

Vol. 1

Scientific
Introduction

1809

5th June 1809 —

1st Lecture on Galv. — M^r Singer

— State of Discoveries in Electricity before Galvani — Volta's Electrometer and Experiments

— Metalle part of two pieces of metal — History of Galvani's

Discovery — Frog, several capt:

with it — Feet joined and the armed spine placed on them, when brought into the circuit of three

broughts = 120 Series, it springing three or four inches high, sometimes thrown off the table to a considerable

distance on the floor. — Frog

Galvanised by three person taking hands —

— Great advantage of brought over piles.

Discoveries by Carlyle and Rubensson, by Cruikshank and others.

— Decomposition of Water, several

Different ways - W. S. Objects
to Cruickshank's Syphon, as it
must be broken to get out the
Gases!! One made by ^{drilling} making
two holes through the opposite rim
of a wine glass - wires through these
and glass tubes to receive the Gases.

W. Singer's mode is by two small
tubes in a glass filled with water
- Experiments on Coloured fluids, in
single tubes, placed horizontally
on the bottom of an ale glass
inverted, on the middle trough ^{at}

- Arborescences of Saltpetre
formed in the same manner.
(These would have looked more
beautiful in a perpendicular
situation of the tubes.)

- Experiments with the con-
denser. An insulated plate of
Copper and Zinc applied several
times to each other and attached
to the Condensing Electro-motor.

Shewed that the zinc plate is posi-
tive and the Copper negative.
- Same Exp. with the Voltaic ap-
paratus.

W. Singer's 2 Section - Galvanic
- Structure of the Voltaic appa-
ratus - Commins de Tapes, took
too much room - Peter trouble
some in cleaning - Crutchshank
brought - Wilkinson's improve-
ment - Davy's porcelain trough
Suggested by Dr. Babington -
Singer made of supporting the
plates when they are not used,
by flat pieces of wood, of the depth
of the plates. (This is a simple &
easy mode much preferable to that
of Mr. Davy)
- Great and small plates compare
Same charge spread over a large
surface is less intense than over
a small surface. This is the case
also in common Electricity - proved
by charging great and small
jars with the same number of
turns of the Cylinder. This ap-
plied to great and small in the

Voltaic Apparatus - Great plates
more advantageous in the deflu-
cation of Metals - The same in
Wilkinson's brought when both
sides ^{of the plate} are acted on by the acid
mixture. What is the use of the
acid? - It has been said that it is
a better Conductor of Electricity than
water. But Metals are better
Conductors than either acids or
water. It would be a great ad-
vantage, if water would answer
the purpose. - Water is a bad con-
ductor of Electricity (see Mr. Greig's
Exp^s in the Phil. Transactions)
- For Experiments on good con-
ductors, Large plates should
be used in the Voltaic Apparatus
when imperfect conductors are
used, small plates and a greater
number are preferable. For gene-
ral use, plates of 6 inches square
are perhaps, the best. —

- various metals, both in foil
and wire burnt - Gold, silver tin
lead &c in leaves. A brass ball
three or four inches in diam.
stand on a stand. The foil laid
on the ball. A metal point, and
sometimes another of a different
metal used to complete the circuit.
Beautiful colours - Silver a
fine green - Mr Davy on one
occasion produced a white flame
flame. This he said was owing
to its great purity; but Mr S.
proved that it was owing to his
having made use of charcoal on
the end of the closing wire; charcoal
always produces a white flame.
- The common method of explaining
the action of the Voltaic Battery, by
Induction - Power in the Voltaic
properties of number of series.
This Mr S. thinks not satis-
factory, and will, at a future

lecture, propose a theory of his
own.

- Mr Davy, at the Exhibition of his
sheet of 20 plates of one foot square
said that a piece of iron might be
kept red hot for 24 hours by it.

This Mr S. says cannot be done,
for the battery, which is the most
powerful at first, gradually di-
minishes in power.

12th June 1809

M. Sengier's 3^d Lecture -

Electro Chemical Science -

- Recapitulation of the chief objects of last lecture. - Voltaic Apparatus - Nitric acid acts more powerfully, but its action is soon over Sulphuric Acid decomposes the plates, too rapidly and produces much inflamm^{at} air, Nitro-muri acid acted very powerfully, but the action soon ceased. On the whole Muriatic acid answered the best. It acts more uniformly and much longer than any of the others.
- For common purposes, an ounce of acid to a pint of water, may be used. This acid dissolves the coat of Zinc, and consequently the plates require little cleaning.
- The action of every trough decreases from its commencement.

- The power may in some cases,
be totally lost, but will recover in a
short time.

- Great and small plates - Their
comparative strength - Large plates
should be used ^{for} experiments
on conducting substances.

- Where the heat and light?

Not in Electricity - Not from the
Atmosphere, for "Dest." inflames
Charcoal in Vacuum, also in
Water. It may be said - from the
Oxygen of the Water. But it
produces this light also in oil
of Turpentine which contains no
Oxygen.

W. S.'s explanation. All
bodies contain a certain pro-
portion of heat and Electricity -
Equilibrium. When a portion
of Electricity is added, if the wire be
thick, it passes without producing
any sensible effect. But when the
wire is very small, the additional

Electⁿ cannot pass without disturbing
the Equilibrium, and letting the
heat escape.

- Crumshank's explanation of the
Oxygen and Hydrogen gases being
produced in water, when the wires
are distant several inches from each
other, W. S. says, is unsatisfactory.
A better solution will be found
than this.

- On the production of an acid
at the positive, and an Alkali
at the negative pole of the Battery.
Expt. of Washburn, Peet, Selwyn &
Davy. - The latter Gent^l proved
that neither Alkali nor acid
is produced from pure water
(see his Bakerian Lecture on this
Subject).

Thursday 15 June 1809.

M. Singer's 4th Lecture

— On Sympies

— Decomposition of Saline Sub-
stances. Sulphat of Soda in one
Water glass, and Water in another,
the former connected with the pos-
itive the latter with the Negative poles
of the Battery — Results. acid in the
first and alkali in the last.

Exp. with three glasses. Water on
one side, Sulphuric acid in the
middle and Sulphat of Soda
on the other side, this with the posi-
tive end and the Water with the
negative. Results the Alkali
was found in the Water. — 4 glasses
connected with crossed cotton
threads

— Light produced in Water. Also
in Oil Lamp: which contains no Oil.

Geological Phenomena - explained on Electrostatic principles
- A stratum of clay found over Basalts - Basalts may be decomposed by Voltaic Electricity, and this clay is found to be a component part

Monday 19th June 1809.

Act 5th W. Singer

- See Syllabus

- Chem: Analysis greatly extended by the Voltaic apparatus. - Light and heat supposed to proceed from the attraction and union of the opposite Electric Energies. But here this the case, W. S. observed, the products should be instantaneous. Some thing more is still wanting. The theory of combustion is incomplete still.

- "Elect" is the cause of Chem: act: - Acids and Oxygen are negative attractors and inflated substances in positive.

- Theory of the decomposition of a compound Salt by the Voltaic battery.

- Decomposition of Sulphuric acid - Acid in a warm glass. Platinum wire - porous gave out oxygen gas - Negatives at first Hydrogen gas from the water of the acid contains; but afterwards a white powder is precipitated, which is sulphuret - Sulphur takes up $1\frac{1}{2}$ of its weight of oxygen and Phosphorus $\frac{1}{2}$

- Both these substances were burnt in Oxygen gas in two air pump receivers, that were the phosphorus broke.

- Iron and Selenium in a solution of Sulphate of Copper the iron is covered with copper, but the Selenium is not affected. Bringing the two metals into contact in the solution, and they will both be covered with

Thursday 22 June 1809

W. Stryker & Luten

- On the decomposition of pot-
ash - W. S. tried the Exp^t with
one trough of 50 Series, but
did not succeed. He then com-
pounded 260, with which he
produced small globules of
Potassium. They exploded on
Water

- An amalgam was formed
of Mercury and potassium by
connecting the Mercury with the
side and the zinc potash with
the side of the battery -

- A silver support for the metal-
rods, for Platinum is corroded by
potassium

- W. S. thinks that plates of one
inch square will decompose Pot
ash as well as the same number
of the Stryker.

Thursday 29th June 1809
M. Singer 7th and last Lecture
for the season

- M. S. intended to show the
French mode of decomposing
Pot ash by iron, but he had
not succeeded in his attempt to
effect this, and therefore con-
tented himself with describing
the process. — Performed second
Experiments with the whole
battery consisting of six troughs
of 50 series each, 4 inches square
and two troughs of 32 pan
each, of 4 inches square. = 364
series

- Charcoal burned with great
brilliance, but only a ^{very} small
length of wire could be burnt.
The charge was too weak for
this purpose.

Phosphorus was burnt ⁱⁿ and
a small glass tube, bent, at
nearly right angles, with a
jet-hole near the top.
This was moved in Mercury in
a receiver. The phosphorus was
placed in at the lower end of
the tube, to the bend. On com-
pleting the circle, the Phospho-
rus immediately took fire, and
a quantity of Hydrogen gas
ascended to the upper end of the
tube - In the same manner, Sul-
phur ^{and} Carbon may be burnt.

- Mr. S. says that the Hydrogen
gas, in these experiments pro-
ceeds from the water which
these bodies contain, and is not
a constituent part of the bod-

- Mr. S. concluded ^{the lecture} with caution in
his argument, too hastily, forming
a theory (Diamonds, Artificial
Kiln-stones - Soil on Basaltic
found by Electricity &c. &c.)