ABSTRACT
        The purpose of this project was to specifically
identify important works within the National Bureau of Standards
library collection of approximately 125,000 items that are generally
acknowledged to be pertinent to the development of modern science and
technology. Presented is an annotated list including 197 items
selected from the pre-1900 holdings in the library. The arrangement
is alphabetical by author, and the annotations describe the nature
and significance of either the specific publication entry or its
author in cases of multiple entries by author. The list provides a
general cross-section of the collection and includes important works
from the fields of mathematics, physics, electricity, chemistry,
mechanics, metrology, and the history of science. (Author/DS)

An Annotated List of Historically and Scientifically

Important Works Published Before 1900

in the Library of

The National Bureau of Standards

Janet Terner

September 30, 1977

(Performed pursuant to NBS Purchase Order 712727, July 22, 1977)

NOTE

The documents in this collection may be consulted at the National Bureau of Standards Library; they are not available through interlibrary loan. Prior arrangements should be made by telephone or mail with the Chief, Information Services, National Bureau of Standards Library, Administration Bldg. E120, Washington, D.C. 20234, 301/921-3451.

The National Bureau of Standards, because of its long existence and close connection to the basic scientific disciplines and to the development of modern technology, has acquired a rich holding of important American and foreign publications which are significant to the history of science. A preliminary survey of the National Bureau of Standards Library in April 1977 revealed that many important and numerous rare works pertinent to the history of science and technology are contained in library's collection. These have not been previously identified from an historical perspective.

The purpose of this project, conducted between July 22 and September 30, 1977, was to specifically identify important works within the library collection of approximately 125,000 items that are generally acknowledged to be pertinent to the development of modern science and technology. A survey of all pre-1900 holdings in the library, totaling approximately 1200 items and based upon the shelf list catalog,, was undertaken. That survey was the basis from which this report and list was drawn.

The annotated list presented here includes 197 items selected from the pre-1900 holdings in the library. The arrangement is alphabetic by author, and the annotations describe the nature and significance of either the specific publication entry or its author in cases of multiple entries by a specific author. Attempting to characterize the historic significance of the scientific books in the library, this list provides a general cross section of the collection and includes important works from the fields of mathematics, physics, electricity, chemistry, mechanics, metrology and the history of science. Annotations were written with the perspective of the mission of the National Bureau of Standards Library in mind, and were developed from a variety of standard biographic sources, histories of science, and antiquarian rare book lists.

More than 300 items in the pre-1900 holdings of the library are concerned with metrology, its history, and with scientific and institutional documents pertaining to the development of national and international standards. Of these, only a small sampling were selected for this list, and much additional work needs to be done before an accurate picture of the character and historical significance of this sub-collection can be adequately determined.

The total number of entries presented here is an arbitary one, determined more by the limitations of time than by the limitations of important works held by the library. Numerous worthy books could therefore not be included at this time, and the list should perhaps be considered provisional rather than final. Questions about the inclusion or exclusion of certain works are welcome, and hopefully, will in the future advance this list to a more complete and comprehensive accounting.

Respectfully submitted,

Janet Terner, M.S.
Historian of Science
September 30, 1977

Abel, Niels Henrik, 1802-1829

1. <u>Oeuvres completes de N. H. Abel, Mathematicien, avec des notes et developpements.</u>
Oslo, 1839, 2 v.

An outstanding Norwegian mathematician who lived in poverty and died at an
early age, Abel did brilliant work in higher mathematics. He also proved
the impossibility of solving the general equation to the fifth degree by
algebraic methods. The binomial theorem, developed by Newton and Euler,
was extended by Abel in a completely general form.

Abney, Sir William de Wiveleslie, 1844-1920
2. <u>Instantaneous photography.</u> London, S. Low, Marston & Co., Ltd., 1895.

Abney was one of the founders of modern photography. He combined ingenuity,
manipulative skill and a scientific approach in addition to a talent for
popularization. He pioneered in the quantitative sensitometry of photo-
graphic images, invented a dry photographic emulsion technique, and intro-
duced hydroquinone, still one of the best developing agents known. In
spectroscopy, he developed a red-sensitive emulsion and with it made the
first spectroscopic abalyses of organic molecular structure and the
first solar spectrum photographs in the infrared.

Accademia del cimento, Florence
3. <u>Saggi di naturali esperienze fatte nell' Accademia del cimento.</u> Ed. by
G. Gazzeri. 3d ed. Firenze, Tip. Galileiana, 1841, 133p.

The <u>Saggi</u> systematically records the experimental science as practiced by
the academicians in Florence, ca. 1684. The Accademia was founded in 1657
as an outcome of the impetus given by Galileo's discoveries to the study
of natural science. Advanced for its time, the academicians focused their
efforts on physical experimentation, and eschewed the rhetoric typical of
scientific theorists in London and Paris. "The Saggi still maintains its
position as one of the most influential books to appear in the history of
science."--Shipman, <u>Milestones.</u>

Agricola, Georg, 1494-1555
4. <u>Georgii Agricolae medici libri qvinqve de Mensuris & ponderibus: In quibus pleraq;</u>
<u>a Bvdaeo & Portio parum animaduersa diligenter excutiuntur...</u> Basileae, 1533.

The oldest and possibly the rarest item in the library. Agricola (also known
as George Bauer) is generally regarded as the "father of mineralogy." He made
contributions to such different scientific fields as medicine, mathematics,
theology and history, but is most known for his works in mineralogy and mining.
He was the very first to rely on direct observation rather than on speculation
in the geological sciences. Preceding his classic work, <u>De re metallica,</u> by
about 20 years, this is an invaluable work for the history of weights and
measures.

34-958

5. Agricola, Georg, 1494-1555.

TN617.A27 1563 HC

Opera di Giorgi Agricola de l'arte de metalli; partita in XII. libri, ne qvali si descrivano tvtte le sorti, e qualita de gli uffizij, de gli instrumenti, della macchine, et di tutte l'altre cose attenenti a cotal arte, non pure con parole chiare, ma eziandio si mettano a luoghi loro le figure di dette cose, ritratte al naturale, con l'aggiunta de nomi di quelle, cotanto chiari, e spediti, che maglio non si puo desiderare, o hauerre. Aggiugnesi il libro del medesimo autore, che tratta de gl'animali de sotto terra, da lui stesso corretto, et riueduto.. Tradotti in lingua toscana da M. Michelangelo Florio Fiorentino. .. Basilea, Per H. Frobenio et N. Episcopio, 1563, 542 p.   6-18921

This early and rare work brings together Agricola's important writings in the metallurgical sciences with his writings in zoology. It was published posthumously.

QA804.A37 1774

Alembert, Jean le Rond d', 1717-1783.
6. Traite de l'equilibre et du mouvement des fluides. 1774.

This work was first published in 1744 when the author was twenty-seven years old, and is a companion volume to D'Alembert's landmark work in the development of mechanics, Traite de dynamique (1743). In the latter, he developed a principle as simple and as fundamental for the motion of bodies as is the principle of virtual velocities for their equilibrium. He applied this principle to the theory of the motion of fluids in the above work. D'Alembert is also known for his association with Diderot in the preparation of the Dictionnaire Encyclopedique.

Ampere, Andre Marie, 1775-1836

QC517.A63 1883

7. Theorie mathematique des phenomenes electrodynamiques, uniquement deduite de l'experience, par Andre-Marie Ampere. 2d ed. Paris, A. Hermann, 1883, 164p.
                                                       $100   GS 19-224

The second edition of Ampere's great work first published in 1826. It was the experiments described in it which founded the science of electric currents in motion, which Ampere named "electrodynamics." He also introduced the term "electrostatics" for the older study of stationary electric charges. Clerk Maxwell called Ampere "the Newton of Electricity," and in his honor it is now conventional to measure the quantity of electric current passing a given point in a given time in amperes, a usage originated by Kelvin in 1883.

QC631.A55 1826 HC

8. Description d'un appareil electrodynamique... 2d. ed. 1826.

Andrews, Thomas, 1813-1885

9. The scientific papers of the late Thomas Andrews..London and New York, Macmillan, 1889.

A professor of chemistry at Northern College in Belfast, Andrews is known for his important work regarding the liquifaction of gases. He suggested that for every gas there was a temperature above which pressure alone could not liquify it. This temperature he called the critical point. This discovery pointed the way toward the liquefaction of the permanent gases by demonstrating the necessity of dropping the temperature below the critical point before exerting pressure.

Anville, Jean-Baptiste Bourguignon d', 1697-1782

10. Traité des mesures itineraires anciennes et modernes. Paris, 1769.

D'Anville contributed greatly to the renaissance of geography and cartography in 18th century France. His Traité is an important study of ancient measurements.

Appell, Paul (-Emile), 1855-1930.

11. Lecons sur l'attraction et la fonction potentielle... 1892.

Mathematician and physicist, Appell maintained an amazing career combining teaching, research, editing and public service. His researches were in analysis, function theory, infinitesimal geometry and rational mechanics. His scientific work consists of a series of brilliant solutions of particular problems.

Atwater, Wilbur Olin, 1844-1907, and Francis Benedict

12. Experiments on the metabolism of matter and energy in the human body...Washington, 1899, 112 p.

Agricultural chemist, physiologist and scientific administrator, Atwater was appointed chief of the Agriculture Department. Office of Experimental Stations, where he exerted considerable influence on the development of agricultural research in the U.S. Along with E. B. Rosa, he designed and constructed the Atwater-Rosa calorimeter, and studied metabolism as a problem in physiology and to determine improved dietary standards for the working class. Calorimetric work became very popular in the first decade of the 20th century. Atwater's greatest contribution was organizational and administrative--especially his efforts to establish scientific standards for experimental station work.

Ball, Sir Robert Stawell, 1840-1913.

13. <u>An atlas of astronomy</u>. New York, D. Appleton & Co., 1892.

Ball has been called one of the two or three greatest British mathematicians
of his generation, but is best known for his popular works on astronomy.

Bancroft, Wilder Dwight, 1867-1953

14. <u>The phase rule</u>... 1897.

American born, Bancroft trained in Europe under Ostwald and van't Hoff, and
ultimately became a longstanding and well regarded professor of chemistry
at Cornell. Bancroft strongly encouraged the development of physical chemistry
in the U.S. In <u>The phase rule</u>, he collected together, at great effort, and
in a systematic manner, the existing knowledge on the phase rule. The book
constituted a very important pioneering advance into a domain which was
vigorously and fruitfully developed in the U.S. Bancroft also founded the
<u>Journal of Physical Chemistry</u> in 1896.

Benoit, Jean Rene, 1844-1922.

Benoit served as the Director of the Bureau Internationale des Poids et
Mesures from 1895-1915, and played a large rôle in the efforts to standardize
the units of length, temperature, and electrical resistance in the scientific
world. When Benoit arrived at the Bureau in 1891 as assistant director, the
Bureau was three years old and its main concern was the preparation of proto-
type standard units for its member nations. Charged with determining the
best methods of measuring lengths, a detailed study of thermal expansion,
the various devices for measuring dilation, and the relative merits of diff-
erent thermometers was undertaken. Once the standard lengths were set up,
Benoit played an important role in their verification and in establishing
their relation to other standard units such as the English yard. Benoit was
also involved in the standardization of the 24-meter Jaderin surveying wires
and with the determination of the standard ohm.

NBS holdings:

15. Construction des etalons prototypes de resistance electrque de Ministere des   QC537.B4 1885
    postes et des telegraphes. Paris, Gauthier-Villars, 1885, 80p.

16. Dtermination du rapport du yard au metre. Paris, Gauthier-Villars, 1896, 25p.   QC101.B4 1896

17. Etudes sur l'appareil de M. Fizeau pour le mesure des dilatations appartenant   QC281.B4
    au Bureau Internationale des Poids et Mesures. (no date) 74p.

18. Mesures de dilatation et comparaisons des regles metriques. Paris,
       Gauthier-Villars, 1882?, 1883. 174p.
       (From Trauvaux et Memoires Bur. Int. Poid Mesures, tome 2, 1883)

19. Nouvelles etudes et mesures de dilations par le methode de M. Fizeau.(From: QC281.B42
       Travaux et Memoires Bur. Int. Poids et Mesures, tome 6, 1888) 196p.

20. Rapport sur la construction. les comparaisons et le autres operations ayant   QC101.B47 1889
    servi a determiner les equations des nouveau prototypes metriques. Paris,
    Gauthier-Villars, 1889, 132p.   6-2197 rev.

Bernard, E.   QC84.B5 1688

21. De mensuris et ponderibus antiquis libri tres. Oxoniae, E. Theatro
    Seldonio, 1688. 2d ed.

    An important history of weights and measures in antiquity.

Bernoulli, Daniel, 1700-1782   HB201.B5 1896 HC
22. Die Grundlage der modernen Wertlehre... 1896.

    This unusual work on value, is the only work in the Library by the
    great mathematician Bernoulli.

QA273.B52 1899

Bernoulli, Jacques, 1654-1705.

23. Wahrscheinlichkeitsrechnung (Ars conjectandi) von Jakob Bernoulli (1713).
Leipzig, W. Engelmann, 1899, 2 v.

German edition of Bernoulli's "classical treatise" the Ars conjectandi (1713).
According to Boyer, p. 458, "This is the earliest substantial volume in the
theory of probability....The second part of the Ars conjectandi includes a
general theory of permutations and combinations...(It offered) the first
adequate proof of the binomial theorem for positive integer powers."

Bessel, Friedrich Wilhelm, 1784-1846.   QC89.B55 1839

24. Darstellungen der Untersuchungen und maassregeln... 1839.

German astronomer who directed the new observatory at Königsberg from 1913
until his death. Modern astronomy of precision is essentially Bessel's
creation, which inaugurated the modern era of practical astronomy. Best known
for his detection of stellar parallax, Bessel also introduced such items
as the effective use of the heliometer, the correction for personal equation,
and the systematic investigation of instrumental error.

                                                QD461.B55 No. 35, 1892
Berzelius, Jöns Jakob, friherre, 1779-1848.

5. Versuch, die bestimmten und einfachen verhältnisse aufzufinden, nach welchen
die bestand theile der unorganisichen natur mit einander verbunden sind. 1892.
                                                        4-21849
From: Ostwald's Klassiker der Exakten Wissenschaften, No. 35, 1892. First
published in 1810 in Ofhandlingar i fysik, and rev. in Annalen der physik,
1811-12.

Berzelius was one of the most influential figures in 19th century chemistry.
A most prolific writer, this reprint is one of his important papers in molecular
theory. His exacting studies proved the validity of the law of definite pro-
portions. This helped establish Dalton's atomic theory, and Berzelius was
later to prepare a list of atomic weights that was the first reasonably accurate
one in history. Berzelius also initiated efforts to introduce symbols to
describe chemical compounds. By 1830 he was the greatest chemical authority
in the world and became the veritable "lawgiver of chemistry." (Ihde, 113)

Biot, Jean Baptiste, 1774-1862

26. Recueil d'observations geodesiques, astronomiques et physiques., executees par order du Bureau des Longitudes de France en Espagne, en France, en Angleterre et en Ecosse pour determiner la variation de la pesanteur et des degres terrestes sur le prolongement du meridian de Paris...redige par Biot & Arago. Paris, 1821.

Nominated to the Bureau des Longitudes, Biot and Arago undertook an expedition to determine the arc of the meridian in Spain and the Balearic Islands in 1806. This was followed by other geodesic and astronomical expeditions which were reported in the above publication. Biot's most influential work was in the area of optical activity. He was the first to recognize the phenomena of the rotation of the plane of plane-polarized light. Geodesic studies in 1824-25 led Biot to conclude that the weight of a given body is not the same on all points with the same lattitude, nor is its variation uniform along a particular meridian. This work established the necessity of revising the generally accepted simple ellipsoid theory of the earth.

Bolton, Henry C.

27. A select bibliography of chemistry, 1492-1902. Washington, Smithsonian Institution, 1893.

Still regarded as an important bibliographic source in chemistry.

Boltzmann, Ludwig, 1844-1906

Boltzmann's important contributions focused on three fields--thermodynamics, electromagnetism, and the kinetic theory of gases. In electromagnetism he was one of the first scientists in Europe to recognize the importance of Maxwell's work, which he then expounded in lectures and a treatise:

28. Vorlesungen über Maxwell's Theorie der Elektrizität und des Lichts. 2 v. Leipzig, 1891-93.

Regarding gas theory, Boltzmann made fundamental contributions to the kinetic theory, especially in regard to viscosity and diffusion, and he introduced the Maxwell-Boltzmann equations governing the change in distribution of atoms due to collisions. This work was largely published in:

29. Vorlesungen über Gastheorie. 2 v. Leipzig, 1896-1898.

Boole, George, 1815-1864.

English-born mathematician who was appointed to the chair of mathematics
at Queen's College, Cork. One of his two books on mathematics is:

QA431.B7 1880

30. A treatise on the calculus of finite differences (1860). 3d ed. 1880.

Boole is most famous for his work on mathematical logic and Boolean algebra.
He realized the possibility of an algebra of entities that were not in any
sense numbers, and that the laws which hold for different types of numbers
need not all be valid in a system not applicable to numbers. His system
is described in his:

BC135.B71 1854

31. An investigation of the laws of thought on which are founded the mathematical
theories of logic and probabilities. 1854. (1st edition)

QA55.B72 1801

Borda, Jean Charles de, 1733-1799.
32. Table trigonometriques decimales. 1801.

After the French revolution, Borda played a leading role in establishing the
decimal system of weights and measures, the word "metre" being his. He was
closely associated with Delambre and Mechain in determining the arc of meridian
on which the standard metre was based.

Boussinesq, Joseph Valentin, 1842-1929

Theoretical physicist who was assigned the chair of physical and experimental
mechanics at Paris, he has been called "one of the last figures of classical
science in the 19th century." Boussinesq's work in hydraulics was considerable,
and with much insight he was able to use a method of legitimate approximation
that made it possible to carry out introcate calculations concerning the
study of whirlpools, liquid waves, the flow of fluids, the resistance of
a fluid against a solid body and the cooling effect of a liquid flow. He
also made worthy contributions in mathematics. Holdings of Boussinesq in
NBS Library are:

QA300.B65

33. Cours d'analyse infinitesimale, Paris, Gauthier-Villars, 1887-1890.

QA913.B61 1877

34. Essai sur la theorie des eaux courants...In Memoires, Acad. Sciences de l"inst.
Nat. de France, 24, 1877.

QC128.B6 1889

35. Lecons synthetiques de macanique generale...(1889) 2d ed?, Paris, 1889.

QA913.B62 1897

36. Theorie de l'ecoulement...des liquides. 1897.

Brisson, Mathurin Jacques (1723-1806)   QC89.F8B72 1799 HC

37. <u>Instruction sur les nouveaux poids et mesures, decretes le 18 germinal de l'an III<u>e</u></u>
(7 avril 1795, vieux style); (1799).

Aside from its historical value to the history of metrology, Brisson is credited
with having written the first textbook on physical chemistry. A convert to Lavoi$sie
new chemistry, he compiled tables of specific gravities which Lavoisier used, and is
still useful today. Brisson was professor of physics at the College of Navarre.

                                                         QA303.B8 1855
Brougham, Henry Peter, and Vaux
38. <u>Analytical view of Sir Isaac Newton's Principia.</u> London, 1855.

A lucid study of the <u>Principia</u>, which I. Bernard Cohen points out, has
"the solid merit of critically reviewing, paraphrasing, and classifying
the essentials of the method, demonstrations, and results of that foundation
masterpiece of the modern exact sciences." Although "analytic" the work
does not require extensive knowledge of advanced mathematics, thus providing
the general reader access to the essential methods and principles of Newton's
great work.

Bunsen, Robert Wilhelm (1811-1899)

Professor of chemistry at Kassel, Marburg, Breslau and Heidelburg. Possessed of
an excellent knowledge of mathematics and physics, Bunsen's inclinations were
experimental and inventive. He participated in the development of the Bunsen
burner, the spectroscope, the Bunsen electrochemical cell, the grease-spot
photometer, the absorptiometer, the actinometer, the effusion apparatus, the
filter pump and an ice calorimeter. It has been said of Bunsen: "As an investi-
gator he was great, as a teacher he was greater, as a man and friend he was
the greatest." Bunsen's classical researches on the cacodyl radical supported
the Radical theory developed by Lavoisier, Berzelius and Liebig, and is reported
in his:
QD412.A7B8 No. 27 1891
39. <u>Untersuchungen über die kakodylreihe.</u> 1891.

Bunsen undertook a careful investigation of photochemical reactions in 1854,
and it was found that the amount of chemical change produced was proportional
to the quantity of light absorbed. His studies were reported in:
QD601.B94 No. 38 1892
<u>Photochemische untersuchungen.</u> 1892.

Cajori, Florian   QC7.C13 1899

41. A history of physics in its elementary branches... 1899.

Still considered a definite source for the history of physics.

Campbell, Lewis, 1830-1908, and William Garnett, 1850-1932   QC16.M4C2

42. The life of James Clerk Maxwell. With selections from his correspondence
     and occasional writings. 2d ed. London, Macmillan, 1884, 421p.
                                                                     4-28112

This work remains to this day the standard biography of Maxwell.Includes
a biographical outline, a discussion of Maxwell's contributions to science,
and a selection of serious and satiric poetry which Maxwell composed.
Campbell was a close friend, and Garnett served as Demonstrator of Physics
under Maxwell at the Cavendish Laboratory.

·Candolle, Alphonse P. de, 1778-1841.   Q125.C3 1873 EC

43. Histoire des sciences et des savants... 1873.

The brilliant Swiss-French botanist Candolle served as professor of botany
at Geneva. He launched a monumental 21 volume plant encyclopedia, and intro-
duced Cuvier's system of classification devoting his life to extending and
perfecting it. He invented the word taxonomy, and his system of classification
remains largely in use to this day. Candolle was also an excellent biographer
and he left many notices of great value in the history of science in addition
to the above volume.

Cannizzaro, Stanislao, 1826-1910   QD533.C22 Nr. 30

44.   Abriss eines Lehrganges der Theoretischen Chemie. 1891. Ostwald's Klassiker
      der Exacten Wissenschaften, No. 30.

      A German edition of Cannizzaro's classical paper of 1858,"Sunto di un Corso
      di Filosofia Chimica." At mid-nineteenth century, the calculation of molecular
      weights was still a matter of uncertainty and confusion. Cannizzaro, professor
      of chemistry at Genoa, Palermo and Rome, succeeded in bringing order out of
      this chaos, by demonstrating lucidly that Avogadro's hypothesis could be a
      valid tool for determining the atomic weights of elements.

                                                            QC311.C31 189?
      Carnot, Sadi N.
45.   Betrachtungen über die bewegende kraft des feuers... 1892.

      German edition of Carnot's only published work, (Paris, 1824) Reflexions sur la
      puissance motrice du feu. It established Carnot as one of the most brilliant
      physical scientists of all time. He discovered the cycle of operations in a heat
      engine, known as "Carnot's Cycle," and formulated the second law of thermodynamic
      He described the principle of reversibility and anticipated Helmholtz in his work
      on the conservation of energy.

                                                        Q113.C3 1879 HC
      Cavendish, Henry, 1731-1810

46.   The electrical researches written between 1771 and 1781. Edited by James
      Clerk Maxwell, Cambridge, Cambridge University Press, 1879.
                                                                    $90

      Despite important advances, electricity and magnetism remained mysterious,
      imponderable fluids late into the 18th century, until quantitative studies
      were begun to find some method for measuring them.
                      Cavendish in 1771 showed that no charge was to be found
      inside a charged conductor. The Electrical Researches contains two of Cavendish's
      published papers (Phil. Trans., 1771, 1776), together with his considerations
      on the nature of electrification and also investigations into the mathematical
      theory of charged conductors.

      Cauchy, Augustin Louis, Baron, 1789-1857   QA927.C3

47.   Theorie de propagation des ondes a la surface d'une fluide pesant d'une pro-
      fondeur indefinie. Paris, (1827?)

      A leading French mathematician in the field of analysis, Cauchy served as
      professor of mechanics at the Ecole Polytechnique. A prolific writer, he,
      along with Gauss virtually created the modern form of complex analysis, and
      he is credited with introducing rigour into the calculus. Besides mathe-
      matics, he wrote many important papers in physics and astronomy and helped
      establish the undulatory theory of light. In his work on waves in liquids,
      noted above, he relied upon differential equations and introduced the   15
      Fourier tranform, which he independently discovered.

Cayley, Arthur, 1821-1895

Sadlerian professor of mathematics at Cambridge, Cayley, in addition to
Boole, Sylvester and others, provided a link in the history of pure mathe-
matics with the development of the algebraic theory of invariance which is
fundamentally important in current theoretical physics. Three of Cayley's
outstanding contributions were the invention of the theory of matrices,
the geometry of space of n dimensions, and his geometric ideas which clarified
non-Euclidean geometry. Much of what Cayley accomplished has passed into
the mainstream of current mathematics.
NBS holds:

48. The collected mathematical papers...v 1-13, 1889-1897.   QA3.C3

49. An elementary treatise on elliptical functions. Cambridge, Deighton, Bell
    & Co.; London, Bell & sons, 1876. 384p.   QA343.C3 1876
                                               $125

50. Memoires upon quantics, 1854-1878.   QA215.C3 HC

                                          ND1280.C53 1859

Chevreul, Michel Eugene, 1786-1889

51. The laws of contrast of colour: and their application to the arts of painting,
    decoration of buildings, mosaic work, tapestry and carpet weaving...,&c.
    London, Routledge, Warnes & Routledge, 1859. New 2d ed.   19-4500

    Professor in the natural history museum of the Jardin des Plantes, Chevreul
    made significant discoveries regarding the chemical constitution of soaps
    and fats. In 1824, he became director of dyeing at the tapestry works in
    Gobelin, and he began investigating dyeing and color relationships. In
    1828-30 he published a 2 volume work, Lècons de chemie applique a la teinture.
    He then turned to the problem of color contrasts and pioneered in developing
    laws of color harmonies. His De la loi contraste simultané des couleurs (1839),
    not only influenced the dyeing industry but provided a stimulus for the im-
    pressionistic school of painting.

Chladni, Ernst Florens Friedrich, 1756-1827

Known as the "Father of Acoustics," Chladni, inspired by the works of Euler
and Bernoulli, became a pioneer in experimenta' sound. He studied the torsiona:
vibrations of rods and the longitudinal vibrations of strings and rods, applyin;
the latter to the determination of the velocity of sound in solids. He also
measured the velocity of sound in gases other than air by filling an organ pipe
with gas and then measuring the pitch of the emitted note. The dust figures
formed at the nodes of the vibrating plates Chladni studied are called "Chladni
figures,"and the laws of acoustics he formulated have never been challenged.
Chladni, who was professor of physics at Breslau, published his systematic
thesis in German in 1802. It andsubsequent editions in the NBS library are
noted below:

52. Die akustik... 1802.   QC225,C53 1802
                                                              $ 250-300
                                                         QC225.C52 1809
53. Traite d'acoustique. Paris 1809. $225
        This edition contains an interesting preface of 14 pages describing
     Chladni's discoveries.
                                                         ML2790.C54 1821 HC
54. E. F. F. Chladni's Beytrage zur praktischen akustik...1821.

                                                         QC225.C546 1817 HC
55. Neue beyträge zur akustik. Leipzig, Breitkopf und Härtel, 1817.

Classen, Alexander, 1843-1934
                                                         QD115.C6 1894
56. Quantitative chemical analysis by electrolysis. 2d English ed. 1894.

     Classen's laboratory in Aachen was a center for research on electrolytic
     analysis. He invented useful apparatus and wrote an important handbook
     for electrolytic analysis, the English translation of which is noted above.

Clausius, Rudolf, 1822-1888

"The fundamental idea that a gas was an assemblage of moving particles had
been put forward by D. Bernoulli in 1738 and Herapath and Joule had in 1851
made a great step in advance by calculating the mean transitional velocity
of these particles. This idea, in the hands of Krönig and more especially
Clausius (in 1857), gave birth to the modern theory of kinetic gases, which
has been so splendidly worked out by Clausius and Maxwell, and since then,
perfected in detail by Boltzmann, O. E. Meyer, van der Waals and many others."
--Meyer, Hist. Chem., 1898, p. 494. In Clausius' work the second law of
thermodynamics is enunciated, and the concept of entropy (a term he coined)
is stressed. NBS holds:

                                                         QC311.C6
57. Die mechanische wärmetheorie...3 v. 1887-9(original ed. in 1864-67)
                                                              $250   17
                                                         QC311.C62 1879
58. The mechanical theory of heat. London, Macmillan, 1879.
     (English translation of the 2nd and largely revised edition of the Abhandlungen
     über die mechanische warmetheorie) $50

QA931.C6 1862

Clebsch, Rudolf Friedrich Alfred, 1833-1872

59. Theorie der Elastizität fester körper. Leipzig, 1862.

Clebsch was an important mathematician who served as professor at the Tech-
nische Hochschule in Karlsruhe, the University of Giessen, University of
Göttingen, and was also a founder of the Mathematische Annalen. His book
on elasticity stemmed from his early career. In it he treated and extended
problems of elastic vibrations of rods and plates. His interests here were
more mathematical than physical, and he soon moved on to pure mathematics
where he achieved a dominant place.

QA846.C6

Clifford, William Kingdon, 1845-1879

60. Elements of dynamic; an introduction to the study of motion and rest in
solid and fluid bodies. London, Macmillan & Co., 1878-1887.
Part 1: 1878, Kinematic.

British mathematician, Clifford is most widely remembered as a popular writer
on mathematics and physics whose writings are flavored by highly personal
and philosophic overtones. He was important in introducing Riemann's ideas
and other writers on non-Euclidean geometry to English mathematicians. Clifford
expressed his own originality in his papers on biquaternions, the classification
of loci, and the topology of Riemann surfaces.

QC91.C72

Commission des Poids et Mesures, 1793

61. Signatures of the original metric committee. Also signatures of the Commission
Internationale du Metre members who witnessed the original document 72 years
later.

Coulomb, Charles Augustin de, 1736-1806.   QC516.C85 Nr. 13 1890

62. Vier abhandlungen über die elecktricität und den magnetismus. Leipzig, 1890,
88p.   3-19266

Note: From Ostwald's Klassiker der Exakten Wissenschaften, Nr. 13. The
articles origially were published in Histoire et memoires de l'Academie
Royale des Sciences, 1785-1786..

Beginning his career as a military engineer, Coulomb moved toward scientific
experimentation. In 1777 he invented a torsion balance which measured the
quantity of a force by the amount of twist it produced in a thin, stiff
fiber. Applying this invention to electricity for the purpose of improving
the mariner's compass, he discovered in 1785, that the force of electrical
attraction or repulsion is proportional to the product of the charges on
each sphere and inversely proportional to the square of the distance between
the spheres, center to center. This meant that electrical forces obeyed
a rule similar to gravitational forces, and is called Coulomb's law. The
coulomb, the unit for the quantity of electric charge, was named in his honor.
This 1890 publication reprinted Coulomb's classic reports of 1785 and 1786.

QC518.C85 1897

Curry, Charles Emerson.

63. Theory of ele.tricity and magnetism. With a preface by Ludwig Boltzmann.
London, New York, Macmillan, 1897, 442p. 47-36326
$140

A good restatement in English of Boltzmann's theory in electricity and
magnetism. Boltzmann wrote: "Dr. Curry thought that (my book of lectures
on electricity and magnetism) translated into English might be useful...
and offered a more elaborate treatise...inserting my lectures as well as
the theory of Hertzian oscillations, Maxwell's equations for moving bodies, etc."

QE372.D23 1892

Dana, James Dwight, 1813-1895

64. The system of mineralogy of James Dwight Dana, 1837-1868. Descriptive
mineralogy, 6th ed. New York, Wiley, 1892.

A graduate of Yale, then assistant to Benjamin Silliman, Dana published his
first edition of the System of mineralogy (1837) when he was 24 years old.
He spent the next four years as geologist and mineralogist on the Wilkes
expedition which explored the South Pacific. His reports of the zoology
and geology of the coral islands are classics. Later, he served as professor
of natural history and geology at Yale. His System of mineralogy went
through five editions.

QB28.D3 1821a

Delambre, Jean Baptiste Joseph, 1749-1822
65. Histoire de l'astronomie moderne. Paris, 1821.

In this classic work, Delambre analyzed the writings of the major astronomers
such as Descartes, Galileo, Copernicus, and Keppler, as well as giving accounts
of certain minor but significant astronomers, reference to whom is rarely found
in other works. According to I. Bernard Cohen, "there is hardly a subject treated
by Delambre...on which the scholar will not find important insights and valuable
information. ...Delambre's work remains the most useful work of its kind ever
written."
It was Delambre who proposed the new unit of measure, the metre, based upon the
10-millionth part of an arc drawn through Paris from Dunkirk to Barcelona (1798-99).

QA273.D37 1756 HC

DeMoivre, Abraham, 1667-1754

66. The doctrine of chances: or, a method of calculating the probabilities of
events in play. 3d ed. London, A. Millar, 1756, 348p. $225

A French mathematician who adopted England as his home for the last 66 years
of his life, DeMoivre achieved recognition in his own lifetime for his
contributions to algebraic calculations, the science of life-contingencies
and life-expectancies. Todhunter called this work on probabilities, "the
most important contribution to the theory of probability before the 19th
century." The 3d edition was much enlarged over earlier ones, the first
edition in 1718, and the 2d edition in 1738. DeMoivre's work on probability
was superceded and overshadowed by Laplace's great synthesis.

19

QA273.D38 1838

De Morgan, Augustus, 1806-1871.

67. An essay on probabilities and their application to life contingencies and insurance offices. London, Longman, Orme, Brown & Green & Longmans, 1838, 306p.

6-5370

De Morgan, a mathematician who held the chair in mathematics at the University College, London, was a prolific writer who exerted considerable influence on the development of mathematics in the 19th century. He was a great teacher and also made original contributions in the fields of analysis and logic. Subsequent developments in symbolic logic owes much to his fundamental work in logical research. De Morgan was also a powerful advocate of decimal coinage. His Essay on probability, written for an encyclopedia, is regarded as a standard work in the theory of probability and is still cited in the insurance literature.

BL245.D7 1896

Draper, John William, 1811-1882

58. History of the conflict between religion and science. 1896.

Draper came to the U.S. from England in 1833, and received his M.D. from the University of Pennsylvania in 1836. He practiced as a physician in Virginia and New York. He also served as professor of chemistry at William and Mary College and soon after at Hampden Sidney College, becoming then the first professor of chemistry in the newly founded New York University Medical College. A pioneer of photography in the U.S., his researches in chemistry were numerous, original, and valuable; his earlier History of the intellectual development of Europe (1852), is still regarded as an authoritative work. Draper's History of the conflict between religion and science(1874) was his most popular work, widely read in many transla-translations. It offered a vigorous polemic against the persecution of scientists by religionists.

Q113.D7 1878

Draper, John William, 1811-1882.

59. Scientific memoirs: being experimental contributions to a knowledge of radiant energy. New York, 1878.

$100

First collected edition which contains Draper's important early papers "Examination of the radiation of red-hot bodies" (1847), "On invisible fixed lines in the sun's spectrum detected by photography" (1843), and other related papers on the negative rays of the sun, the diffraction spectrum, the decomposition of carbonic acid gas by plants, on daguerretype, lunar photography, the chlorhydogen photometer, microscopic photography, electro-motive power of heat, etc.

QC518.D8 1894

Drude, Paul Karl Ludwig, 1863-1906

70. <u>Physik des aethers</u>...1894.

As a physicist, Drude became convinced that Maxwell's electromagnetic theory was superior to the older mechanical view of light. This led to his <u>Physik des aethers</u> (1894) which was one of the first German books to base explanation of electrical and optical effects on Maxwell's theories.

Duhem, Pierre Maurice Marie, 1861-1916

Duhem, a French physicist, was an unusual and noteworthy scientist who made important contributions in science (especially thermodynamics, hydrodynamics, and physical chemistry) and in the philosophy of science and the history of science. Despite his accomplishments, Duhem was never offered a professorship or chair at a major university owing to personal and professional conflicts. His work in thermodynamics extended and elaborated on the pioneering work of Gibbs and Halmholtz and introduced their knowledge of chemical thermodynamics to a whole generation of French physicists and chemists. His <u>Potential thermodynamique</u> (1886) is historically important for the systematic use of thermodynamic potentials, when others were still using osmotic pressure as a measure of chemical affinity. His book on hydronamics had an important influence on mathematicians and physicists, and he is regarded as a lone pioneer who for years tried to provide rigorous general theorems for Navier-Stokes fluids and for finite elasticity in Kelvin-Kirchoff-Neumann bodies. His works at NBS include:

QC311.D8 1895

71. <u>Le potential thermodynamique et ses applications a la mecanique chimique et l'etude des phenomenes electriques</u>. Paris, A. Hermann. 1895 ed.

QC20.D8 1891

72. <u>Hydrodynamique, elasticite, acoustique.</u> 1891

QC311.D83 1896

73. <u>Theorie thermodynamique de la viscosite</u>...1896.

QD261.D8 1898

74. <u>Manuel operatoire de chimie organique</u>...1898.

QA308.E8

Euler, Leonhard, 1707-1783.

75. <u>Supplemente und Zusätze zur Integralrechnung.</u> 1830.

Euler, the great Swiss mathematician who spent most of his career at St. Petersburg, was the creator of modern mathematical expression, and one of the most outstanding mathematicians and astronomers of his century. Euler's contributions range over the entire field of pure and applied mathematics. His researches on series led to his creation of the theory of definite integrals by the development of so-called <u>Eulerian integrals</u>. The above work was published first in 1794 as a supplement to his great textbook, <u>Institutiones calculi integralis</u> (1768-1770).

Michael Faraday, 1791-1867

English physicist and chemist, Faraday was one of the most famous and ingenious scientists of the 19th century. Among his contributions are: the liquification of chlorine, the isolation of benzene, and the discovery of certain chlorides and compounds of carbon, iodine and hydrogen. In 1831 he began his studies in electricity and magnetic forces. He discovered magnetic induction and was the first to use the concept of magnetic lines of force and to provide an explanation for what he called the dielectric constant. His conception of electric and magnetic forces and their inter-relations were essential to the direction taken by science thereafter, es-pecially since Maxwell developed his equations based upon them. Faraday also demonstrated the existence of five sorts of electricity, and formulated the basic laws of electrolysis, introducing many terms now universally used. Faraday is also credited with the discovery of the rotation of the polarization plane of light. Important works by Farady at NBS are:

                                                            Q113.F21 1859 HC
76. <u>Experimental researches in chemistry and physics</u>. London, 1859   ($175)

>   In this work, Faradays important discoveries in chemistry and physics ranging from 1821 to 1857 are presented.

                                                            QC503.F2
77. <u>Experimental researches in electricity</u>. London, 1839-1855. 3 v.
                                                            $325

>   On the Grolier List of 100 Books Famous in Science, it contains his classic electromagnetic researches.

                                                            QC71.F24 1860 HC
78. <u>A course of six lectures on the various forces of matter</u>...1860.

                                                            QD161.F21 1853 HC
79. <u>The subject matter of a course of six lectures on the non-metallic elements</u>.

>   Faraday was renowned for his great skill as a lecturer

                                                            QA32.F5

Fibonacci, Leonardo, fl. 1220

80. <u>Scritti di Leonardo Pisano</u>... Roma, Tipografia delle scienze matematiche e fisiche, 1857-62. 2 v.

Leonardo of Pisa, or Fibonacci, was educated in Barbary where he became acquainted with al-Khwarizmi's <u>Algebra</u> and the Arabic numeral system. With his return to Italy, he published his <u>Liber Abbaci</u> (1202, rev. 1228), and is credited with introducing Arabic mathematical science into Europe. The mathematical masterpiece of the Middle Ages, it remained a standard for more than two centuries. In this work can also be found the so-called Fibonacci series 1, 1, 2, 3, 5, 8, 13, 21..etc., in which each term is the sum of the two preceding terms. The <u>Liber Abbaci</u> is included in this 19th century reprint of Fibonacci's great works, as well as his <u>Practica Geometrica</u> (1225) which introduced a large amount of material on geometry and trigonometry, presumably from Greek sources now lost.

Fleming, Sir John Ambrose, 1849-1945

Fleming, an electrical engineer who had worked with the Edison Company
in London and then became professor at University College "was one of
the leading teachers of his time. His flair for linking together the
mathematical bases of little-understood phenomena with their practical
effects was a factor which drew many distinguished engineers;to his special
lectures at University College as well as...at the Royal Society of Arts."
--DNB. In 1890, he began studying the "Edison Effect" which led in 1904
to his invention of the thermionic valve, which ultimately made radio
broadcasting possible. Two of Flemings works are in the collection:

QC601.F59 1899

81. The centenary of the electric current...1899.

QC601.F6 1898

82. Magnets and electric currents. An elementary treatise for the use of
electrical artisans and science teachers. London, E. & F. N. Spon, 1898.

Fourier, Jean Baptiste Joseph, baron, 1768-1830.

The first of the French mathematical physicists, Fourier was awarded an
appointment at the Ecole Normale and later, a chair in the Ecole Poly-
technique. Beginning in 1807, Fourier examined the flow of heat in solids
and developed a new method of mathematical analysis of the process. His
studies were published in 1822 as the Theorie analytique de chaleur. Of
this work, Maxwell wrote that it "was the first and greatest book on the
physical subject of the conduction of heat. It is one of the very few
scientific books which can never be rendered antiquated by the progress
of science." The development of Fourier analysis marked "an epoch in the
history of mathematical physics."--Cajori. Held by NBS are:

QC254.F56 1878

83. The analytical theory of heat. Translated by Alexander Freeman. Cambridge,
The University Press, 1878, 466p.   46-39765
   --First edition in English $110

QC254.F56 1888

84. The analytic theory of heat. New York, Stechart, 1888.
   --presumably the first American edition

85. Oeuvres de Fourier...1888-90.   QC3.F77

Fresnel, Augustin J., 1788-1827

86. <u>Oeuvres Completes</u>. Paris, Imprimerie Imperiale, 1866-1870. 3 v. First and only
collected edition. $200

Fresnel served as a government engineer for years before he began his ex-
perimental researches in 1815. Fresnel discovered the principle of
interference without being aware that Young had achieved this more than
13 years earlier. To remove objections to his theory, Fresnel designed
his memorable experiment which produced two small sources of light without
resorting to apertures or edges of opaque obstacles. By using two plane
metallic mirrors, forming an agle nearly 180° with each other, he avoided
diffraction and yet produced interference with the reflected beams. In
the <u>Oeuvres completes</u> can be found the experiments and mathematical proofs
that make Fresnel the creator of the wave theory of light.
Note: vol. 1 missing; replaced with 1965 reprint.

Galilei, Galileo, 1564-1642

87. <u>Unterredungen und mathematische demonstrationen über zwei neue wissenszweige</u>...
1890-91,

A German translation and reprint (Ostwald's Klassiker series?) of Galileo's
great work on mechanics, <u>Conversations and mathematical demonstrations on two
new branches of science</u> (1638). It constituted the most notable progress
in mechanics since Archimedes, and throughout the work, Galileo depended
on the results of experiments rather than speculation.

Galton, Sir Francis, 1822-1911

88. <u>English men of science: their nature and nurture</u>. London, Macmillan & Co., 1874,
270p. 10-20467

Galton investigated the families of great men and suggested that genius
was hereditary. His works founded the science of eugenics, though the term
itself was not coined until 1883. Galton was a proponent of Darwinism,
and he devoted much time and effort to support his view with statistical
evidence.

Gauss, Karl Friedrich, 1777-1855

German mathematician, astronomer and physicist, Gauss has been ranked, along with Archimedes and Newton, as one of the greatest mathematicians of all time-- the "prince of mathematicians." He enriched mathematics in a large variety of ways, and, in many respects, set the pace for the expansion of mathematical research in the 19th century. His most profound discoveries in mathematics were achieved between the age of fourteen and seventeen. In 1795, he discovered the method of least squares, of which two editions are noted below, In 1801, he published the Disquisitiones Arithmeticae, usually considered his greatest achievement. Equally prolific in astronomy and geodesy, he computed the orbit of planetoids, published in his Theoria motus (1809), and developed formulas for calculating parallax. In 1818, he was commissioned to make a geodesic survey to the Kingdom of Hanover, which led to his invention of the heliotrope. After 1831, he took up fundamental research in electricity and magnetism, invented the bifilar magnetometer, and was honored with the naming of the electromagnetic unit, the gauss. His works in NBS include:

QA275.G2 1887 HC

89. Abhandlungen zur methode der kleinsten quadrate...1887.

QA275.G27 1855

90. Methode des moindres carres...1855.

QA3.G3

91. Carl Friedrich Gauss Werke... 1870--
     (--bd. 2, bd., 4, bd. 5 only)

QD181.I1G3 No. 4
1889   HC

Gay-Lussac, Joseph Louis, 1778-1850

                                                                        der
92. Untersuchungen über das jod. 1899. Ostwald's Klassiker/Exakten Wissenschaften,
     Nr. 4. Originally published as"Memoire sur l'iodide," Annals de chemie, 1814

French chemist who served as professor of chemistry at the Ecole Polytechnique and later at the Jardin des Plantes, Gay-Lussac is distinguished for his work on laws of gases and the properties of iodine and cyanogen. In 1808 he published his most influential work, the law of combining gas volumes, which proved crucial to consolidating atomic theory. Although iodine was discovered in 1811 by B. Courtois, it was Gay-Lussac who brought about an understanding of this element and gave it the name iode (from the Greek ioeides meaning violet colored). A considerable controversy surrounded Gay-Lussac's work with iodine because Humphrey Davy challenged him on the priority of his work.

Gibbs, Josiah Willard, 1839-1903.

Born in New Haven, where he spent almost his entire life, Gibbs was one
of America's greatest scientists. He is responsible for much of the
basic work in modern chemical thermodynamics and statistical mechanics.
Appointed professor of mathematics at Yale, Gibbs, and his great contributions
in thermodynamics remained almost unknown until Maxwell, in 1875, recognized
his work. His early papers in mathematics, physics, and thermodynamics,
were all published in the Transactions of the Connecticut Academy of Sciences
between 1873-1878. His great importance rests on his comprehensive appli-
cation of mathematics to chemical subjects, which was unrivaled in his day.
NBS has his:

QC311.G5 1892 HC
93. Thermodynamische studien...transl. by Wilhelm Ostwald. Leipzig, 1892.
                                                            :$385

    First German edition of Gibb's three papers on thermodynamics.
    Before him, the sciences of thermodynamics comprised only the rela-
    between heat and mechanical work. Owing to Gibbs, thermodynamics
    was broadened to include the whole field of energy transformations
    between all the forms in which it may be manifested--thermal,
    mechanical, electrical, chemical, or radiant.

QD501.G4 1899 HC
94. Equilibre des systems chimiques...1899.

                                                    QC751.G46 1893 HC
Gilbert, William, 1544-1603.

95. William Gibert of Colchester: On the loadstone and magnetic bodies, and
on the great magnet of the earth. Transl. by P. Fleury Mottelay. New
York, Wiley & Sons, 1893, 368 p.   4-1294

The first English translation of Gilbert's classic work on magnetism. Today,
the unit of magneto-motive force is called the gilbert.

Glaisher, James, 1809-1903

British meteorologist, largely self-taught, who served as superintendent
of the magnetic and meteorological department at Greenwich. He effectively
organized meteorological observations and climatological statistics in the
United Kingdom.

QC886.G5 1867
96. Diurnal range tables, newly arranged; containing corrections for temperature,
adapted to different hours of observation, for different ranges of daily
temperature... 4th ed. London, Taylor & Francis, 1867.

QC886.G52 1880
97. Table of corrections for temperature.. 2d ed. London, Taylor & Francis.

Glaisher, James Whitbread Lee, 1848-1928

Son of James Glaisher, he was an astronomer and mathematician who was
interested in the calculation of numerical tables. He served on the
Committee on Mathematical Tables, which issued a 175-page report containing
much historical and bibliographical data, published in 1873. He has
been called "a mathematical stimulus to others rather than a pioneer."

QA51.G53 1879
98. Factor table for the fourth million....1879

QA51.G54 1880
99. Factor table for the fifth million....1880

QA51.C55 1883
100. Factor table for the sixth million...1883.

Glazebrook, Richard Tetley, 1854-1935

British physicist who became secretary of the British Association Committee
on Electrical Standards in 1883, and then served as director of the National
Physical Laboratory when it was established in 1913. An accomplished experi-
mentalist, as NPL director he pressed for the determination of fundamental
units for both scientific and industrial purposes. He wrote several textbooks
which were widely used:
QC255.G5
101. Heat and Light...Cambridge, 1894.

QC127.G52 1895
102. ...Mechanics, an elementary textbook. 2d ed. 1895.

Grashof, Franz, 1826-1893

Grashof's career focused on applied mechanics, thermodynamics and machine design. In 1854 he became director of the Office of Weights and Measures at the Gewerbe-Institut, and was a founding member of the Verein Deutscher Ingenieure, and later became its director. He was recognized as an authority on mechanical engineering and was regarded as an outstanding teacher and engineer who influenced a generation of engineers that followed him. The Grashof Medal is named for him and awarded annually for achievment in technology. He also served on the Standards Commission.

TJ145.G7
103. Theoretische maschinenlehre. 3 v. Leipzig, 1875-90.

> This work was characterized by sharp insight and critical observation regarding the limits of accuracy and the admisibility of assumptions, and was without peer in the literature.

QC191.G7 1878
104. Theorie der elasticität und festigkeit...Berlin, 1878.

> In his work, for the first time, were presented the fundamental equations of the theory of elasticity. In this text on the strength of materials he treated flexure, torsion, bucking,
>
> plates and shells.

QD905.G88 1876 HC

Groth, Paul Heinrich von, 1843-1927.

105. Physikalische krystallographie. Leipzig, 1876.

Groth's most important contribution to science was his explanation of the connections between chemical composition and crystal structure. In this work can be found his investigational findings on the optical, thermal, elastic, magnetic and electrical properties of crystals. Many of his views on morphotropy and isomorphism, and on chemical crystallography in general have become firmly embedded in the chemical literature.

Guillaume, Charles Edouard, 1861-1938

After obtaining his PhD, Guillaume entered the Bureau Internationale des
Poids et Mesures. He remained there throughout his career and became its
director in 1915. His first work was devoted to thermometry, resulting in
his Etudes thermometriques (1886), and his Traite pratique de la thermometrie
de precision (1889), the latter becoming a standard work for metrologists.
He then participated in the preparation of the national meters, a fundamental
work which marked the origin of modern metrology. After 1890, Guillaume
took up his investigations on metal alloys, especially the ferronickels
and obtained an alloy, invar, that was widely employed because of its
non-expansive qualities. He also discovered elinvar, an alloy whose
elasticity does not vary with temperature. In '920, Guillaume received
the Nobel Prize for his work on ferronickels. NBS holds his:

QC271.G82 1886 HC
106. Etudes thermometriques. 1886

QC101.G8 1893
107. Rapport sur l'etude des metaux propres a la construction des regles etalons.
        Paris, Gauthier-Villars, 1893.

QC271.G8 1889 HC
108. Traite pratique de la thermometrie de precision. Paris, Gauthier-Villars, 1889.

QC100.G8 1893
109. ...Unites et etalons. P-ris, Gauthier-Villars, 1893, 190p. 40-2567

Guldberg, Cato Maximilian, 1836-1902
QD501.G97 Nr. 104 1899   QD501.G97 Nr. 104 1899
110. Untersuchungen über die chemischen affinitäten. 1899. Ostwald's Klassiker
        der Exakten Wissenschaften, Nr. 104.

Along with P. Waage, Guldberg is known for his "Law of Mass Action."
Beginning with their first paper on chemical equilibrium in 1864, Guldberg
and Waage developed mathematical expressions that cover both forward and
reverse chemical reactions, and cited some 300 quantitative experiments
as evidence of the manner in which mass, concentration, and temperature
affected reaction rates. Their brilliant work remained almost unknown
until Wilhelm Ostwald adopted the law of mass action and proved its validity
by new experiments (1877). Guldberg's and Waage's papers on mass action
have been abridged and translated into the above work.

Hassler, Ferdinand Rudolf, 1770-1843

1\.1. Logarithmic and trigonometric tables; to seven places of decimals, in a
pocket form. New York, C. & G. & H. Carvill, 1830.

These tables are notable because their author is a major figure in the
history of American metrology. Born in Switzerland, he emmigrated to the
U.S. in 1805. A geodesist and mathematician, he became the first superin-
tendent of the United States Coast Survey, the first scientific bureau under
the government. While engaged in obtaining instruments for the Coast
Survey, Hassler, being one of the leading metrologists in his day, devoted
considerable attention to securing standards of weights and measures for
the government.

Hatly, Rene-Just, 1743-1822

.12. Traite elementaire de physique. 2 v. 2d ed. Paris, 1806.

After writing his Essay on the theory and structure of crystals (1784) which
laid the foundation for the mathematical theory of crystal structure, Hauy
was ordered by Napoleon to write a textbook on physics. This book, (first
edition, 1802), was outstanding for its clear, methodical exposition of
physics.

Heaviside,Oliver, 1850-1925

113. Electrical papers. 2 v. London, 1892.

Heaviside is recognized as the founder of the theory of cable telegraphy
and discoverer of the "heaviside layer" in the upper atmosphere. Beginning
in the 1870's, he wrote technical articles including proposals for multiplex
telegraphy. His contributions to telegraphy theory had significance far
beyond their immediate technical importance. He introduced self-induction,
impedance and conductance notions, and regarded telegraphy, whether
by cable or by radio-waves, as being essentially the same.

Heine, Heinrich Eduard, 1821-1881

L14. Handbuch der kugelfunctionen, theorie und anwendungen. 2d ed. 2 v.
Berlin, 1878-81.

Mathematician Heine's greatest work, its treatment of spherical functions
(legendre polynomials) became the standard compendium on the subject well
into the 20th century.

Herschel, John Frederick William, 1792-1871.

QC101.H62 1863 HC

115. <u>The yard, the pendulum and the metre</u>...1863.

Mathematician, physicist and astronomer, Herschel is perhaps best re-
nowned for his astronomical contributions. In 1850, curiously following
in Newton's footsteps, Herschel became Master of the Mint. There he
advocated decimal coinage, and wrote articles on metrology, physical
georgraphy and the telescope. The above work in metrology came from
this last period in his life.

Hertz, Heinrich Rudolf, 1857-1894

Professor of physics at Karlsruhe, Hertz's great fame rests upon his
experimental proof of the Faraday-Maxwell hypothesis that electrical
waves can be projected through space. He also demonstrated that electric
waves are essential the same as light waves. They travel in straight
lines with the same velocity as light waves; they can be reflected and
refracted; they are subject to interference and can be polarized. His
work was not only scientifically significant but it also entitled him
to be regarded as a pioneer of radio communication. Works of Hertz at
NBS are:
QC3.H49
116. <u>Gesammelte werke.</u> 1894-95. 3 v.

QC3.H5 1896
117. <u>Miscellaneous papers</u>, ed. by P. Lenard. London, 1896.
         This volume contains 19 technical papers published between 1880-1892.

QA805.H57 1899
118. <u>The principle of mechanics presented in a new form.</u> London, 1899.
         Hertz's last major work, published posthumously in 1894, this is
         the first English edition. Following Helmholtz's investigations, it
         discusses the various forms of energy and the conditions of transmission

         from one form to another. The preface contains much biographical data.

QD511.H53 Nr. 9 1890

Hess, Germain, 1802-1850.

119. <u>Thermochemische untersuchungen</u>...1890. Ostwald's Klassiker der Exakten
.Wissenschaften, Nr. 9.

A pioneer in thermochemistry, Hess established (1838-40) the law of constant
heat summation (Hess's Law), which states that the heat developed in a chemical
change is constant, whether the change occur in one or in several stages.
This, in fact, is a consequence of the conservation of energy principle,
but at the time the principle had not been clearly formulated. Hess's
contributions have been reprinted in the above edition.

31

Hoff, Jacobus Hendricus van't, 1852-1911.

Van't Hoff was a pioneer of stereochemistry and the theory of solutions,
and one of the greatest chemists of ... day. His work on solutions resulted
in the Nobel Prize in 1901. His works at NBS include:

QD481.H694 1898
120. <u>The arrangement of atoms in space.</u> 2d rev. & enl. ed., London, New York,
Longmans, Green, 1898. $175
First published in 1875, this is the work on which the whole science
of stereochemistry was largely based. Van't Hoff reasoned that sub-
stances which show optical rotation do so because of the asymetric
structure of their molecules.

QD453.H69
121. <u>Lectures on theoretical and physical chemistry.</u> 1899-1000.

QD191.H7 1897
122. <u>Vorlesungen über bildung und spaltung von doppelsalzen.</u> 1897.

QD1.J6
123. <u>Jahresbericht über die fortschritte der chemie.</u>

Founded in 1822 by Jons Jakob Berzelius, this annual review was famous
and esteemed. In it Berzelius reported his own significant findings, and
brought attention to important research published elsewhere. Berzelius
was shrewd in judging scientific work and had a rare insight into the
significance of observations made by others.

QC3.J6
Joule, James Prescott, 1818-1889.

124. <u>The scientific papers of James Prescott Joule.</u> 2 v. London, 1884-1887.

Joule is celebrated for his experimental establishment of the mechanical
theory of heat. In 1841 - 1849 he published several papers establishing
theoretically and experimentally the mechanical equivalent of heat. In 1848
Joule wrote his epoch-making paper on the kinetic theory of gases, containing
-he first estimate of the velocity of gas molecules. Of Joule, Lord Kelvin
remarked, "his boldness in making such large conclusions from such very small
observational effects is almost as noteworthy ...as his skill in extorting
accuracy from them."

Jordan, Camille, 1838-1921

'5. <u>Cours d'analyse.</u> 3 v. 1882-1887.

Regarded as a 'universal" mathematician, who published in practically all
the branches of math, Jordan's conception of rigourous proof in analysis was
far more exacting than that of most of his contemporaries. His <u>Cours d'anlyse</u>
had a widespread influence and set the standard which was not surpassed for
many years.

Kant, Immanuel, 1724-1804.

126. <u>Allgemeine naturgeschichte und theorie des himmels...1890.</u> (Ostwald's
Klassiker der Exakten Wissenschaften, no. 12)

The great philosopher's cosmological work, <u>Universal Natural History and
the Theory of the Heavens</u> (1755), in which he boldly anticipated astronomical
facts that were later confirmed by very powerful observational techniques
and with the help of relativistic cosmological theory. He conjectured that
our solar system is a part of a vast system of stars making up a single
galaxy, that the so-called nebulous stars are galactic systems external to
but similar to our own galaxy, and that there are many such galaxies in
the universe as a whole.

Kelvin, Baron (William Thomson), 1824-1907.

Along with Michael Faraday, Thomson was also responsible for initiating the
theory of electromagnetic field. Along with Helmholtz, Thomson contributed
to the establishment of the first law of thermodynamics. Reviewing Carnot's
work on an ideal heat engine, Thomson established the theoretical absolute
temperature scale, the Kelvin scale. In 1851, he ennuciated the second
law of thermodynamics, from which considerations, led him to contributions
to the theory of chemical equilibrium. From these, and many other important
contributions, Thomson came to be known as one of the greatest physicists
of the 19th century. Works by Thomson at NBS include:

127. <u>Elements of natural philosophy.</u> 1894.

128. <u>Popular lectures and addresses.</u> 3 v. 1889-

129. <u>Mathematical and physical papers, 1882-1911.</u> 1884-90. (vol. 2 & 3 only)

30. <u>Reprint of papers on electrostatics and magnetism.</u> 2d ed. 1884.

131. <u>Treatise on natural philosophy.</u> Cambridge, University Press, 1895-96. 2 v.
        --with P. G. Tait

Kepler, Johannes, 1571-1630

132. <u>Nova stereometria doliorum vinariorum</u>. 1615.

One of the earliest and rarest books in the NBS Library, this work by
the great celestial physicist, is generally regarded as one of the sig-
nificant works in the prehistory of the calculus. He set about to
compute the actual volumes of wine casks delivered to his home. Instead
of using the classical Archimedian procedures, he adopted a less rigorous
but productive scheme in which he considered that the figures were com-
posed of an infinite number of thin circular laminae or other cross sections.
Captivated by the task at a time when he was engulfed by personal troubles,
he extended his method to other shapes. This book was probably the first
book ever published in Linz. This work was later revised as <u>Messekunst</u>
<u>Archimedis</u> (1616).

Note: The shelf list entry indicates that this rare work is missing. Efforts
might be undertaken to try and locate it.

Kirchhoff, Gustav Robert, 1824-1887.

German physicist, Kirchhoff generalized the equations dealing with the flow
of electricity in conductors and developed a theorem that gives the distri-
bution of currents in a network. He also provided a logical synthesis of
mechanics which he considered an accurate description of natural phenomena.
His work in spectral analysis with Bunsen laid the basis for the science
of spectroscopy. With it, they discovered the elements cesium and rubidium.
Kirchhoff applied spectroscopic methods to the study of the chemical compo-
sition of the stars which resulted in the Kirchhoff law of radiation. It
states that the ratios of the emissive to the absorptive powers were the
same for all bodies at a given temperature for radiation of a given wavelength.
Works by Kirchhoff at NBS include:

133. <u>Vorlesungen über mathematische physik.</u>(Published in 4 volumes)
      --I. <u>Mechanik.</u> 4th ed. 1897   QA805.K58 1897
       II. <u>Mathematische optik.</u> 1891.   QC383.K55 1891
      III. <u>Electricität und magnetisimus.</u> 1891   QC518.K6 1891
       IV. <u>Theorie der Wärme.</u> 1894. QC254.K5 1894

      QD545.K58 1898 nr. 101
134. <u>Abhandlungen über mechanische wärmetheorie.</u> (Ostwald's Klassiker der
         Exakten Wissenschaften, Nr. 101).

      QD95.K58 1895 Nr. 72
135. <u>Chemische analyse durch spectralbeobachtungen.</u> Written with Robert Bunsen
         and edited by Wilhelm Ostwald. Ostwald's Klassiker der Exakten
         Wissenschaften, Nr. 72. 1895.

      QB551.K58 1862
136. <u>Researches on the solar spectrum.</u> 1862.

QD11.K8   HC

Kopp, Hermann F. M.
Geschichte der chemie. Braunschweig, 1843-1847. Four parts in two volumes.

First edition of the standard history of chemistry, distinguished by its compre-
hensiveness and thoroughness. It remains a monumental work of learning, patient
labor, skill and sagacious criticism.

QA804.L17   HC

Lagrange, Joseph Louis, 1736-1813
138. Mecanique analytique. Nouvelle edition, revue et augmentee par l'auteur. Paris,
1811-1815, 2 v.
$225

2d edition. Ernst Mach called this work "a stupendous contribution to the
economy of thought." It includes the discovery of the general equations of motion.
One of the greatest of French mathematicians, Lagrange set out to dispose once
and for all the reasoning necessary to resolve mechanical problems by embodying
them as much as possible in a single formula.

Lambert, Johann Heinrich, 1728-1777

Lambert did pioneering work in pyrometry in addition to his studies on
light absorption. He rediscovered the principle that the fraction of
incident light absorbed by a medium is proportional to the thickness
of the medium.
QC253.L25 1779 HC
139. Pyrometrie; oder, vom maasse des feuers und der wärme. Berlin, 1779.

QC391.L22 1892
140. Lamberts photometrie. 1892. 3 v.

Laplace, Pierre Simon, Marquis de, 1749-1827.

Laplace's mathematical genius was discovered early and at the age of 20 he
was appointed professor at the Ecole Royale Militaire. His greatest contri-
butions were in the fields of celestial mechanics and the calculus of pro-
babilities. For a time, he served as a member of the Commission des Poids
et Mesures. His work on probability calculus is remarkable. The major work
was his Theorie analytique des probabilites (1812), a splendid exposition,
without any intervention of mathematics, of the principle and application
of the geometry of chance. His other significant work in this field is
his Essai philosophique sur les probabilites.(1814). NBS possesses editions
of both works:

QA273.L3 1816
141. Essai philosophique sur les probabilites. 3d ed. Paris, 1816.

QA273.L3 1840 HC
42. Essai philsophique sur les probabilites. 6th ed. 1840

QA273.L34 1886 HC
143. Theorie analytique des probabilites. 3d ed. Paris, Gauthier-Villars, 1886.

QA241.L49 1808

Legendre, Adrien Marie, 1752-1833

144. Essai sur la theorie des nombres. 2d ed. Paris, Courcier, 1808, 480p.
$125

Legendre, like Laplace, was a mathematical genius, but because of "his
timidity and Laplace's unfriendliness toward him, few important offices
commensurate with his ability were tendered to him. As an analyst, second
only to Laplace and Lagrange, he enriched mathematics by important contri-
butions. The gem in this work is the theorem of quadratic reciprocity,
previously indistinctly given by Euler, but herein clearly enunciated and
partly proved. This law was called by Gauss the "gem of arithmetic."

Lejeune-Dirichlet, Peter Gustav, 1805-1859.

Friend and disciple of Gauss, Dirichlet amplified the latter's classic work,
Disquisitiones arithmeticae (1807). He is also credited with the "marvelous
theorem...that every arithmetic progression, a, a+b, a+2b, a+3b, a+4b,...etc.,
in which a and b are integers with no common divisor greater than 1, contains
an infinity of primes."--Bell, p. 237. His works at NBS include:

QA3.L42
5. G. Lejeune Dirichlet's werke. 2 v. 1889-97.

QA241.L55 1894
4 rlesungen über zahlentheorie. 4th ed. 1894.

36

Liebig, Justig, 1803-1873   QD305.A2L7 1891

147. <u>Abhandlung: Über die constitution der organischen säuren.</u> Liepzig. 1891.
Ostwald's Klassiker der Exakten Wissenschaften, Nr. 26.

This is a reprint of Liebig's important work on organic acids reported in
1837-38. In his search for an understanding of organic acids, Liebig re-
surrected the ideas of Davy and Dulong on the role of hydrogen in acid, and
concluded that acids are hydrogen compounds in which the hydrogen may be
replaced by metals.

Mach, Ernst, 1838-1916.

Works by the great Austrian physist and philosopher include:

QC252.M2 1896
148. <u>Die principien der warmelehre</u>...1896.

QC225,M3 1873
149. <u>Optische-akustische versuche</u>...1873.

QA802.M15 1893
150. <u>The science of mechanics</u>. Chicago 1893.
    The first English edition of Mach's great work <u>Die mechanik und ihrer
    entwicklung</u> (1883).

QP461.M3 1872 HC
151. <u>Zur theorie des gehörorgans</u>...2d ed. 1872.

Maury, Matthew Fontaine (1806-1873)

1.(<u>The Physical geography of the sea.</u> 8th ed. 1860.

The eighth edition of the first major textbook of modern oceanography (1st ed--1855).
On the Grolier <u>List of 100 Books Famous in Science.</u> For the first time, in this
work, the sea was viewed as the subject matter for a distinct scientific discipline.
In it, Maury described the general extent of the ocean surfaces, the forms of coast
lines, the ocean tides and currents, the physical and chemical conditions of sea
water and the various organisms that inhabit the oceans. Includes sketch of the
first section of the first map of the floor of the North Atlantic Ocean. An officer
in the U.S. Navy and Superintendent of the Depot of Charts and Instruments of the
U. S. Navy Department, he was responsible for the adoptation of the uniform system
of recording oceanographic data for the naval vessels and merchant marine of the
entire world. The first edition is valued at more than $150.

Maxwell, James Clerk, 1831-1879

One of the greatest physicists of the 19th century, Maxwell took the
experimental studies of Faraday concerning electric and magnetic fields
and stated them in exact mathematical form. In 1864, he predicted that
electromagnetic waves could be produced, and were so discovered by Hertz
in 1887. Maxwell's studies also led to his famous conclusion that light
waves are electromagnetic in nature and not mechanical. In 1871 he published
his <u>Theory of heat,</u> and in 1873 his <u>Treatise on electricity and magnetism</u>
which became the foundation of modern electromagnetic theory. Maxwell's
works at NBS include:

QC518.M44 1888
153. <u>An elementary treatise on electricity.</u> 2d ed. Oxford, 1888.
          --written for the non-mathematical student

QC495.M37 1857 HC
154. <u>Experiments on colour.</u> 1857

QC3.M5 1890
155. <u>Scientific papers.</u> 2 v. 1890.
          Included are his papers on physics, mathematics, electromagnetism,
          kinetic theory, and matter

QC255.M48 1899
156. <u>Theory of heat.</u> 1899,

QC518.M47 1873 HC
15.. <u>A treatise on electricity and magnetism.</u> 2 v. Oxford, Clarendon, 1873.
          First edition. One of the most oustanding books in science.

QC518.M47 1892
.c8 <u>A treatise on electricity and magnetism.</u> 3d ed. 1892,   38
          the final version of this great text.

QB291.M48 HC

Mechain, Pierre Francois Andre, 1744-1805

159. <u>Base du systeme metrique decimal</u>...1806-10.

Mechain, along with Delambre, undertook an expedition to determine the
standard length based on calculations of the measurement of a meridian arc
extending from Dunkirk to Barcelona. They reported their findings in
1798 and the final metre was established from which three platinum standards
and several iron standards were produced.

Mendeleev, Dmitrii Ivanovich, 1834-1907.-

Mendeleev, who accomplished much important work in physical chemistry and
matrology, also contributed important theories of the nature of solutions
and the origins of petroleum. His chief claim to fame rests upon his
brilliant work creating the periodic law of the elements,

QC107.M44 1898 HC
160. <u>Kalebaniia viesov</u>... 1898.

QD31.M53 1891 HC
161. <u>The principles of chemistry</u>. 5th ed. London, New York, Longmans, Green, 1891.
         --the periodic law included as an appendix.

QC175.M6 1899

Meyer, Oskar Emil, 1834-1909.

162. <u>The kinetic theory of gases</u>. 1899.

Professor of physics at Breslau, Meyer's experimental work contributed
to the final formulation of the kinetic theory of gases by Clerk Maxwell
in 1871. This book is an attempt to make the new molecular theories
available to a wider circle of audiences, especially chemists and natural-
ists who are less familiar with mathematics. Translated from the German.

Meyer, Lothar, 1830-1895

German chemist who independently and almost simultaneously with Mendeleev discovered the periodic law of the elements. Mendeleev's system was more elaborated than Meyer's and became the accepted system of periodicity. The germ of Meyer's idea on periodicity can be found in his earliest edition of Modern theories of chemistry, but it was not explictly stated until 1870, shortly after Mendeleev's announcement. At NBS can be found the following works by Meyer:

QD467.M61 Nr. 66 1895
163. Die anfänge des natürlichen systems der chemischen elemente. 1895.
    Ostwald's Klassiker der Exakten Wissenschaften, nr. 66

QD463.M4 1883
164. Die atomgewichte der elemente aus den originalzahlen neu berechnet. Leipzig,
    Breitkopf and Härtel, 1883, 245p.

QD453.M62 1888
165. Modern theories of chemistry. translated from the German 5th edition. 1888.

Michelson, Albert Abraham, 1852-1931.

Michelson was awarded the Nobel Prize in physics for "his optical precision instruments and for the spectroscopic and metrological investigations made with them." While on leave from the University of Chicago to work at the International Bureau of Weights and Measures at Sevres (1892-93), Michelson showed that the standard of length could be replaced by reference to a specific wavelength of light, one found in the cadmium spectrum. This made possible a new natural physical standard of higher precision and one of universal reproducibility. Michelson, along with E. W. Worley, had discovered previously (1887) that the measured velocity of light in space is constant no matter what the motion of the observer or the source may be. At NBS two of Michelson's works are available:

QC101.M62 1894 HC
166. Determination experimentale de la valeur du metre...1894.

QC407.M6 (photocopy)
167. Experimental determination of the velocity of light. 1882?

QD157.M67 1897 HC

Moissan, Henri (1852-1907)
Le Fluor electrique. Paris, 1897, 385 p., with 42 figures in text.
$115

First Edition, considered rare. "The original edition of the book on the electric
furnace, invented by the author, which made electrolytic industry possible and is
in use at the present time."--Duveen, p. 408. In 1892, Moissan created the electric
arc furnace for the purpose of obtaining very high temperatures for experimental
work. It enabled him to prepare many new compounds--carbides, silicides and bromides--
and melted and volatized substances which had previously been regarded as infusible.
He was awarded the Nobel Prize in 1906 in chemistry --"for his research on the iso-
lation of the element fluorine and for placing at the service of science the electric
furnace which bears his name."

Mouton, Gabriel   QB41.M93 1670
169. Observationes diametrarum solis. Luduni, Ed typographia M. Liberal,
        1670.

In 1670, Mouton, a scientist in Holy Orders at Lyon, proposed a linear
scale based on a geodetic minute of arc decimally divided. Mouton's plan
was discussed for almost 100 years before the progress of commerce and
science called for more rational measures than the weights and measures
then in common usage.

Newton, Sir Isaac, 1642-1727

Two valuable editions of Newton's revolutionary books are at NBS:

QA803.N4 1729 HC
170. The mathematical principles of natural philosophy. Translation into
        English by Andrew Motte. London, 1729 $700

QC353.N56 1730
171. Opticks: or, a treatise on the reflections, refractions, inflections and
      colours of light. 4th ed. London, W. Innys, 1730.

Ohm, Georg Simon, 1787-1854
172. <u>Gesammelte abhandlungen</u>... 1892.   QC3.03 1892

Director of the Polytechnique School of Nürnberg, and professor at the
University of Munich, Ohm's most important work was his <u>Die galvanische
Kette mathematisch bearbeitet</u> (1827), in which he presented a precise
formulation of the notion of electro-motive force. It further established
the relation between electro-motive force and electric current. He also
introduced the idea of resistance of the conductor which came to be known
as Ohm's law. His work greatly influenced the theory of electricity and
its applications.

Ostwald, Wilhelm, 1853-1932   QD453.086 1891 HC
173. <u>Solutions</u>. Being the fourth book, with some additions, of the second edition of
Ostwald's "Lehrbuch der Allgemeine Chemie," translated by M. M. Pattison Muir.
London, 1891.
First English edition. $100
One of the chief founders of modern physical chemistry, Ostwald won the Nobel
Prize in 1909 for his work on catalysis. His "Lehrbuch" from which this translation
was extracted was, in its time, the greatest textbook in chemistry.

Planck, Max Karl Ernst Ludwig, 1858-1947

Throughout a long and active career, Planck's main interest lay in thermo-
dynamics. In his <u>Vorlesungen uber thermodynamik</u> (1897) are four of his
most important papers dealing with the principle of the increase of entropy.
This concept led Planck to his derivation of the correct radiation formula
and his concept of the "quantum of action," now recognized as perhaps the
most fundamental of the universal constants. In 1918, Planck received
the Nobel Prize for Physics.

QD511.P7 1893
174. <u>Grundriss der allgemeinen thermochemie</u>..1893

QC311.P74 1897 HC
175. <u>Vorlesungen über Thermodynamik</u>. Leipzig, Veit & Co., 1897.
    --First edition of his classic work.

Poggendorffs, Johann Christian, 1796-1877.

Z7404.P74
176. J.C. Poggendorffs biographische-literarisches handwörterbuch...Leipzig,
1863-

A most valuable resource for the history of science. It provides
biographical information, and is a unique tool for identifying and
tracing scientific papers published before 1900.

Poincare, Jules Henri, 1854-1912

Considered one of the greatest mathematicians of the late 19th century,
Poincare used mathematics as a tool to investigate the planets, the tides,
electricity and light. He served as professor at the University of Paris.
His works at NBS include:

QC183.P75 1895
177. Capillarite...1895.

QA805.P74 1899
178. ...Cinematique et mecanisms...1899.

QB351.P75
179. Les methodes nouvelles de la mecanique celeste. 1892-99. 3 v.

QC321.P75 1895
180. Theorie analytique de la propagation...1895

QC661.P75 1894 HC
181. ...Les oscillations electriques...1894.

QA925.P75 1893
182. ...Theorie des tourbillions.. 1893.

QA825.P75 1899
183. Theorie du potential Newtonien. 1899.

QC355.P75 1892
184. ...Theorie mathematique da la lumiere II. 1892.

QC311.P75 1892 HC
185. ...Thermodynemique. 1892.

Rayleigh, John William Strutt, Baron (1842-1919), and William Ramsey (1852-1916)

186. <u>Argon, a new constituent of the atmosphere</u>. Washington, Smithsonian institution, 1896, 43 p.

$135

The first American edition of the classic work announcing the discovery of argon. The discovery was the unexpected outcome of investigations into the density of oxygen and nitrogen. Lord Rayleigh received the Nobel Prize for Physics in 1904 for this work, the most important consequence of which was that it led to the discovery of helium. Ramsey received the Nobel Prize in chemistry in 1904 for his discovery of the presence of other inert gases with argon.

Rayleigh, John William Strutt, <u>Baron</u>, 1842-1919.

187. <u>Die theorie des schalles</u>. 1880.

German edition of the <u>Theory of Sound</u> (London 1877-1878, 2 v.). The only textbook ever written by Lord Rayleigh, it addresses dynamical questions of resonance and vibrations both of gases and of elastic solids. The treatment is mathematical. At once this work assumed the rank of the leading book on the subject, a position it has retained.

Rome de l'Isle, Jean Baptiste Louis de, 1736-1790.

188. <u>Metrologie, ou tables pour servir a l'intelligence des poids et mesures des</u> <u>anciens</u>...Paris, 1789, 214p.

A valuable history of metrology by the French mathematician.

Thompson, Edward P.
189. <u>Roentgen rays and phenomena of the anode and cathode: Principles, Applications, and</u> <u>theories</u>. New York, 1896.

$100

"A very early work on Roentgen rays,"--Walter Alvarez. An American pioneer in radiology, Thompson, along with Thomas Alva Edison and F. W. Magie of Princeton, are described by A. Evans, as having done the "most original and enduring work" in America, on the Roentgen rays.

QC518.T48 1895

Thomson, Joseph John (1856-1940)

190. Elements of the mathematical theory of electricity and magnetism. 1st ed.
Cambridge, 1895, 510p.

"His textbook...has probably moulded the ideas of many generations of students
in these matters, outside of those who were privileged to hear the living voice"--
Rayleigh: Sir J. J. Thomson (1942)

191. Elements of the mathematical theory of electricity and magnetism. 2d ed. Cambridge,
at the University Press, 1897, 508p.

QC518.T48 1897

"I have also made a few verbal alterations in the hope of making the argument
clearer in places where experience has shown that students found unusual difficulties.
--Preface.

QC518.T5 1893

192. Note on recent researches in electricity and magnetism. Intended as a sequel to
Professor Clerk-Maxwell's Treatise on electricity and magnetism. Oxford, 1893.

$115

This volume marked the first account in English of the discharge of electricity
through gases. Thomson was concerned with consolidating the status of electro-
magnetic theory that had been left by Clerk Maxwell, and deals mainly with the
solution of various electrical problems of great mathematical difficulty. Thomson
was awarded Nobel Prize in 1906 "for his theoretical and experimental investigations
into the transmission of electricity through gases."

QC925.T48 1883 HC

193. A treatise on the motion of vortex rings. 1883.

For this essay, J. J. Thomson was awarded the Adams Prize at the University of
Cambridge.

TA475.T78 1824

Tredgold, Thomas, 1788-1829.
194. Practical essay on the strength of cast iron, and other metals...containing practical
rules, tables and examples: founded on a series of new experiments, with an extensive
table of the properties of materials. 2d ed., enl. & improved. London, J. Taylor,
1824, 307p.
Approx. $100

Beginning his career as an apprentice cabinet-maker, then joiner and journeyman
carpenter, Tredgold studied architecture and engineering. His work was the first
serious attempt in England to determine practically and scientifically the data of
resistance. This work was a standard textbook for English engineers for a long time.

QC89.U5A32 1790 HC

U. S. Dept. of State

195. Report of the secretary of State, on the subject of establishing a uniformity in the weights, measures and coins of the United States. N.Y., 1790, 49p.

10-6985

In this historically important document, Jefferson, then Secretary of State, presented to Congress a plan for establishing uniformity in the coinage, weights and measures. He proposed a system whereby the measures and weights and coins "will be derived altogether from mechanical operations, viz.: a rod vibrating seconds...subdivided and multiplied...for every measure of length, surface and capacity, and these last filled with water to determine the weights and coins..."

Vega, Georg, freiherr von, 1754-1802

QA55.V4 1856 Eng.

196. Logarithmic tables of numbers and trigonometrical functions. Transl. from the 40th ed. 1856.

English translation of Vega's most complete and important work (1797), the Tabulae logarithmico-trogonometricae. Based on Adriaen Vlacq's Arthmetica Logarithmica (1628), it provides a more compendius arrangement of the table of the logarithms of numbers. There are tables of arcs of a circle, a comprehensive collection of trigonometric formulas, and Wolfram's hyperdic logarithms of primes.

Whewell, William

Q125.W55 1857

197. History of the inductive sciences. 3d ed. 3 v. 1857. $70

First published in 1837, this work established Whewell as a high authority among the scientific writers of his day. Indispensible for the student of the history of science.