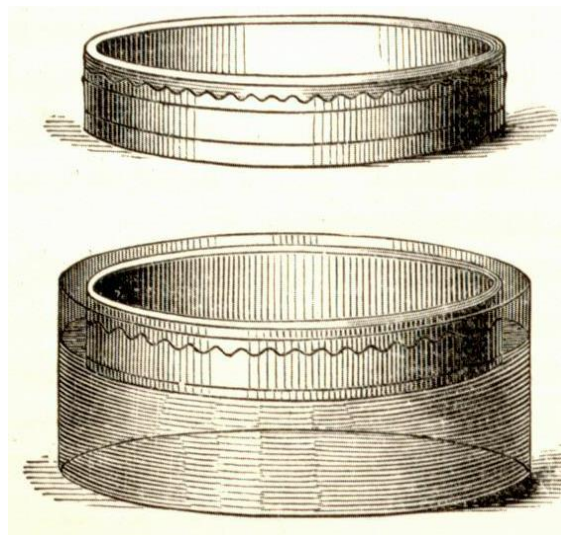
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Further major contributions - osmosis

‘The force of liquid diffusibility still acts when two liquids are separated by a porous sheet of animal membrane, or unglazed earthenware; for the pores of such a membrane are occupied by water and an uninterrupted liquid communication exists between the water on the one side and the saline solution on the other. Under these circumstances, a flow of liquid takes place, generally, though not always, from the water to the saline solution, so that the quantity of liquid diminishes on one side of the septum, while it increases on the other’.

Bakerian Lecture to Royal Society, 1854



A Royal Appointment

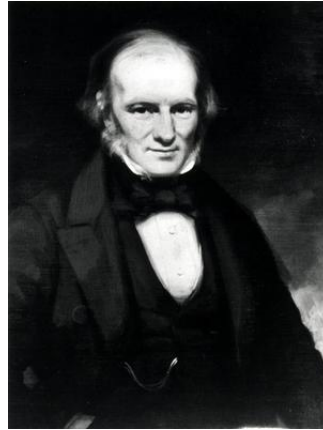


Appointment as Master of the Mint, 26th May, 1853

Some of Thomas Graham's Students



Lyon Playfair –
politician, public health campaigner



James Young –
Shale oil industry leader



Frederick Penny –
Freeland Professor of Chemistry
Forensic Science and analytical
Chemistry pioneer



Walter Crum –
Entrepreneur and scientist



Thomas Graham
FRS
1830-1837



Frederick Penny
1839-1869



Robert Tatlock
b1837 d1934
With Penny
1857-1867

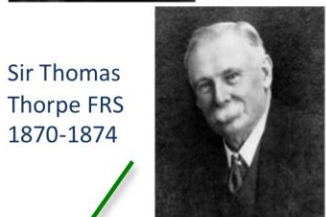


Mary (Tatlock)
Thomson
b1828



John Thomson
b1827

James Miln Thomson
b1859 d1924



Sir Thomas
Thorpe FRS
1870-1874



William Dittmar FRS
1874-1892



Barbara Thomson
b1896
Ernest Suckling



Charles Suckling FRS
b1920 d2013



Peter Pauson
1959-1990



Me
1990-2012



