

2001. 200

Notes  
on  
Davis's Lectures  
Royal Institute.

18<sup>th</sup> Dec 1809

at 8<sup>A</sup> for m

---

Notes on Davy's  
Lectures at the Royal  
Institution

---

Introductory Lecture  
10<sup>th</sup> December 1809.  
at 8 in the Even'g.

---



at 10 p. m.

Monday 18<sup>th</sup> December 1809

Electro-chemical Science Part 1  
Introduction. General views of the  
subject. Origin and progress of  
chemical science.

W. D. Bevan by alluding to  
the many discoveries made since  
his last evening lecture 1808. -  
(Decomposition of ~~some~~ many bodies  
formerly thought simple bodies  
- His apparatus last morning  
course consisted of 1000 Lixiv now  
it is 2000. Experiments of the pre-  
sent course will be performed  
on this.

History of Elec<sup>n</sup> - Ambr -  
Gilbert - Franklin Identity of E<sup>n</sup> & L<sup>n</sup>  
Galvani - Frog laid on a plate  
of zinc supported by the hand

and the circuit formed by a Silver  
Wire - Galvanic Hypothesis - that  
Galvanism was a fluid *seri* common  
betraying to the nerves and muscles  
of animals, put in motion by metal  
Zincs - Phenomena observed before  
Galvanic Experiment - Silver  
to the under side of the tongue on the  
upper part of the tongue -  
Poke out of a pencil put and  
a gold or silver lip - Iron nail  
this upper plate in *standing*  
ships - *Ships* from a tin box  
and a horn - M. D. indicates  
this. - Volta first ascribed  
the identity of Galvanism and  
Electricity - shown by Experi-  
ment <sup>that</sup> the "Elet." is produced from  
the metals - Copper and Zinc  
in contact in air - in water  
produce Elet. -

Description of Volta's pile -

- English ready to encourage new  
discoveries but they got tired of them  
About 50 years after Newton, Ma-  
thematical sciences began to decline  
in England, when they have been  
cultivated abroad to such lengths  
that few Englishmen can now read  
the <sup>late</sup> writers on the continent -

- To Black, Cavendish and Priestley  
Pneumatic Chemistry over its  
existence. The French have improved  
it, but the materials are of British  
manufacture. - What use! -



London 1<sup>st</sup> Jan 1810  
Mr Davy's 2<sup>d</sup> Lecture on  
Electro-chemical Science.  
Descriptive improvements  
of the Voltaic Labyrinth;  
Construction and agencies  
of the great apparatus. Investi-  
gation of the mode of operation  
References to the Laws of Electro-  
Attraction, conduction and  
non conduction. Distinctions be-  
tween. The Experiments on the  
various classes of Electrical  
agents

---

Volta's pile - common des-  
tapes - Cruikshank's trough  
Wither's improvement.  
Dr. Babington's first recom-  
mended troughs of Wedgewood's

was - Apparatus of the  
Royal Institution - 500 pairs  
made <sup>up</sup> of in the future  
- Laws of Electric action -  
friction - Conn on Electric ma-  
chine - Attraction, repulsion  
shown by Gold leaf - Pith ball  
&c - Two cylinders of paper w-  
- lined with Gold leaf hung on  
the tops of two rods or wires  
on the positive and negative  
conductors. - Attraction  
by the voltaic Instruments  
spark from both. -  
- Negation positive - Franklin  
Theory. Whether two spheres  
flame. Whether Elect be a  
fluid - Induced current.

Cap<sup>s</sup> in the Elect<sup>r</sup> machine -  
- Elect attraction and repulsion  
Insulation - Luminous conductors  
Leyden Jar charged and discharged  
cannot be discharged by a non-  
conductor - Lightning - Identity of  
Elect<sup>r</sup> and Lightning - Good conduct<sup>r</sup>  
safest and most dangerous si-  
tuations during a thunderstorm -  
- Dangerous conductors & how  
abundance of wood the conductor  
the <sup>lightning</sup> body a better conductor  
than a vegetable.  
- On the French attempt to  
decompose the diamond. It is  
a nonconductor therefore cannot  
be decomposed by Electricity  
+ D. divided all bodies into con-  
ductors, imperfect conductors &



non conductors - enumerated  
the principal of each class -  
- Changes which some bodies con-  
- duce with regard to their conduct-  
- ing powers - Wood Charcoal -  
- air, cold and heated -  
- Luminous conductors. Large  
- gold leaf Electrometer  
+ Test this Evening 1 $\frac{1}{2}$  hours.  
++ W. D. a little elevated. -  
+ The French still make use of  
the piles which they say is  
superior to the troughs. The wood  
of the latter they alledge con-  
- ducts the Electric matter. -

Royal Inst, 1<sup>th</sup> Decr, 1810  
Mr. Davy's 3 Lect. E. C. S. -  
Laws of the excitation of  
Electricity, by heat, by friction,  
by contact. Electricity by Induct.  
Application to the explanation  
of the phenomena of the Vol-  
taic battery and to apparatus  
in Nature.

- Positive and Negative Elec.  
Excitation by contact - Copper  
and Zinc, when separated  
after contact, the Copper is  
negative, the Zinc positive  
The same, but in different de-  
grees with iron, silver, Gold &c  
and zinc - Glass and  
Mercury, Positive and Neg-  
ative - Amalgam of Mercury  
and Zinc is lin. negative, Glass  
positive. Hence the action



of the Electrical Machine,  
The simple contact of the  
amalgam on the Rubber, and  
the cylinder produces positive  
Electricity on the <sup>glass</sup> rotation of the cyl<sup>inder</sup>  
produces a rapid succession  
of contacts. — Water is one  
of the imperfect conductors  
— voltage Electricity by contact.  
Strip of Copper and Zinc in  
water. Corrosion not the  
cause but the effect Galvanic  
action  
— This best experiment, M.  
D. thinks irreconcilable to  
G. Franklin's Hypothesis.

— Elect. produced by evaporation  
Common experiment described —  
This experiment is in M. D.'s  
opinion much in favour of Franklin's  
System, the most so of any. —  
— A small Elect. machine  
in a glass receiver made to  
act in Carbonic acid gas or  
Oxygen gas, and in rarified air  
In the former more powerful  
than in Atmospheric air,  
In oxygen gas the same as  
in At. air — In rarified air  
very little action, because  
this is a conductor. —



Mr. Davy adopts the Hypothesis that heat is not a fluid, but produced by the motions and actions of bodies on each other - Blacksmith hammers a piece of cold iron till it be hot - Iron on a <sup>dry</sup> grinding stone - Air in a syringe violently compressed lights ammonia (fungus).

Dr. Sturtevant's Theory of Earthquakes, Mr. D. thinks the best, to this may be added the production of "Elec." from Metallic Strata.

- Aurora Borealis, Mr. D. thinks an Electric phenomenon and satisfactorily accounted for - Ice is a perfect non conductor from the Effect of the Atmosphere, in the Northern regions, some return to the earth thro' the ice. -



Royal Institution 15<sup>th</sup> Jan<sup>ry</sup>  
Mr. Davy's 5<sup>th</sup> Lect. Ch. Secm<sup>l</sup>  
of the Difference between  
Voltaic and Common Elect<sup>n</sup>.  
Experiments on a Battery  
composed of large plates;  
comparison of their power  
with those of smaller combi-  
nations. General review  
of the Voltaic apparatus.  
Experiment of Ignition

Common Elect<sup>n</sup> & Friction  
produces Heat Elect<sup>n</sup> but  
of greater intensity than the  
Voltaic machine. Some change  
of Elect<sup>n</sup> thrown over a large  
surface is less intense - Exp<sup>t</sup>  
change of a small jar thrown



into a large one - Galley  
with a small charge has the  
same effect as the Voltaic Dis-  
small wire burned with it &c. -  
Judged that shews by four  
small conductors the ends posi-  
tive and negative alternately -  
also by the numerous words  
Royal Institution -

Mr. Berthollet says that Elec-  
tricity is by the separation of  
the parts and the application  
of oxygen - Mr. Davy proved  
that this is not true by the  
following elegant experiment.  
Platina wire was kept red  
hot in by the Voltaic reaction  
in an exhausted receiver of an  
air pump. The more perfect  
the vacuum the more red

the more metal appeared, became  
said Mr. D., there was nothing  
to carry off the heat. -

- Mr. Davy before believed this  
to be the result of the retraction  
of bodies, with Bacon and New-  
ton, and that Electricity is  
the consequence of certain at-  
tractions and repulsions. He  
thinks the experiment of the  
paper with the bar on both  
sides is agreeable to his  
theory but contrary to that  
of his worthy Colleague Mr  
Dalton. For was it matter  
which made the heat the  
bar would be found only  
on the inside. -

- I could not hear distinctly  
Mr. D.'s account of it -



Monday 22<sup>nd</sup> Jan<sup>y</sup> 1810.  
W. Davy's 5<sup>th</sup> Lecture E.C.S.

History of transfer. Connection  
of the Electrical Phenomena with  
Chemical changes in the Galvanic  
Experiments on this subject.  
Excitation of Electricity from  
by chemical agents. Historical  
views of the progress of Elect.

— could not attend this  
Lecture. —

Royal Institution  
Monday 29<sup>th</sup> Jan, 1810  
Electro-chemical Science.  
Lect. 6 - Chemical agency  
of Electricity. Early modes  
of applying Elect. as an  
agent of decomposition.  
Experiments on the decom-  
positions by the voltaic  
battery. General principles  
of this Department of the  
Science. —

— could not attend —



Royal Inst. Feb 5<sup>th</sup> - 1810

Electro Chemical Series -  
Lecture 7 - M Davy  
Decomposition of Acids &  
Alkalis, by Electricity -  
Energy and properties of  
the new substances obtained  
Potassium. Sodium

The same experiments  
were exhibited in this lecture  
as on the same subject last  
season. In this lecture he  
only described the French  
mode of decomposing Pot  
ash, in this former he  
had shown the experiment  
- He also replied to some  
objections of Mr Dalton  
against the supposition

of M Davy of there being  
only two principles of body  
oxygen and Hydrogen. But  
as I did <sup>not</sup> hear Mr Dalton, I  
did not perfectly understand  
Mr Davy when I also would  
not distinctly hear.



Monday 12 Feb. 1810  
Electro Chemical Science  
List: 8

Decomposition of the Earthy  
Metals of the Alkaline  
earths and earths. General  
relations of Salifiable Bases.  
Probable agencies of the metals  
of the earth. Volcanoes. Petro-  
re Stones.

History of opinion respecting  
the earths being metallic and  
- no direct experiments to prove  
this. Merely a theory conjectured  
given up several years before  
Davy made the discovery  
of decomposing the Alkalies  
History of W. D.'s first ex-  
periments and failures -  
- Berzelius' made by making  
an amalgam of the metal



metals and mercury, which  
is done by Electrolysis the Alloys,  
with the regulus power even  
of forty parts of metals. It  
is sufficient to show the fact  
that not so convenient for pre-  
paring the metal for experimental  
purposes may be obtained  
separately - here some difficulty  
From the decomposition of the  
alkaline earths and esters  
only described - Silica con-  
tains more oxygen than any  
other body -

- In the preparation of py-  
rophosphorus potassium is found  
which takes fire when exposed  
to the air - Potassium acts  
on platinum for this D. wrote  
under contained a mass of py-  
rophosphorus by this means

- New Discoveries likely to be  
of use in the arts - In the  
conversion of cast into metal-  
lic iron - Iron parts with  
a substance in the process -  
a kind of glass -  
- Geology improved by the  
new discoveries -

Dr. Maskelyne and Mr. Lavoisier  
have shown that the mean  
density of the earth is more than  
twentieth of bodies on the surface.  
Near the exterior parts of the earth  
are probably metals - Water  
falling on them must occasion  
explosions - Volcanos  
- Experiment a small <sup>cup</sup>  
in a glass, <sup>in</sup> the cup a bit  
of potassium, water poured  
into the glass caused the  
potassium to explode - represents  
a volcano. -



Metalline stones, probably  
masses of new metal which  
take fire in our atmosphere  
cannot be formed in the at-  
mosphere, for were this the case  
they would fall perpendicularly  
W. D. does not pretend to say  
from whence they come -

- Exp. a bit of potash in  
a wine glass a little water  
poured on it, thrown upward  
it descends and has like a  
metalline stone, and the liquid  
has the same colour. -

Royal Inst<sup>n</sup> Monday  
the 19<sup>th</sup> Feb. 1781. L. Sec.  
Lect: 9<sup>th</sup>

Experiments on the Decomposition  
of the fluoric and boracic acids.  
Experiments on the Mercuric  
acid. Decomposition of Phosphorus  
and Sulphur. Experiments on  
Carbonaceous matter. Metallization  
of ammonia. General review of the  
Chemical arrangements of matter.  
On the probable advancements of  
Chemistry. Conclusions of this course.

In this lecture the processes  
by which the new substances  
were obtained, will be <sup>shown, the</sup> properties  
of these bodies will be explained  
in our next course of Chemistry.  
The first acid which I tried  
to decompose was the boracic and  
then this acid (as solid) is sub-  
jected



just to the Voltaic Machine  
The Platinum wire is covered with  
a black or brownish substance  
but in small quantities, because  
the Boracic acid is a nonconductor.  
It cannot therefore be decomposed  
by Voltaic Electricity. The Platinum  
and other bodies already treated of  
- Polaris produced with Boracic  
acid an important matter.

- see Babbage Lecture 100

Philosophical Transactions  
for 1804 part 1<sup>st</sup> - for an  
account of attempts to decom-  
pose the Boracic, Fluoric and  
Muriatic acids -

- M. V. found that he was  
not decomposing Muriatic acid  
of water by opposition on  
the acid by alone. But by  
uniting it with phosphorus  
Phosphorus & Sulphur -

M. Davy concluded his  
Lecture with intimating his  
intention of commencing the  
set of experiments on Charcoal  
and the Diamond and that if  
he succeeded in breaking down  
he would present them to the  
Ladies who had been <sup>present</sup> ~~there~~  
with their company at his  
Lectures.

Saturday 3 March 1810  
On the advantages that may  
be derived from improving the  
Royal Institution, and rendering  
it permanent as a great sci-  
entific establishment. With  
views of the progress of the  
experimental sciences and  
arts in Britain; and of the  
means which may affect their  
advancement. — By some of the  
Managers.

See the printed papers  
on this subject. —



at 2 p.m.

Royal Institution 1810

Saturday 10<sup>th</sup> March -

Mr Davys's Lecture on  
Chemical Philosophy

- Most interesting illustrated by  
experiments. Chemistry of the  
Nations. Alchemy. Experiments  
of the early Philosophical Chem-  
ists. Researches of Robert  
Boyle, Black and Mayow. Founda-  
tions of Chemical Philosophy

Three methods of acquiring a  
knowledge of Nature, Observation,  
analogy and Experiment  
Example - a plant in water  
Exposed to the sun's rays - Oxygen  
gas &c. -

- Chemistry of the ancients consisted  
in the working of some Metals,



and trying certain Colours.  
- Discovering (supposed) Chaptal  
Kant in Germany - supposed to have  
been the Discoverer of the art of di-  
stillation - Another supposed to be  
Galen make any mention of  
chemical experiments, we may  
hence conclude that chemistry  
was but little known in their  
Days. - Arabians - Alchemists  
of their Chemists - European  
Alchemists Agrius, Raymond  
Lully, Basil Valentine - Dan  
Reinout Paracelsus &c. -  
- Cause of failure in the process of  
making gold was generally an  
explosion understood to be by  
accident, when particles of gold  
were found scattered about.  
- N. D. thinks that this was  
effected by Arsenic fumes in one  
+ Experiment upon A. F. on  
prop. in a lamp spirit lamp.

exploded very feebly - Experiment  
with a retort - Robert Boyle  
showed another where the ex-  
periment had succeeded, particles  
of gold on its inside  
- Exp: Solution of Sulphur of  
Copper rubbed on a plate of  
Iron, its turn <sup>was</sup> but little  
Difference between the colour of  
the Iron and Copper, this experiment  
was not near so striking as  
when polished iron or steel is  
made use of.  
+ Experiments and observations  
by Bacon, Boyle, Hook, Mayon  
and Newton &c. -  
- Small part of atmospheric  
air employed in supporting life  
and combustion - Experiment  
of breathing air in a jar in-  
verted in water, through a bent



tube - candle resting under -  
 animal killed in this jar -  
 - condensed air supports flame  
 longer than common Atmosphere  
 in air - Proved by a candle  
 burning for a long time on  
 the charged condenser.  
 - Lavoisier and Laplace laid the  
 foundations of true Chemistry  
 - Jussieu - earth - Phlogiston

Saturday 17<sup>th</sup> Month  
 Chem: Phet. Lect 2 Davy  
 Discoveries of Glauber, Lavoisier  
 and Newbery. Chemistry  
 views of Newton. Attraction  
 its nature. Progress of  
 Pneumatic Chemistry.  
 Pneumatic processes illustrated  
 by Experiments (Different air).  
 Discoveries of Cavendish, of  
 Priestley.

Glauber discovered that acids  
 and Alkali Resolves earth  
 other Exps. Sulphuric acid and  
 Salt of soda, tried by test paper  
 but of paper not did not seem  
 - Points and Lines. - Lavoisier  
 published the first book on Che-  
 mistry - Physician to Louis 14<sup>th</sup>  
 and present to the Duke of Orleans



- Homburg - Pyrophorus Exp! -  
was not very striking -

X Academy del sciences - Royal  
Society of England, and Royal  
Academy of Sciences at Paris  
established.

- W. Water - factitious air -

- J. Blakes Discovery of  
fixed air and its properties  
Exp! - fixed air made -  
presence of fixed air in carbonic  
and alkalies render them  
mild, absorb caustic - form  
lime water -

+ J. Blakes Discovery the  
foundation of Pneumatic  
chemistry -

- W. Cavendish's Discoveries,  
in this <sup>Science</sup> were numerous and  
important.

Here an Eplog on Cavendish  
concluded by saying "no Death

was so much lamented by men  
of Science, since that of Newton.

Doctor Priestley's Discoveries  
very numerous, and very  
important -

Character of Priestley - was no  
chemist - Letter of his to W.D.  
says he began his Pneumatic  
Studies with ~~no~~ almost no  
apparatus, or knowledge of  
Chemistry - He was a great  
Enthusiast, and an <sup>excellent</sup> experi-  
menter, but an indifferent rea-  
soner - He, W.D. saw, he might  
be permitted, as a chemist  
to regret that Mr. P. had  
directed his attention to be so  
much drawn off from pursuit  
of such importance, to those  
of a more transient and perish-  
able nature. -



- In this lecture Mr. D. Estlin  
 the Pneumatic Chemical appa-  
 ratus, and the method of ma-  
 king and preserving the gases  
 Several Experiments -
- Paper extinguished by car-  
 bonic acid two ways
  - Can Dela Philosophi-  
 ca - flame thro' a very  
 small bore, common heat.
  - Oil of turpentine inflam-  
 ed by nitrous acid - Bovi-  
 us Experiment.
  - Charcoal in Oxygen Gas
  - Steel wire - heated spring  
 in ditto
  - The piece <sup>of charcoal</sup> was much too  
 large, effect not very remark-  
 able. -

4

Saturday 24 March 1810  
Chem. Philosophy Lect 3 - Davy.  
Discoveries by of Scheel, illustrated  
by Experiments. Composition of  
the Air & phos. Its renovation  
Respiration. Later Discoveries of  
Cavendish. Nitrous acid. Com-  
position of Water. Generalization  
of Lavoisier. Experiments & il-  
lustrations

---

+ I was too late for this lecture  
and obliged to take a seat  
so far from front that I could  
not hear —

- When I entered the Theatre Mr.  
D. was preaching Helium with  
Oxygen Gas - Contraction - red colour  
- Oxygen <sup>Gas</sup> discovered by T. Priestley  
and Mr. Scheel, without any  
knowledge of each other's discovery



- Japan in Oxygen Gas.
- Phosphorus in Nitro-jarboke
- Candles extinguished in Nitrogen gas
- Discovering of the Component parts of the Atmosphere, Oxygen and Nitrogen - Priestly - Cavendish.
- Eudiometry discovered by Priestly, Eudiometers - G. Hofman &c.
- Observations on the purity of the atmosphere
- Respiration - Crawford's Phlogiston
- Formation of water
- History of the discovery - Warllin - Priestly - Water Cavendish - the fact the real discoverer.
- Lavoisier, who had heard of this, published the discovery afterwards, as his own.

Wednesday 28<sup>th</sup> March 1810  
 Chem. Phil. Lect. 4<sup>th</sup> - ~~2<sup>nd</sup>~~  
 - Nitrous oxide, its properties; Experiments on its respiration.  
 History of the discovery of the Gas absorbable by water. Muriatic acid gas. Oxygenic acid gas. Experiments discovered by Schut demonstrating the nature of these bodies. Fluoric acid discovered by Schut. Experiments upon it. Its decomposition.

Nitrous oxide discovered by G. Priestly. He called it Dephlogisticated Nitrous air - Candles burn in it with an enlarged flame. Sulphur if weakly lighted, is extinguished in this air; but if strongly lighted it burns with a large greenish blue flame. - Surprising effects on the nervous system.



Sensations sometimes pleasurable - at others the contrary - resembles suspicious intoxication - Mr. D. breathed it till he began to experience it.

- He made a small quantity of it in a glass vessel over a patent lamp.

- Muriatic acid gas - Oxygen - water gas - (Discovered by Davy)

The latter contains less oxygen than the former. Oxy. M. a. gas has never been decomposed, the other gas has been decomposed.

- Extremely difficult to free the muriatic acid from water, when this is nearly done, the air has the property of recovering lost paper when the paper is well dried.

A quantity of the acid in this state produced no difference in the <sup>left</sup> paper, but when water was

afterwards thrown on the acid it decay on the paper it instantly turned red.

- Fluoric acid discovered by Scheel - Engraving on glass - Decomposition by Potassium - Experiment performed in a glass bent tube.

- Lavoisier's brilliant discovery of oxygen's being the unifying principle not commercially true - Example

- We know two acids which contain no oxygen, the fluoric and Muriatic

- Mr. Davy has succeeded in decomposing muriatic acid by iron - thinks this may probably be done to advantage on a large scale.



Wednesday 4<sup>th</sup> April 1810

Chemical Phil. Lect. 5 Mr. Davy.

- Discoveries of Phosphureted and Sulphureted Hydrogen. Experiments on their properties. Discovery of the Hydrocarbonates. Of the economical applications of Gas from Coal. Gaseous bodies of carbon. Discoveries concerning the diamond and Carbonaceous substances. —

- Lecture employed in the history of the discoveries, and the discoveries of the above Gases. —

- I did not hear distinctly, being in a back seat

- Shewed coal gas made in an earthen ~~and~~ retorts —

This gas contains three different kinds of gases 1 Olefiant 2 Carbonic Oxide 3 Hydro-Carbonate  
The first is <sup>by</sup> far the greatest in qu<sup>ty</sup>



- A bill is now before par-  
liament Mr. Dawy would not  
give any opinion on the sub-  
ject, but in what case may  
it may be determined, it ought  
to be remembered that Gas  
lights are an enemy ally of fire  
lock manufacture.

- History of Experiments on the  
combustion of the diamond.  
- Comte's Grand Duke of Tur-  
key first burned the diamond  
Dr. Macquer, Guntion De Morveau  
found it a pure charcoal.

- To make a diamond it  
will first be necessary to  
find carbon and platinum  
which has not yet been done  
- This however may properly  
be done by a bottom reaction  
of 2000 pair, some 500 hundred  
sufficient to decompose some very  
refractory bodies

- Experiments on Sulphuric  
Acidogen - Christophredt Velle  
from a retort, took fire in the  
atmosphere more vivid than  
common.

- Christophredt Velle - burnt on  
the sulphur acid at the bottom  
when sulphuric acid was found  
in it by a glass funnel reaching  
to the bottom of the glass



13

Wednesday 11 April 1810  
Chemical Phil<sup>o</sup> Lect: G. W. Davy

- History of the discoveries made  
concerning heat; with experimental  
illustrations. Dicks experiments on  
the radiation of heat. Flourens  
experiments on the radiation of cold.  
D. Black's experiments. Combustion.  
Comparison of the theories of Cal-  
vendoth and Lavoisier.

---

- Two opinions concerning heat  
1<sup>st</sup> Material 2<sup>d</sup> a property of bodies  
- 1<sup>st</sup> Effect of heat observed was its  
expanding all bodies, solid, fluid  
and uniform  
1<sup>st</sup> Experiment. The end of the  
tube of a retort was plunged  
into water, and a spirit lamp  
applied to the bottom. The atmos-  
phere in the retort was perfectly



expelled from the next Ex. -

2. A quantity of Ether in a small retort was entirely expelled from the retort by pouring hot water on it. When cooled it returned and filled the retort as before.

3. Cold water in a wide tube, on the application of a spirit lamp rose in the tube.

4. Thermometer tube. History -

5. Radiation of heat - Two mirrors placed on stands perpendicular to the horizon. no experiment with these - Other two placed parallel to the horizon, one on the floor, the other on a high support. The radiation of heat shown by the expansion of gas in a long mercury tube on

a piece of paper on the side of the lower mirror.

6. Radiation of Cold - Ice held in the focus of the lower mirror and Leslie's Photometer on a large scale placed in the focus of the other - It was not much affected - No necessity for suppressing cold a positive body -

- W. D. gave the history of D. Stahl's Discoveries - Latent heat - improvement by Irvine - D. Crawford's account of heat - Theories of Combustion - Caloric Stacks - Lavoisier's Lavoisier.

7. Conductors of heat, & Glass Metals, wood, fur, hair, clothes (discussed in the usual manner, also temperature of the human body seen in all elements



- American bear has a tem-  
perature of 80 - a dead body  
soon acquires the temperature of  
the surrounding atmosphere. Not  
to a living body - Blayden and  
Fordyce's experiments in a heated  
oven. -

<sup>42</sup>  
Saturday 5 May 1810  
- Connection between heat, light  
and electricity. New experiments  
on the radiation of heat in vacuo.  
Chemical powers of <sup>light</sup> electricity.  
History of Dr. Herschel's experiments  
on the solar spectrum and the  
disruptions arising from them.  
Lect 7 Chemical Electricity -

The radiation of heat is much  
affected by the colour of the  
body. Dark coloured bodies ra-  
diate heat more than white bodies  
Exp. a tin globe with hot  
water in it, one side painted  
black and the other remaining  
bright. The black side affected  
Lect. Different that much  
more than the metallic bright  
side - Dr. Franklin's experiment



of pieces of different colored  
cloths laid on snow. The black  
sent the deepest, the white  
had scarcely any effect. —  
— Hence in conveying heated  
air or steam through a  
room, if it is the object to  
heat the room, the tubes  
should be black or dark  
coloured, — if the heat is wanted  
to act not in the room but  
at a distance, the tubes should  
be bright. —

— Mr Leslie has endeavored  
to show that heat is not in  
reality radiated, but is propagated  
with the velocity of sound  
by conduction or pulsations  
In refutation of this  
In answer to this Mr. Davy  
proved by experiment that  
heat radiates in vacuo.

— The Voltaic Battery was em-  
ployed in showing the production  
of light and radiation of heat.  
First in a receiver full of air,  
then exhausted when the light  
was not as brilliant as in air,  
Charcoal was used. —

— Condensation of bodies produces  
heat — rubbing the hand hard  
on the skin of the coat —

— See hammering a piece of  
soft cold iron till it will  
light a match — Condensing  
air — <sup>condensing</sup> Condensing  
air — Condensing —

— Mr. Davy asserts that heat is  
only a quality, that he calls the  
Newtonian doctrine, Altho' Newton  
mentions it only in the queries  
to his optics. He does not think  
that Dr. Herschel's late experiments



afford any unaccountable ob-  
jections to this heat as a quality  
and produced by motion, or vibra-  
tion —

— No condensation produces heat  
no rarefaction produces cold —

— A question has been frequen-  
ly asked, does the temperature  
of the Earth ~~remain~~ <sup>continue</sup> the same  
in all ages? If not whether does  
it increase or decrease? Various  
opinions have been entertained  
on this subject. Some ~~allege~~ <sup>maintain</sup>  
that the temperature increases  
and bring as a proof that Ger-  
many is now much warmer  
than in the time of the Romans.  
This is owing to the cutting down  
of the Great Forests — Mr. Lavoisier  
thinks the temperature is increasing

but at the very slow rate of  
two Degrees in years.

— Those who maintain that the  
heat of the earth is decreasing  
bring their Argument from the  
sun which they say must be  
diminishing, and from the radi-  
ation of the earth. —

Saturday 12<sup>th</sup> May 1810

Chemical Phil<sup>y</sup> Lect: 8<sup>th</sup>

History of the discoveries which connect Electricity with Chemistry. Construction of the Voltaic Apparatus. Experiments on its general powers.

- Amber - Linnæus, which must either have been the Tapes or the Tourmalin both which are electrical. - Dr. Gilbert the first Electrical Philosopher. While Bacon was pointing out the true road to philosophy, when Galileo ~~was~~ was investigating the laws of motion, Dr. Gilbert was establishing two new Sciences Magnetism and Electricity. —



- Otto Guericke constructed the  
 first Elect. Machine, a globe of  
 Sulphur &c. - This was by Mr.  
 Wastley exchanged for a Globe  
 of Glass. Mr. Stephen Gray's great  
 Discovery, Conductors, non Conductors  
 Du Fay - Belisier, residues. Elect.  
 These improper terms were removed  
 by Positive and negative -  
 Discovery of the Leyden jar.  
 Exp. a spirit with a piece of  
 wire in it, gave Mr. D. a stronger  
 shock than he expected -  
 - Great great Discovery, and the year  
 in the same is the identity of  
 Electricity and Lightning by  
 Franklin - Doye or Franklin. -  
 x Accounts thought Amber and  
 the same were Anomalous

Exp<sup>s</sup> on this subject  
 - Attraction and repulsion is caused  
 - Negative and positive - by sealing  
 was &c. -  
 Electricity of the earth Neg: Cond: part  
 Exp. two Leyden jars of large leaf  
 supported, one on the conductor the  
 other on the rubber, attract each  
 other, when both on the same  
 support they repel each other -  
 - Three small conductors placed in  
 a line with intervals of air be-  
 tween each, every conductor furnished  
 with three pair of feet, both, one  
 piece on the middle and one at  
 each end. The conductor next  
 to the prime conductor is placed  
 at about a foot from distant from  
 it -  
 - When the machine is turned



The pitch of leather on the end  
of the first small conductor next  
to the prime conductor diverge  
with faces negative El<sup>tr</sup>. Those  
on the opposite end of the same  
conductor diverge with positive El<sup>tr</sup>  
with the middle points is neu-  
tral. The same facts take place  
and in the same order thro  
the other two small conductors.

Davy applied this experiment  
to the explanation of the pheno-  
mena of the Leyden jar -

A person insulated sparks  
Electricity drawn from the  
earth. —

History of Discoveries in Galva-  
nism - Fray G. de Sordani -

- Galvanis theory - Anion at Plat?  
- Volta's theory - The Electric matter  
produced by the metals.

Exp. Two plates, copper and zinc  
brought into contact are both  
electricized, the zinc positive the  
copper negative - This was  
discovered by Volta by means of  
his condenser of Electricity. - Exp<sup>t</sup>  
did not seem well with Mr D -  
who used Lesh's Volta's small  
condensing plates attached to the  
Gold leaf Electrometer. —

- Volta's apparatus - Pile -  
Trough - Wedgwood's porcelain  
troughs - Exp<sup>t</sup> with 1000 line  
Charcoal lined bottom - Metals in  
Wires and Soil -



— Mr. Davy promises to exhibit  
the whole battery of 2000 Seren.  
at the conclusion of the course.  
+ Air in a bent glass tube  
was decomposed by Common  
Elect. from the previous conduct  
— Also gave Voltaic Elect. this  
gas in the upper part of a  
glass tube was converted into

Saturday 19<sup>th</sup> May.  
Lect. 9<sup>th</sup> Chem: Philosophy  
(Decomposition of Neutral Salts  
Alkalies and earths, by Electricity,  
with Experimental illustrations  
and historical details. —

+ For the particulars of this  
Lecture see Mr. Davy's Bakerian  
Lectures — Parkinson's and Murray's  
compounds &c —  
— Mr. Davy gave a short and  
out History of discovery by the Voltaic  
machines —  
Experiments were exhibited to  
prove all the new discovered  
properties and effects of Voltaic  
Electricity  
— In the Exp<sup>ts</sup>. Two insulating  
stands with a plate of platinum



on each, were used. The wires  
from the large battery were directed  
by the universal dischargers. —

— In decomposing Potash Soda &c  
a small lamp was laid on one  
of the platinum plates connected  
with the negative plate of the Bat.  
with which the positive wire was  
brought into contact with the  
upper surface of the small liquid,  
a violent action takes place  
particularly at the surface, and  
small globules having the  
appearance of mercury, <sup>are</sup> separated  
at the under, or negative, side.  
These either softens or are soon  
covered with a crust of pot ash,  
by attracting oxygen from the  
atmosphere. This metal is  
best preserved in Naphtha then  
Carefully distilled. —

— Potassium decomposed Carbonic  
acid, in a glass vessel. —

— Sulphat of Soda decomposed, the  
acid and alkali shown by test  
paper. —

— Bismuth made of decomposing  
bodies by Amalgam. at work  
mercury — Mr. Davy's improvement  
of this method. —

— Effect of Potassium on steam  
on water

— Silver and zinc in diluted  
sulphuric <sup>acid</sup>, the zinc only is oxidized  
but bring them in contact, and  
the silver is also oxidized.



Mr. Davy remarked that the  
many facts seemed to prove that  
chemical affinity was the result  
of Electrical agency, yet it was  
too soon to attempt or expect  
at this moment a satisfactory  
Chemical Theory of Chemical  
Phenomena

- + A little liquid sulphat of  
Pot ash in both platinum cups  
or plates which were connected by  
Asbestos, after a few minutes, the  
cup connected with the negative  
end of the battery was found to  
contain a solution of pot ash,  
the other diluted Sulphuric acid.
- + With water in the positive  
and sulphat of soda in the  
negative - result the positive has  
Sulphuric acid, the negative, Soda

In the first of these experiments,  
the acid and Alkali move in  
contrary directions, passing each  
other in contrary directions, along  
the unresisted Asbestos, or Ami-  
anthen.

+ Take three cups in the 1<sup>st</sup>  
Sulphat of potash-negative. In the  
middle, Am<sup>a</sup> - In the 3 Water-Positive  
In about 5 minutes 150 part of  
(6 part.) acid was found collecting  
round the wire in the water; it had  
therefore passed thro' the ammonia  
without being arrested by its strong  
affinity to that substance.

+ When the disposition was reversed  
Pot. positive, Water negative and  
an acid in the middle, the alkali  
was conveyed thro' the <sup>unresisted</sup> acid and  
collected in the distilled water.



It is very remarkable that  
in their transfer, the acids and  
Alkalies lose their effects on test  
papers connected with the substance,  
exerting their influence only at the  
Positive and Negative wires. —

— Mr. Davy in their investigation  
in the Laboratory, made use of  
cups of Gold, Platinum, Agate,  
also Sulphat of Lime and the  
compound bodies, and always  
found the acid in the cup con-  
nected with the positive wire  
and the Alkaline earth, in the  
cup connected with the negative  
side of the Battery. —



61.  
Saturday 26<sup>th</sup> May 1810  
Lect. Philology Lect 10<sup>th</sup>  
Decomposition of acids by  
volcanic Elect<sup>n</sup>, and by Ch<sup>l</sup> pro-  
cesses. Decomposition of Boracic  
acid. Decomposition of fluoric  
acid. Metallization of Am-  
monia. General views concerning  
the nature of bodies and con-  
cerning ~~the nature of bodies~~  
~~and concerning elementary~~  
matter.

In this lecture M. D. decomposed  
the boracic and fluoric acid  
by potassium in a small retort  
as last year - the residue was  
a yellowish inflam<sup>ble</sup> - matter.



- Ammonia with Mercury  
amalgam. Now the basis of an  
amalgam also with mercury  
it is therefore a metal. Only  
the  $\frac{1}{12000}$  part of the mercury!!  
When is this metallic substance  
obtained? a very difficult subject  
- application to Geology -

G. Mackenzie's observations  
and M. Cavendish's experiments  
show that the mean density  
of the earth is double that  
of the bodies on its surface

- It is probable that the interior  
parts are composed of metals  
which on exposure to the air  
or water become oxidated

Hence perhaps the origin of volcanoes  
and earthquakes -

- Meteoric Stones may be  
metals which become oxidated  
in the atmosphere.

- Cast iron converted into  
wrought by heating the mass  
in charcoal, and hammering  
it. A matter few of which  
is

- M. D. offers these opinions  
merely as conjectures - The earth  
is too young for a complete  
theory.



Should be 11  
Chemical Phil<sup>y</sup> Lect: 12

- Exhibition of the power of  
the whole Voltaic Appa-  
ratus, consisting of 2000 plates  
Experiments of research and  
Analysis with this combination,  
which has not before been  
put into action

Conclusion of the course

Mr. D. commenced by in-  
forming us that as he intended  
at this lecture to exhibit experi-  
ments with the whole Voltaic  
battery of 2000 plates, it was un-  
necessary to make use of any  
previous explanations. —

He first tried the power of 500 on  
two pairs of charcoal on the com-  
mon discharge, and after that



burned & plates were. —

2. The same Exp<sup>t</sup> with 1000  
on the whole of the old plates  
The effect to all appearances  
was about double of that of the  
former.

3. 500 new plates seem nearly  
equal to the 1000 old plates

4. 1000 new plates did not  
act with some defect in the com-  
munion. The whole was then  
put in action. It did not act  
w<sup>ell</sup>. — went into the trough some  
several times, the Petroleum gas  
became too powerful for the  
Audience, several left the room  
when at length Mr. Davy was  
advised to adjourn the Lecture till  
Saturday next. —

Saturday 9<sup>th</sup> June 1810.

Mr Davy exhibited <sup>Exp<sup>t</sup> on</sup> the galvanic  
battery apparatus which was  
placed below and conducting wires  
raised up thro' the floor into  
the lecture room. The Experiment  
was performed with the shale  
battery of 2000 plates and all  
succeeded. —

— Fire is the great Instrument  
for converting Solids into fluids  
and fluids into elastic fluids.  
Some bodies have hitherto resisted  
the action of the strongest heat  
that has been used. —

— Experiments —

— Charcoal burned at two inches  
distance

— Platinum, Lead, Iron, Bismuth, Rhodi-  
um, Zircon, Silver, Manganese &c  
were all melted by the battery,



with the addition, in some of the instances, of a stream of Oxygen Gas. Steam was boiled and three drops on the tube visible, some of the others did the same.

To ascertain <sup>whether</sup> the metals are susceptible several were burned in vacuum, gold, silver &c, and some dark fluid was certainly produced two instances.

An attempt to melt charcoal, did not succeed. M. D. however intends to repeat the experiment privately.

Muscovy, in the barometer tube, was acted on for some time with any change.

Plumbago suffers some change, could not be found.

M. D. performed three experiments on charcoal and plumbago with a view to trace light on the diamond. If ~~the~~ Carbon could be found, it was

probably crystallized in cooling and forms some kind of diamond.

Substances acted on in these experiments were put into small cavities in thick pieces of charcoal fixed on the universal discharge with these brilliant experiments M. Davy concluded his lecture for the season.



London 19<sup>th</sup> Jan. 1811

Saturday 19<sup>th</sup> Jan. at 2<sup>o</sup> o'clock  
W. Davy —

Chemical Philosophy - Lect. I -  
Introductory. Objects of this course  
of lectures. Of the powers and ar-  
rangements of Matter. New views  
on the Chemical agents; their ar-  
rangements in Nature; their  
uses in art. On the combinations  
of substances, and of the proportion  
in which they combine. Reason  
why this branch of knowledge  
ought to be cultivated, promoted  
and encouraged.

— Study of Chemistry needs no  
recommendation —

~~Subjects~~  
— ~~Subjects~~ of Chemistry have  
been lately much enlarged. It  
is about three years since the  
Alkalis were decomposed, and



new metals were discovered. The French Chemists maintained that these metals were compounds, Hydrates. About 5 months ago, they retracted their opinion and allowed that they are simple bodies. - Some bodies unite, and are decomposed, as sugar, or salt in water, alkalies in acids, metals in acids. The power by which this is effected is called attraction. This attraction is very different in different bodies. The French Chemists say that it is affected by the mass or quantity of matter. M. D. said he adopted this opinion, but he now thinks

it unfounded - When this doctrine first came into vogue, the Atomists of the sea would swallow up every thing. Aristotle Philosophy first taught in Greece by Moschus before the Trojan war, but was first reduced to system & taught by Epicurus. - An attempt has been made lately by a very ingenious Philosopher to revive it. I shall have occasion to consider this and object to the doctrine. We know nothing of the form or magnitude of the original particles of matter. - Fluid bodies - metals the principle of combustion.



the  
Saturday 26<sup>th</sup> Sept 1811  
Chem: Phil Lect: 2<sup>d</sup> M. Davy  
of attraction and its laws, il-  
lustrated by Experiments. Views  
of the French School of Chemistry  
combated. Attractive powers as  
well as combinations definite.  
Of the connections of Magnetism,  
Electrical and Chemical attraction

One of the most important  
Phenomena in Nature is  
Attraction - A Stone falls to  
the ground - Water descends  
in the Atmosphere - The  
plants are all attracted by  
the sun. These phenomena  
are said to be owing to the  
attraction of Gravitation.



Attractions also takes place  
between the minute particles  
of matter and at various  
distances from each other.  
In this case, when the bodies  
are homogeneous it is  
called attraction of cohesion  
when the bodies are hetero-  
geneous, it is called Che-  
mical attraction. —

Expt. Two pieces of some  
malleable adhere to each other  
so as to require a considerable  
force to separate them. This  
is an instance of the attr<sup>n</sup> of  
Cohesion, or adhesion as it is  
sometimes called. This exp<sup>t</sup>  
succeeds equally well in vac-  
uo, therefore the pressure of  
the Atmosphere is not con-

with the phenomenon.

Expt. Illustration of Chemi-  
cal attraction —

1<sup>st</sup> Fact is that when two bodies  
are united by Chem. attraction  
their properties are changed.  
The product possesses properties  
very different from either of  
the component parts E. G. acid  
and Alkali = Neutral salt. —

— Oil and water mix  
but soon separate — Add  
solution of Pot ash = form  
Soap. Mordants in dyeing

2 Same bodies always unite  
in one fixed proportion.

Expt Nitrous Gas and Oxy-  
gen Gas form Nitric Acid  
the proportion is Oxygen  
2. Nit. Gas 1.



Exp. Mercurial acid gas and  
Ammoniacal gas form a  
solid, or viscid of Ammonia.  
The proportion is Mer: acid  
gas 1 Am<sup>l</sup> gas 1-

The earlier chemists were  
of opinion that no action  
took place between two bodies  
unless one of them at least was  
fluid "Cohærens non agunt  
"non fluida". This is generally  
the not universally true.

E.g. Amalgam of zinc and  
iron, two solids act very  
prominently on each other.

best purging medicines. The  
amalgams of Mercury on  
lead, and an amalgam  
mercury and bismuth  
rubbed together in a mortar  
become fluid.

fact. The attractive power is  
of different strength in different  
bodies. E.g. if two bodies attract  
each other with a force sufficient  
to cause them unite, and a  
third body be presented to the  
two which has a more powerful  
attraction to one of them than  
the two have for each other, the  
two will separate, and the third  
body will unite with that for  
which it has the most power-  
ful attraction and form a new com-  
pound. On this principle  
Tables of Elective Attr<sup>ns</sup> as they  
are called were first formed  
by Geopler in 1719. Newton  
first gave Chemists the promise  
of attr<sup>ns</sup> to account for Chemical  
Phenomena.

Berthollet has lately offered



A new view of this subject  
He says Chemical Atm. is con-  
siderably affected by the mass, that  
is, the third body in the  
experiment mentioned above.  
may, in a certain proportion  
not be able to decompose the  
other two, yet if it be added in  
larger quantity, it will separate  
part of one of the others. Expt  
boil together Sulphat of Barys  
and Pot ash, a quantity of Sul-  
phat of pot ash will be produced  
Had the pot ash in this Expt  
been pure, W. D. says it would  
be conclusive in favour of Ber-  
thollet's opinion; but he made  
use of Carbonate of Pot ash,  
and forgot what he himself  
first showed, that pot ash when  
after heated ~~with~~ red hot, will

a quantity of water. —  
W. D. thinks that if Berthollet's  
opinion were true, there would  
be no certainty or dependance  
on Chemical operations. —

In the experiment of mixing  
nitrous and oxygen gas to form  
nitric acid, the Oxygen and Ni-  
trogen are Chemically com-  
bined; but in forming At-  
mospheric air, they are only  
Mechanically united. —

W. D. showed a new gas  
the name of which I could not  
hear. It serves to ascertain the  
quantity of moisture - water -  
in Atmospheric air - it is  
a very delicate substance. (Hygro-  
meter) (Fluoroboric acid)  
W. D. concluded the Lecture  
with just mentioning, Electric and  
Magnetic attractions. —



+ combination of Man, foot  
or iron bodies may take place  
most minerals have their  
iron ingredients —

Double Elective ~~attraction~~  
attraction — Quercus — Duck  
power, M<sup>r</sup> D. thinks a very  
defective mode of expressing  
this subject — he does not  
know what the strength of  
the attractions are, how far  
can they be expressed by  
numbers. M<sup>r</sup> D. attempts  
to illustrate the subject by  
two persons, one with money  
in the funds wants to pur-  
chase an estate, the other  
has an estate to dispose of  
— This illustration did not  
appear very appropos. —

Royal Institution 2 Feb<sup>r</sup> 1811  
Chemical Philosophy Lect 3.  
Of the powers opposed to attri-  
and first of heat, Thermometer  
Excitation and communication  
of heat. New Experiments.  
Economical application.  
Equable expansion of Gases.  
Laws of their combinations.  
Operation of heat in Nature  
and Art.

When we consider the Ele-  
ment of fire in its impor-  
tant effects in its great u-  
tility to man and other  
animals, we need not be  
surprized that it was by  
some nations made the ob-  
ject of religious worship  
The term heat is familiar



to every person. It has however  
two significations, a sense  
and the cause of that sense.  
It was to remove a sup-  
posed ambiguity arising from  
this that the French Chemists  
introduced into their new  
Nomenclature, the word Caloric  
to signify the cause of  
the sensation of heat. This  
appears to be quite unnecessary.  
What man ever mistook the  
sensation for the burning  
coals which produce that sen-  
sation? Who ever supposed  
that iron was melted by  
sensation? The left we  
found, in the technical  
terms of a science, from  
common language, the mean-

ing will that science be  
learned and the left ambi-  
guity will then be in its  
terms. Caloric is a theoretic  
term and consequent  
by must be ever liable to  
change. The French Nomen-  
clature of 1780 will not ap-  
ply, in several instances to  
the present state of Chemistry.  
E. G. Oxymuriatic Acid  
was then supposed to con-  
tain a great quantity of  
Oxygen. It is now found not  
to contain a single parti-  
cle. The French <sup>new</sup> Calendar  
was adapted only for France,  
Prussia, Russia &c. —  
Not apply to India or  
the Lord Force. —



- Heat affects an equilibrium  
+ Heat enlarges the dimensions of all bodies, and in this way it affects all  
- Pyrometer shown but not put in action - Wedgewood's Pyrometer Ditto. The contract of the clay in the last instrument no exception to the general rule, w<sup>as</sup> also expected  
- M. D. mentioned an Expt. with Magnesia as a proof of this, which I would not be distantly.

- Expansion of fluids shown by Experiments with fluids in glass tubes as usual

- History and construction of all the different kinds of Thermometers

- Can Helmsont's air Thermometer give the hint to Luch who greatly improved it in his Thermometer or differential Ther. - This shew<sup>ing</sup> that first discovered the boiling and freezing points are fixed  
- Was contrivance for showing the greatest and least height of the Therm. During the night, Fluids for Thermometers are water, oil, Ether Alcohol, Mercury. The last is upon the whole, the best.

Equal quantities of heat produce equal expansions in the Thermometer - Expt. described any quantity of water at 100 mixed with an equal quantity at 50. The Ther. will show



The Arithmetical mean be-  
tween them 75. But this  
will not be the case if the  
fluids are of different kinds  
E. G. If a quantity of quicksilver  
at 75 be mixed with the  
same quantity of water at 100  
the Ther. will indicate not 125  
the Arith. mean but 120, so  
that the quicksilver has lost  
30 and the water has gained  
only 20. Hence a larger quan-  
tity of heat is requisite to  
raise water through any given  
number of degrees of the scale,  
than quicksilver through the  
same. Water is therefore said  
to have a greater capacity  
for heat than quicksilver.

and in the proportion of 3 to  
2. This last example is taken  
from Dr. Huxley and differs  
from the proposition by other  
chemists who make it about  
3. to 1.

— Solid, fused, vapour. A  
change from the first to the  
second, and second to the third  
is always attended with and  
absorption of heat - Latent  
heat. A change in the con-  
trary order gives out heat  
This subject was illustrated  
in the most manner.  
— Mercury was frozen by  
Mixture of Lime and Snow  
— water was attempted to  
be frozen by Sulphur acid



Experiment, but it did not succeed. As this experiment was attempted in the opposite side of the room, I could neither see nor hear. —

— Boiling described — Action shown by putting some coloured water over clear water in a tube — The experiment failed by the breaking of the tube. Proust or Berthollet in a jar shows this very well. —

— Power of bodies in conducting heat very different. Expt. described — Glass and metal rods — Metals the best conductors (Differ in metals). Ascertained by covering rods of different metals and of the same dimensions, partly with wax and exposing the

uncovered ends to the same degree of heat — Lines of melting will be inversely in the conducting power —

— Expt. a piece of paper wrapped round a piece of metal will not be burned. Hartley's fire plates to season horses from being burned.

— The hand been about 140° in iron, 170 in water and above the boiling point

— D. Fordyce's Experiments in a heated room. —

— Conductivity power of a lobster hair, wool fur &c. —

Man as well as other animals preserve the same temperature in all climates



— Animal heat is supposed  
to be derived from the oxy-  
gen gas of the atmosphere  
taken into the lungs in  
breathing. Some late Expts  
of Mr. Berzelius seem to oppose  
this theory  
— see Philosophical Trans.

41