"Sorting Techniques in Computing" by John Powell

John Powell described a Bubble sorting technique. Suppose you have ten items whose weight happens to decrease as they are numbered (N) from 1 to 10. But you wish to sort them so that the weights are in increasing order.

    Is Item 1 lighter than Item 2? No.   So exchange   1 & 2
    Is Item 1 lighter than Item 3? No.   So exchange   1 & 3

    Is Item 1 lighter than Item 9? No.   So exchange   1 & 9
    Is Item 1 lighter than Item 10? No. So exchange   1 & 10   The order is now: 2, 3, 4 …, 10, 1
        Repeat the process to give: 3, 4 …, 10, 2, 1
        After 10 iterations we have: 10, 9, 8 …, 2, 1

Each iteration requires one less exchange, but it is a long process with N^2 trials.

Bubble sorting always works, but are there other routines which would reduce the number of steps?

- Shell Method, applied to 100 items: test Items 1 to 10 against Items 91 to 100, then to Items 81 to 90 and so on.
- Using the Fibonacci sequence to select the chose the item for test.
- Quick Sort: choose a likely value and test all items to see if they are greater or smaller;
- Or get the computer to choose. This method is usually quick but not always.

John Powell finished with an alphabetical sort – where a list of names can be broken down into a set of lists for each of the 26 letters. This is much closer to the ideal of putting each item directly into its final position.

"Get More light from a Candle" by Richard Buchanan

Richard Buchanan brought a pair of bulbous wine bottles filled with water and set on a base with a low power electric lamp, simulating a candle, between them. An old-fashioned set-up.
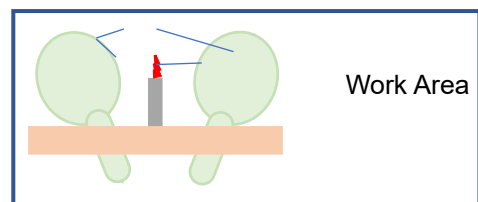
    The bottles act as crude lenses gathering light from the candle and directing it to a work area. Such lenses do not focus to a point – which is desirable for lighting an area. Two bottles give 2 work areas, another two at right angles give 4 areas. The work could be lace making, writing or whatever.

    Such a set up could have been made from the 3rd century when glass blowing was already practiced. It was certainly in vogue in the late middle ages.

A Spiralarm Lamp by Alan Ashby

Alan Ashby brought a lamp with the appearance of a miners' safety "Davy Lamp". It was a safety lamp, but more complex and designed for the safety of sewer maintenance men who could **a)** suffocate if rotting sewage had used up the oxygen in the air they were breathing; or **b)** be in danger from flammable gasses.

    A wick fed from a paraffin vessel is lit, and allowed to stabilise for about three-quarters of an hour.

a) When ready the lamp is lowered into the sewer. If the oxygen content of the air has dropped from the normal 21% to below 17% the flame goes out.

b) The flame is used to heat a Spiral tube, slightly unwinding it. If there are flammable gasses, eg methane, the flame will burn more strongly and further unwind the spiral tube, causing it to close an electrical contact and light a warning lamp.

Alan Ashby also brought the accompanying: Working and Maintenance Instructions of the Naylor "Spiralarm" Automatic Gas Alarm type 'S'.

Addendum by Richard Buchanan - *who in the latter part of his career wrote instructions for the manufacture of telecommunications equipment.*

The Instructions were interesting in that they show a common problem in how to write them.

You want instructions intelligible to a newcomer; and you need someone familiar with the device to write them. Familiarity means that things can be taken for granted and omitted from the instructions. A newcomer will probably have some relevant experience and not need every little thing explained, though how little is little?

The Spiralarm instructions seem, to me with no relevant experience, to be quite good but to have been concocted between a specialist and an office typist, neither with a good command of English.