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OPINION

## Science and profit

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ONCE upon a time, pure and applied science were the same. Sir Humphry Davy discovered seven chemical elements, and invented the miner's safety lamp. Louis Pasteur investigated the properties of molecules, and worked out how to stop milk spoiling. Everybody thought that was admirable. Somehow, things have changed. Today the feeling is widespread that science and commerce should not—must not—mix. There is a queasy suspicion that the process of discovery is in some way corrupted if it is driven by profit.



This week saw two things that reflect this suspicion, which for many people is hardening into unshakeable conviction. One was the unease that greeted publication of the sequence of the human genome (see [article](#)). The other was a report by Oxfam, a British charity, on the plight of people in the third world, too poor to buy the western medicines they need to stay healthy. The cases may seem unconnected, but they are not. The underlying issue is the same, and goes to the heart of the debate over science and profit: what are the terms on which scientific knowledge can be owned?

### Performance bonus

In the case of the genome, two groups have been in contention: one funded mainly by taxpayers, dedicated to the public good; the other funded privately, dedicated to the pursuit of profit. The race was acrimonious—with one side charging that the genome is the heritage of mankind, and the other seeking to establish commercial rights over it. The Oxfam report thumps away in more traditional style, denouncing western capitalism and complaining that drug companies concentrate on treatments for rich-world diseases, leaving the poor to fend for themselves, and that they keep their prices too high. In both cases, it is alleged, the ignoble search for profit distorts and corrupts.

These accusations are ill-conceived. Needless to say, not all science should be, or can be, driven by profit. Some fields of research are done to satisfy man's spiritual, rather than material, appetites. They seek answers to the sorts of "how did we get here?" questions which earlier generations confronted with religion. Another kind of knowledge may be useful and practical, yet too diffuse to be owned. This constitutes what economists call a pure public good. Pure public goods, when costly to produce, are nowadays funded by taxpayers and provided by governments—because, for the most part, they have to be. That leaves the rest: a fabulous vista of scientific, and commercial, opportunity.

The problem with the genome is that when it moved from the second category to the third, it took the scientists in the public project by surprise. The founders of Celera Genomics found a way to profit from the genome—or, to be more accurate, from carefully annotated and ingeniously packaged descriptions of bits of it, which drug companies are happy to buy (see [article](#)). As a result, they got a move on. They did their work faster and in some ways better than their public-

sector rivals—who would probably still be plodding towards their goal had they not had the spur of competition. The public researchers complain that Celera drew on public knowledge in order to advance their private goals. So it did—that is what public knowledge is for.

However, the genome remains a common heritage. Celera's activities do not stop other people using that public knowledge—and even packaging it for sale in other ways than those done by the firm. Genomes are not inventions and cannot be patented. Celera has no proprietary rights over the human genome *per se*, just over its version of that genome. In short, Celera's pursuit of profit has been good for science, and for man.

Difficult technical questions about the design of patents for particular genes (which are allowed) still need to be resolved. Any company seeking to assert ownership of scientific knowledge needs to be held to the traditional tests: advances should be original, non-obvious and useful. This standard has not always been rigorously applied. But none of this alters the basic fact that, in genome research, science and profit have mixed very productively.

The question of third-world drugs is undeniably more vexed—but impugning the profit motive is a fatuously inadequate answer. If not for the lure of profit, the drugs that Oxfam wants sent to developing countries would not exist in the first place. Now that the drugs have been developed, it is often argued, the cost of manufacture is, in most cases, much lower than the price charged. This is gouging, the indictment goes on: drug companies could make money even if they sold the drugs much more cheaply. Again, because of profit, the benefits of science are being withheld.

Nonsense. Developing drugs is expensive. If companies are to keep trying, they must expect to make enough profit to meet the cost of developing not only the drugs that work, but also the ones that do not. Consider another point. Presumably, as good profit-maximisers, firms would be willing to increase their sales in the third world, even at knock-down prices, if they could maintain their profits in the West. They suspect, with reason, that demands would soon arise for prices to be cut there too; "grey" re-importing would increase, as well. These concerns deserve to be taken seriously.

The case for much more generous provision of life-saving drugs to the developing countries is irresistible both morally and as a matter of economics. But it is naive, wrong and in the long run counter-productive, to expect the cost of this aid to be met out of drug-company profits. Instead, rich-world taxpayers should pay. It would be much better to spend aid money on drugs for developing countries than it is to waste it in the usual ways.

Far from compromising science, profit in both these cases—the development of new medicines and the elucidation of the genome—has animated it, and directed it towards meeting pressing human needs. It is a happy marriage. Davy and Pasteur would surely have approved.