

Commentary: Biotech Blooms in the Delaware Valley

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Abstract

In June 2008 *Biotechnology and Genetic Engineering Reviews* along with other leading journals in the field was invited to review developments in the Philadelphia region as a model for co-operation between the academic researchers in the Life Sciences and Medicine and the Industrial Biotechnology Sector. This report summarises the impressions made from a “European” viewpoint based on selected site visits.

Greater Philadelphia today – the Life Sciences Perspective

Rustbelt: perhaps the word which would come to many a mind when locations such as Pennsylvania and New Jersey are talked about. Old steelworks, once mighty chemical plants pumping forth pollution into a yellow-stained haze, all of them now heading for dereliction amidst growing unemployment. For all of us who ever – in the ‘old days’ - drove up the I-95 northbound, there was no prospective sight so fair as that of the Route 128 (around Boston) coming into view. Even New York’s famous skyline seen on the journey had limited power to excite: from New Jersey it was hard to make it out. Of course there was Princeton and other Universities to visit en route, havens of excellent research in the life (and other) sciences. Perhaps, one felt, the engineering sciences at least were a hope for the future of the region, but the life sciences seemed at that juncture to be remote and uninvolved.

Today there has been a huge change across the board. The Life Sciences are flourishing in every area, and so are the industries based upon them. To look at this more closely, let us first quickly define what we are talking about. The term ‘Greater Philadelphia’ denotes a cluster of 11 contiguous counties, in 3 states (New Jersey, Pennsylvania and Delaware). It differs only very slightly from the combination of the

two Metropolitan Statistical Areas (MSAs) of Philadelphia and Trenton. The alternative term ‘Delaware Valley’ is geographically expressive, and is sometimes used.

Concerning ‘Life Sciences’ a word needs to be said. ‘Divided by a Common Language’ – the old transatlantic translation problem arises. In the UK, for sure, the term denotes a collection of biology-based academic disciplines: in the USA it rather denotes a science-based area of knowledge-driven investment, entrepreneurial activity and employment, and in contrast to common usage in the UK, it includes health service provision. I will stick to the US usage, at least to be best of my understanding.

The writing of this report arises out of a visit made to the Greater Philadelphia Region at the invitation of Select Greater Philadelphia, of which organisation more is said below. In under four days we visited a wide range of major companies, small companies, hospitals/healthcare facilities, research institutes and university-associated facilities. Everywhere we were addressed by the Chief Executive Officer or equivalent, and had the chance to hold discussion with them. We also heard the work of *Select Greater Philadelphia* described, and had the chance to learn the meaning of the fascinating term “serial entrepreneur” through being addressed by – a “serial entrepreneur”.

So where does the activity in Life Sciences in the Greater Philadelphia Region stand today, in relation to the total US national commitment? How is technology transfer faring? What sort of 2-way interaction is there between industry (manufacturing or service) and academia? It has to be acknowledged that our very presence on this visit betokens a situation where a recent comment by Louis Weiner (Chair of Medical Oncology, Fox Chase Cancer Center) is apposite: “this is a remarkable region that is often under-recognized for its high amount of human talent”. There is clear local recognition for the fact that in terms of world impact, Greater Philadelphia has some catching up to do, before it can on a wide assessment basis outstrip (say) Boston, San Diego or the Bay Area. But it is impossible as a visitor not to be impressed by both the pace of change and the level of current achievement. *Figure 1* illustrates how in concentration in employment, level of recent growth and in size of the sector, Life Sciences in Greater Philadelphia now challenges the more internationally known ‘major players’.

The actual figures are even more impressive. The 2008 Regional Report “The Evolution of Innovation” recognises the local importance of nano-research and technology, IT, defence, chemistry and financial services, but is proud to label Life Sciences as “our region’s #1 industry”. 55,900 people work in the core industries, and 352,300 in supporting industries. At \$443 per person in the region, the level of industrial R&D spend for the life sciences was the highest of any region in the USA. To quote: “Home to approximately 400 life science and related companies, the region’s life sciences cluster of pharmaceutical, biotech, R&D and support companies is one of the largest in the country. Key to the success of this cluster are the 3,435 life science degrees awarded (annually) in the Greater Philadelphia Region . . .”. No less than 2.5% of the working population in that region are now in employment based on the Life Sciences, a truly remarkable proportion.

What is Select Greater Philadelphia?

Select Greater Philadelphia (*Select*) was created in 2004, as a non-profit organisation dedicated to building the economy of the region by enhancing the area’s profile and

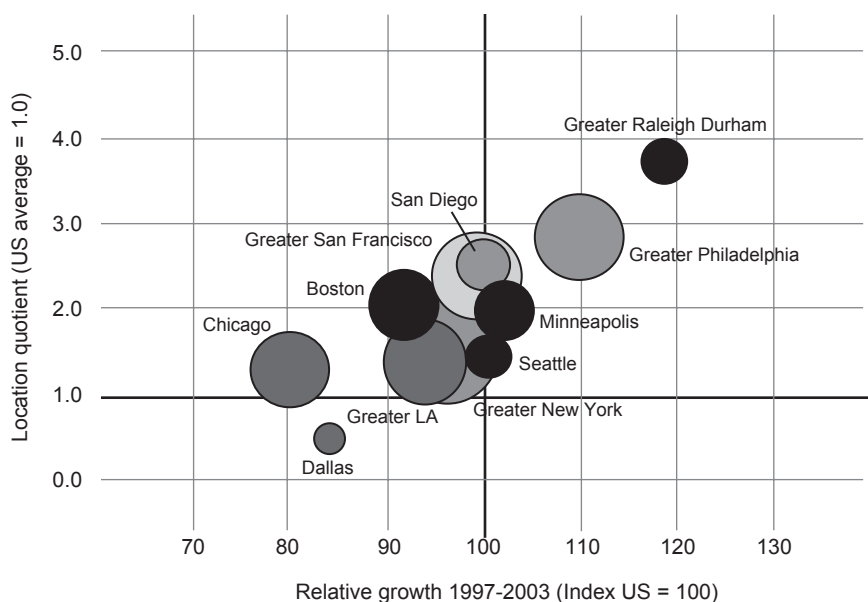


Figure 1. Life Sciences industry employment - concentration, growth and size - in Greater Philadelphia and in other regions of the USA. Figure reproduced by kind permission of *Select Greater Philadelphia*.

image. It is basically CEO-led, affiliates to a range of local Chambers of Commerce, and enjoys the direct support of more than 100 local companies. It aims to impact both nationally and globally, and has a particular focus on life science organisations, as the region's #1 industrial sector. From a UK or European standpoint, it would in many of its activities be regarded as a type of non-statutory Regional Development Agency.

Select charges no fees to those for whom it provides assistance. It might for example be asked for current information on the local life sciences infrastructure or workforce, and can supply wage, tax, utility and business cost comparisons. It also offers information not only on existing structures and infrastructures, but on matters which could help to underpin new ventures, such as introductions, venture capital connections, local industry organisations and events. It is able to offer some support for new ventures, in certain cases.

Visits and views

Between the extreme north of the region (Princeton NJ) and the far south of the region in Delaware, eight sites were visited, and we were addressed by senior executives from 20 organisations in total. These latter came from a very wide range of sector and activity: from companies large and small (GlaxoSmithKline; Medical Diagnostics; AstraZeneca; Incyte; from Research Institutes or similar (the Wistar Institute; Coriell Institute for Medical Research; Fox Chase Cancer Center; the Delaware Technology Park); from Healthcare/Hospitals (Cooper University; Virtua Healthcare; Jefferson University Hospital; The Children's Hospital of Philadelphia; Temple University

Health System; the Christiana Hospital): from organisations involved in co-ordination and promotion (Delaware BioScience Association; Pennsylvania BIO; Greater Philadelphia Life Sciences Congress; BIO New Jersey): and from Universities other than University Hospitals (Drexel University; University of the Sciences; University City Science Center).

It is impossible to do justice to the depth of hospitality and insight imparted by all these contributors. If I select just a limited sample out of so much wealth, it can only be on an arbitrary basis, and no doubt deeply biased towards my own interests. But select I must, if this article is to stay within reasonable bounds of space and reader attention level, so with apologies to those omitted from mention, here are a few of my most lasting personal impressions.

The Coriell Institute for Medical Research offered us a view of the future of medicine as it may very well soon be. That is, personalised for the benefit of the individual patient. Affymetrix chips ('lab on a chip') were being used to detect SNPs (Single Nucleotide Polymorphisms) in patients from the overnight incubation of a saliva sample: over 90% of a million SNPs could be detected. Obviously the current block to progress lies in the fact that there is only a seriously limited knowledge base of the SNPs associated with particular clinical states (e.g. drug resistance, side effects, effectiveness), but their belief that this knowledge base will grow in the near future does not seem unreasonable. The Institute also houses the world's major Human Tissue Data Bank, with samples obtained from and supplied to locations world-wide.

The Cooper University Hospital, the Jefferson and Temple Mount University Hospitals, and the Virtua Hospitals offered fascinating insights into aspect of medical care in the US. Understandably, if you are serving a community such as the (very economically deprived) area of South Philadelphia, survival under a high patient load seems more relevant than do tomorrow's amazing techno-prospects. How to cope with the burden of "charity patients" – the term was used by one speaker – when the Federal Government imposes duties without defined funding was a matter of constant worry. No less than 80% of all admissions at Temple Mount University Hospital we were told are those taken on an 'emergency' basis. With 50 million Americans having no medical insurance of any kind, all of this seems inevitable.

More positively, the way in which Cooper University Hospital, located in one of the poorest cities in the country (Camden) saw its remit as including development of the immediate built and landscaped environment as part of its responsibility to that community was quite inspiring. A potential lesson for the new Foundation Hospitals in the UK, perhaps? In this and in some other matters of detail, European medical practice – itself very diverse from country to country – can incorporate new ideas. But it is hard to see any European country seeing the benefits of (for example) most hospital consultants being self-employed, with their own personal computerised system of patient records, a system usually incompatible with that used by the other consultants and of course with that used by the hospital itself (as recounted to us by a Senior Clinician at Virtua Healthcare, a private hospital).

Medical Diagnostics in Princeton, NJ made, I know, a very great impression on all of us in the European delegation. It is a small company, with what seems to be a very good idea and product. For diagnosing a suspected infection by some disease vector they dispense with all the standard paraphernalia of testing for a range of suspected vectors and do a wide search/scan of the DNA content of an appropriate

patient sample. A simple idea – it certainly is. Does it work? Well, they are selling a lot of analyses, but only in North America. The CEO (Dr Eli Mordechai) feels that he has no idea as to how to explore the European markets.

And Dr Mordechai is clearly a remarkable person, and much though we could see in his product, his company structures entranced us even more. Is ‘contracting out’ of services etc at every level a mantra of Western companies? Dr Mordechai will have none of that. He wants new buildings – he sets up a profit centre in his company to do the building. Does he need IT systems, legal services? He buys them in, so they are directly responsible to the management. Of course, that way he gets exactly what he wants, which happens to include neo-colonial drawing room furniture in offices, and glass chandeliers everywhere. Amazing. On top of all that - he runs a Masters’ program for staff, and is setting up a PhD program: but not, I think, with his very own built-in University.

The Delaware Technology Park treated us to a range of wonderful high-tech goodies, of which the star attraction was its vast 3D projection wall within its very comprehensively equipped Imaging Centre. With 3D glasses on, and equipped with a Wii-style hand-held controller, one can walk – physically, one does actually move – into a 3-dimensional space whose magnification you can control. So clinicians can look around inside a body cavity (reconstructed from CAT-scanners, whatever) and peer at the tumour on the liver, whilst those studying binding of drugs to target proteins can get ‘right inside’ the protein molecule and see the drug docking onto its target. It’s about as multidisciplinary as it gets.

Overall impressions from a European perspective

The selected examples quoted above do not perhaps convey some of the most important, rather general impressions which I, for one, formed. First and foremost, these related to the level of co-operation which clearly exists between disparate organisations. The easy interplay between academia and industry, the open recognition by companies of the educational foundation necessary for the growth of a knowledge-based economy, the simple frankness with which Healthcare Chief Executive Officers spoke to us of their problems as well as their achievements, the conviction among so many in the local biotech/biopharma world that mutual regional co-operation could lead to great prosperity for all parties: these things and many others besides spoke to me of real achievement, and of things worth learning from.

Now it is important to be aware of the words “grass”, “greener” and “other side of the hill”. I do note one statement (taken from a Report commissioned for the Region of Greater Philadelphia) to the effect that licensing out of discoveries by larger companies to smaller ones works better on the whole in Europe than in the US. The interchange of ideas and practice across the transatlantic pond will always be a two-way one. But let one example be given of something clearly beneficial which could hardly be conceived of as happening in the UK. In Delaware, we were shown in the presentation a photograph of around 14 jubilant investigators celebrating their reception of the award of a large Research Grant. Into a study of the ‘earth zone’ we gathered, which apparently denotes anything 20 miles up from *terra firma*. The application had distinguished lead investigators, so what is at all surprising about it being funded? Well, my ears picked up a throw-away line, stating that among the 14

investigators two were from Wesley College, an Institution which had never previously been in even joint receipt of a major research grant. Nice for them, of course, but nothing noteworthy in itself? Perhaps not. For few North Americans reading this will comprehend how hard it is to imagine such a thing happening in the UK, at least.

One thing however is beyond argument, and was increasingly impressed upon me during the course of the visit. Select Greater Philadelphia is surely playing a major part in the continuing regeneration and onward development of what was once a depressed region. To judge from the high level of presentation and the quality of attainment profiled by the speakers who addressed our visiting group, *Select* does have some very good material to work with. But bringing together people who for many purposes are in competition with each other, and fostering among them the idea that the bolting on of mutual help and collaboration can achieve more than competition by itself, can never be easy. "How could you live around The City of Brotherly Love and not collaborate?" (Catherine Bonuccelli). All too easily, I suspect, Ms Bonuccelli, human nature being what it is. Greater Philadelphia owes an awful lot to Mr Thomas Morr (President & CEO) and his team at *Select* for the work which they are doing in fostering so active a spirit of collaboration.

References

THE SELECT WEB SITE: www.getthere1st.com

THE SCIENTIST, January 2008 (special edition): "Life Sciences in the Philadelphia Region"