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GEORGE MARTINE, M.D., F.R.S. (1700–1741) AN EARLY THERMAL ANALYST?

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A study of the life and work of George Martine, who seems to have been the first to have used the principle of differential thermal analysis, reveals that his stature scientifically (and perhaps medically) has not as yet been fully appreciated. A complete bibliography of his writings is appended.

The value of the thermometric studies of George Martine was early recognized internationally [e.g. 1] and indeed his work on heating and cooling was the basis on which Joseph Black founded his concept of heat capacity [2]. As it has recently been suggested that Martine was the first to make use in his experiments of the principle of differential thermal analysis (DTA) [3], an account of his life and work on heat may be of interest to thermal analysts.

The Martine family

To appreciate the outlook and character of George Martine, it is necessary to know something about his forebears. In fact, he came of a family that had a long and influential connection with the town and University of St. Andrews, Scotland, as well as with the Church. His ancestry can be traced back to John Martine, who was Dean of Guild of St. Andrews in the mid-sixteenth century, and his wife Margaret Ramsay [4]. Their son, James Martine, D.D., (1543–1620) was Dean of the Faculty of Arts at the University in 1575–1578 and 1582–1587 [5] and "Provost" (Principal) of St. Salvator's College there from 1577 to 1620 [5, 6]. Association with the University may, however, go back much further, as a "George Martyn" (a

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common earlier spelling) became a "Licentiate" (graduate) in 1492 [5]—and, as will be seen below, "George" and "James" were frequently recurring names in family history. Be that as it may, James, while Provost, saw to the repair of neglected buildings at the College [6] and, in 1609, had the great bell of the College recast [6, 7]; his name is still inscribed thereon [6]. At this time, and possibly for some time before, the house of the Martine family was close to the College [6].

James left no issue but, on his death, he was succeeded as Provost by his nephew George Martine, D.D., grandson of John, who served until his death in 1646 [6]. One of the sons of this George and his wife, Catherine Schevez, was another James (1614–1684), a parish minister who owned "seven aikers of St. Andrews which belonged to the priorie there" [8], presumably acquired by the family on the earlier dissolution of the monasteries. This was the estate of Claremont, which he passed on to his son, another George (1635–1712), who was Commissary Clerk (a clerical post) of St. Andrews from 1666 to 1690 [8], when he was deprived of it for "not taking the assurance to King William and Queen Mary" [8]. As amanuensis to Archbishop James Sharp (1613–1679), this George kept meticulous notes of the Archbishop's household expenses [8] and wrote a fascinating account of the St. Andrews of his time in 1683 and a history of St. Rule's Chapel, neither of which were published until about 100 years later [9, 10].

George Martine, M.D

According to the Dictionary of National Biography [8] and to biographies based thereon [11], the George in whom we are interested was the son of the last-named George. But, according to records at the University of St. Andrews, he was in fact the son of James Martine of Claremont and his wife Margaret McGill [12] and was thus the grandson and not the son of George. His birthdate is universally given as 1702, but this also seems to be in error, as, (a) on matriculation as a student at Leyden in November 1721 he gave his age as 21 [13] and (b) in a short biographical note in the Preface to a posthumous book of Martine's, Alexander Monro, *primus*, Professor of Anatomy at the University of Edinburgh, states that he died (early in 1741) "anno aetatis 41" (Appendix, I). Both these facts suggest a birth date in 1700—which is also consistent with his matriculation as a student at the University of St. Andrews in session 1713/14 [12], as 13 was then a common age for university entrance.

While at University, he was involved in an incident connected with the 1715 Jacobite uprising in Scotland. On the day that the "Old Pretender" was proclaimed King at St. Andrews, he was one of a party of students that rang the College bell of St. Salvator's after two of his fellow-students had "held a pistol to the porter's wifes

breast and required the keys of the Church and Steeple from her" [14]. No great retribution overtook the perpetrators of this deed, possibly because of a certain sympathy with the cause within the University [14], and Martine paid his fees for his bachelorship in 1716 [12]: there is no record of him taking his mastership [12].

Before the Faculty of Medicine was founded in the University of Edinburgh, medical classes were held outside the University. One of these was taught by Alexander Monro, *primus,* and Martine's name appears on his class list for 1720 [15]. He must have decided on a career in medicine about this time, for, in 1721, as already mentioned, he moved to the University of Leyden, where he studied under Boerhaave [16]. Like most of his contemporaries [16], he did not graduate at Leyden but in 1722 he gained his M.D. at St. Andrews "on testimonials signed by Wm. Rutherford, M.D., William Eccles, M.D., Thomas Younger, M.D., J. Drummond, M.D., Robert Lowis, M.D., and James Eccles, M.D., which merely state "that Mr George Martine, younger of Clermont, student in medicine has by his great application and studie assisted by a happie genius so far improv'd himself in all the severall parts of medicine that are requisite to make a compleit physician that he is sufficiently qualified to deserve the degree of doctor in medicine in any University'" [12].

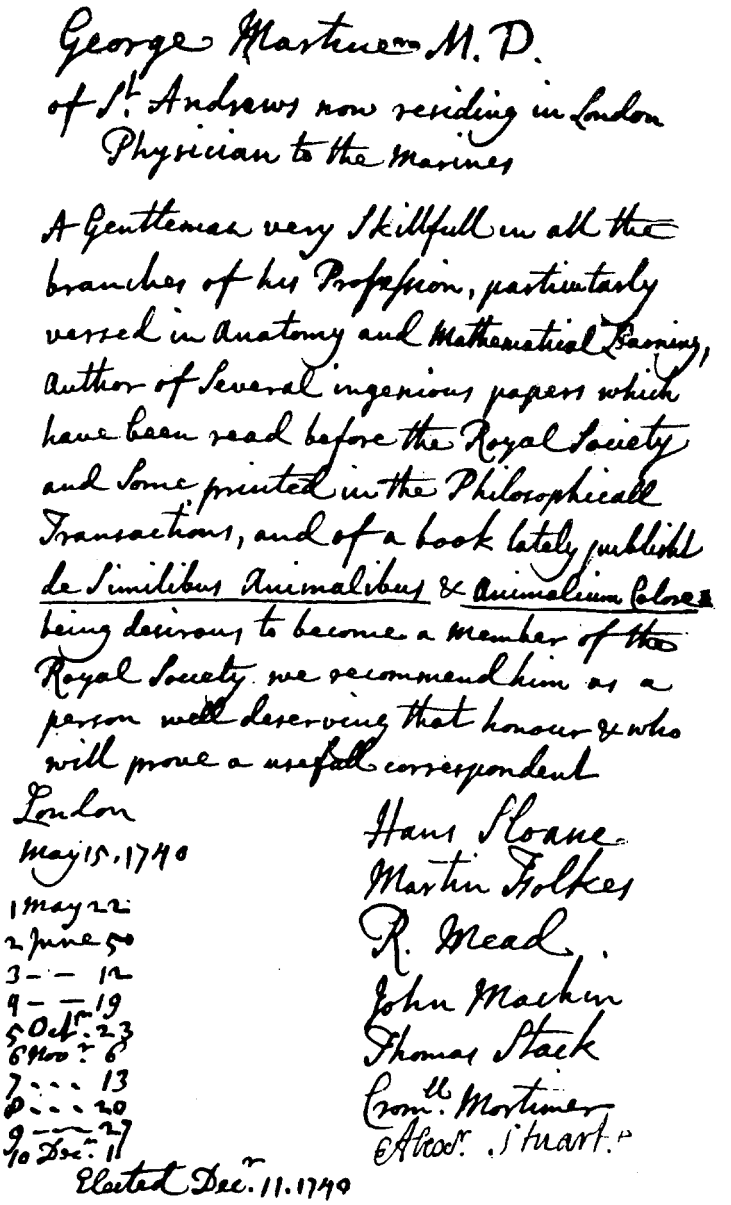
He practised as a physician in St. Andrews from then until 1739, apart from about two years from late 1725, when he and William Graeme, M.D., a contemporary at Leyden and already a member of the Edinburgh Incorporation of Surgeons, opened a medical school in the two basement rooms at the Surgeons' Hall, Edinburgh, recently vacated by Alexander Monro, *primus,* on his move to the University there [16]. It seems generally agreed that the spectacle of two St. Andrews graduates teaching medicine in Edinburgh was the spur that caused the Faculty of Medicine to be founded in the University of Edinburgh in 1726 [16, 17]. In any event, the school, where Martine taught the Theory and Graeme the Practice of Medicine, was not a success and Martine had left by 1728 [12], presumably returning to St. Andrews. Graeme moved to London in 1729 and was elected F.R.S. in 1730. It is rather interesting that a postscript to a letter from Martine to Graeme, dated "St. Andrews, Sept. 1730" (the original is still in the Royal Society's archives [18]) and communicated by Graeme to the Royal Society, should have been Martine's first publication (Appendix, A).

On his father's death in 1725 Martine inherited Claremont, which he sold in 1732—the same year as he registered as a reader at the University of St. Andrews Library [12]. The many references to the literature in his publications, the majority of which were written at St. Andrews, indicate that he made good use of that facility. It is not clear when he moved to London, but certain passages in unpublished letters to Cromwell Mortimer from Paris in September and November 1739 (which were read before the Royal Society and copies of which are in the Royal

Society's archives [18]) suggest he may well have moved about the summer of that year. As two of his essays are dated from St. Andrews in 1739, he certainly spent part of the year there. In December 1739, he was appointed "Physician to Lord Cathcart, C. in C., Expedition to W. Indies" [19], but he seems to have spent most of 1740 in London where some of his books were published (see Appendix). His essays on heat and thermometry were read before the Royal Society during the winter of 1739–40 (see below) and his book on "De Similibus Animalibus et Animalium Calore" was presented to the Society on 1 May 1740: his "Essays Medical and Philosophical" in book form was also presented on 23 October of that year, when he attended as a "stranger" introduced by Dr. H. W. Gerdes [18]. Both books are still in the Society's Library. He was proposed for Fellowship of the Royal Society on 15 May 1740 by a distinguished panel of Fellows (Fig. 1). On 5 August of the same year, he had the great honour of being elected an Honorary Fellow of the Royal College of Physicians of Edinburgh [16, 20].

Elected F.R.S. on 11 December 1740, he never had the opportunity of signing the Obligation Book [18], as at that time he was either at sea or in the West Indies—probably the latter, as his Commander-in-Chief, Lord Cathcart, died at Dominica on 20 December 1740 [21]. He himself did not long survive, as he died of a fever (probably malarial [11]) at Carthagena sometime before 9 April 1741 [22].

We have no direct record of the personality of George Martine, but his publications and his life story reveal a lot. Clearly he was an erudite man and a voracious reader with an analytical and critical mind, familiar not only with the work of the ancients in Greek and Latin but also completely up-to-date with the advances made in his own day in both medicine and in natural philosophy. He also inherited many of the traits of his ancestors, as he was deeply religious (see last paragraph of Appendix, C) and, at least when younger, displayed a Jacobite tendency. Moreover, he had a certain innate ability that allowed him to assess matters logically, he was observant and meticulous in his work and had an undoubted practical turn of mind. Whether he was the fleet surgeon castigated by Tobias Smollett in "Roderick Random", as has been suggested [11], it is impossible to say, but surgeons aboard ship in those days would have had to be somewhat callous. By any standard, he was a great man, greatly appreciated by the eminent men of his own day, as is evidenced by the honours showered on him, particularly in the last year of his too short life. No portrait or likeness of him seems to exist, even with the present members of the same family (R. Martine, private communication).


George Martine M.D.
of St. Andrews now residing in London
Physician to the Marines

A Gentleman very Skillfull in all the
branches of his Profession, particularly
versed in Anatomy and Mathematical Learning,
Author of Several ingenious papers which
have been read before the Royal Society
and Some printed in the Philosophicall
Transactions, and of a book lately publish'd
de Similibus Animalibus & Animalcum Calore
being desirous to become a Member of the
Royal Society we recommend him as a
person well deserving that honour & who
will prove a usefull correspondent

London
May 15. 1740

Hans Sloane
Martin Folkes
R. Mead
John Machin
Thomas Stack
Cromwell Mortimer
Alexr. Stuart

1 May 22
2 June 5
3 — 12
4 — 19
5 Oct. 23
6 Nov. 6
7 — 13
8 — 20
9 — 27
10 Dec. 11

Elected Dec. 11. 1740

Fig. 1 The Certificate of Candidature of George Martine for Fellowship of the Royal Society. Alexander Stuart signed later than the other Fellows, as his name is not in the copy of the certificate in the Minutes of the Meeting of 15 May 1740: the dates in the bottom left-hand corner are those of Meetings of the Society between the dates of proposal and election. (Reproduced by kind permission of the President and Council of the Royal Society)

Martine's studies on heat and temperature

His publications (Appendix) clearly show that Martine's interests were essentially medical. But assessment of his medical papers and books is outside the scope of this article—nor could this writer attempt it. It would appear, however, that his interest in human and animal heat and its variation with species, fevers, etc., induced him to take an interest in heat, as such. At this point, one should mention that in his time heat and temperature were essentially synonymous and he does not greatly distinguish between them. In his time too, it was often considered that there were different kinds of heat—for example, a distinction was made between heat from the sun and bodily heat—but Martine throughout his work makes it clear that he does not subscribe to this view but believes that heat whatever its source is the same. It is reasonable, therefore, to conclude that it was his interest in bodily heat and temperature that led him on to consider the subject in its wider aspect.

This he did in four "Essays" in his book "Essays Medical and Philosophical" (Appendix, G). Martine devotes 7 pages of the Preface to the First Edition to discussing the first two medical essays and more or less dismisses the others, which are the most important from our viewpoint, with the words:

> "The rest of these papers were most of them read at some meetings of the Royal Society last winter. They are all in the way of the History and Philosophy of Nature: and chiefly concerning the measurement of the degrees of Heat; a subject hitherto but very indistinctly handled; and yet without a knowledge of which our ideas of Heat, and of its effect on bodies must be very imperfect. They may be the occasion of making further advances in the Philosophy of this part of Nature, as we, or others better qualified, may have opportunities of making more observations on this almost inexhaustible subject."

These papers were indeed "the occasion of making further advances", as Joseph Black essentially founded his concepts of heat capacity and latent heats [2] on the material they contain. Moreover, Black made them recommended reading for his students, with the result that they appeared, without the medical essays, in two further editions in 1772 and 1792 (Appendix, Ga, Gb).

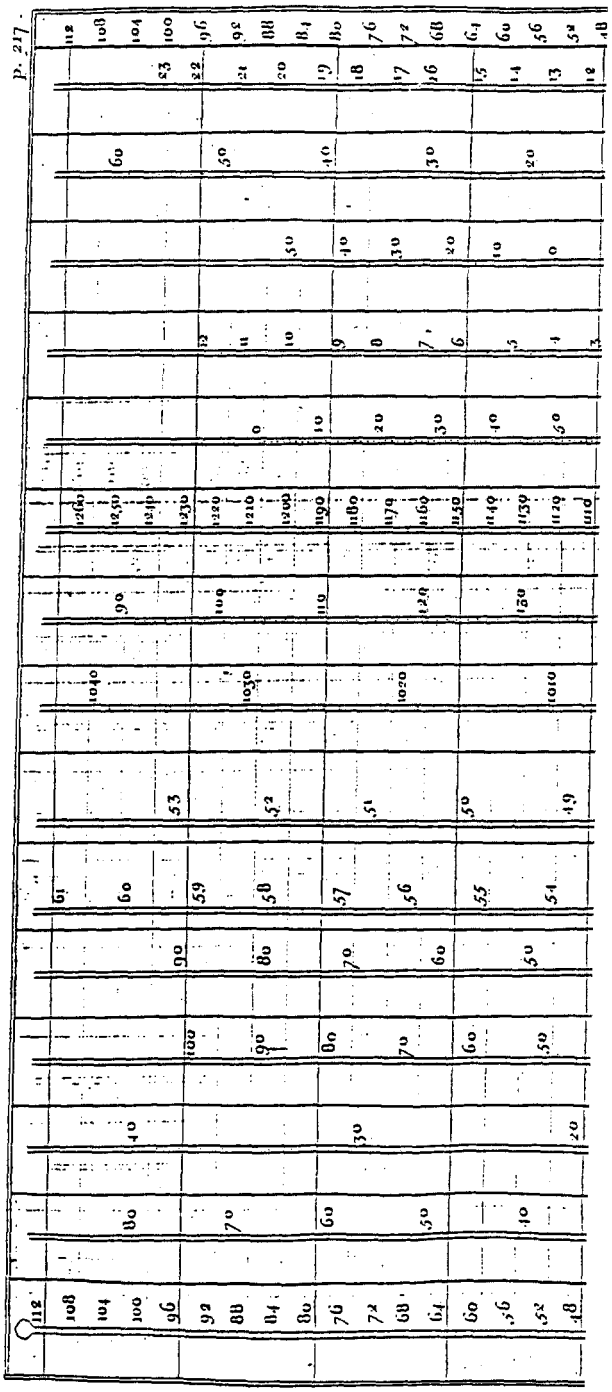
The four Essays were arranged not chronologically but logically in that they become essentially a unit. Thus, the first is introductory, the second compares temperature scales, the third details his own work and ideas on heating and cooling and the fourth rounds off the story by collecting together much information on the temperatures of melting, boiling, etc., of a large number of materials.

The introductory Essay (Appendix, G, Essay III) describes the history of the thermometer, which he attributes to Sanctorius, in terms that could be little bettered today and then goes on to review and assess those thermometers that were then in use. He considers the ice-point as satisfactory for calibration, as, despite a

literature reference that it did not hold at Naples (which he attributes to faulty experimentation), he could find no difference in places as far apart as St. Andrews and Dijon. His own observations indicated that major errors in the boiling point of water could be avoided if this point were measured "at a middle state of the atmosphere in places near the level of the sea". He notes in Newton's paper [23], "some inconsiderable arithmetical errors" and some observations "not accurately enough made": moreover, he is surprised at his choice of linseed oil, which adheres to glass, as a thermometric liquid. Spirits of wine is also rejected in favour of mercury, "which heats and cools faster than any liquor we know . . . ; it never freezes at any degree of cold hitherto observed and bears a great degree of heat before . . . boiling . . . ; and if purified does not stick to the sides of the tube". Its low expansion can be overcome by choice of appropriate bulb: stem volume ratios. Large bulbs of 7.5–10 cm diameter, as then in use, had, apart from their bulk, many disadvantages and, consequently, he recommends a small and portable thermometer. The construction of this, using a small bulb and narrow tubing of even bore, is described in detail and those that are made "with greater exactness" by "Wilson of London" are recommended. Presumably these were made to Martine's own design, as his thermometers were generally used by doctors until the introduction of the short-stemmed clinical thermometer [16]. He concludes that "there could well have been a more convenient scale" scale than 32–212, but considers it should be adopted, as there were then so many Fahrenheit thermometers around. All-in-all, this Essay is an impressive piece of work, revealing not only Martine's knowledge of the literature and of practical aspects, but also his analytical, critical and logical mind.

His paper on the comparison of thermometer scales (Appendix, G, Essay IV) is an attempt (and a very successful one) to solve one of the difficulties of his time—namely, that much thermometric information, e.g. on the weather, was obtained by "one-off" thermometers and could not be compared with that obtained by a different thermometer at a different place. By an extensive literature search and his own observations that involved such criteria as the body temperatures of animals and birds, Martine was able eventually to correlate two points on each of 14 different thermometers with two points on the Fahrenheit scale and so relate in all 15 scales (Fig. 2). This tour-de-force was appreciated by scientists for many years to come [1].

The most important Essay from the thermoanalytical aspect is that on the heating and cooling of bodies (Appendix, G, Essay V). In it, Martine argues that the cooling of a body should follow the same law as that obeyed by a heavy body descending perpendicularly in a medium that resists it in proportion to its velocity. According to Newton's *Principia,* Liber II, Prop. III, this is a hyperbolic curve that can be fitted by the sum of two progressions, one geometrical and the other arithmetical (Fig. 3). So that he could not be accused "of fitting theory by



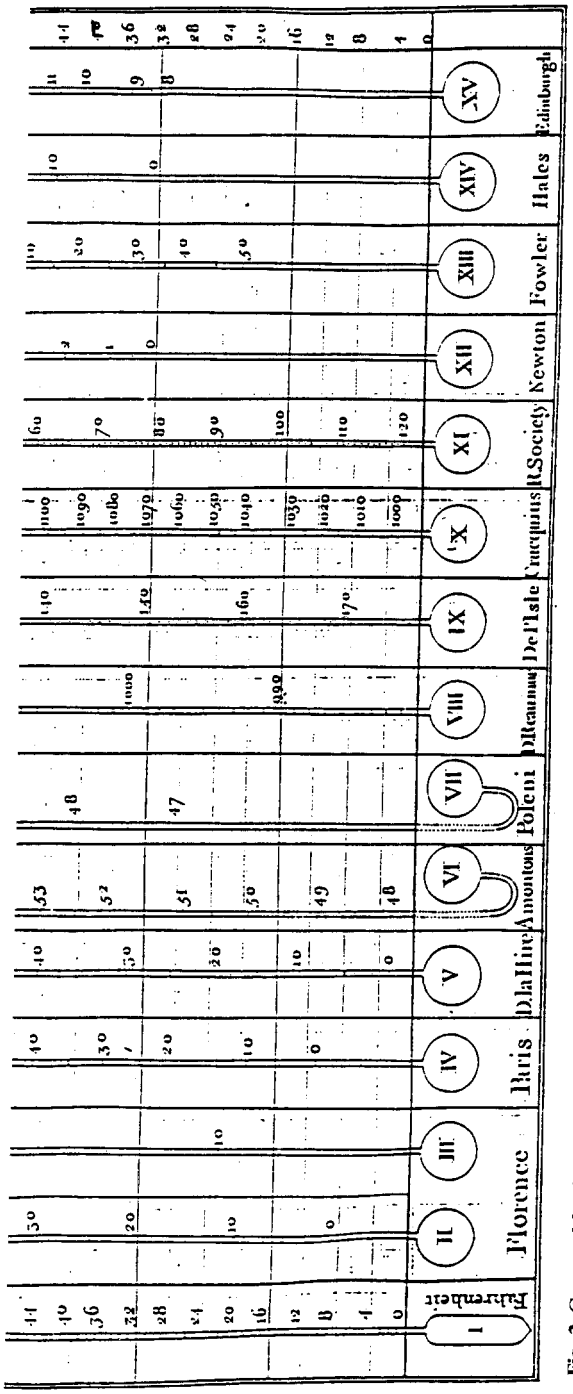


Fig. 2 George Martine's diagram showing the comparison of 15 different thermometric scales (Appendix, G, Essay IV)

experiment", he tested this out by use of Musschenbroek's data for the cooling of small metal bars and found very good agreement. It also fitted the cooling of a small thermometer from 108 °F. The relationship, however, would not hold in certain instances, such as a large irregular body that might maintain a warm atmosphere around it. Where it did hold, high temperatures could be measured from the curve

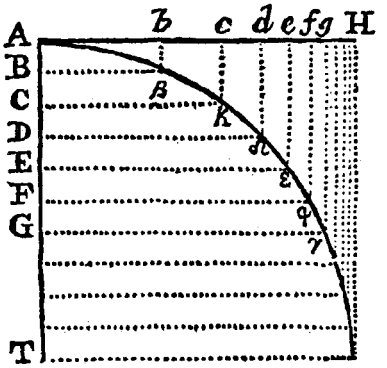


Fig. 3 George Martine's diagram for the cooling of a body: AH and AT are the temperature and time axes, respectively (Appendix, G, Essay V)

obtained after a certain time by a thermometer and extrapolation, either graphically or theoretically. To follow this up he carried out some important experiments. Until this time, it had commonly been considered that the amount of heat required to heat a body over a given range of temperature was proportional to

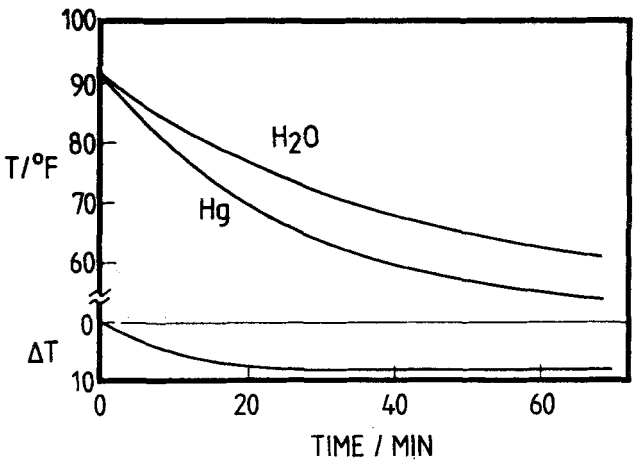


Fig. 4 Plots of the data of Martine for the cooling of equal volumes of water and mercury (Appendix, G, Essay V) and the $\Delta T/t$ curve derived therefrom

the density of that body. Thus, mercury should require $13^1/_2$ times as much heat as water. Martine, for very good reasons, doubted this and put it to the test. First of all, he placed roughly equal volumes of mercury and water into two identical thin-walled glass flasks, "set them down... *almost close to one another*... before a great fire ...*so that the heat should equally set upon them*" [my italics] and measured, by identical sensitive thermometers, the temperature of each as they heated up. He found, as he expected, that the mercury heated more rapidly than the water. When they were at the same hot temperature, he set the flasks side-by-side in a cool place and found that the mercury cooled more quickly. Being a meticulous worker, he repeated the experiment with more carefully measured quantities and tabulated all his results. The results for the second cooling experiment (the heating one is vitiated by the heat being applied to only one side of the flasks) are plotted in Fig. 4, together with the curve for $\Delta T(T_{Hg} - T_{H_2O})$ against time. Although Martine himself did not derive ΔT, this seems to be the first use of the principle of DTA with recording of experimental data. The $\Delta T/t$ curve is of the type from which heat capacity and specific heat can be calculated [24], although no phase change or other such event is observable. Martine also repeated this experiment with olive oil and rectified spirit, finding in each case that water heated and cooled more slowly: similar curves can be plotted for these. This paper concludes with a comment on how much work remains to be done along these lines—surely a prophetic statement!

The fourth, final and longest Essay (Appendix, G, Essay VI) is a remarkable repository of information on what was at that time considered to be the heat of the sun, planets, etc., the highest and lowest atmospheric temperatures then recorded, the melting and boiling points of metals, salts, oils, etc., and even the temperatures of flame and fire. Although therefore of importance mainly from the historical aspect, it has aspects of interest. Thus, he notes here that he considers heat to be the same, irrespective of source. Moreover, he calculates absolute zero (the concept of which he attributes to Amontons) to be -400 °F (-239 °C)—remarkably good considering the extrapolation involved. The temperatures of insects, fish, animals and birds are discussed, mainly from the viewpoint of his own observations, and, as would be expected from a physician, those of various parts of the human body are detailed. The effect of fever on temperature is also given, with particular reference to himself during an attack of "the Ague" in 1738. Truly, George Martine was a polymath.

Conclusion

It is hoped that the above account will help to put George Martine and his work into focus with respect to heat, temperature and thermal analysis. His medical

studies have not been assessed, but they too appear to show erudition and enterprise [11]. Perhaps a reassessment is overdue.

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References

1 J. A. de Luc, Recherches sur les Modifications de l'Atmosphere..., 2nd Edn. (4 Vols.), Duchesne, Paris, 1784.
2 J. Robison (Ed.), Lectures on the Elements of Chemistry Delivered in the University of Edinburgh by the Late Joseph Black M. D., Creech, Edinburgh, 1803.
3 R. C. Mackenzie, Thermochim. Acta, in press.
4 H. Scott, Fasti Ecclesiae Scoticanae. Oliver and Boyd. Edinburgh, 1915–1961.
5 A. J. Dunlop, Acta Facultatis Artium Universitatis Sanctiandreae 1413–1588. Oliver and Boyd, Edinburgh, 1964.
6 R. G. Cant, The College of St. Salvator, Oliver and Boyd, Edinburgh, 1950.
7 R. G. Cant, The University of St. Andrews: A Short History, Scottish Academic Press, Edinburgh and London, 1970.
8 Dictionary of National Biography: Articles in George Martine (the elder) and George Martine (the younger).
9 G. Martine, Reliquari Divi Andreae or the State of the Venerable and Primitial See of St. Andrews, James Morrison, St. Andrews, 1797.
10 G. Martin(e) of Clermont with Remarks by Professor Brown, The History and Antiquities of St. Rule's Chapel in the Monastery of St. Andrews in Scotland, John Nichols, London, 1787.
11 D'Arcy W. Thompson, The Scotsman (Newspaper), December 27, 1941.
12 R. N. Smart, Keeper of Muniments, University of St. Andrews, personal communication.
13 R. W. Innes-Smith, English Speaking Students of Medicine at the University of Leyden, Oliver and Boyd, Edinburgh, 1932.
14 W. C. Dickinson (Ed.), Two Students at St. Andrews 1711–1716, Oliver and Boyd, Edinburgh, 1950.
15 Mrs J. Currie, Edinburgh University, personal communication.
16 E. A. Underwood, Boerhaave's Men at Leyden and After, Edinburgh University Press, 1977.
17 W. S. Craig, History of the Royal College of Physicians of Edinburgh, Blackwell, Oxford, 1976.
18 A. J. Clark, Deputy Librarian, Royal Society, personal communication.
19 W. Johnston, Roll of Commissioned Officers in the Medical Service of the British Army ... 20 June 1727 to 23 June 1898, University Press, Aberdeen, 1917.
20 D. Guthrie, Extramural Medical Education in Edinburgh and the School of Medicine of the Royal College, Livingstone, Edinburgh, 1965.
21 Gentleman's Magazine, 11 (1741) 108.
22 Gentleman's Magatine, 11 (1741) 332.
23 I. Newton, Phil. Trans. Roy. Soc., 22 (1701) 824.
24 M. I. Pope and M. D. Judd, Differential Thermal Analysis, Heyden, London, 1977, p. 39.

Appendix

Publications of George Martine

Martine seems to have kept up an extensive correspondence on professional and philosophical matters, as some of his papers are extracts from his letters submitted for publication by the recipient—usually under the name "Martin" although he himself always used "Martine". Papers that appeared in "Medical Essays and Observations Revised and Published by a Society in Edinburgh" are difficult to reference. This relatively short-lived periodical appeared in six editions between 1733 and 1771 and the pagination of papers varies from edition to edition, although the article number remains constant. Consequently, the article numbers are given in brackets after the page numbers in the earliest edition that could be traced. The publications are listed in chronological order.

A The Postscript of a Letter from George Martin M.D. to William Graeme M.D. F.R.S. giving an Account of the Operation of Bronchotome (*sic*), as it was performed at St. Andrews. Phil. Trans. Roy. Soc., 36 (1730) 448–455.

B An Essay on the alternate Motions of the Thorax and Lungs in Respiration by Dr. George Martine, Physician at St. Andrews. Med. Essays Observ., 1 (1733) 156–171 (Article XII).

C An Essay concerning the Analysis of Human Blood; by Dr. George Martine, Physician at St. Andrew's *(sic)*. Med. Essays Observ., 2 (1737–2nd Edn) 66–113 (Article VII).

D The Experiment of Cutting the Recurrent Nerves carried on further than has hitherto been done. In a Letter from Dr. George Martin, Physician at St. Andrews to Mr. Monro, Professor of Anatomy at Edinburgh by whom it was communicated. Med. Essays Observ., 2 (1737–2nd Edn) 114–121 (Article VIII).

E Some Thoughts concerning the Production of animal Heat and the Divarication of the Vascular System being an abstract from a Latin Treatise, of the Heat of Animals; In a letter to Dr. John Stevenson Physician in Edinburgh from Dr. George Martin Physician in St. Andrews. Med. Essays Observ., 3 (1737–2nd Edn) 133–160 (Article XI).

F Georgii Martinii M.D. De Similibus Animalibus et Animalium Calore. A. Millar, London, 1740.

G Essays Medical and Philosophical. By George Martine M.D. A. Millar, London, 1740.
The essays are:
I An Essay on the Periods and Crises of Diseases (undated)
II An Essay on the Specific Operation of Cathartic Medicine (undated)
III Some Observations and Reflections Concerning the Construction and Graduation of Thermometers (St. Andrews, Aug. 1738)
IV An Essay Towards comparing Different Thermometers with one another (London, 1740)
V Essay on the Heating and Cooling of Bodies (St. Andrews, 1739)
VI An Essay Towards a Natural and Experimental History of the Various degrees of Heat (St. Andrews, 1738, 1739)

Ga Essays on the Construction and Graduation of Thermometers and on the Heating and Cooling of Heating and Cooling of Bodies. By George Martine M.D. Second Edition. A. Donaldson, Edinburgh, 1772. (Contains Essays III–VI of G, above).

Gb Essays on the construction and Graduation of Thermometers and on the Heating and Cooling of Bodies. By George Martine M.D. A New Edition with Notes and Considerable Additions... W. Creech, Edinburgh, 1792. (Contains Essays III–VI of G, above.)

H Reflections and Observations on the Seminal Blood Vessels: by the late Dr. George Martin, Physician to the American Expedition. Med. Essays Observ., 5, Part 1 (1742) 227–249 (Article XIX).

I Georgii Martinii M.D. In Bartolomaei Eustachii Tabulas Anatomicas Commentaria. (Prepared for publication by Alexander Monro, *primus*). A. Millar, London, 1755.

N.B. The Dictionary of National Biography states that a manuscript note on the British Museum copy of "Examination of the Newtonian Argument for the Emptiness of Space" (London, 1740) suggests that it was also written by Martine: no evidence for or against this has been found, but he was certainly familiar with Newton's writings.

Zusammenfassung – Durch das Studium von Leben und Werk von George Martine, der augenscheinlich der erste Anwender der Prinzipien der Differentialthermoanalyse war, wird offenkundig, daß sein Wesen bisher wissenschaftlich (und möglicherweise auch medizinisch) nicht gebührend gewürdigt wurde. Eine komplette Bibliographie seiner Schriften ist beigelegt.

Резюме — Изучение жизни и работы Ж. Мартина, который, кажется, впервые использовал принцип дифференциального термического анализа, показывает, что его научная (и возможно врачебная) деятельность все еще не отражена в полной мере. Приведен полный список его трудов.