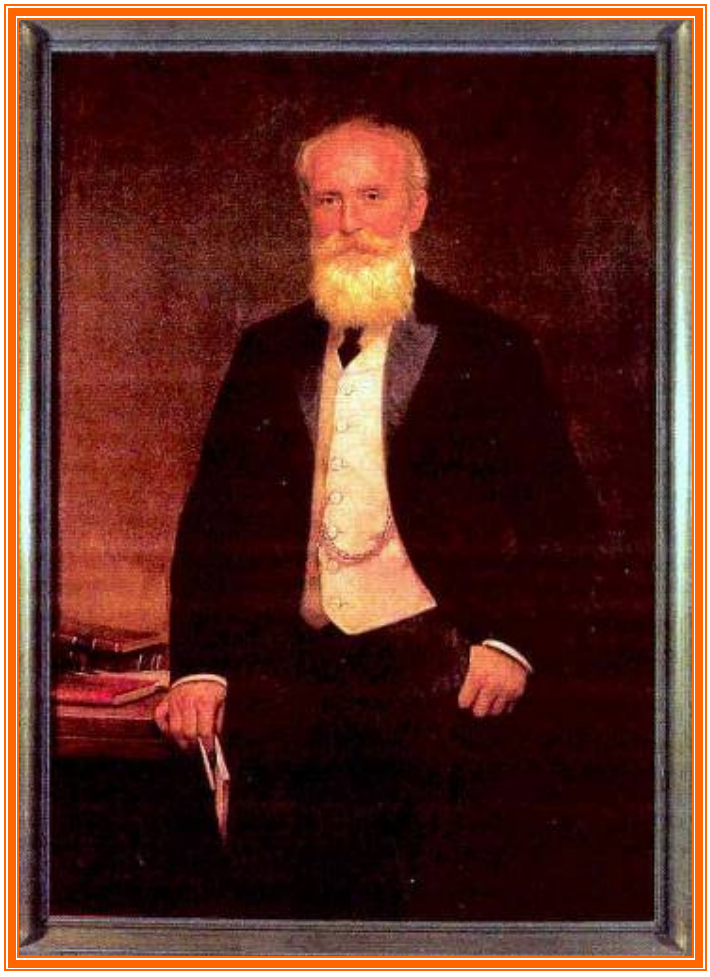
HERMANN RIETSCHEL
1847-1914



Rietschel laid the foundation of scientific design for the HVAC industry which until the late 19th century relied almost entirely on empirical methods

[99] Hermann RIETSCHEL **1847-1914**

German scientist, academic, and heating and ventilating engineer. Founded his own company in Berlin to specialize in the design of heating, ventilating, gas, and water systems (1871). His colleague, Rudolf Henneberg, joined him as a partner (1872). The business flourished and opened offices in Dresden and Vienna. "The success of the firm was due primarily to Rietschel's systematic application of general physical and engineering principles to the design." He was determined to put heating and ventilating system design on a surer, more scientific footing. Revised the *German Building Handbook* (1880). Founded the VDI (German Engineer's Association) for heating and plumbing (1880). Set up as a consulting engineer in Berlin (1881). Responsible for heating and ventilating systems in the Reichstag building. Appointed to the newly formed Chair of Heating and Ventilating at Berlin's Technical University (1885). Published a wide range of significant technical papers and reports, including *Guide to Calculating and Design of Heating & Ventilating Installations* (1894). His many successful projects covered "heat transfer coefficients for water-air and steam-air heat exchangers, the economy of heat insulation, pressure drop and friction coefficients in metal and masonry ducts, pressure drop values for air filters, and pressure drop and friction coefficients for steam and water flow in pipes." He was involved with the design of the thermal power station in Dresden (1895), investigated the performance of low-pressure steam control systems (1902), and produced an analysis of district heating (1902). He still found time to produce a monograph, *Church Heating*, based on his studies of churches in Ulm and Strasbourg. However, it is only in recent years that the importance of his writings on air conditioning have been fully appreciated in English-speaking countries. His textbook (1894) includes a chapter, *Kuhlung Geschlossener Raume*, "perhaps the earliest comprehensive example of a real scientific approach to room cooling. Hermann Rietschel advocated a scientific approach before the turn of the century (thus predating Carrier [101]), and he published a step-by-step approach for calculation of cooling plants."

(Mini-biography from "The Comfort Makers," Brian Roberts, ASHRAE, 2000)

Hermann Rietschel was born on April 19, 1847, in Dresden. His father, Ernst Rietschel, was a sculptor but his son was destined to follow an entirely different path—that of science and eventually its application in heating and ventilation engineering. First, he studied mechanical engineering in Dresden at the Polytechnic, at the same time working in industry. In 1867, he joined what was then the Royal Academy of Industry in Berlin, listening to lectures by Aronhold, Dove, Fink, Wiebe, and Reuleaux. Through his friendship with Friedrich Eggers, he gained his appreciation of art and humanities.

Later Rietschel decided to found his own company to specialize in the design and installation of heating and ventilation systems, as well as gas and water services. Launched in 1871, at the time of rapidly increasing business activity in Berlin, the firm grew quickly under Rietschel's alert and skillful guidance.

In 1872 his colleague Rudolf Henneberg joined him as a partner, and contracts began to come in from all over Germany and from neighboring European countries. District offices were set up in Dresden, Vienna, and other European capitals. The success of the firm was due primarily to Rietschel's systematic application of general physical and engineering principles to the design. His practical knowledge made sure that the design was carried through correctly.

As a businessman, however, Rietschel was not entirely happy. He felt the compulsion to put the heating and ventilation system design on a surer, more scientific footing. He had already begun his writing career in 1880 with the revision of the sections on heating and ventilation for the *German Building Handbook*.

In the same year he formed the German Engineer's Association (VDI) for heating and plumbing. In 1881 he gave up his business activities to become a consulting engineer in Berlin. During this time he was responsible for the design of the heating and ventilating system in the Reichtag building and for the German exhibitions of 1882 and 1883.

In spite of his extraordinary and practical achievements, Rietschel was already closely connected with science. Therefore, it was only for other reasons that he changed from practice to theory and research. He came out of business and occupied himself with the scientific basics of heating and ventilation. On May 2, 1884, the Prussian State Parliament expressed the wish for professors in universities including those in Berlin to teach the subject of hygiene and sanitation technology. It was recognized that the further development of hygiene and sanitation technology, including heating and

ventilation technology, was only possible through continuous exchanges between theory and practice.

As the chair of heating and ventilation at the Royal Technical University in Berlin-Charlottenburg was to be occupied, the responsible officials were of the opinion that only Hermann Rietschel had the necessary practical experience in the relations with the theoretical knowledge of this subject. The result was the appointment of Hermann Rietschel, who had been neither promoted nor named as professor of ventilation and heating technology in the Department of Architecture at the Royal Technical University in Berlin-Charlottenburg. This happened on July 13, when he was 38 years old.

Rietschel's principle was that the scientific method alone gave results that could be used with confidence. With a sure knowledge of the fundamentals, the engineer could assess the effect of any divergence from the normal path and make sure that he did not fall into error—as reliance on purely empirical rules might well do.

He developed the necessary mathematical formula from the beginning to end and made easy the understanding of these with examples. He introduced his lectures always with a hint of the scientific and practical hygiene for which the execution of this technology was necessary, and he was in continuous dialogue in this field of knowledge.

For many years he was a member of the German Union of Health Care, but here also he was not only a receiver but a giver and contributed thereby in a wider sense to the advancement and maintenance of hygiene.

From 1885 onward, Rietschel published a wide range of significant technical papers and reports: 15 books, about 60 special articles, and other Institute communications, lectures, and congress reports. The year 1893 saw the first edition of his textbook *The Calculation of Ventilation and Heating Systems*. Until his death the book went into five editions and was published in many countries besides Germany. In its updated versions it remains one of the leading German texts, although there has been no translation into English of modern editions.

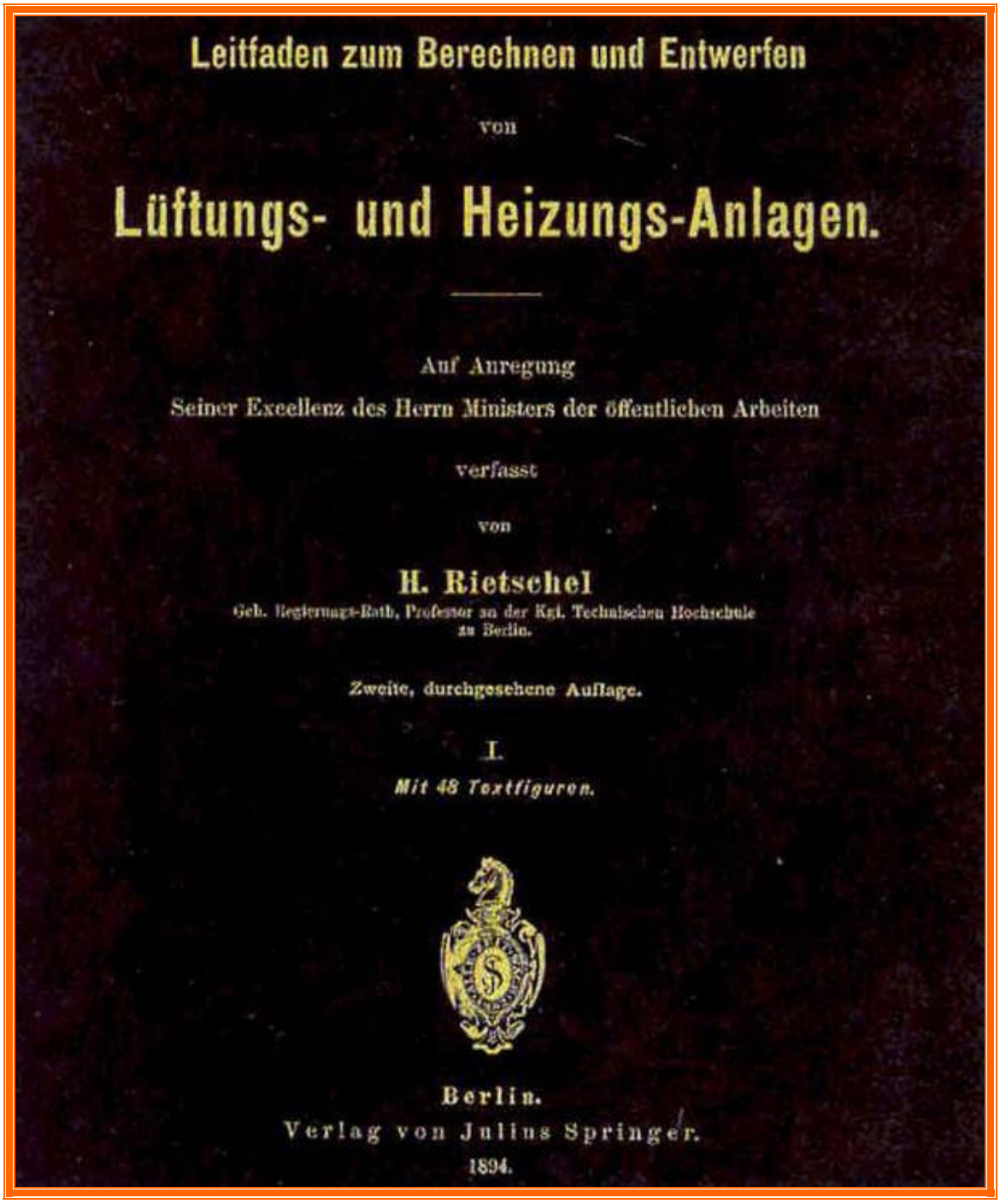
Rietschel's practical experience in the profession had shown him on what a flimsy basis the methods of calculation actually stood. They lacked experimental data. Rietschel therefore set up what must have been the world's first heating and ventilating laboratory. Under his guidance the laboratory began work on the essential questions of the time, questions that the industry urgently needed to solve.

Before Rietschel's work, there was nothing except rules of thumb to guide engineers in these essential calculations. The first professional conference of heating and ventilation engineers took place in Berlin in 1896, the choice of Rietschel as chairman being unanimous. The success of subsequent conferences owed much to his guidance, the force of his kindly and dignified presence, and the high standard of the papers he presented. He brought to the conferences all that was best in heating and ventilating engineering development, both in Germany and abroad.

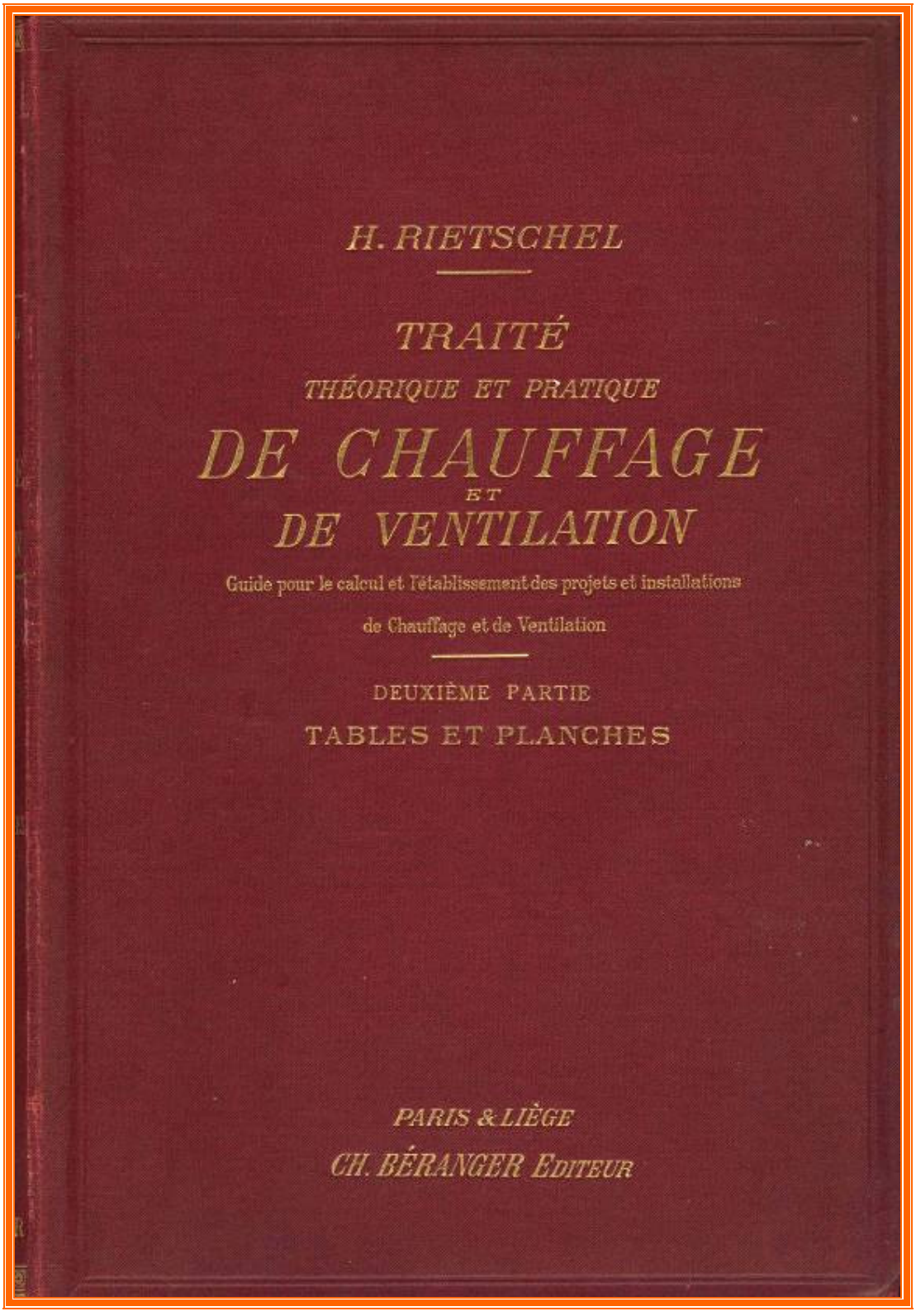
The great service that Rietschel rendered to the engineering profession and the public was recognized in many ways. In 1893 he became confidential advisor to the German government. The Technical University of his old town of Dresden made him Dr.-Ing. honoris causa, the German heating industry association, the Austrian engineers' and architects' association, and the Royal Sanitary Institute in London made him a honorary member; the Royal Swedish Academy of Science chose him as a corresponding member; and the German Museum of Masterworks in Science and Technology in Munich made him an advisor.

At the end of the summer term in 1910, Rietschel relinquished his position as professor. Honors still continued to come in. But despite the acclaim and accolades, Rietschel remained, as always, modest and unassuming. Hermann Rietschel died on February 18, 1914, after a severe illness. He was buried in the cemetery of Berlin-Grunewald.

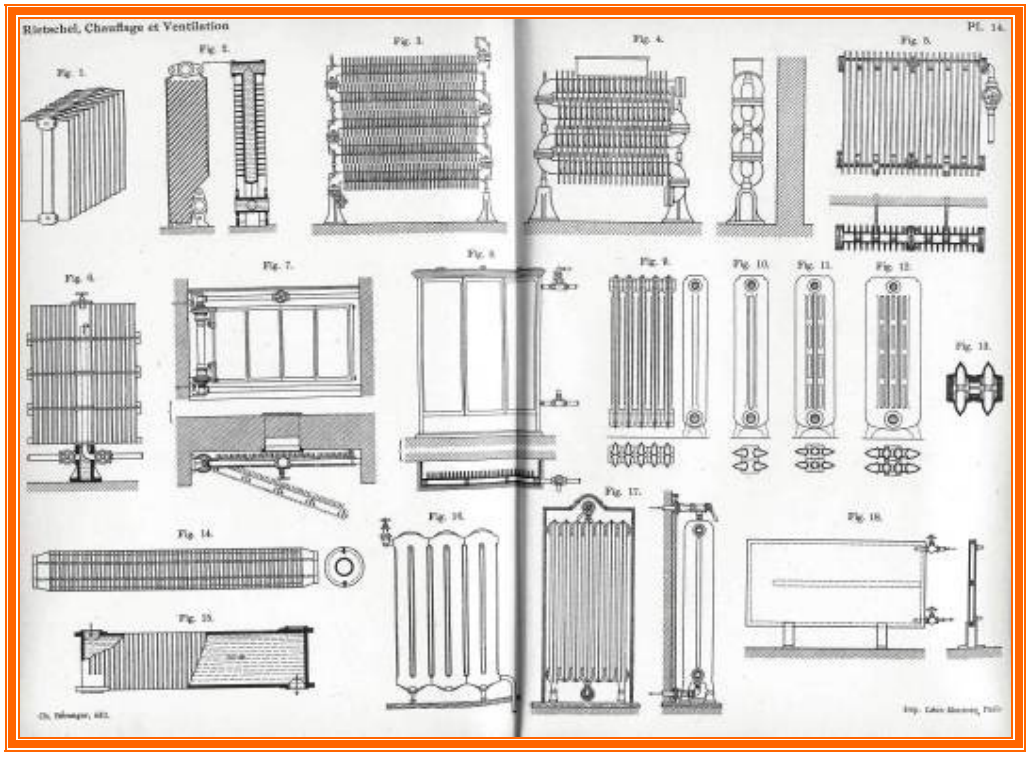
(Text extracts from "Hermann Rietschel's Life and Achievements," Klaus Usemann, ASHRAE Paper CH-95-17-3)

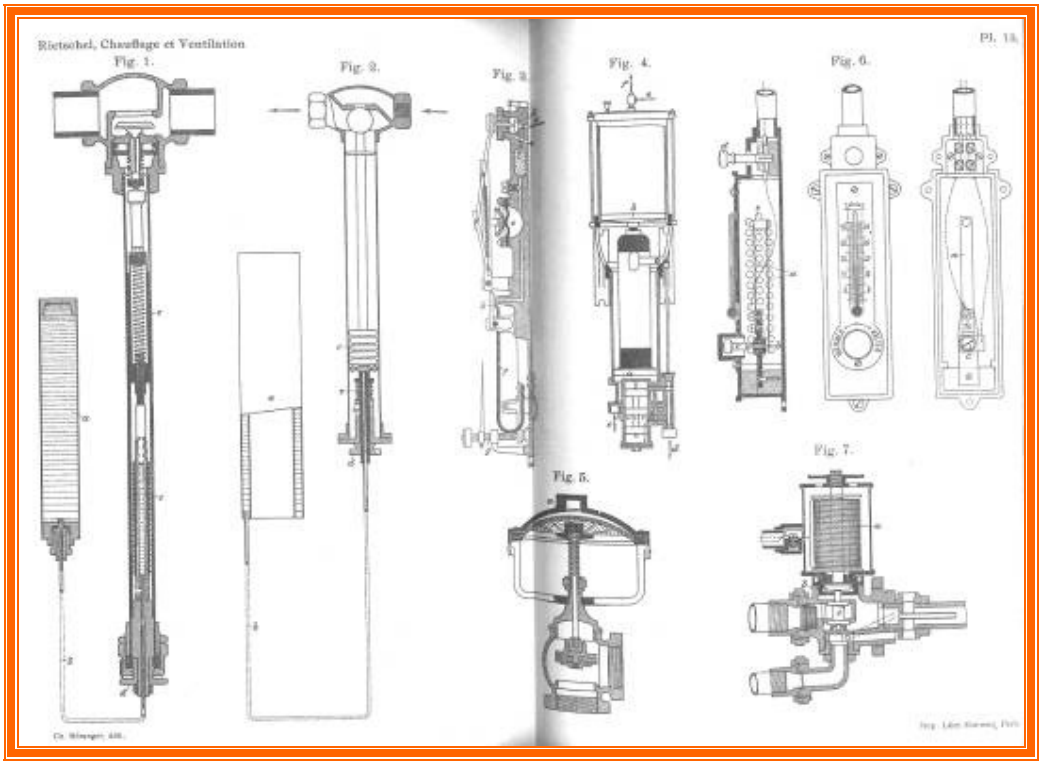


Rietschel's textbook in German 1894

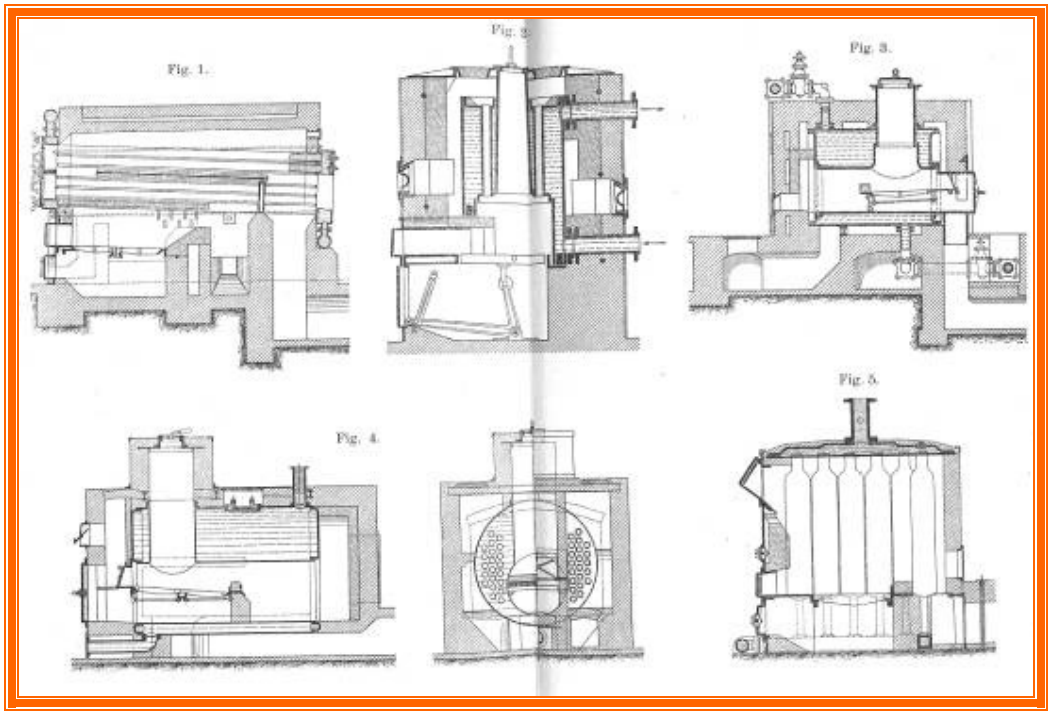


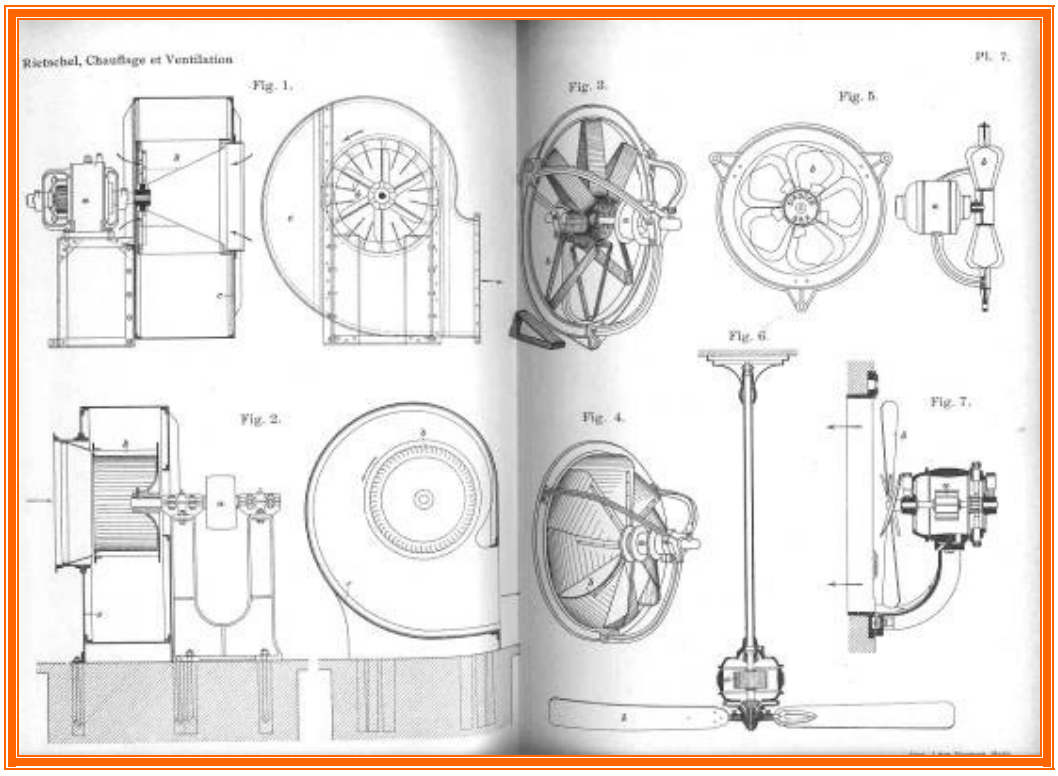
Rietschel's Handbook in French 1911 (CIBSE Heritage Group Collection)
The four sample illustrations below are from this book





(Top) Types of radiators (Below) Various automatic controls





(Top) Various boilers (Below) A variety of fans

RIETSCHEL-BRABBÉE

HEATING
AND
VENTILATION

A HANDBOOK FOR ARCHITECTS AND ENGINEERS

BY
C. W. BRABBÉE

Translated for American use from the Seventh German Edition of Rietschel-Brabbée "Heizungs-und Lüftungstechnik"

FIRST EDITION
SECOND IMPRESSION

McGRAW-HILL BOOK COMPANY, INC.
NEW YORK: 370 SEVENTH AVENUE
LONDON: 6 & 8 BOUVERIE ST.; E. C. 4
1927

(CIBSE Heritage Group Collection)

PREFACE TO THE GERMAN EDITION

When, at the suggestion of His Excellency the Secretary of Public Works, I undertook the writing of this text on the design of heating and ventilating systems, I did so because of the apparent need of a definite treatment which was not too comprehensive.

The books available in the field of heating and ventilation, while undoubtedly planned to assist the engineer, fail in the matter of designing practical installations. The broad discussion of the theory and design often obscures the general perspective and so lacks the terseness required for ready application.

This text is to serve practice; only those theoretical discussions are embodied which are required for the proper application of materials to the desired objective.

From my experience as consultant, I find a lack of proper relationship between the work involved in the preliminary design for bidding purposes and the final completion of the project. In the former, much energy is required of the engineers due to the common insistence on an unnecessarily large number of drawings, specifications, estimates, etc. On the other hand, for final installation too little is required of the engineer in the way of technical and hygienic knowledge with faulty systems as the result.

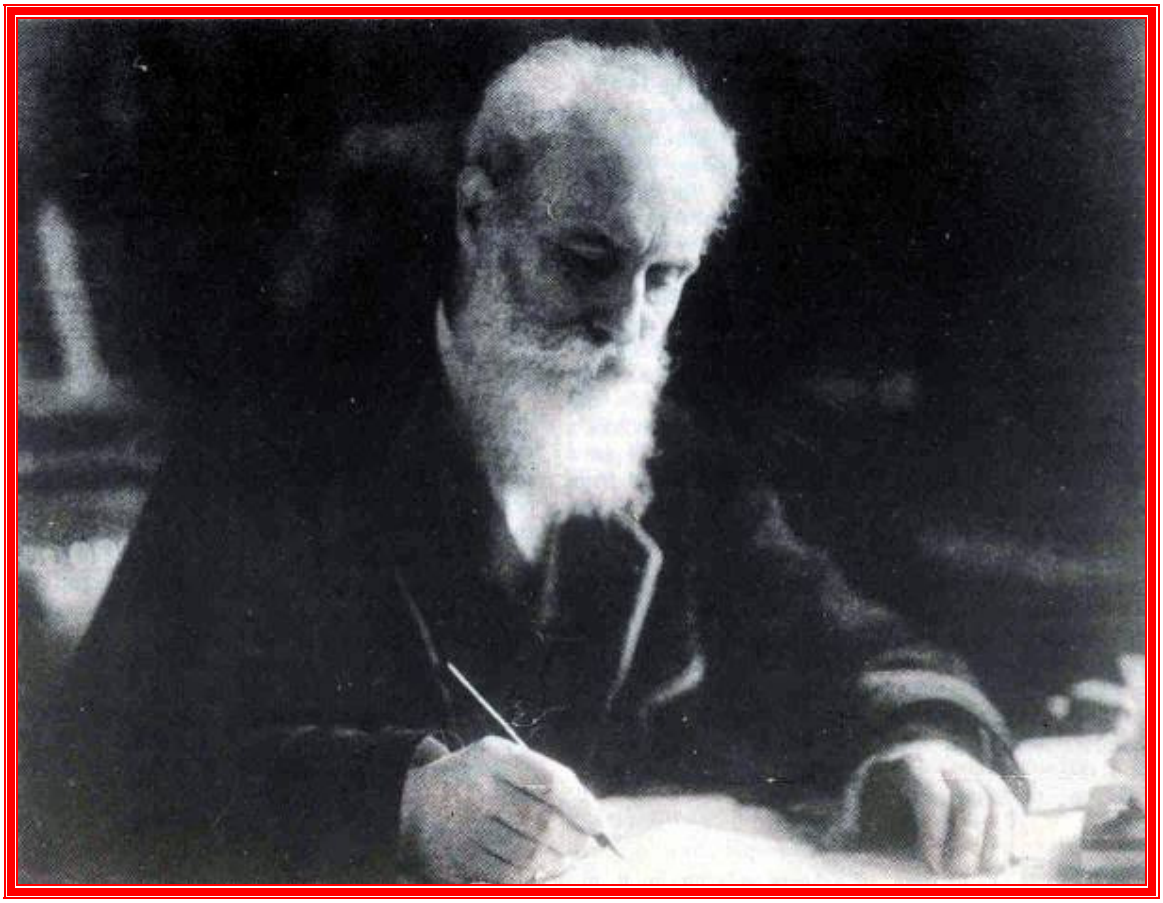
In the field of heating and ventilation many phases are still beyond the realm of scientific analysis; as far as possible these topics should be studied for the benefits that might accrue. Scientific methods alone can give us the assurance that we are headed in the right direction, particularly in those departures from standard practice occasionally necessary in everyday application.

In compiling this text I desired not only to inform owners and architects of the true setting of the problems but also to equip the engineer with rapid means of computation for his designs. The treatment of the text material and the Tables contained in Part II will confirm this. In numerous examples, the principles discussed are applied to problems arising in practice.

The drawings supplied with this text offer an insight into numerous applications, some of them being designs of the more important installations. To limit the scope of the book only the more important descriptions are included. It therefore presupposes a certain acquaintance with the subject on the reader's part.

RIETSCHEL.

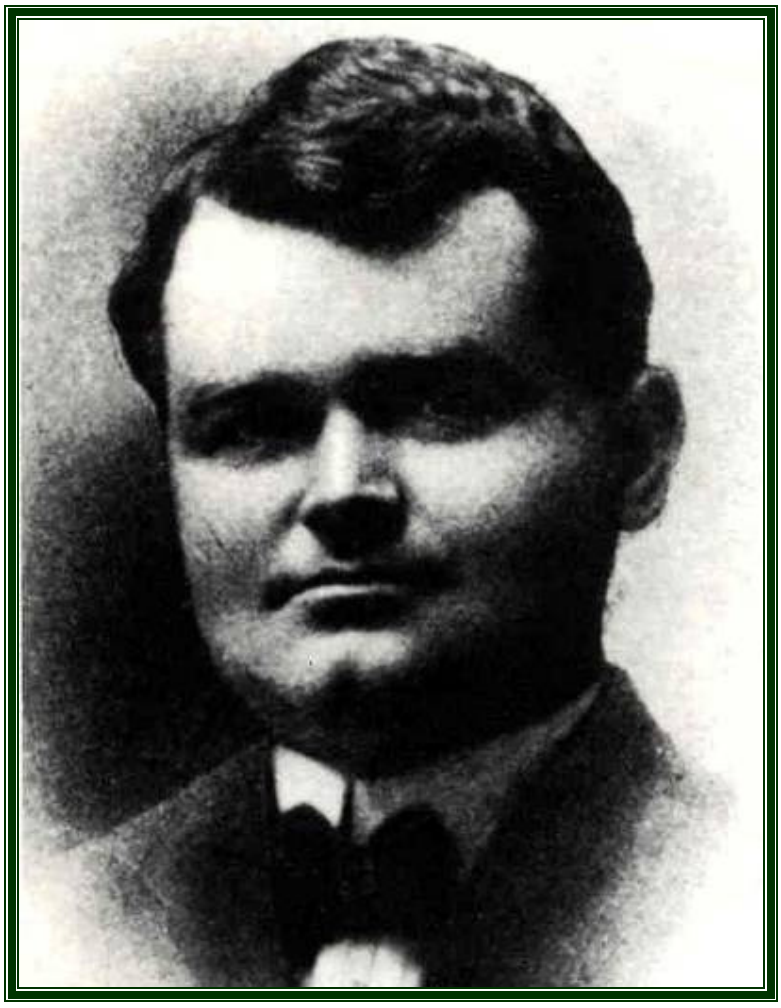
BERLIN, GERMANY
April, 1893.



Rietschel at work (Building Services & Environmental Engineer, January 1979)

Rietschel is buried in the family vault at the cemetery of Berlin-Grunewald

WILIAM H ROSS
Active 1904



1st Secretary ASRE in 1904

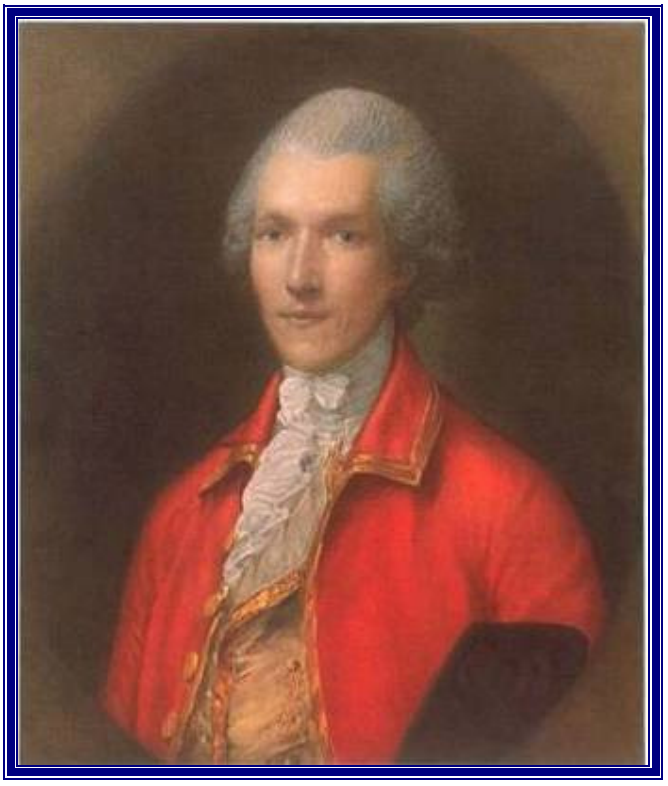
[261] William H. ROSS **active 1904**

At the beginning of the 20th century, most American refrigerating engineers belonged to the American Society of Mechanical Engineers (ASME), or to trade associations such as the Southern Ice Exchange, or to the recently formed (1903) Ice Machine Builders' Association. Ross, employed by the *Cold Storage and Ice Trade Journal*, decided to try and form an association for refrigerating engineers. When ASRE was officially organized (December 1904), Ross was appointed Secretary of the new Society (serving in that capacity until 1927). The magazine, *Refrigerating Engineering*, was later to record, "All charter members give credit to Mr. Ross as the prime mover who conceived of ASRE and pushed its organization."

(Mini-biography from "The Comfort Makers," Brian Roberts, ASHRAE, 2000)




SIR BENJAMIN THOMPSON, COUNT VON RUMFORD 1753-1814



Scientist, Statesman, Soldier, Spy
He invented a kitchen range, double boiler and baking oven
and carried out experiments on heat conservation and fuel efficiency.
He designed a boiler and produced rules for fireplace construction

[15] Count RUMFORD (Sir Benjamin Thompson) **1753-1814**

Born Woburn, Massachusetts. Went to London where, for his experiments with gunpowder, he was elected Fellow Royal Society (FRS). Later, in the service of the Elector of Bavaria, introduced army education, drained marshes, established workshops, and provided relief for the unemployed. Credited with introducing the steam engine of Watt [13] to the continent. Made Count of the Holy Roman Empire (1791). Became interested in heat, then thought of as a fluid, *caloric*. Rumford, while boring cannon at Munich (1798), noticed the blocks of metal grew so hot as the boring tool gouged them out, they had to be cooled constantly with water. He concluded that the mechanical motion of the borer was being converted into heat and that heat was, therefore, a form of motion. Returning to England, he helped establish the Royal Institution (1799) and appointed Davy [153] a lecturer. He refused to patent his many inventions, which included a double boiler, a drip coffeepot, a pressure cooker, and a kitchen range. He also devised his rules for *Chimney Fireplaces* (1796) that "have hardly been bettered to this day." Settled in France (1804), where he made an unsuccessful marriage to the widow of Lavoisier [148] and where he died. Today, the *Rumford Club* of London (founded May 1947) remains a meeting place for engineers.

(Mini-biography from "The Comfort Makers," Brian Roberts, ASHRAE, 2000)

Benjamin Thompson was born in Woburn, Massachusetts, in 1753, the son of a small farmer. After brief schooling, he was apprenticed to a Salem merchant who reported "your son is oftener *under* the counter constructing some little machine . . . than *behind* it arranging the cloths or awaiting the customers". As volunteer pyrotechnist at the 1766 celebrations on the repeal of the Stamp Act, he was involved in an explosion – and fired by his employer.

Thompson was next apprenticed to a local physician. He carried out many electrical experiments, and built a machine similar in principle to a modern alternator. He also attended lectures at Harvard and for a time took up school-teaching at Rumford, New Hampshire.

In 1772 he married a woman a good deal older than himself who was the daughter of one of Concord's two leading citizens and the widow of the other. Later he said, "She married me, not I her". Mrs. Thompson had inherited considerable wealth, and it was this together with his new connections that introduced Thompson to a different circle, where he was able to make himself useful to Governor John Wentworth.

Thompson had strong anti-revolutionary feelings and the Committee of Safety charged him with unfriendliness to the cause of freedom. Although acquitted, he was threatened by hotheads to such an extent that he left Concord with his wife and baby, never to return. He joined the British forces in Boston and was entrusted with despatches to London, where he was regarded as an authority on American matters. Given a position in the Colonial Office, he rose to be Under-Secretary of State.

About this time, Thompson became interested in ballistics and carried out tests at sea with the Navy, during which time he devised a new system of naval signalling. In 1779, he became a Fellow of the Royal Society.

On the strength of his associations with the Bavarian Court, he persuaded George III to confer a knighthood on him, and shortly afterwards left for Bavaria – not as a representative of Britain, but as ADC to the Elector. In this capacity he carried out experiments with materials used for soldiers' clothing and used his influence to take over workshops, in which he set the innumerable beggars of Munich to work making uniforms. During his researches, Thompson discovered convection currents, after noting the movements of impurities in the liquid of a thermometer.

The Elector then made Thompson Minister of War, Minister of Police, Major General,Grand Chamberlain of the Court and State Councillor, all at the same time.

Following this, he was made a Count of the Holy Roman Empire and an Imperial count. The King of Poland also conferred on him the Order of St. Stanislaus with the rank of White Eagle. From then on he became known as Count Rumford, second only to the Elector.

Rumford invented the kitchen range, double boiler and baking oven for kitchens, and the pressure cooker. He carried out experiments on heat conservation, food economy, fuel efficiency and boiler design. As Minister for War, he abolished the system by which each soldier did his own cooking, and introduced the field kitchen. Back in London in 1795, he was appalled by the smoke from the crude fireplaces then in use. He introduced the narrow throat flue, smoke shelf and damper, specifying dimensions and reduced smoke emission. Rumford's "Rules" on fireplace construction have never been improved upon. He founded the Royal Institution and in 1796 instituted the Rumford medals and awards, to be given by the Royal Society and the American Academy of Arts and Sciences, which are among the highest honours available to physicists.

In 1797 he made a calorimeter to show actual heat of combustion and was the first to measure the calorific content of many fuels. Rumford also developed a photometer to measure light intensity, and the candle used became the international standard for over a century. His "Enquiry concerning the Source of Heat which is excited by Friction" was presented before the Royal Society, and proved that heat was not a material substance as previously believed. This paper was based on Rumford's observations on heat generated during the boring of cannons.

In 1801, Rumford visited Paris, where he met Mme. Lavoisier, widow of the famous chemist. She accompanied him on a tour of Bavaria, and he married her in 1805. A London newspaper commented: "Married: Count Rumford to the widow of Lavoisier, by which nuptial experiment he obtains a fortune of £8000 per annum – the most effective of all the Rumfordizing projects for keeping the house warm".

Rumford soon found that although he had lived happily with Mme. Lavoisier, life with the Countess Rumford was impossible. He wished for nothing more than to be left in peace with his work, but she needed constant company and entertainment. He referred to her as a "female dragon", and after constant quarrelling, they parted in 1807.

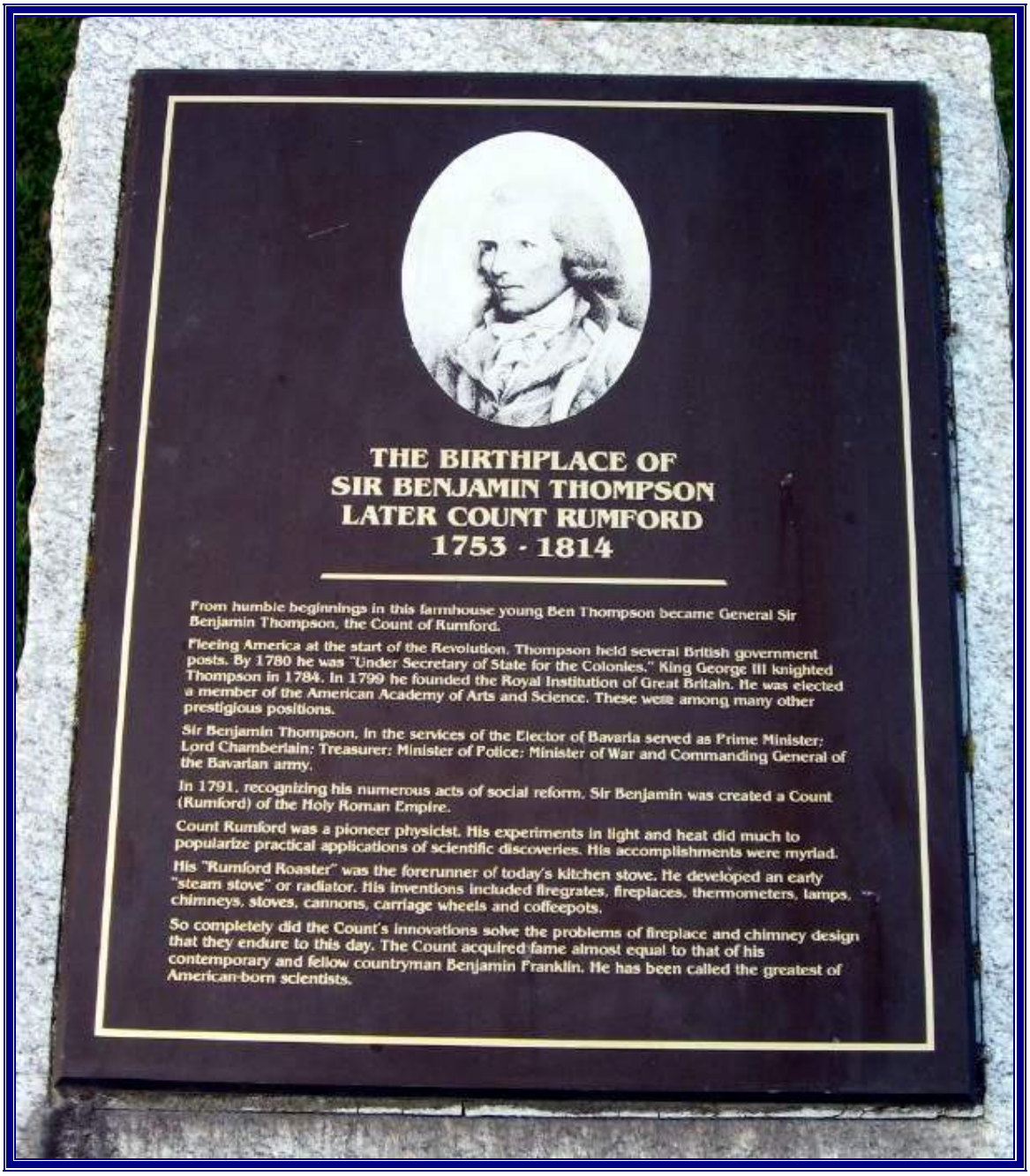
Towards the end of his life, Rumford worked on the analysis of steam and condensed water in steam heat systems, for which he developed safety valves and expansion sections of pipes. His death in 1814 was sudden, and he was buried at Auteuil.

(Text from "The Heatmakers No. 2," Potterton Commercial Division)

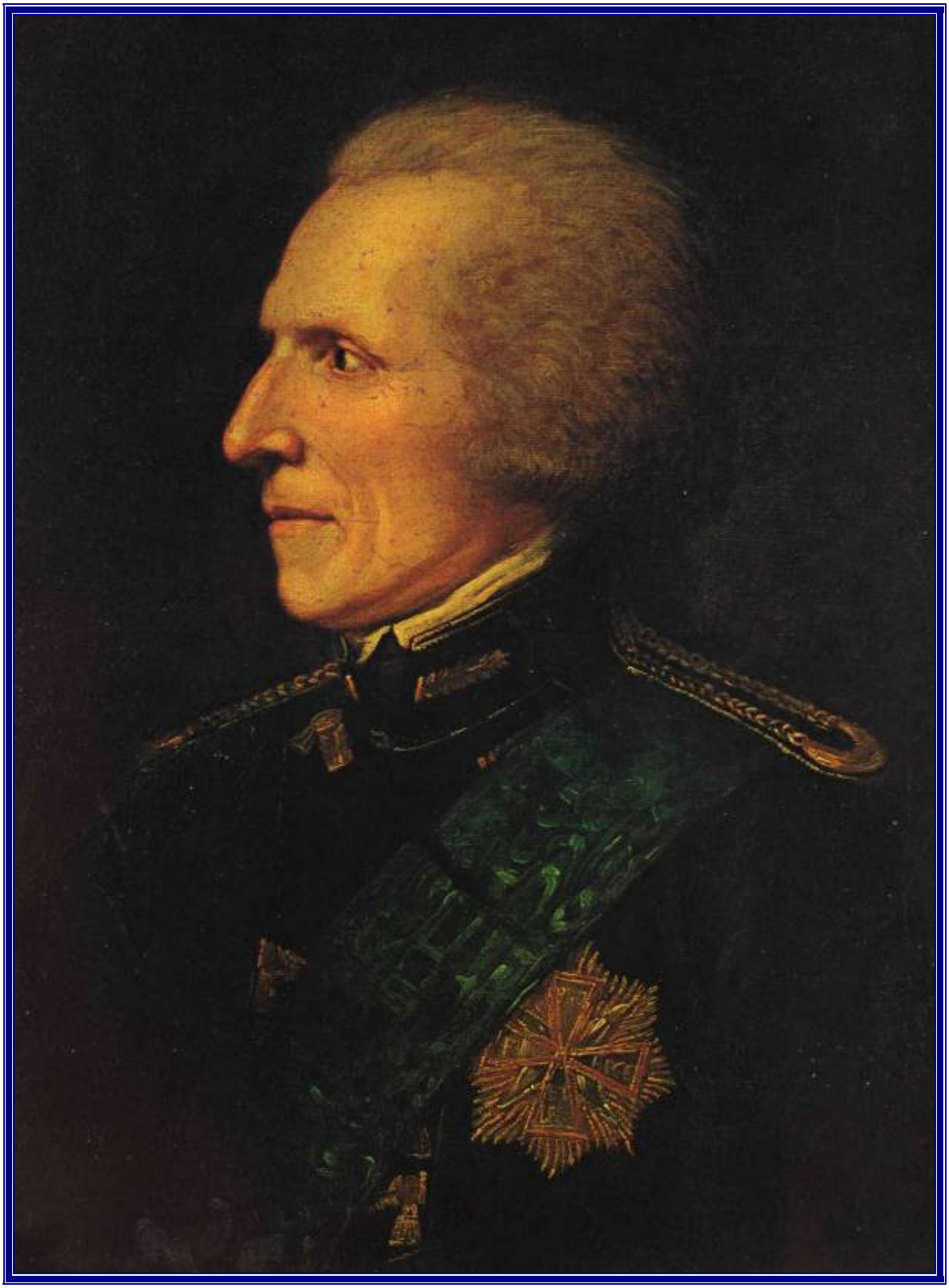
In attempts to improve, it is always desirable to know exactly what progress has been made – to be able to measure the distance we have laid behind us in our advances

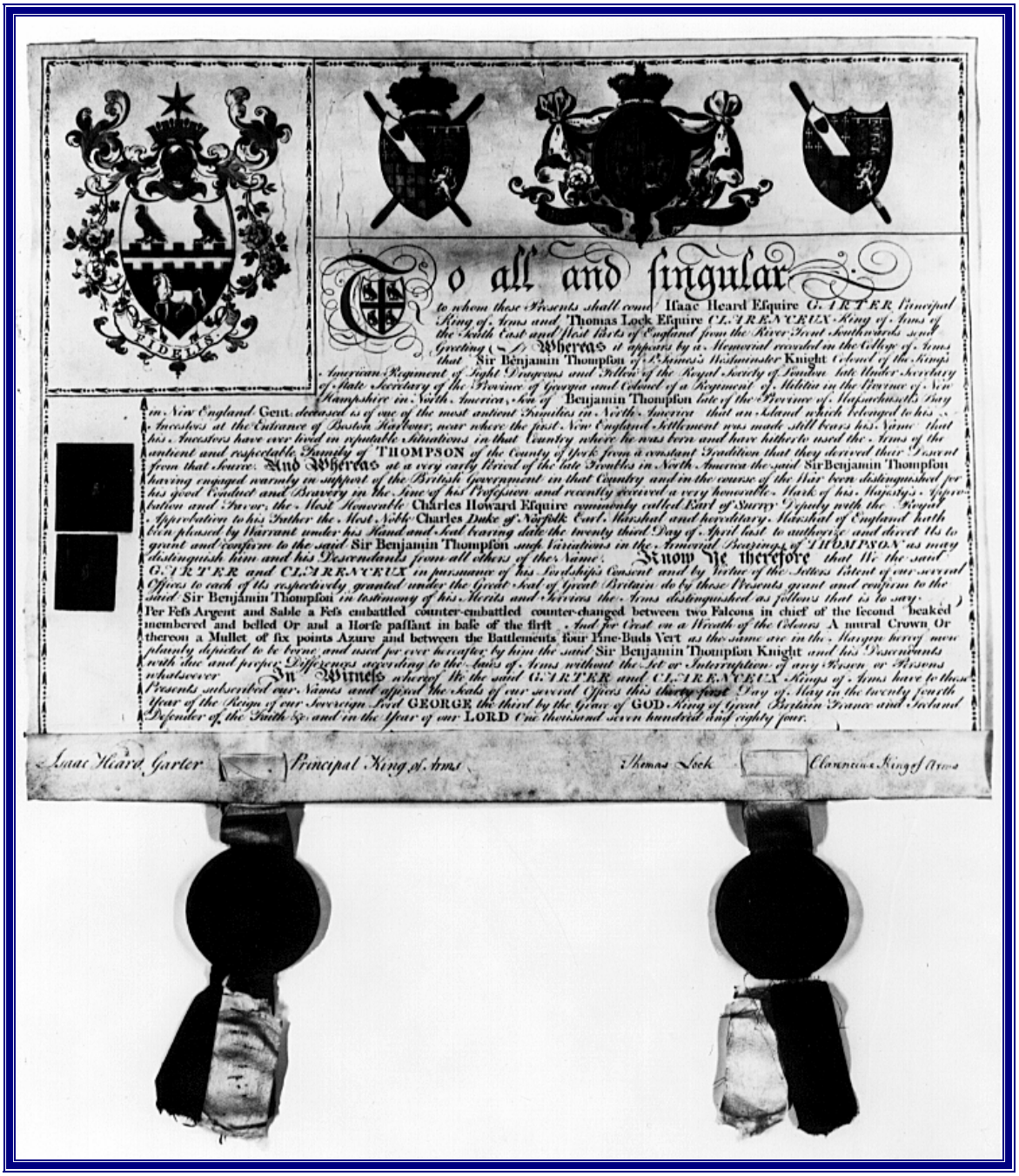
Count Rumford, 1753/1814

Birthplace of Count Rumford, Woburn, Massachusetts



Woburn Memorial Tablet





To all and singular to whom these Presents shall come Isaac Heard Esquire *GARTER* Principal King of Arms and Thomas Lock Esquire *CLARENCEUX* King of Arms of the South East and West Parts of England from the River Trent Southwards send Greeting ~ Whereas it appears by a Memorial recorded in the Office of Arms that Sir Benjamin Thompson of St James's Westminster Knight Colonel of the Kings American Regiment of Light Dragoons and Fellow of the Royal Society of London late Under Secretary of State Secretary of the Province of Georgia and Colonel of a Regiment of Militia in the Province of New Hampshire in North America Son of Benjamin Thompson late of the Province of Massachusetts Bay in New England Gent. deceased is of one of the most antient Families in North America that an Island which belonged to his Ancestors at the Entrance of Boston Harbour, near where the first New England Settlement was made still bears his Name that his Ancestors have ever lived in reputable Situations in that Country where he was born and have hitherto used the Arms of the antient and respectable Family of THOMPSON of the County of York from a constant Tradition that they derived their Descent from that Source And Whereas at a very early Period of the late Troubles in North America the said Sir Benjamin Thompson having engaged warmly in support of the British Government in that Country and in the course of the War been distinguished for his good Conduct and Bravery in the Line of his Profession and recently received a very honourable Mark of his Majesty's Approbation and Favor the Most Honorable Charles Howard Esquire commonly called Earl of Surrey Deputy with the Royal Approbation to his Father the Most Noble Charles Duke of Norfolk Earl Marshal and hereditary Marshal of England hath been pleased by Warrant under his Hand and Seal bearing date the twenty third Day of April last to authorize and direct Us to grant and confirm to the said Sir Benjamin Thompson such Variations in the Armorial Bearings of THOMPSON as may distinguish him and his Descendants from all others of the Name Know Ye therefore that We the said *GARTER* and *CLARENCEUX* in pursuance of his Lordship's Consent and by Virtue of the Letters Patent of our several Offices to each of Us respectively granted under the Great Seal of Great Britain do by these Presents grant and confirm to the said Sir Benjamin Thompson in testimony of his Merits and Services the Arms distinguished as follows that is to say Per Fess Argent and Sable a Fess embattled counter-embattled counter-changed between two Falcons in chief of the second beaked membered and belled Or and a Horse passant in base of the first And for Crest on a Wreath of the Colours A mural Crown Or thereon a Mullet of six points Azure and between the Battlements four Pine-Buds Vert as the same are in the Margin hereof more plainly depicted to be borne and used for ever hereafter by him the said Sir Benjamin Thompson Knight and his Descendants with due and proper Differences according to the Laws of Arms without the Let or Interruption of any Person or Persons whatsoever In Witness whereof We the said *GARTER* and *CLARENCEUX* Kings of Arms have to these Presents subscribed our Names and affixed the Seals of our several Offices this thirty first Day of May in the twenty fourth Year of the Reign of our Sovereign Lord GEORGE the third by the Grace of GOD King of Great Britain France and Ireland Defender of the Faith &c. and in the Year of our LORD One thousand seven hundred and eighty four.

Isaac Heard Garter Principal King of Arms — Thomas Lock Clarenceux King of Arms

Grant of Coat of Arms 1784

PHILOSOPHICAL

TRANSACTIONS.

XIV. *New Experiments upon Heat. By Colonel Sir* Benjamin Thompſon, *Knt. F. R. S. In a Letter to Sir* Joſeph Banks, *Bart. P. R. S.*

Read March 9, 1786.

DEAR SIR,

I HAVE at length begun the courſe of experiments upon heat which I have ſo long had in contemplation; and I have already made a diſcovery, which, if not new to you, is perfectly ſo to me, and which I think may lead to a further knowledge reſpecting the nature of heat.

(CIBSE Heritage Group Collection)

ESSAYS,

POLITICAL, ECONOMICAL,

AND

PHILOSOPHICAL.

By BENJAMIN Count of RUMFORD,

KNIGHT OF THE ORDERS OF THE WHITE EAGLE, AND ST. STANISLAUS; *Chamberlain, Privy Counſellor of State, and Lieutenant-General in the Service of his Moſt Serene Highneſs the* Elector Palatine, *Reigning* Duke *of* Bavaria; *Colonel of his Regiment of Artillery, and Commander in Chief of the General Staff of his Army*; F. R. S. Acad. R. Hiber. Berol. Elec. Boicæ. Palat. et Amer. Soc.

VOL. I.

LONDON:

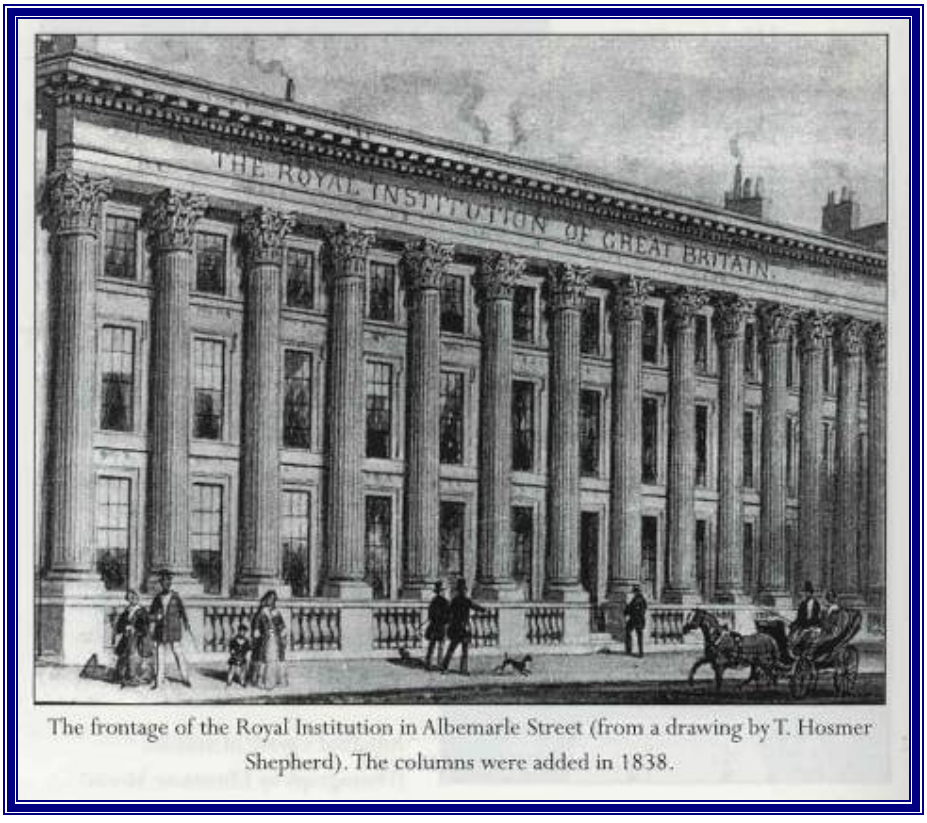
PRINTED FOR T. CADELL JUN. AND W. DAVIES (SUCCESSORS TO MR. CADELL) IN THE STRAND.

1796.

The title page of the first edition of Rumford's *Essays*.

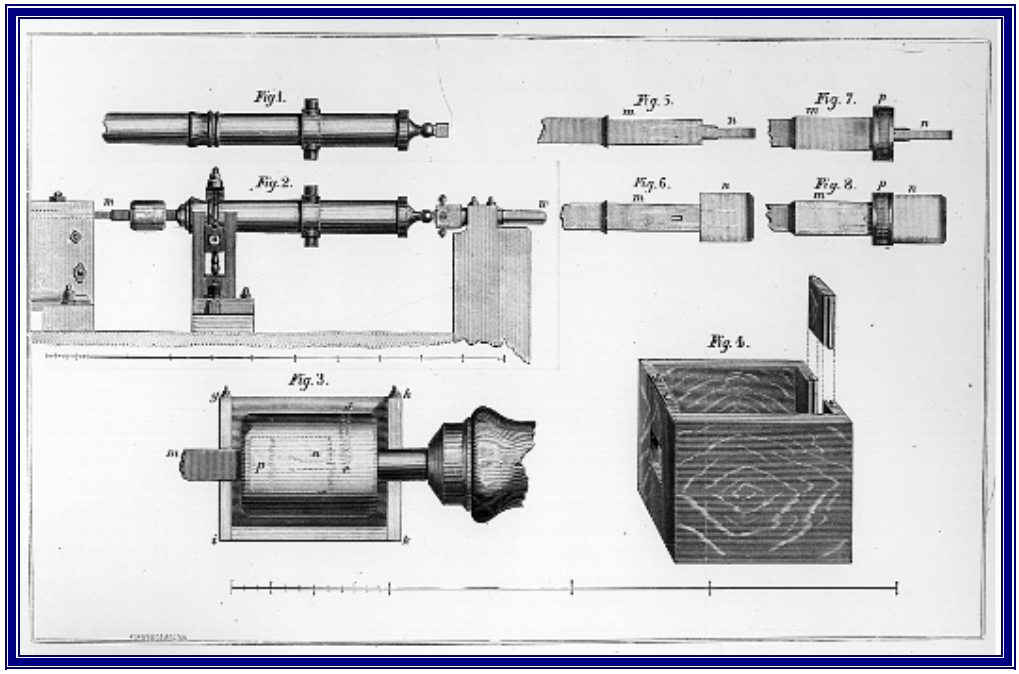
"The Comforts of a Rumford Stove," Cartoon by Gillray 1800

Portrait of Rumford aged forty-five.



The frontage of the Royal Institution in Albemarle Street (from a drawing by T. Hosmer Shepherd). The columns were added in 1838.

Rumford founded the Royal Institution



Rumford's cannon boring experiment

Experiments in pneumatics at the Royal Institution, Cartoon by Gillray
(Rumford is standing on the right)

OBSERVATIONS

RELATIVE TO

THE MEANS OF INCREASING THE QUANTITIES OF HEAT OBTAINED IN THE COMBUSTION OF FUEL.

IT is a fact which has been long known, that clays, and several other incombustible substances, when mixed with sea coal in certain proportions, cause the coal to give out more heat in its combustion than it can be made to produce when it is burned pure or unmixed; but the cause of this increase of heat does not appear to have been yet investigated with that attention which so extraordinary and important a circumstance seems to demand.

Daily experience teaches us that all bodies — those which are incombustible, as well as those which are combustible and actually burning — throw off in all directions heat, or rather calorific (heat-making) rays, which generate heat wherever they are stopped or absorbed; but common observation was hardly sufficient to show any perceptible difference between the quantities of calorific rays thrown off by different bodies, when heated to the same temperature or exposed in the same fire, although the quantities so thrown off might be, and probably are, very different.

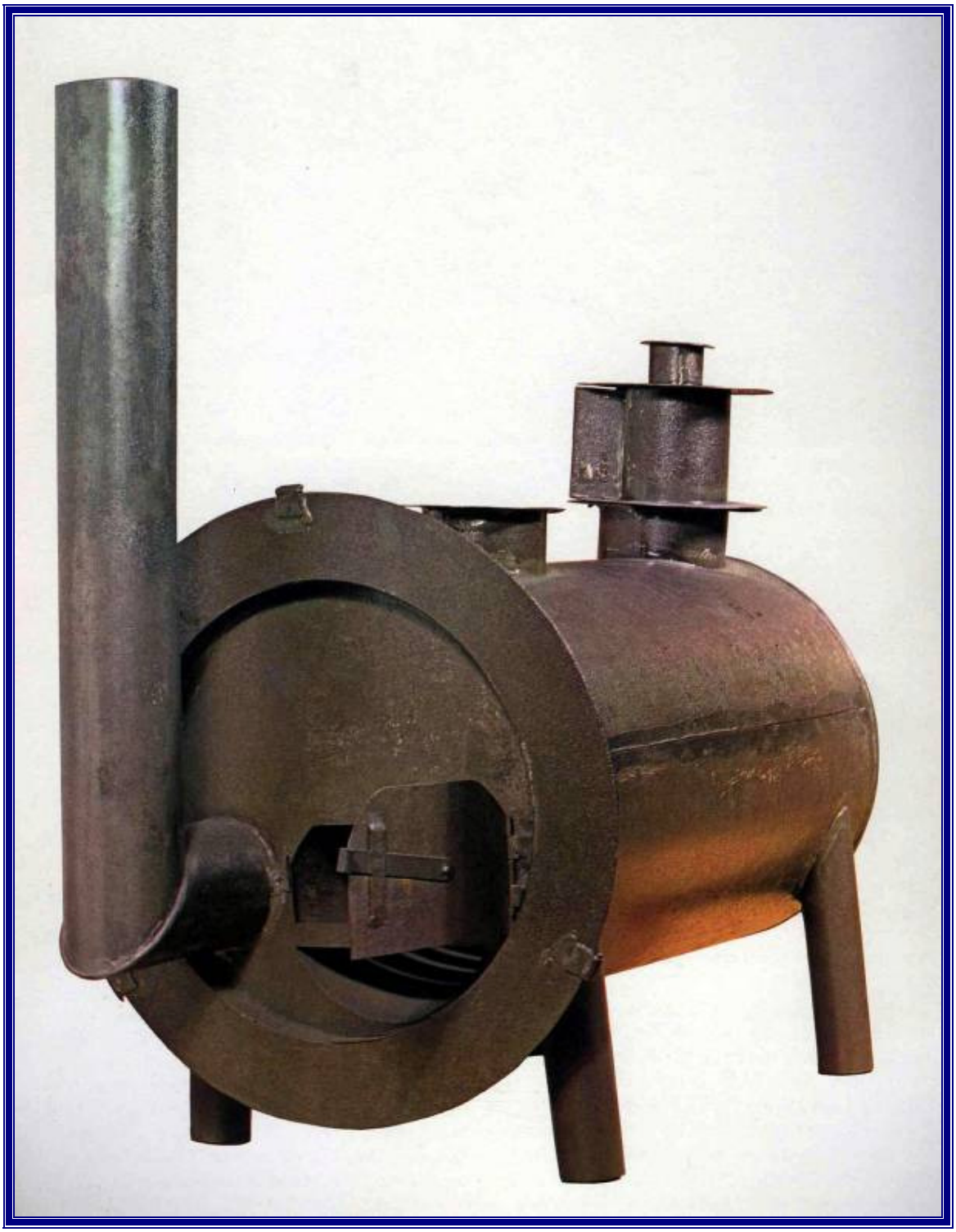
It has lately been ascertained, that, when the sides and back of an open chimney fireplace in which coals are burned are composed of firebricks, and heated red-hot,

Rumford on means of increasing heat

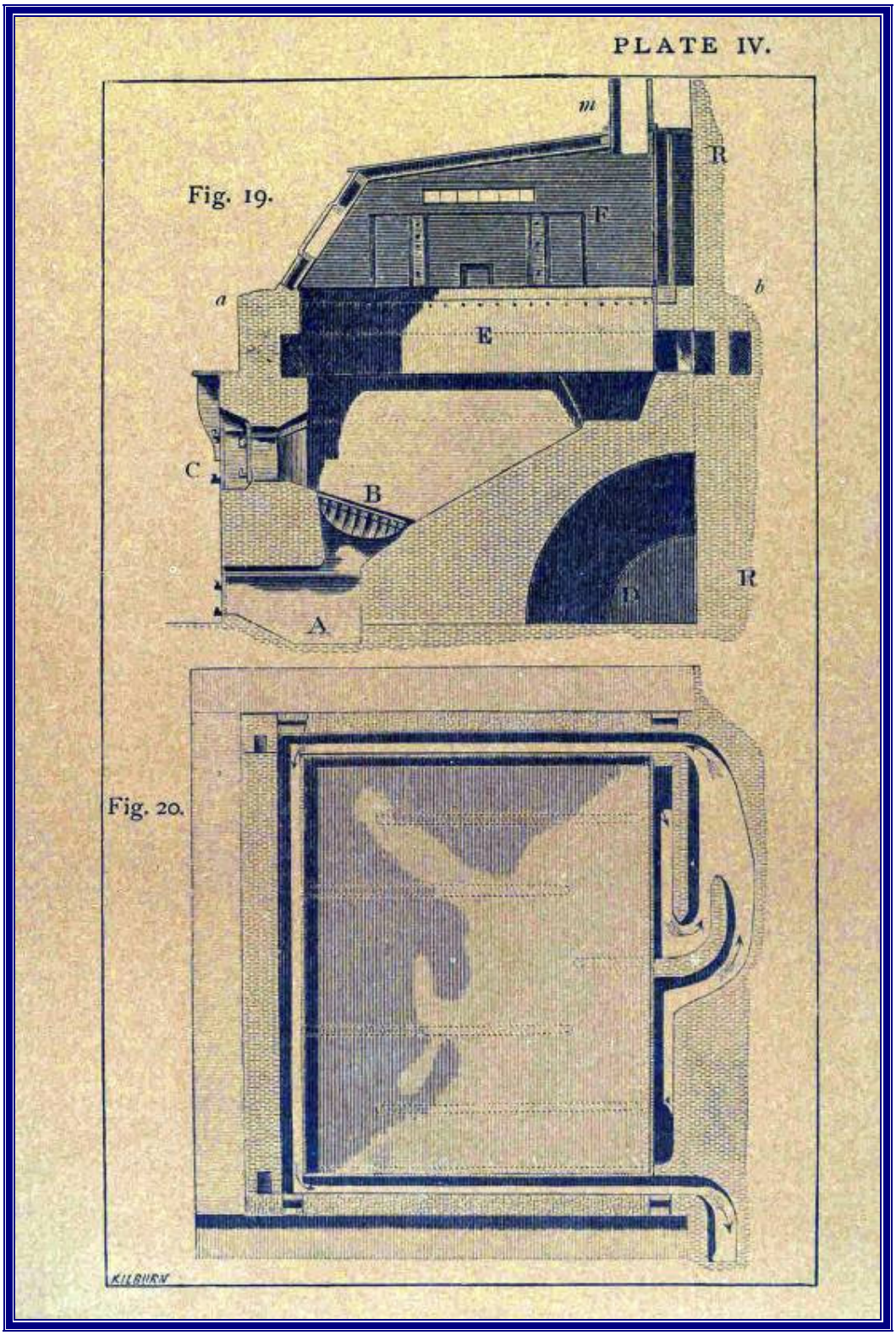
they throw off into the room incomparably more heat than all the coals that could possibly be put into the grate, even supposing them to burn with the greatest possible degree of brightness. Hence it appears that a red-hot burning coal does not send off near so many calorific rays as a piece of red-hot brick or stone of the same form and dimensions; and this interesting discovery will enable us to make very important improvements in the construction of our fireplaces, and also in the management of our fires.

The fuel, instead of being employed to heat the room *directly* or by the direct rays from the fire, should be so disposed or placed as *to heat the back and sides of the grate*, which must always be constructed of firebrick or firestone, and *never of iron or of any other metal.* Few coals, therefore, when properly placed, make a much better fire than a larger quantity, and shallow grates, when they are constructed of proper materials, throw more heat into a room, and with a much less consumption of fuel, than deep grates; for a large mass of coals in the grate arrests the rays which proceed from the back and sides of the grate, and prevents their coming into the room; or, as fires are generally managed, it prevents the back and sides of the grate from ever being sufficiently heated to assist much in heating the room, even though they be constructed of good materials and large quantities of coals be consumed in them.

It is possible, however, by a simple contrivance, to make a good and an economical fire in almost any grate, though it would always be advisable to construct fireplaces on good principles, or to improve them by judicious alterations, rather than to depend on the use of additional inventions for correcting their defects.



Model of a boiler designed by Rumford about 1798



Boiler described below

Fig. 19 is a vertical section of the boiler represented in the foregoing plate (Fig. 17). This section is taken through the middle of the boiler, of the fire-place, and of the cover of the boiler. A is the ash-pit, with a section of its register door; B is the fire-place and its circular dishing-grate; C is the entrance by which the fuel is introduced, with sections of its two doors; D is a space left void to save bricks; E is the boiler, and F its wooden cover; m is the steam chimney which is furnished with a damper; R, R is the vertical wall of the house against which the brick-work in which the boiler is placed; a,b, is the curb of timber in which the boiler is set.

The manner in which the cover of the boiler is constructed, as well as its form, and the door and windows which belong to it, are all seen distinctly in this figure.

Fig. 20 is a horizontal section of this fire-place taken on a level with the bottom of the flue which goes round the outside of the boiler, in which flue, before the fire-place was altered, the flame circulated. The flues under the boiler are, in this figure, indicated by dotted lines.

Extract from Rumford's "Of the management of fire and the economy of fuel"

Harrogate 30th Augt 1800

I have to request your particular care to the following commission, which I am extremely anxious should be executed with the utmost attention and dispatch. Get the following articles packed up and shipped in the very first Vessel that sails from London to Leith, addressed, "c/o Sir John Stuart Bart. M.P. to the care of Capt. George Ritchie at Leith".

"A Boiler, with steamers complete from Mr. Symmers fitted into one of the large iron plates with a hole in it, 15 inches in diameter, which you will find among my castings at the Institution. You must give Mr. Symmers the iron that the boiler may be exactly fitted to it.

"6 fire-Place door-way frames, and "6 ash Pit door-way frame each, with two Irons for holding it, fitted to it and marked or packed together that they may not be changed. To each of these frames there must be a "fit stopper, which

Extract from a Rumford letter dated 30 August 1800

Rumford Statue at Woburn, Massachusetts

Walter Harding E. A. Couzens (Pres. I.H.V.E. 1946 & 1947) Willis H. Carrier Bernard C. Oldham (Founder Chairman) F. L. Cooper A. E. Merrin

J. F. L. Grocott R. R. Poole R. E. W. Butt

The Rumford Club

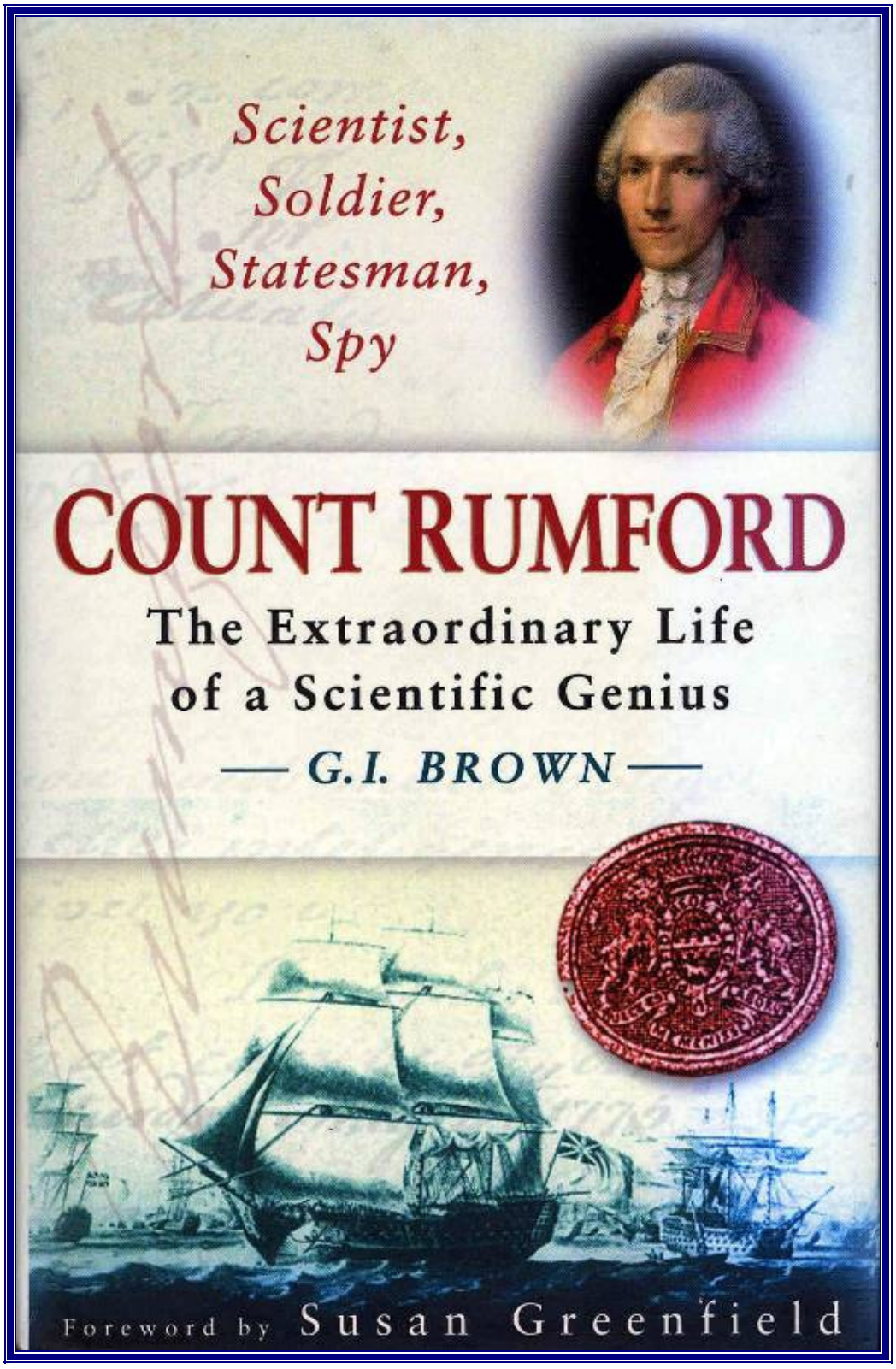
Many who had been business competitors in 1939 came to appreciate the value of working together during the war. This experience made it clear that normal peacetime contact through trade associations, technical and engineering institutions left something of a gap. Discussion of common scientific and technical problems in an informal after-dinner atmosphere was therefore suggested.

In 1946 and early 1947 some members of the Institution of Heating and Ventilating Engineers and of the Society of Instrument Technology met informally on various occasions, and in May 1947, it was decided to form a club to meet at monthly intervals during the winter; the dinner on each occasion to be followed by discussion on three questions unknown previously except to the contributor and the Secretary and selected by the Chairman at random. Questions had to be related to the application of science to practice in the use and control of air.

'Rumford' was particularly appropriate as a name for the club since he was well known for his work in developing efficient heating, and the pioneering of the application of philosophy to practice.

An early meeting of the Club was at a luncheon in June 1947 convened at short notice in honour of Willis H. Carrier, the father of air conditioning, who was visiting this country for the centenary celebrations of the Institution of Mechanical Engineers. Carrier was elected an honorary member of the club. The above photograph was taken of the occasion.

The Rumford Club



Biography of Rumford (CIBSE Heritage Group Collection)