Private prescription:

A thought-provoking tonic on the lighter side

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Instruments in verse

Few scientists would disagree with the statement [1] made by Sir Humphry Davy (1778–1829) that 'nothing tends so much to the advancement of knowledge as to the application of a new instrument'. In fact, it is well recognized that the progression of science depends as much on the invention and development of new instruments as it does on new ideas and hypotheses. In this article I have chosen to highlight two specific instruments that, in their time, revolutionized progress in electrophysiology and medical diagnosis in the nineteenth century, namely the mirror galvanometer and the stethoscope, because both have been commemorated in poems written by eminent scientists who used them in their research.

The mirror galvanometer

Precision measurements of electrical current, whether it be induced by physical, chemical or biological means, were only able to be undertaken with the invention of the mirror galvanometer in the 1830s. This instrument comprises a coil of wire suspended between the poles of a permanent magnet. Any current passing through the coil induces a magnetic field that reacts with the magnetic field of the permanent magnet causing the coil to rotate. The deflection is then measured by a beam of light reflected by a mirror attached to the coil. The instrument can be made as sensitive as necessary by changing the sizes of the coil and magnet. It is reported that Emile Heinrich Du Bois-Reymond (1818–1896), regarded by many as the founder of modern electrophysiology who pioneered the study of electrical activity in nerve and muscle fibres, developed a mirror galvanometer that required 5.1 km of wire wound in 24,000 turns. However, it was left to James Clerk Maxwell (1831–1879), the physicist best known for his work on electromagnetism, to write a poem on the instrument entitled *On Tomson's Mirror Galvanometer* [2]:

The lamp-light falls on blackened walls,
And streams through narrow perforations,
The long beam trails o'er pasteboard scales,
With slow-decaying oscillations.
Flow, current, flow, set the quick light-spot flying,
Flow current, answer light-spot, flashing, quivering, dying.

O look! How queer! How thin and clear,
And thinner, clearer, sharper growing
The gliding fire! With central wire,
The fine degrees distinctly showing.
Swing, magnet, swing, advancing and receding,
Swing magnet! Answer dearest,
What's your final reading?

O love! You fail to read the scale
Correct to tenths of a division.
To mirror heaven those eyes were given,
And not for methods of precision.
Break contact, break, set the free light-spot flying;
Break contact, rest thee, magnet, swinging, creeping, dying.

Those of us who had the 'privilege' of using these instruments while at school or university in the 1950s or earlier will certainly appreciate the sentiments expressed by Maxwell.

The stethoscope

The stethoscope was invented in 1816 by Rene-Theophile-Hyacinthe Laennec (1781–1826), the physician regarded as the 'father' of chest medicine. Originally a perforated wooden cylinder, the stethoscope has been modified over the years to more convenient forms. An important medical and literary figure of that time, Oliver Wendell Holmes (1809–1894), wrote a ballad on the instrument in 1848 entitled *The Stethoscope Song* [3]:

There was a young man in Boston town,
He bought him a stethoscope nice and new,
All mounted and finished and polished down,
With an ivory cap and a stopper too.

It happened a spider within did crawl,
And spun him a web of ample size,
Wherein there chanced one day to fall
A couple of very imprudent flies.

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The first was a bottle-fly, big and blue,
The second was smaller, and thin and long;
So there was a concert between the two,
Like an octave flute and a tavern gong.

Now being from Paris but recently,
This fine young man would show his skill;
And so they gave him, his hand to try,
A hospital patient extremely ill.

Some said his liver was short of bile,
And some that his heart was over size,
While some kept arguing, all the while,
He was crammed with tubercles up to his eyes.

This fine young man then up stepped he,
And all the doctors made a pause;
Said he, 'The man must die, you see,
By the fifty-seventh of Louis's laws.'

'But since the case is a desperate one,
To explore his chest it may be well;
For if he should die and it were not done,
You know the autopsy would not tell.'

Then out his stethoscope he took,
And on it placed his curious ear;
'Mon Dieu!' said he, with a knowing look,
Why, here is a sound that's mighty queer!'

'The bourdonnement is very clear,
Amphoric buzzing, as I'm alive!'
Five doctors took their turn to hear;
'Amphoric buzzing,' said all five.

'There's empyema beyond a doubt
We'll plunge a trocar in his side.'
The diagnosis was made out,
They tapped the patient; so he died.

Now such as hate new-fashioned toys
Began to look extremely glum;
They said that rattles were made for boys,
And vowed that his buzzing was all a hum.

There was an old lady had long been sick,
And what was the matter none did know:
Her pulse was slow, though her tongue was quick;
To her this knowing youth must go.

So there the nice old lady sat,
With phials and boxes all in a row;
She asked the young doctor what he was at,
To thump her and tumble her ruffles so.

Now, when the stethoscope came out,
The flies began to buzz and whiz:
Oh, ho! The matter is clear, no doubt;
An aneurism there plainly is.

The bruit de rape and the bruit de scie
And the bruit de diable are all combined;
How happy Bouillard would be,
If he a case like this could find!

Now, when the neighboring doctors found
A case so rare had been described,
They every day her ribs did pound
In squads of twenty; so she died.

Then six young damsels, slight and frail,
Received this kind young doctor's cares;
They all were getting slim and pale,
And short of breath on mounting stairs.

They all made rhymes with 'sighs' and 'skies,'
And loathed their puddings and buttered rolls,
And dieted, much to their friends' surprise,
On pickles and pencils and chalk and coals.

So fast their little hearts did bound,
The frightened insects buzzed the more;
So over all their chests he found
The rale sifflant and the rale sonore.

He shook his head, 'There's grave disease,
I greatly fear you all must die;
A slight post-mortem, if you please,
Surviving friends would gratify.'

The six young damsels wept aloud,
Which so prevailed on six young men
That each his honest love avowed,
Whereat they all got well again.

This poor young man was all aghast;
The price of stethoscopes came down;
And so he was reduced at last
To practise in a country town.

The doctors being very sore,
A stethoscope they did devise
That had a rammer to clear the bore
With a knob at the end to kill the flies.

Now use your ears, all you that can,
But don't forget to mind your eyes,
Or you may be cheated, like this young man,
By a couple of silly abnormal flies.

A cautionary tale with a distinct message about not letting new technology go to your head; as relevant today as it was then 150 years ago!

Comment

Both poems were written by eminent scientists (both held professorial posts at the time) and yet the treatment of the subject is quite different. Maxwell's treatment is more descriptive whereas Holmes' treatment is more satirical. However, both display a depth of knowledge only available to those who are well versed in their use and both express sentiments that should be understandable to both scientists and non-scientists alike. So, why not an 'Ode to a Mass Spectrometer' or 'The Rhyme of the Raman Microscope'? The possibilities are endless – a challenge to the readers of *Drug Discovery Today*!

References

1 Hager, T. (1995) *Forces of Nature: the Life of Linus Pauling*, Simon and Schuster
2 Campbell, L. and Garnett, W. (1882) *The Life of James Clerk Maxwell*, MacMillan
3 Holmes, O.W. (1887) *The Poetical Works of Oliver Wendell Holmes*, Houghton, Mifflin and Co.

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Stem cells: hype *and* hope ▼

A recent short review article by Paul *et al.* in *Drug Discovery Today* [1] provided an update on the possible use of two types of stem cell in regenerative medicine. The first is the embryonic stem (ES) cell derived from the inner mass of the developing blastula, and the second is the adult stem cell derived from specific regions of differentiated tissues. Several possible clinical applications for these cells are also highlighted in the review, including diabetes and Parkinson's disease (PD). The review title poses the question of whether there is 'hype' or 'hope' in this field. I would like to suggest that there is both.

First, there are the master cells from the blastocyst. This whole field is, of course, shrouded in the ethical controversy regarding derivation of ES cells from living human embryos. Because the moral status of the embryo is determined largely by one's own religious and ethical persuasions, there will never be a simple answer as to whether society should have harvested such cells to begin with. However, the reality is that there are now several cell lines available. These ES cells cannot form a new human alone, they exist as an artefact of tissue culture. As such, there is little ethical argument over the growth of these isolated cells. This is perhaps why President Bush has allowed National Institutes of Health (NIH) funding to be used for all ES cell lines already generated and logged with NIH, but not the derivation of new ones (http://grants.nih.gov/grants/stem_cells.htm). The challenge now is to prove that these cells can actually provide important information on human development, and possibly restore function in various diseases.

The sequence of events begins with extensive tissue culture experiments to show that different cell lineages can be isolated from the starting ES cell population. Ideally, these lineages (neural, muscle, blood) will be devoid of ES cells that, by definition, will form a teratoma following transplantation. Once specific lineages have been isolated, the next challenge will be to prove they can function as well as sister cells that are normally resident in adult tissues. This is an important point, because simply deriving a differentiated cell from an ES cell might not recapitulate normal development (which occurs over a much longer time period and within the complex environment of the developing organism).

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