

BOYLE, HOOKE AND HALLEY DIVING ADVANCEMENTS IN LATE 17th CENTURY ENGLAND

This presentation revolves around the early history of the
ROYAL SOCIETY OF LONDON (or RS)

Were to be involved in diving from the 1660s

One of its founders was to be **Bishop John Williams**
1648 book *Mathematical Magick*

PIC 1 Williams
PIC 2 book cover

Wilkins visualised whole colonies of people living underwater in an ark.
'But the greatest difficulty of all will be ... how air may be supplied for respiration:'

This idea led much of the Societies later experimentation on diving.

RS began to come together 1695 at Oxford then London

PIC 3

Its members were not only clever, but many of them very rich.

They met at least once every week, when experiments were performed for their pleasure
EXPERIMENTS LED THEIR EVERY MOVE

From the very beginning the RS took an interest in diving - **led to an extent by the work by von Treilben in Sweden** (*Wasa* work was from the end of 1663)

PIC 4 bell

OUTCOME the RS had a diving bell made of **lead** in which their secretary lasted ½ hour

1664 Jacob Maule and Mr. Rochefort describe their experiences diving in Sweden in letters to the society

Also in 1663 this man, **ROBERT BOYLE**, published the second edition of his book *Experiments Physical Mechanical...* which laid out **BOYLE'S LAW**

PIC 5 Boyle

(Charles' law to the French - because he rediscovered it 20 years later
- with temperature, although Boyle made temp allowances in his expts.)

What is Boyle's law?

To Schoolboys, double the pressure, half the volume

PIC 6 $Pv = \text{const}$

in 1671 at Sheerness 3m high cylinder with one-way valve

lowered to depths down to 35m and PROVED Boyle's law

Later produced a chart of air compression to 600m 'OF USE TO DIVERS'

Boyle's assistant was called ROBERT HOOKE

PIC 7

We have no picture of him for reasons which I will explain

Hooke was a polymath - a genius - and with the book published
Boyle allowed him to become CURATOR of the Royal Society on a salary
of £4 per year < 5 Euros

The curator was the man who came up with all of the experiments for the Society

With weekly meetings - while he came up with ideas, he never really had time to finish all of
the experimentation involved, before he had to dream up new experiments for the next
meeting.

What he left were many loose ends which others later picked up and claimed the credit for.
This made Hooke very bitter

1664 War with Holland loomed and the RS began to consider all manner of methods of
diving OUT OF A DIVING BELL

Why? THE PROBLEMS WERE

PIC 8

- **Supplying the bell with AIR**

Robt Hooke suggesting two buckets 'AS IN A Well' one up/one down

PIC 9

For years members of the RS seem to have MADE FUN OF HIM For this idea

- **A diver working outside the bell, Hooke suggesting**

PIC 10

1st DIVER W/ Bag over the mouth

2nd The diver enclosed in a bag - had been tried in Sweden

PIC 11

3rd Hooke then said he had thought of something safer and suggested air being decanted from one cylinder into another

PIC 12

PIC 13

The equipment was built and tried out in front of the Soc. Where Hooke lasted 4 minutes with his nose stopped - criticised for not standing properly

Then they found a diver a Depthford tried the gear out

Left it with him and in JULY 1664 it was reported that the Diver — a good while – and wanted some glasses so that he could see

SUCCESS Hooke's promised deep convex glasses

They had to have been tried uw, because 20 years later he said that the glasses had not worked

Even if the diver lasted 4 minutes uw, this was still a 100% increase on b-hold diving.

Now fast forward 22 years

In **1687 WILLIAM PHIPS, 'an Englishman of American birth'** arrived back in England with the equivalent of nearly ½ Euros in treasure, salvage from a Spanish wreck off San Dominica -

PIC 14 Phips

PIC 15 Ship wreck

PIC 16 Map

This made many of his backers, including the king even richer and began a rush of **PATENTS** for diving companies and equipment in the 1690s

One involved was this man **EDMUND HALLEY** of Halley's comet fame

PIC 17 Halley

PIC 18 comet

who picked upon some of Hookes ideas and made a number of letters or relations to the RS **1688 and 1691**

PIC 19 list

1. A bell on wheels - indication that Hooke's ideas for working outside the bell had not worked that well

PIC 20 Bell on wheels

2. An air pump for divers – letter picture showed 'Cap'

PIC 21 Halley letter

PIC 22 Letter detail

3. Diver going deeper than the bell

PIC 23 Deeper than bell

4. His time at Pagham in 1691 with experiments

PIC 24 Pagham bell

Fast forward again, to 1717 when he again wrote to the RS about diving –
In the light of a new (German) king and people like Col. Becker
Demonstrating their equipment in the river Thames

Halley made a dive in the river Thames in the presence
of Marten Triewald, who later came up with his own bell

PIC 25 air supply

Next letter to the RS was in 1721 when he introduced his final design for working uw
and the one he was to be best known for

PIC 26 diver lock-out

PIC 27 stylised diver lock-out

Why there is no picture of Hooke

PIC 28 Hooke outline

PIC 29 Apple

PIC 30 Tree

PIC 31 Newton

Who was he? GAVE us GRAVITY and laws of motion

Robert Hooke died in 1703 and in 1704 NEWTON became President of the Royal
Society

He hated Hooke and had all picture of him destroyed and along with all of Hooke's
papers – very childish – so Hooke has never been recognised and was envisaged in many
ways

Then, recently, this came to light

PIC 32 Hooke

LADIES AND gentlemen I give you Robert Hooke, the man who, within the technical
constraints of his time, gave us our first SCUBA