



PATENTS ACT 1977

BETWEEN

Ian Alexander Shanks

Claimant

and

Unilever Plc

Defendants

Unilever NV

Unilever UK Central Resources Limited

PROCEEDINGS

Application under section 40(1) of the Patents Act 1977 for employee compensation
in respect of patent EP(UK) 0170375 and related patents

HEARING OFFICER

J Elbro

Mr Patrick Green QC (instructed by Beresford & Co) for the claimant
Mr Daniel Alexander QC and Mr Jonathan Hill (instructed by Herbert Smith Freehills
LLP) for the defendants

Hearing date: 26-29 March, 2-5 April and 2 May 2012.

DECISION

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Introduction

- 1 An application for employees' compensation relating to patent number EP (UK) 0170375 and counterpart foreign patents ("the Shanks patents") against Unilever plc, Unilever UK Central Resources Limited ("CRL") and Unilever NV (collectively "the defendants") was made by Professor Ian Alexander Shanks ("the claimant") on 9 June 2006.
- 2 EP0170375 was filed on 12 June 1985, claiming priority of 13 June 1984, and was granted on 16 May 1990. Professor Shanks is named as an inventor. The claims relate to an electrochemical test device and a method of manufacturing an electrochemical test device. The Shanks patents were assigned from CRL (a research part of the Unilever group) to three different companies within the Unilever Group for nominal sums. The companies were Unilever plc, Unilever NV and Internationale Octrooi Maatschappij "Octropa" B.V. (the latter changing its name to Unilever Patent Holdings B.V. in 1987).
- 3 The Statement of Case was amended three times by the claimant between 2006 and 2011. The defendants filed their Counter Statement on 10 November 2006. This was then amended three times between July 2011 and December 2012. The claimant filed his evidence-in-chief on 28 November 2008, the defendants filed their evidence on 25 November 2011 and the claimant his evidence-in-reply on 8 February 2012. Further evidence was filed by the defendants and the claimant in the run up to the hearing. The hearing took place on 26-29 March, 2-5 April and 2 May 2012. Portions of the hearing were held in private because of issues raised relating to matters of commercial confidentiality. Mr Patrick Green QC instructed by Beresford & Co appeared for the claimant and Mr Daniel Alexander QC and Mr Jonathan Hill, instructed by Herbert Smith Freehills LLP, appeared for the defendants. Following the hearing, the defendants and the claimant made further submissions in writing on certain matters on 16 May 2012 and 31 May respectively.

Witnesses in the Case

- 4 The claimant called himself as a witness, with expert evidence from Mr John Emanuel and Professor Anthony Turner. Professor Turner also gave evidence of his involvement with the invention. The defendants had evidence from Professor Brian Birch, Dr Cornelis Mulder, Mr Michael Samuel, and Mr Peter Welch, with expert evidence from Dr Rupert Osborn.
- 5 Professor Shanks is the claimant and an ex-employee of Unilever named as inventor on the patents in this case. Professor Shanks faced heavy cross-examination on the claims he made regarding his contribution to the invention, and came across extremely convincingly. His honesty was particularly shown during a brief diversion in the hearing when he gave evidence that appeared to be contradicted by his own legal advisors as to whether he had been sent a certain photograph, but he did not back down and it later transpired that in fact he had been correct. I believe that I can generally trust his evidence, but with the caveat that his recollection of events of 30 years ago was clearly imperfect, and his interpretations of some events may not be the whole story.

- 6 Professor Turner was Head and Principal of Cranfield University until 2006. He gave expert evidence on the invention in this case, its significance in the field, and the relevant market. He was also directly involved in the early days of the invention and gave evidence regarding this. Professor Turner's technical knowledge and enthusiasm for the subject shone through while he was giving evidence and he came across as a reliable witness when speaking on subjects he had knowledge of. He freely accepted, however, that he was an expert in biosensors, not in economics.
- 7 Mr Emanuel has had long experience of licensing and technology transfer. He gave expert evidence across the topics in this case. His licensing knowledge and experience was apparent.
- 8 Professor Birch worked at Unilever from the 1960s to the 1990s. In particular, he was involved in the work on the development of biosensors following on from Professor Shanks' work, and he gave evidence about that and about the organisation of Unilever's research activities. His evidence was largely consistent with others' and in my view he was telling the truth as he saw it.
- 9 Dr Mulder, Vice President of Patents at Unilever (now retired), gave evidence regarding the functioning of Unilever's patenting operation, the value of Unilever's patents and how it exploits them. He answered questions honestly, and did not try to avoid questions on the relevance and robustness of his valuation evidence. Much of his cross-examination consisted of him being taken to various documents from the evidence of Unilever's licensing activities, and he was clearly uncomfortable with trying to comment on the merit or otherwise of various actions in the absence of context. In my view this was completely understandable as he had not seen these documents previously.
- 10 Mr Samuel was formerly Unilever's National Financial Director, having retired in 2005. He gave evidence about Unilever's corporate structure, its finances, and way of operating.
- 11 Mr Welch previously worked for Unilever as part of Unipath, where he had responsibility for patents. He gave evidence on Unilever's licensing of the patents in this case and on their valuation for the purposes of Unipath's sale. One feature of his evidence was that he originally had not remembered his involvement in the valuation, and this evidence appeared only in his second witness statement, which he made after having had his memory jogged by reviewing documents relevant to this case. I nonetheless found his evidence reliable on this point.
- 12 Dr Osborn is CEO of IP Pragmatics Limited, an IP asset management company. His expert evidence covered the full range of topics in this case. On licensing issues, he came across as less confident and experienced than Mr Emanuel, and some of his expert opinions were at times unclear as to the precise justification behind them.

The Invention and its relationship to the glucose testing field

- 13 Professor Turner was clearly an expert in the glucose testing field and provided a very helpful overview of the field, upon which the following summary is based.

- 14 The original word “diabetes” comes from “sweet urine” and was originally diagnosed by tasting for sweetness. Chemical tests then arose. In the 1940s the chemistry was packaged into convenient tablets so as to avoid having to measure out various components. This chemistry was then built into paper strips which change colour in response to glucose.
- 15 Instrumented reading of these strips really began with the invention of the reflectance photometer in 1969, which worked by looking at the colour of the light reflecting off the strip. The original instruments were rather bulky and expensive but still however marked the beginning of placing an instrument for carrying out blood glucose measurements in ordinary peoples’ hands.
- 16 The trend following this invention was to miniaturise these reflectance photometers over the years until they became pocket sized. By around 1980 a successful reflectance photometry product was being used by many people to test for glucose initially in urine but later in blood. Using them with blood was less straightforward as the blood had to be wiped off the strip before placing the strip inside the instrument.
- 17 In parallel with the development of glucose testing the biosensors field was also developing. A biosensor is essentially the integration of a biological sensing element with a transducer. In 1962 a paper was published which provided a means for measuring glucose using electrochemistry.
- 18 The work Professor Turner was involved in in the early 1980s was an electrochemical version of the blood glucose testing device which involved finding a way to miniaturise electrochemical biosensors that had been successfully commercialised in 1975. That instrument was about the size of a microwave oven and designed for use in laboratories where you would go to have your blood glucose checked. Professor Turner and his colleagues came up with a way of facilitating a pocket sized electrochemical device. It involved using a specific mediator to connect the enzyme and the transducer so that specific currents were obtained from the device which related accurately to the blood glucose level.
- 19 It was at this point that the invention in question in this case came in. The idea was to include a cavity having a dimension small enough to enable sample liquid to be drawn into the cavity by capillary action. Electrodes were included within the cavity so that electrochemistry could be carried out on the sampled liquid. A wall of the cavity could be coated with a material appropriate to the test to be carried out on the device. This device was referred to as an Electrochemical Capillary Fill Device (“ECFD”) by the parties. According to Professor Turner, eventually most of the companies making electrochemical home glucose testing devices used a capillary fill approach.
- 20 EP0170375 B1 and the other Shanks patents relate to this device. Claim 1 of the EP patent, the only independent claim, reads:

“1. A specifically-reactive electrochemical test device, comprising electrodes, and a cavity (1-3, 51-2) having a dimension small enough to enable sample liquid to be drawn into the cavity by capillary action, the electrodes being arranged to contact the liquid, characterised in that the electrode structure (10-11, 61-2) for making one or more measurements of one or more electrically measurable characteristics of the sample is included within said cavity (1-3, 51-2),

and in that optionally a surface or wall (51) of the cavity carries a coating (63,83) of a material appropriate to the test to be carried out in the device.”

- 21 Other features were disclosed in this patent application such as specific types of the electrodes and coatings, and a mass production technique.
- 22 Alongside the ECFD Professor Shanks also developed a Fluorescent Capillary Fill Device (“FCFD”) which was also subject to patent protection. The present case does not relate directly to this invention but it is referred to in places as the two ideas were developed together.

A Brief History of the invention’s development

- 23 Professor Shanks joined Unilever on 5 May 1982 having been previously employed by the Royal Signals and Radar Establishment. He was employed by Unilever UK Central Resources Ltd (CRL) which employed all of Unilever’s UK-based research staff and was based at Unilever’s Colworth Research Laboratory.
- 24 His work involved at least sensors for process control and process engineering, in particular biosensors. Whether he had a wider remit than this was in dispute as I explore below.
- 25 On 13 June 1984 Unilever filed UK patent application 8415018 (“the priority application”) entitled “Devices for Use in Chemical Test Procedures”. Professor Shanks was listed as the sole inventor. This application covered both the ECFD technology and the FCFD technology. A second patent application was also filed which related solely to the FCFD technology.
- 26 On 12 June 1985 European patent application EP0170375 was filed in the name of Unilever claiming priority from the priority application. Professor Shanks was listed as an inventor in this application along with two colleagues, Martin Smith and Claes Nylander. Publication of the grant of this patent took place on 16 May 1990.
- 27 Other patent applications were filed in other countries as can be seen from the following table:

Country	Number	Date of cessation
Australia	AU 588245	11 June 2005
Canada	CA 1231136	11 June 2005
EPO (France, Germany, Italy, Netherlands, Sweden, Switzerland, UK)	EP 0 170 375 (DE 3577748 D1 in Germany)	11 June 2005
Japan	JP 2527933 B2	11 June 2005
United States	US 5141868	25 August 2009

- 28 Professor Birch provided a useful summary of the structure of Colworth and the source of its funding. Unilever’s research laboratories (Port Sunlight was the other) were organised into Divisions which were in turn further divided into Sections or Groups. These Divisions, Sections and Groups reflected the principal areas of research in the laboratories and were broadly organised to reflect the research being performed which was most applicable for certain business interests (or Co-

ordinations). There were however certain Divisions or Sections whose research was of broader application to the Unilever group as a whole. In addition and separately the Central Research and Engineering Fund (CREF) sponsored some research and this would also be generally broader in its objectives. Funding for research could be obtained from the budgets of either the various Co-ordinations or individual operating companies within those Co-ordinations, or from CREF. The Co-ordinations were required to give a proportion of their research budget to CREF.

- 29 Funding for a new Biosensors Section at Colworth was put in place in 1984 and was funded partly by CREF and partly by the Medical Products Group ("MPG"). Professor Shanks initially headed up this section. MPG funding for the Section was however withdrawn in early 1987.
- 30 Professor Shanks left Unilever on 3 October 1986. In 1987 what was left of the Biosensors Section became the Sensors Group which, although on a smaller scale than the Biosensors Section had been in its heyday, continued some further development of the ECFD technology. Professor Birch was involved in supervising a CASE student alongside Professor Turner of Cranfield University to take forward a coulometric ECFD for glucose testing between 1987 and 1991.
- 31 On 13 October 1987 the FCFD technology, including the technology, equipment and certain patent rights, was sold to Ares-Serono. Ares-Serono also retained a three-year option on the ECFD technology but never took up this option.
- 32 Further patent applications were filed in the biosensors field, in particular some based on the work of Professor Birch (the "Birch patents"). Neither Unilever nor Unipath ultimately marketed a blood glucose meter using the ECFD technology. The patents were however maintained.
- 33 Later Unilever had contact with a number of companies operating in the glucose testing field, most of which eventually took fully-paid-up licenses on the Shanks patents. Most of the licensees also took licenses on the Birch patents. These licenses were negotiated between 1992 and 2001.
- 34 Professor Shanks returned to Unilever in 1994 as Divisional Science Advisor to the Research and Engineering Division. He had limited involvement in the licensing negotiations relating to the Shanks patents.
- 35 Along with other patents, management responsibility for the Shanks and Birch patents was transferred to Unipath, a subsidiary of Unilever, in 1994. Unipath took on the bulk of Unilever's medical diagnostics business, including successful products in the field of pregnancy and fertility testing, in particular the ClearBlue pregnancy test.
- 36 In December 2001 Unipath, along with the Shanks and Birch patents was sold to Inverness Medical Innovations (IMI) for a figure of £103 million.
- 37 EP0170375 expired on 11 June 2005. The present action was filed on 9 June 2006. The last member of the Shanks patent family to expire was US5141868, on 25 August 2009.

The Law on inventor compensation

38 Section 40(1) of the Patents Act 1977 (“the Act”) provides as follows :

"Compensation of employees for certain inventions

40(1) Where it appears to the court or the comptroller on an application made by an employee within the prescribed period that the employee has made an invention belonging to the employer for which a patent has been granted, that the patent is (having regard among other things to the size and nature of the employer's undertaking) of outstanding benefit to the employer and that by reason of those facts it is just that the employee should be awarded compensation to be paid by the employer, the court or the comptroller may award him such compensation of an amount determined under section 41 below."

39 The section has been amended by the Patents Act 2004 so as to make compensation payable when the invention (and not just the patent) has been of outstanding benefit. The amendments only affect patents applied for after 1 January 2005. So this case is regarding the unamended section.

40 Section 41 sets out how the amount of compensation is to be determined:

41(1) An award of compensation to an employee under section 40(1) or (2) above shall be such as will secure for the employee a fair share (having regard to all the circumstances) of the benefit which the employer has derived, or may reasonably be expected to derive, from any of the following –

- (a) the invention in question;
- (b) the patent for the invention;
- (c) the assignment, assignation or grant of –
 - (i) the property or any right in the invention, or
 - (ii) the property in, or any right in or under, an application for the patent,to a person connected with the employer.

41 In this case, there is no dispute between the parties that the invention belonged to the employer and hence Section 40(1) applies. In cases such cases, Section 41(4) provides guidance as to the meaning of a fair share in Section 41(1):

41(4) In determining the fair share of the benefit to be secured for an employee in respect of an invention which has always belonged to an employer, the court or the comptroller shall, among other things, take the following matters into account, that is to say –

- (a) the nature of the employee's duties, his remuneration and the other advantages he derives or has derived from his employment or has derived in relation to the invention under this Act;
- (b) the effort and skill which the employee has devoted to making the invention;
- (c) the effort and skill which any other person has devoted to making the invention jointly with the employee concerned, and the advice and other assistance contributed by any other employee who is not a joint inventor of the invention; and

(d) the contribution made by the employer to the making, developing and working of the invention by the provision of advice, facilities and other assistance, by the provision of opportunities and by his managerial and commercial skill and activities.

42 The matters of dispute between the parties are primarily the size of the benefit obtained by the employer, whether that benefit is “outstanding” as in the words of Section 40(1), and if so, what the “fair share” under section 41(1) should be. Much of the factual evidence relates to this last question and the categories given by Section 41(4).

Factual Issues

43 I set out here a number of factual findings. The first sections concern, in historical order the development of the invention, the significance of the invention, and how the patent was licensed; and the contributions of Professor Shanks and Unilever to these. I will later refer back to these when considering the criteria above for determining “fair share”. I then consider the costs incurred by Unilever relating to the invention and the Shanks patents, and the income it received from the licensing and the eventual sale (as part of the Unipath sale) of the Shanks patents. I later refer back to these sections when considering the size of the benefit and whether or not it is outstanding.

How the invention came about and was developed

Professor Shanks’ employment by Unilever and his early remit

44 Professor Shanks joined Unilever on 5 May 1982. In his previous role working for the Royal Signals and Radar Establishment his expertise lay in the field of liquid crystals and LCDs. Professor Shanks confirmed that his work on LCDs prior to joining Unilever brought relevant insights into the CFD work he developed at Unilever, particularly in relation to making vast numbers of components cheaply and reproducibly which he regarded as very important. He had also carried out relevant work with PVC substrates. As part of his recruitment, a letter was sent from a senior principal scientist in Unilever to the Royal Signals and Radar Establishment dated 20 October 1981. This letter discusses the need to recruit “a high calibre and senior individual active in research engineering who can establish his own research programme in an area relevant to the Company”. Professor Shanks was subsequently recruited to fulfil this role. There is broad agreement that Professor Shanks was primarily recruited to work on process engineering and process control sensors with a focus on biosensors. He was based in Colworth Research Laboratories, a Unilever research base.

45 Professor Shanks claims that his remit was strictly limited to process sensor devices to assist in the control or improvement of Unilever’s manufacturing processes. The extent to which he was free to diverge from this initial remit is in dispute. Professor Shanks’ contract of employment does not specify the remit of the work he was employed to carry out. He claims that he had to pursue his ideas for blood glucose sensors in his own time and using his own materials and considered this work to be clearly going outside his brief and flying in the face of Unilever’s “known strategic objectives” and that in doing it he directly defied his divisional manager. Professor Birch however commented that Professor Shanks was clearly tasked with

establishing his own research programme pursuing original research and that it would not be unusual for a senior scientist to work out-of-hours (he referred to his own experience testing sensors in his washing machine).

- 46 Professor Shanks submitted a report on 1 August 1982, just under three months after joining Unilever, entitled “Report on new opportunities afforded by electronic sensors”, which was included in evidence. The report includes a wide-ranging review of how various types of sensors could be used in Unilever’s processes, listed in two tables. One of these tables has a section entitled “New product opportunities” with nine entries, one of which is entitled “Sensors for monitoring glucose, insulin or immunoglobulin levels in diabetics. (Control unit + insulin pump + limited re-usability or disposable sensor”.
- 47 Mr Alexander suggested that the presence of a section on new product opportunities including the entry on monitoring glucose and the details included in this section implied that such matters were not outside Professor Shanks’ remit. I am not convinced that this document helps to establish this. Numerous and wide-ranging opportunities for the application of biosensors are included in this report, many lying squarely in Unilever’s core business areas. Merely three months into his role at Unilever, it seems to me that Professor Shanks wished to present as wide a range of opportunities as possible. What this report does establish is that at the date of its submission Professor Shanks was contemplating sensors for monitoring glucose.

Unilever Corporate Culture

- 48 Questions as to the corporate culture at Unilever, specifically at Colworth, arise throughout the events surrounding this case. In particular questions arise as to the extent to which Unilever’s scientists were encouraged or discouraged from departing from their narrow remit. Mr Samuel gave some useful evidence on this point. He said that working in new product areas created a lot of distraction and disruption from supporting the main core business of Unilever and was discouraged. He gave an example of where Unilever had deliberately taken action to stop this sort of thing being disruptive within the business. It moved a lot of entrepreneurial activity into something called “Unilever Ventures” which is run as a separate organisation where people who want to invest their own time and money in new businesses can do so without it being a disruption to the existing business.
- 49 When asked about the position of an employee inventor in Unilever, Mr Samuel commented that they were not paid to be an entrepreneur and agreed that if they were entrepreneurial it was something outside of what they were being paid for. He said:
- “Any organisation requires people to work in a team context doing the role that is required of them and so forth; yes. Clearly, one wants them to do well and use all their skills and competences to do a really good job, but an entrepreneur is taking independent decisions and the organisation is not one that is set up to run like that.”
- 50 This reflects Mr Samuel’s evidence generally. He paints a picture where Unilever’s scientists should do the job they are paid to do in developing existing products and should not ever use their initiative to do something even slightly different even if this is in addition to their normal duties.

- 51 Several witnesses (Mr Samuel, Professor Birch, Dr Mulder, and Mr Welch) were taken to an article by Alison Kraft entitled “Corporate venturing: the origins of Unilever’s pregnancy test. (Company Profile)” published in 2004. The author consulted the Unilever archives for the research set out in this article.
- 52 The article focuses on the success of Unipath in developing the ClearBlue pregnancy test but it also refers to problems Unipath encountered due to its different culture from that of its parent Unilever. The article portrays Unilever as a company which has a history of being handicapped by routine and cultural rigidities and which struggled to translate basic research into products back in the 1950s. Unilever encouraged ‘defensive’ research which focused on protecting existing market positions. According to the article:
- “A culture of caution meant that innovation tended to be incremental and continued to lie within the company’s ‘core’ markets. Radical innovations remained unlikely not least because operating companies were usually not interested in developing and marketing concepts far beyond their existing product lives.”
- 53 Although according to the article attempts were made to improve things, the company struggled to develop innovative new products and had a couple of setbacks in the 1960s and 1970s with new products which were launched but ultimately abandoned.
- 54 Moving into the 1980s, the article states that a 1982 report on Unilever’s management culture observed that there was “too much emphasis on information and consultation” and that managers were “too concerned with discussion and evaluation of all the options to the detriment of the entrepreneurial spirit”. The author concluded that “Seemingly, and for manifold reasons, Unilever’s ability to develop new markets, create new businesses and translate basic research into marketable products remained as problematic in the 1980s as it had done 20 years earlier.” The report does however say that when MPG was created in 1983 it had a great degree of autonomy and scientists took leading management and business development roles. Eventually the medical diagnostics business became Unipath.
- 55 None of the witnesses who were taken to this article disagreed with its findings. Professor Birch’s view was that by the 1980s things had moved on since the 1950s. He did however agree that operating companies were still not usually interested in developing and marketing concepts far beyond their existing product lines. He also confirmed that in the period leading up to the 1980s “there was persistent unease about the slowness and efficiency of the transition from basic research to marketable products”.
- 56 This article and the evidence of Mr Samuel provides support for Professor Shanks’ evidence that he was strongly discouraged from pursuing inventions in areas not relevant to Unilever’s core business despite the isolated success of Unipath.
- 57 Taking into account all the evidence I have heard on this question, I readily see how Professor Shanks formed the view that he was warned not to stray away from his remit of sensors for process control. I think however, that Unilever was somewhat more open to his moving slightly beyond that remit than he asserted. It is clear that he was a respected scientist who was taken seriously and was given the freedom to set up an entire new section, the Biosensors Section, which was funded partly by

CREF and partly by MPG. On balance I conclude that Professor Shanks was made to understand that he should not stray too far from his brief of biosensors for process control and process engineering, although he was given a wide remit within this brief. I however believe that he did have at least some freedom to develop his ideas in other areas, even if the level of interest for these ideas within Unilever was in question, a point I come back to below.

Professor Shanks' contribution to the invention

- 58 Important to the question of an appropriate “fair share” of any benefit due to the claimant is the question as to how much Professor Shanks had contributed to the invention. Professor Shanks gave extensive evidence on this point, with Professor Turner giving some additional evidence. The defendants had no witnesses with direct contemporaneous experience of what occurred before the filing of the EP patent, except for a small role played by Professor Birch.

The first prototype

- 59 Professor Shanks visited Cranfield University in July 1982 where he learnt about the research that John Higgins and Professor Turner were carrying out in the area of biosensors for monitoring diabetes. Professor Turner said that he could not remember the detail of the meeting but recalled the general interest in his work. Despite both sides being a little cagey (presumably because of patents in the pipeline), he said that they would have been keen to engage with Professor Shanks because they wanted commercial involvement and sponsorship. He would not however have revealed their use of ferrocene as a mediator as this was the subject of their 1981 patents which would not have been published at the time of the visit. This work was published in April 1984 in a paper entitled “Ferrocene-Mediated Enzyme Electrode for Amperometric Determination of Glucose”.
- 60 Professor Shanks says that this meeting encouraged him to spend many evenings reading about electrochemistry and other literature on sensors for process control.
- 61 According to Professor Shanks he had many times filled the 10 microns thick gap between the glass plates of an LCD with liquid crystal simply by placing a droplet on the edge of the cell and using capillary attraction within the narrow gap. He realised that this could be used with other liquids such as blood or urine. He then saw how this technique could be used with etched or printed planar electrodes and the enzyme electrochemical methods of Cranfield to measure glucose concentrations in blood, serum or urine using an electrical capillary fill device. He also claimed that he envisaged the use of an ion selective membrane in his device. According to his evidence Professor Shanks also developed a fluorescence (FCFD) device.
- 62 Professor Shanks states that he built the first prototype in October 1982 at home using some slides from his daughter's toy microscope kit with some Mylar film as spacers, held together with bulldog clips. The test described in his witness statement however relates only to an FCFD device. He was asked under cross-examination whether he had in fact built any prototype ECFD device before discussing his ideas with colleagues in Unilever and why he had not included details of any ECFD tests in his witness statement. Professor Shanks could not satisfactorily explain why he had included details of his FCFD prototype but no details of any ECFD prototype in his

witness statement. He considered it may have been an oversight. He asserted, however, that he did build such a prototype using bulldog clips, mylar spaces, a slide from his daughter's toy microscope set, and a piece of glass with pre-etched electrodes. He said that this piece of glass was a former seven segment LCD plate and therefore the electrodes were made out of tin oxide.

- 63 Professor Shanks gave some detail of how he built the prototype ECFD in his oral evidence. Although it is difficult to understand why he did not include these details in his written witness statement I am prepared to accept that he did build such a prototype.

Demonstrations

- 64 Professor Shanks claims that he demonstrated the ECFD concept to a number of people in Unilever using the prototype he put together in 1982. This is disputed, as is the extent to which the alleged prototype would be suitable for testing glucose in blood. In relation to the latter Professor Shanks said that it would be suitable if an enzyme or mediator were added. There is a difference here between a rough prototype and a device that could practically be used for blood glucose testing. I am satisfied that the prototype would have operated as Professor Shanks indicated as a rough prototype to demonstrate the concept, even if it could probably not be used day-to-day for blood glucose testing.
- 65 Professor Shanks indicated that he would have demonstrated the ECFD concept at the end of a demonstration of the FCFD concept. The ECFD demonstration would have been secondary to the FCFD demonstration which was a much easier principle to demonstrate. When it came to recalling to whom Professor Shanks demonstrated the ECFD, his evidence was inconsistent, in particular as to whether he had demonstrated the ECFD device to Sir Geoffrey Allen who was Research and Engineering Director. It is clear that Professor Shanks' memory is not perfect in relation to precisely to whom he demonstrated the ECFD device. I am however satisfied that he did build a prototype and that he did carry out at least some demonstrations of the device. Professor Shanks commented that Iain Anderson, who led the creation of MPG, was more interested in the FCFD technology.

The priority application

- 66 Professor Shanks is listed as the only inventor on the priority application. My starting point is therefore that Professor Shanks invented the invention disclosed in the priority application. The defendants conceded this to an extent, arguing that the disclosure in the priority document was the maximum possible extent of Professor Shanks' contribution to the invention.
- 67 The priority application does not however include certain details of the ECFD device which were included in the EP application filed a year later which claimed priority from the priority application. Using silver particles embedded in a polymer and using ion selective membranes are two such details. The priority application refers only to tin oxide electrodes and does not mention a dispersion of silver particles. Perhaps more significantly the priority application makes no reference to using the device for glucose testing. In relation to the disclosure of the priority application, Professor Birch described its disclosure as giving "only a very superficial outline" of the ECFD

device. The defendants dispute whether Professor Shanks in fact invented any of these features and argue that they are the result of the contribution of the other inventors listed on the application from which EP (UK) 0170375 was granted.

68 According to Professor Shanks the reason these features were not included in the priority application is because the patent attorney would not include them in the specification (see below). Moreover Professor Shanks claimed that he could not get the patent attorney, Terry Stancliffe, to include any mention of glucose testing in the priority application.

69 In his oral evidence Professor Shanks said, in relation to the nature of the electrodes:

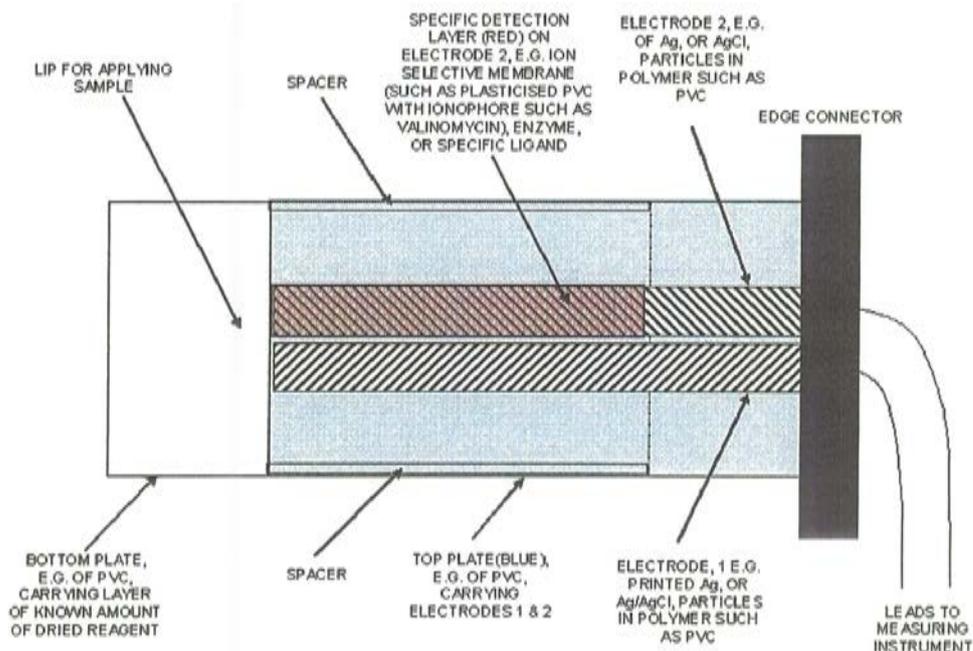
“But when I conjectured that you would use gold or silver or graphite, or any one of a number of conductive layers, including a dispersion of silver particles which had been chloridised, by immersing them in hydrochloric acid and hydrogen peroxide, into a PVC matrix to make an ink which you could print and which you could then solvent weld to a PVC substrate so it did not come loose or peel off ...”

70 Professor Turner also commented that it was well known that the electrodes for biosensors could be of carbon or platinum but any noble metal as well. Gold was frequently used.

71 In relation to the use of ion selective membranes, Professor Shanks claims that he conceived of this himself without input from others. Professor Birch commented that ion selective membranes had been around a long time.

The ECFD diagram

72 Professor Shanks submitted the following diagram as an exhibit to his first witness statement to demonstrate the ECFD principles.



Electrical CFD: principles conceived by I Shanks, in 1982, before arrival of co-inventors

- mass manufacturable capillary fill cell of LCD construction with ~0.1 to 1mm gap
- automatically defining known sample volume in reaction chamber
- possible solvent welding of printed pvc based electrodes to top plate and of printed pvc ion-selective membrane to electrode 2
- dried layer of soluble reagent (e.g. for known addition, or to define reference electrode potential)
- possible uses as potentiometric, amperometric, coulometric, or impedance measuring sensor

EXHIBIT IS4

- 73 This diagram was prepared for the purposes of this case. During cross-examination Professor Shanks however indicated that there was a precursor to this diagram which had inadvertently been destroyed. This earlier diagram was a copy he made when he left Unilever in 1986. As far as Professor Shanks could remember, the diagram was a rough sketch similar to Figure 4 in the priority application.
- 74 Professor Shanks maintained that he conceived of all the elements in this diagram himself before the end of 1982. The significance of this claim is that the diagram includes the use of polymer electrodes and ion-selective membranes referred to above which Professor Shanks claimed he wanted to be included in the priority application.
- 75 Initially he said that there were no annotations but later in his oral evidence he said that there was text on the drawing, possibly in the form of annotations replacing the numbers present in Figure 4 of the priority application. When questioned as to the content of these annotations, Professor Shanks said he thought the electrodes in the diagram could have been labelled as "electrode 1" and "electrode 2". The important point here is that they did not include any further information as to the nature of the electrodes such as that included in the diagram above. Professor Shanks could not

remember who drew the diagram and thought it may have been used as a precursor to Figure 4 of the priority application.

- 76 Mr Alexander understandably pressed Professor Shanks considerably on why he took a photocopy of this diagram from the Unilever file, particularly given that the patent application had been published by then and was in the public domain, and also on why this earlier diagram had been destroyed. I have already commented that Professor Shanks came across as an honest witness and I believe that Professor Shanks was telling the truth in relation to this diagram. I do not find the original's destruction suspicious. However, I do not believe the diagram provides any evidence as to what Professor Shanks had come up with in 1982.

Tensions between Professor Shanks and Unilever Patent Department

- 77 Professor Shanks says that he initially disclosed his invention to the patent attorneys in November 1982. If this is the case then it took Unilever's patent department a considerable amount of time to file the patent application. Professor Shanks said that the delay was, in part, due to a disagreement between Professor Shanks and Terry Stancliffe as to what should be included in the application. In relation to some correspondence between Terry Stancliffe and Professor Shanks and his colleague Martin Smith relating to the finalisation of the specification of the priority application, Professor Shanks said during cross-examination:

"The essence and most of the key features were described, but the patent does require some thought as to what is actually going to go in the consistory clause, or clauses, and what embodiments are going to be shown and how they are going to be illustrated and there was a lot of argument. You will see in brackets just below the middle of paragraph 3: "(Theoretical matter which does not assist this exposition is not helpful)." Theoretical matter, to Terry Stancliffe, was anything that was not a practical embodiment and included knowledge you had picked up from reading papers or books, or whatever, where you wished to incorporate that, not necessarily as a claimable feature, but as an enabling aspect of an embodiment. There was a lot of fuss and interaction. Electrodes, we discussed earlier, was another of those. He would not budge on including the obvious things that you would want to describe as electrodes because I had only demonstrated cells using tin oxide. So there was a lot of wasted time over that period, is what I am telling you, and I am blaming Terry, but I probably, by my intransigence or persistence, was partly responsible for that."

- 78 In a letter to Terry Stancliffe from Martin Smith, although there were a few minor amendments suggested, Martin Smith stated:

"Thank you for sending copies of the above applications. Both Ian and I have gone through them in detail and can find no omissions or errors that require immediate action."

- 79 Professor Shanks explained that there was a degree of compromise and resignation by this point.
- 80 There is some corroboration of the disagreement between Professor Shanks and Terry Stancliffe in the half year review of the MPG, dated June 1984, which relates to a meeting which took place on 14 June, which was in evidence. This review refers to this disagreement in a section entitled "Micro-electronic biosensors – applications" with Professor Shanks' name alongside it as follows:

“Mr. Stancliffe explained that concepts could not be patented but construction instructions had to be included to obtain a good patent with wide but sustainable patent claims. A premature application might reduce basis of future claims.

Dr. Kyle suggested that traditional Unilever patenting approach might not be applicable in this rapidly developing area and that Dr. Shanks and Mr. Stancliffe should try to reach an appropriate compromise.”

- 81 Professor Shanks clarified what he thought Dr Kyle was referring to when he referred to the traditional Unilever patenting approach. He clarified as follows:

“I referred earlier on to Mr. Stancliffe's stated dislike for theoretical propositions, but I explained to you that his use of the words "theoretical propositions" meant anything that had not actually been demonstrably reduced to practice including proven literature examples and prior art which was not actually part of the invention, but had been incorporated in a way which should allow you to make it work. That would not wash with him. You really had to show him something working where you understand it and believe it. Sometimes life does not afford you that luxury or by the time you have got it, someone else has actually protected the device and you are out in the cold. However, it was in tune with a general philosophy within Unilever, confirmed to me by no less than Wim Mulder and Lou Virelli, that their job was there to police the scientists to make sure that not too many damn fool inventions actually get protected. There was a considerable degree of challenge and hurdle jumping required before you got any significant action out of them and that continued down the course as they thought of new obstacles that they would like to see dealt with.”

- 82 In the context of some minutes of a meeting in which Dr Kyle suggests that Unilever's traditional approach to patenting may not suit the rapidly developing area in which Professor Shanks was working, Dr Mulder said:

“Assuming that this is the context, my immediate reaction would say, "I don't think so", because any patent filing is always a squeeze between wanting to file early and wanting to get the best possible patent outcome. Any patent application is a compromise between the two. If you wait until you have the ultimate patent, you may never get that patent, and if you are too early you cause all sorts of problems occasionally. I think that that dilemma is still as relevant as it always was. I would be very cautious to say, "Yes, I think that we are doing things differently in that sense." This is a very recognisable discussion between the patent attorney who, basically, says, "We really need to have more support or more comparative experimentation", or "We need to find out this, that and so", and on the other hand, we have the people who are, not necessarily the inventor, the decision makers, saying, "Well, this is a very competitive market. There are time pressures? If we wait too long we will lose the priority". That sort of discussion is almost applicable to any patent application. So where the problem sometimes comes in is in the assessment of the market; how dynamic the market is, how much repetition there is, what the competitors are doing and whether they are working in similar areas, so everyday counts type of approach.”

- 83 Mr Samuel also said that if time, effort and resource are going to be required to patent something, it needs to be justified. Costs are managed at the level at which it is appropriate to do so.

- 84 A memo dated 23 January 1985 indicates that Terry Stancliffe was looking to include more subject matter in the supplementary applications of the two priority applications. He asked Dr Hornby of Seward Laboratory, part of a medical division of a Unilever subsidiary, who, according to Professor Shanks, was an expert in blood glucose monitoring for comments. He also asked for “suggestions for adaptations and ancillary features that would be attractive in the marketplace”. When it was suggested that it was highly likely that Dr Hornby had provided the prompt for inclusion of a reference to glucose in the EP application, Professor Shanks said that this was “equally probable” to him. Whether or not Dr Hornby's contribution had an

impact on the inclusion of glucose testing in the EP application, I am satisfied that Professor Shanks saw glucose testing as the major application to the ECFD technology right from the beginning after his visit to Cranfield University. Professor Birch confirmed that an inventor knowing what he knew at the time would have been keen to see glucose mentioned in the patent application.

- 85 It is apparent that there was a difference of opinion between Professor Shanks and Mr Stancliffe as to the approach which should be taken in drafting the patent specification. I am satisfied that Professor Shanks wanted more detail and a reference to blood glucose testing in the application. Mr Stancliffe took the view that these should not be included at this stage but could be added in a subsequently filed application. The absence of these elements in the priority application does not therefore challenge Professor Shanks' evidence that he himself came up with ion selective membranes and silver particles embedded in PVC and had in mind an application in the field of blood glucose testing prior to the filing of the priority application.
- 86 Professor Shanks said that although his co-inventors Martin Smith and Claes Nylander contributed useful information to the specification of the EP application, Martin Smith's contribution only made it into one claim of the patent and Claes Nylander's contribution lay solely in the embodiments and was not present in any of the claims. More specifically, Professor Shanks said that Dr Nylander brought specific examples of ion selective membranes and also of what sort of reference electrodes may be used rather than the general idea of using them. He helped to flesh out some of the details in the embodiments. Dr Nylander also "kept" the electrochemistry, that is, reviewed it and provided assurance that it was in good working order which was important as the inventors did not have the benefit of making and testing the devices. His interest really lay in the area of ChemFETs, according to Professor Shanks. Professor Shanks' evidence was unshaken in cross examination when shown later work of Claes Nylander relating to a composite electrode, with him readily accepting that Dr Nylander developed the composite electrodes beyond his ideas following on from the work on the invention in the Shanks patents.

Conclusions on Professor Shanks' contribution

- 87 I note that the independent claims in EP0170375 as granted are based on subject matter also found in the priority application and I therefore conclude that the invention defined in at least the independent claims was invented by Professor Shanks. Bearing in mind all the evidence I have heard concerning how the invention was devised, the nature of discussions between Professor Shanks and Unilever's patent department, the demonstrations he said he did of the ECFD device, and the evidence on the contribution of the other inventors, I am satisfied that Professor Shanks' account of who invented what is accurate. The other inventors did contribute to the patent, but I am satisfied that Professor Shanks invented the invention claimed in the independent claims, had contemplated the use of electrodes apart from tin oxide and ion-selective membranes, and also had in mind the application to glucose testing. Professor Shanks' evidence was overall convincing, the defendants had no witnesses who could contradict it, and the contemporaneous documentation in evidence was consistent with Professor Shanks' evidence.

Subsequent development of the ECFD and FCFD work at Unilever

- 88 Considerable documentary evidence from various reports and memos was provided as to the extent to which Unilever were interested in medical products. Professor Shanks and Professor Birch both worked at Unilever during the 1980s and their evidence is therefore relevant to this point. Professor Birch was however employed at Unilever's Port Sunlight location prior to his arrival at Colworth, and indeed Professor Shanks visited him there early in the development of ECFD. Professor Birch and Professor Shanks did not however overlap by a great deal at Colworth, with Professor Shanks leaving shortly after Professor Birch arrived. I accept their evidence as to events except as noted below.

1983

- 89 A 1983 CREF strategy report to Unilever's Special Committee states: "We apply science and technology at, or near, the leading edge of world knowledge to objectives of foreseeable relevance to Unilever". Professor Birch considered this to be a fair statement. In an appendix to this report, in relation to biotechnology it is stated: "In biotechnology the process science is often the economic determinant but it is not a generic area itself. It has to be coupled into specific process for defined products and it is therefore best that individual laboratories with specific projects themselves carry out the associated processing developments necessary." There is also a reference to using sensors for coupling to immunodiagnostic systems as an area of the biotechnology programme of CREF. Although there is no specific reference to blood glucose testing, Professor Birch's view was that it did not exclude it either. It is apparent that in 1983 Unilever's research and development was focussed towards areas of relevance to Unilever, in particular in the area of biotechnology to defined products. This would not in itself however exclude blood glucose testing products, as Professor Birch commented.

1984

- 90 Professor Shanks explained that in June 1984 CREF was funding the biosensors work and MPG funding was still five months away. Nevertheless MPG had some say in the work being carried out. Although CREF was only interested in process control, MPG was interested in immunodiagnostic sensors suitable for over-the-counter products for consumers. They were not, however, interested in therapeutics. Professor Shanks said that in the eyes of Iain Anderson - who was involved in the creation of MPG - a glucose sensor, when it becomes a medical sensor, was a therapeutic sensor with lives at stake and regulatory clearances to be considered. Unilever was not interested in moving into this sector and was much more interested in the FCFD technology which had application in other areas. Professor Shanks says that this is why an MPG half year review dated June 1984 contains little information on the ECFD technology¹.

¹ It does however mention an electrical CFD under test involving gold sol in solution. This threw up some confusion at the hearing, with Professor Shanks being challenged in cross-examination as to whether this contradicted his evidence that "no research was conducted by Unilever on the ECFD prior to 1985". Professor Shanks responded to this by indicating that electrical and electrochemical CFDs were different technologies, although I note inconsistencies in his own usage of the terms.

91 Another MPG report dated December 1984 included a section describing progress on a facility for the small scale manufacture of capillary fill devices. Professor Shanks said that although this facility could be used for ECFDs, it was designed primarily with FCFDs in mind and the vast majority of the work which was done with this facility would have been on FCFDs. Professor Shanks did however concede that a mention in the report of an evaluation of the feasibility of the new range of electrical sensors for measuring immunological reactions probably did refer to the possibility of using ECFDs.

1985

92 Professor Shanks said that he was not really involved in the ECFD after the end of 1984. He was focussed more on the FCFD work for the MPG. By the end of 1985 the FCFD work had progressed as far as a non-optimised research prototype.

93 According to the evidence of Mr Samuel the work of MPG was championed by at least one Board member and therefore became a special case in terms of priorities and support. Professor Shanks said that there was internal politics at play here, with everyone jostling for support for their particular programmes. What was most important to Unilever depended on who you asked. CREF would say that process control was the most important. MPG would highlight biosensors for medical products. Professor Shanks said that although he fought his corner for the ECFD technology for glucose testing, he was caught between two directors.

94 A 1985 CREF report includes a section on "Biosensors and Biotechnology". This section mentions a link between research problems and commercial goals. Potentiometric electrode sensors based on polymer layers which should provide the basis for disposable sensors either for medical diagnostics or for appropriate plant side monitoring applications are mentioned, as well as optical ideas.

1985-1987

95 Professor Birch said that between 1985 and 1987 the overwhelming emphasis was on the FCFD work with a little work done on ECFD. Professor Shanks' recollection appeared to agree with this, going so far as to estimate that the ECFD work in the latter half of 1985 involved costs of much less than about £16,000. Professor Shanks himself left Unilever in October 1986.

96 According to Professor Birch MPG funding dried up in the Spring of 1987, just over a year after he joined the Biosensors Section. The work was left to be funded by CREF. Research funded by CREF had to be directed at something to do with the business in broad terms and then the relevant Co-ordination would take on the funding of the research. The ECFD work got an increasingly diminishing contribution over the three years since the beginning of the sensors section, according to Professor Birch. They carried on with the ECFD work "out of bloody-mindedness, as much as anything else". Professor Birch did not think that the technology was appropriate or attractive to Unilever applications. At around the same time the FCFD technology, including the equipment, was sold to Ares-Serono.

97 In a memorandum dated 3 August 1987 Professor Birch stated:

“Our work has majored on devices for glucose and potassium ion measurement in body fluids, the former is now at an advanced testing stage;”

He also stated that the work had been funded to date by MPG and CREF. Professor Birch suggests in this memorandum some unorthodox (to Unilever) funding proposals from “non-standard sources” involving third parties. When asked whether a researcher working in late 1986 and early 1987 on developing devices for glucose monitoring in blood would have been acting in accordance with Unilever’s policies, Professor Shanks did not consider this to be the case and claimed that the researchers working on blood glucose testing were “chancing their arm”.

98 I think the truth probably lies somewhere between the two extremes. Unilever, through the influence of MPG, probably did allow the ECFD concept for blood glucose testing to be developed, but it was not a priority and future funding was not assured. The proposals by Professor Birch to seek funding from “non-standard sources” involving third parties lend some support for this view.

99 In 1987 the MPG funding was withdrawn from the Biosensors Section and Martin Smith left Colworth in August 1987. In paragraphs 71 and 72 of his witness statement Professor Birch states:

"Despite his efforts, Martin was evidently not keen to be involved in a Sensors Group which was not focused on biosensors. I recall one of his final derogatory remarks to me was, 'I didn't come to Unilever to stick sensors into food processing pipes'. The remark applied to the work programme of the Sensor Group that he had inherited but I am sure that the same sentiment was echoed by the “non-Colworth staff”, all of whom had been recruited on the basis of the Biosensors Section's *raison d'être*. However, all was not lost, and we continued, mainly through bloody mindedness, to pursue our work on electrochemical sensors and biosensors."

100 These comments along with comments made in the above report provide further support to the view that developing a glucose testing product based on the ECFD technology was not considered important by Unilever.

1987-1991 – The CASE studentship

101 Professor Turner started working with Professor Birch on a coulometric device and decided to take this forward by making a joint application for funding for a PhD student to one of the research councils. The work carried out by this student, Nick Morris, and his co-supervisors Professor Birch and Professor Turner related to a glucose test based on coulometry. This work took place between 1987 and 1991. During that period Professor Turner had regular contact with Professor Birch. He said that they were looking at a broad range of issues. Unilever’s main interest was in process control so they were out on a limb with glucose, but were nevertheless definitely looking at glucose. The PhD itself focussed on work involving mediators. He said:

“I can recall being told at the time, that Unilever did not really want to work in that direction, that it wanted to work on process control. So this was almost a side, almost a hobby-type stuff. At least my recollection is that we did the CASE studentships so that we could do some work in this area and we were always really having to say we were working on process monitoring but we did the glucose stuff. I had an interest in glucose, Brian had an interest in glucose and we sort of pursued it but I did not get the idea that it was a main thrust at the time in Unilever, but I had limited knowledge of what was going on inside. It was just what I was told by the people I was working with.”

102 He commented that it was not like the commercial development that he had been involved with in other companies. It was not full steam ahead but more like a small academic project. A lot of further work and effort would be required to turn it into a commercial device. There would have to be investment in manufacturing and so on. The back had been broken in that the capillary fill device was easily mass producible so the equipment would not be hugely expensive by industrial standards. It would however still be substantial. A lot of business development and building would also be required to create a business from that prototype. He considered that the ability to mass produce these devices was key to the market because it had to be made in very large quantities. Another key technology driver was the mediators which moved devices away from the bench top down to portable pocket sized devices.

1988

103 An April 1988 research report entitled "A coulometric sensor for glucose in blood. The development and testing of a pre-production prototype" included a recommendation that the glucose monitor described in this document should be taken from pre-production device stage to full commercialisation. Professor Shanks said that, unless Unilever's policy had changed, this recommendation would have been contrary to Unilever's policy. He highlighted the difference between recommending this and actually getting support, funding and permission to take it forward. Professor Shanks however accepted that according to this document and two further Unilever reports referenced in this document a significant amount of work had been carried out by Unilever on this device. Overall it seems to me however that an ECFD glucose monitor was not significantly on Unilever's radar. This recommendation ultimately came to nothing and in 1989 Unilever corresponded with Professor Turner in relation to seeking interest in the technology (see below).

1991

104 An informal Unilever report dated October 1992 but produced in 1991 entitled "The unfulfilled potential of electrochemical biosensors" and authored by R J Heaton and B J Birch stated:

"The largest potential market for a biosensor is the determination of glucose levels in whole blood, hence the glucose in blood biosensor has enjoyed huge research input over the past few years, with the aim of developing a commercial system satisfying consumer needs."

105 The report also states on page 13:

"Unilever has not launched its glucose [capillary fill device] through its Medical Operating Companies (e.g. Unipath) as the company does not wish to go into competition with the medical giants on glucose in blood analysis. There are also questions over liability as life and death situations can arise in this field, the ultimate consequence of sensor malfunction are of a much greater magnitude than, for example, those of the ClearBlue pregnancy and ClearPlan fertility tests, optical biosensors also marketed by Unipath."

106 Richard Heaton was one of two students doing a final year project with Unilever. Professor Birch's recollection was that this work was substantially theirs with little or no discussion or intervention by himself, even though he was Richard Heaton's nominal supervisor. He commented that the words in the second of the paragraphs above could not have been his because he had no knowledge of high-level discussions in Unilever. Professor Birch said that, although he was supervising the

students who wrote this report and allowed this report to be published internally within Unilever under his name, he may not have given it sufficient examination before allowing its publication. In any case the perception of the student was that there was considerable unfulfilled potential in the glucose testing field and that Unilever were not interested in moving into this market themselves.

1994

- 107 Professor Shanks returned to Unilever in 1994 initially as Divisional Science Advisor to the Research and Engineering Division. He said that he had not followed the fate of the Shanks patents during the period of working at Thorn EMI and did not follow up its fate upon his immediate return to Unilever. It was not until Professor Birch told him about the licensing position in 1995 that he heard of what had happened to the Shanks patents. Professor Shanks also mentioned that there was also an email from Rodney Tate (who was in charge of licensing the Shanks patents) from around the same time but he then recollected that that took place in 1997. This was later confirmed by a copy of an email which was included in the evidence. Professor Shanks did not get directly involved in the commercial exploitation of the Shanks patents. His role was at that time quite different. Moreover he said that he got a sense that Unilever would like to keep him at arm's length, although the evidence shows that there were one or two occasions where he was involved. Professor Shanks says that these occasions were the exception rather than the rule.
- 108 Taking all the evidence on Unilever's development of the invention in the round, I consider a very clear picture to have been painted. Unilever was interested in the biosensors work to an extent, but could not be said to have got behind the invention and pushed it. It was far from being considered a key technology. MPG seemed to have had more freedom and autonomy to pursue these sorts of projects, which perhaps explains how some research on the ECFD device for glucose testing was allowed to continue, albeit as an offshoot of the FCFD work and work on biosensors for process engineering and process control. It seems to me, however that in general Unilever were not all that interested in pursuing a product for glucose testing based on the ECFD device. Professor Shanks himself might have been more keen to develop the work in that area, despite coming up against some management resistance, but after leaving in 1986 does not seem to have done anything to significantly develop it or push it forward.

The significance of the invention in the glucose-testing field

- 109 Professor Turner, based on his experience in the field, considered the capillary fill device to be very significant in the field of blood glucose monitoring. He described it as "the missing piece of the puzzle" which had a huge impact on the field in enabling a convenient sampling method. He said that it is now ubiquitous and is used by the vast majority of devices of all major manufacturers. He saw this technology and the publication of a key Diabetes Complications and Control study as reasons for a steep upturn in the glucose testing market in the 2000s compared to the 1990s.
- 110 Professor Turner justified his assertions on the increase in the market by providing data on the growth of the glucose testing market, both in terms of the biosensors market for glucose testing and the total home blood glucose monitoring market worldwide. The former excludes other technologies for glucose monitoring such as

photometry. His data came from various sources. During cross-examination he clarified the basis for the figures presented. Much of the data used for the size of the world market for biosensors for glucose came from himself and his colleagues by doing primary research on what sales were going on. He admitted it was not a perfect science but they did their best to ascertain what each of the major companies were selling. Professor Turner believed that the figures give a good broad representation of the market sizes. In terms of the world market in biosensors for glucose testing, his figures showed this taking off in 1995. Looking at his glucose testing figures (beyond just biosensors), he pointed to a major jump in 1995 that he attributed to capillary action devices coming on-stream. He was challenged on this in cross-examination, Mr Alexander pointing out the data for 1995 and 1996 comes from different sources. Professor Turner accepted this but still maintained the overall data showed the same pattern.

- 111 Professor Turner confirmed that he had taken account of other relevant factors such as the effects of reimbursement by health authorities of diabetes testing for patients in the United States and the increased extent to which diabetes may have been diagnosed over the period from 1982 to 2007 and refers to the latter in an Eastern Europe and Far East context in his witness statement. Inflation was another factor mentioned as impacting on the data displayed in the graphs. Professor Turner said that he was looking for technology drivers rather than economic drivers and maintained his opinion that the capillary fill technology was the key technology driver at the time.
- 112 Dr Osborn did not agree with Professor Turner's view that the Shanks patents represented an essential component of technology which was instrumental in driving the development and expansion of the glucose monitoring commercial sector. He claimed to be unable to find evidence to support such a critical role for the technology. Dr Osborn considered that the positions the licensees took in the negotiations and the value they were prepared to assign to a license reflected more that of companies wishing to overcome a potential freedom to operate problem for an improvement to existing products than seeing the Shanks patents as a means for improving their competitive position and creating new markets. Dr Osborn found it difficult to reconcile the content of the licensing files with Professor Turner's report. He however confirmed that this was not an area in which he claimed expertise. He also agreed that it was significant that the licensees had approached Unilever rather than the other way round, and that some of them were interested in an exclusive license. Moreover he agreed that the market, independently in his view, came to the viewpoint that having an ECFD-like device had some advantages and was a key factor in contributing to the value of the Shanks patents.
- 113 Dr Osborn also analysed patent filings through patent contour mapping. This shows varying "heights" for technology where invention is more or less prevalent. The mapping showed the ECFD area as a low hill, indicating, for a mature technology such as ECFD now is, that it was not something which others felt worth innovating further on. From this he drew the conclusion that ECFD solved an important product performance requirement where companies require an adequate solution but which on its own does not give a competitive advantage. For the glucose monitoring field generally, however, his evidence was consistent with Professor Turner's showing a rapid take-off around 1998/9 in the numbers of patents published.

114 It is clear to me from these figures that the glucose testing market expanded considerably in the late 1990s and 2000s. It would seem that biosensors played a key role in this. I found Professor Turner's knowledge of the field more convincing than Dr Osborn's data analysis and I believe the contribution to the field of ECFD technology was greater than Dr Osborn allowed. I note that the ECFD technology did eventually appear in most personal glucose testing products. On the other hand, I do not think that Professor Turner's data reliably established ECFD as the key driver which caused biosensors to take off. Overall, as appears from the licensing negotiations and their outcome (covered in more detail below), this appears to have been a useful technology that most significant players in the field were willing to pay millions of pounds for the ability to use, but not one that seemed to be vital.

Licensing of the invention

115 A considerable amount of cross-examination, particularly by the claimant, was directed towards the question of how well Unilever had carried out the licensing negotiations. In summary, the claimant contends that Unilever did not do as well as they could and missed out on the opportunity to make a great deal more out of the Shanks patents, while the defendants argue that more skill and effort was put into the licensing work than was put in by Professor Shanks making the invention.

116 Dr Mulder in his witness statement provided some general comments on Unilever's licensing activity. He said:

"Unilever and its R&D programme is not and never has been directed at obtaining a revenue stream based on licensing out of any part of its proprietary technology."

and

"Usually the bulk of patent effort takes place in the early stages of the innovation process and is often based on proof of principle experimentation. The R&D process is generally targeted to carry out critical go/no go experiments within the early stages of projects and R&D efforts are abandoned as soon as clarity is obtained about lack of feasibility or lack of further business interest. Therefore, the patent portfolio associated with any discontinued technology has limited value because the technology is insufficiently developed and there remains little business interest. Licensing out has therefore never been established as a realistic alternative revenue stream for Unilever, nor has any form of structural dedicated internal resource been developed to enable development of licensing out activity."

117 Mr Emanuel agreed that this was consistent with the evidence he had seen and in relation to the Shanks patents said: "I think it must have been a bit of a surprise to them and they responded to it, but it certainly did not look as if anybody owned and was responsible for the technology and responsible for making money out of it."

118 Licensing activity first arose in the context of Professor Turner's involvement with Unilever. There were some discussions about either Cranfield University taking a license or Professor Turner helping Unilever to find licensees. The bulk of the licensing negotiations however took place directly between Unilever's patent department and prospective licensees.

Professor Turner's involvement in licensing the Shanks patents

- 119 Professor Turner had a lot of contact with various companies and he did at one point suggest to Unilever whether the work which had come out of the CASE studentship could be exploited. Professor Turner wanted to exploit this work but realised that in order to do that he would need a license for the ECFD technology. It was at this point that he considered whether he could bring on board a third party who may be interested in taking such a license. He had an early interaction with an Italian company who wanted to invest in something. Professor Turner had in mind the ECFD work for that company and they were interested but, due to a four and a half month delay in hearing back from Unilever, the client went elsewhere.
- 120 Professor Turner explained that, like any applied academic, he was still interested in exploiting the research carried out during the PhD but by that time he had quite a sizeable group and he was trying to interest companies in anything he had. He explained that he talked to a lot of companies about all sorts of biosensors. He was not out there trying to sell the ECFD technology but was interested in getting a take-up of the specific mediator technology. He could not remember which companies he specifically spoke to about this as there were a lot of companies passing through at the time. He did a lot of general publicity, but this was in relation to all the work of his group and the remit was much broader than just biosensors. There was a lot of activity but it was not targeted specifically on the ECFD technology. He did speak to large diagnostics companies such as Boehringer Mannheim, Matsushita and later Roche and was “pretty certain” that he told them that they should be careful of infringing the Shanks patents. He did not however feel that he was in a position to negotiate between big companies. Professor Turner thought it possible that this is what prompted these companies to talk to Unilever about a license. When he spoke to companies such as Boehringer Mannheim he was looking for R&D sponsorship for Cranfield University and nothing came of that. In relation to a letter to Mr Tate stating that he was “talking to a large number of companies about biosensors and attempting to match their requirements with your technology” Professor Turner said in cross-examination that he was probably being a little over-enthusiastic. When he said that “none of our negotiations, however, are in an advanced stage” he meant that he had had a bit of a go and no one was interested. In reality they were not really doing much on this beyond telling companies the technology existed because there was nothing much in it for Cranfield University.
- 121 It seems to me that Professor Turner did not carry out serious license negotiations on behalf of Unilever and his efforts to attract interest were in the context of attracting interest in the whole spectrum of technologies for which he was interested in obtaining investment. At this stage it seems that neither Unilever nor Professor Turner made any serious or sustained attempts to obtain licensees for the Shanks patents.

Unilever's general approach to licensing the Shanks patents

- 122 Mr Emanuel made a number of criticisms of Unilever's overall approach to the licensing of the Shanks patents. In his view there was no evidence of satisfactory market assessments, financial evaluations, due diligence, business development or marketing in the licensing negotiations in the present case. His overall suggested approach is perhaps captured in this quotation from his evidence:

"If I can go back to my experience, my experience is generally of non-litigation situations. My experience is that when you have crystallised the technology and you think you have a reasonable grasp of what it is and what its benefits are, you look around for potential licensees. You do your market study, a quick and dirty one, and, if necessary, a bigger one. You then approach the licensees and say, "These are the goodies that we have got." At the same time, in parallel, you are working out a strategy. Should you be selling it as fully paid-up? Should you sell the patent? Should you license it or should you provide a technical service? What sort of deal should you put to people? I would generally start earlier rather than later. One of the great advantages of starting earlier is that they may not have quite thought of it themselves so they are going to be less difficult. If you are attacking them for infringing, the first thing they will do is call their lawyers."

- 123 Mr Emanuel emphasised that it was not about whether you license early or late, but about having a strategy and making soundly based decisions concerning exploitation of the technology. This can sometimes take weeks or months but not years. He said that there was a lot of complexity in agreeing a particular licensing structure with a licensee, and agreed that there is a wide range of reasonable agreements that can be made in a given situation depending on how people want to allocate the risks. He however considered that in the present case there was a lack of strategy and execution and as a consequence Unilever got only a very small proportion of what they might have got.
- 124 As an example of the lack of market assessment, the claimants put forward a decision made by Unilever not to pay \$4000 for a full Frost and Sullivan report on the glucose testing market after having obtained a summary of it. Questioned on this, Dr Osborn acknowledged that the full report would probably have been useful although there are limitations to the usefulness of these reports. The claimant further emphasized that the only sales forecasts Unilever had were provided by a couple of the licensees during the negotiations.
- 125 Dr Osborn considered that the licensing terms originally proposed by Unilever were not unreasonable in the diagnostics industry, based on up-front fees in the [] or [] of pounds and royalty rates between []% and []% depending on sales volume. His view of the licensing negotiations was that they demonstrate the value the licensees attached to the Shanks patents and he did not consider them as core patents but rather were useful for freedom to operate. This contrasts with the view of Mr Emanuel, who considers that Unilever's conduct of the negotiations was not what it could have been and this was the reason that the negotiations proceeded and concluded as they did.

The licensing files

- 126 Unilever provided some 26 lever-arch files of records covering the licensing negotiations, which Dr Osborn drew on in his evidence, stating that the negotiations seemed generally competent. There was some contention between the parties before and during the hearing over how much of this their respective experts needed to read, with the claimant wishing Dr Osborn to be more specific in what he relied on in the files to enable Mr Emanuel to focus on that. In the end, an illustrative selection of papers from the files was focused on at the hearing, and I believe that they successfully conveyed an effective impression of the whole.
- 127 Mr Tate, an agreements officer in Unilever's patent department, dealt with most of the licensing negotiations until his retirement in July 1997. Dr Mulder considered Mr

Tate's expertise to be drawing up correct agreements for a situation. He might also possibly assist in or even carry out negotiations. Dr Mulder said that he would not describe his role as any further than that. He would have dealt with those matters efficiently and professionally but if he became overburdened it would be the responsibility of management to take appropriate measures.

128 Mr Welch explained that Mr Tate continued to deal with the licensing negotiations on a day-to-day basis after the biosensors portfolio was transferred to Unipath. He considered Mr Tate to be efficient, robust and effective in his work. Mr Welch's experience of dealing with the patent department was that they were very responsive to his requirements within the constraints of the resources they had. The resources that were available for the use of Unipath were directed to where they thought the priority should be. The patents department was proud of the relationship they had with Unipath, according to Mr Welch, and had a good responsive relationship.

*The **Company A** negotiations*

129 At the hearing, Mr Green focused much attention in particular on the licensing negotiations with **Company A**. These serve as a convenient exemplar of how the licensing negotiations were conducted. How these proceedings progressed is reasonably clear from the files, and I set out in outline in Confidential Annex 2, some of the points relating to it drawn out in argument and evidence.

130 It is apparent that the terms of the deal finally secured are far less favourable to Unilever than those originally proposed, and on which agreement was nearly reached in July 1992, until an unexplained gap in Unilever's activity. Dr Osborn agreed that viewed in isolation the final deal looked poor, the normal percentage for a licensing deal being of the order of 3% to 5%. Mr Green sought to use this to argue that Unilever had missed the opportunity to secure a better deal than the one they got.

131 Mr Green also pointed out that although Mr Tate considered that there was significant potential value in the Shanks patent portfolio, Unilever made no effort to increase resources devoted to licensing it.

132 Overall there was clearly a great deal of activity during the licensing negotiations, with negotiations with various companies overlapping. There were periods of time during the negotiations where there is agreement that Mr Tate was doing a good job. There were however periods of time where there were unexplained gaps in the negotiations where Mr Tate failed to respond to letters promptly which none of the witnesses were satisfactorily able to explain. Dr Osborn considered some of these delays to be out of character for Mr Tate as later on in all the files he worked efficiently; "at times when he promises stuff it seems to get done". Dr Osborn did not accept that the delays were necessarily down to efficiency and effectiveness, although accepted that this could be one of the reasons. He confirmed that, in the whole context of everything in the files, he did not get an overall impression of inefficiency or ineffectiveness so a particular delay seemed out of character. He therefore sought other explanations.

133 In his expert report Mr Emanuel described the licensing negotiations as "generally good" although he qualified this somewhat in his oral evidence. He claimed that

Unilever's patent department were used to asserting their power, strength and capability to support its patents in validity issues but, "in terms of making a good deal, they did not know what a good deal should have been". In his view they were often lacking in commercial vigour and were slow to respond to people, as when taking months to respond to an invitation to produce a draft agreement where the principles had already been agreed.

Other negotiations

- 134 There were some further examples put to Mr Welch that give some further flavour of the licensing negotiations, their conduct, and questions over the validity of the Shanks patents that arose during them.
- 135 Mr Welch was shown another apparent delay in Unilever's licensing negotiations. In this case **Company B** contacted Mr Tate to enquire about obtaining a license. Mr Tate replied within a few days saying he had forwarded the letter to a Mr van Gent who was by this time responsible for this subject matter. Three months later the company in question however had not received a substantive response from Unilever and sent a chasing letter. Mr Welch considered Mr Tate to be efficient but he had a large amount of work and was therefore setting priorities. Looking at a sequence of correspondence from a single license negotiation did not therefore necessarily see the picture as it was, according to Mr Welch.
- 136 Mr Green also took Mr Welch to a note in which Mr Tate expresses concern about the abandonment of two Japanese cases which were part of a portfolio of Unilever patents which included the Shanks patents (these were not the ones abandoned) for which licensing negotiations were taking place with a company. Mr Tate stated in the note "Abandonment of these 2 Japanese cases looks potentially embarrassing to us, almost whatever the reason".
- 137 Questions as to the validity of the Shanks patents were raised by potential licensees during the negotiations. It was not clear if these questions were above and beyond what might normally be expected in licensing negotiations, although some of the discussions on the validity question went into some depth. Mr Welch was taken to a document in which Mr Tate commented that a company with whom Unilever were negotiating licenses for the Shanks patents seemed to be using a tactic of persistent procrastination, after having challenged the validity of the Shanks patents. Mr Welch said that his experience with these patents was that the strength and persistent, continuing arguments about their validity were significantly higher than he had experienced on other patents they were licensing or enforcing. The only formal challenge appears to be an opposition to the Japanese patent and it appears that the outcome of that was favourable to Unilever.
- 138 Regarding this, there was some discussion at the hearing of the possibility of litigation if Unilever had pressed for better licensing deals, the potential cost of that litigation rising to several millions of pounds, and the risk that the Shanks patents could have been found invalid in litigation. Mr Emanuel pointed out that most companies did take out a license, although Mr Alexander suggested that they did this at the levels they did in preference to potentially very expensive litigation. He described such a patent license as a cost of doing business.

Conclusions on Unilever's licensing efforts

- 139 There was much focus on the licensing activity at the hearing, with several witnesses being taken to different parts of the licensing files and discussion of the reasons and effects of various actions (or inactions). I have outlined the key elements above, but I have considered carefully all the evidence put forward. The combination of all the evidence to my mind makes clear the shape of Unilever's licensing negotiations.
- 140 In my view, Mr Emanuel, drawing on his experience, puts forward cogent points on how Unilever could potentially have done more in relation to licensing the Shanks patents. But it is clear that to a significant degree, Unilever has made a conscious choice about how licensing is not a key part of its business, and consequently, resources devoted to it will always be relatively limited. It is worth noting that in most cases the potential licensees contacted Unilever and initiated the negotiation. (There was one case in which Unilever initiated the negotiation, with **Company B**, although that was in the context of [].)
- 141 This comes through again when detailed consideration is given to the actions of Mr Tate. It is clear that on a number of occasions his actions fell short of the ideal. But there is no clear evidence about the other calls on his time, and what other, at the time equally pressing, work he had to juggle. It is easy, but not I think fair, to sit in judgement on Mr Tate's individual actions and second-guess each of them. With hindsight it is possible to argue that a greater focus on the Shanks patents would have given greater returns. But at the time, this may not have been so readily apparent.
- 142 Even with hindsight, it is not clear that with greater resource and more investment in the licensing, Unilever would have secured any greater returns. It is speculation, for example, that a faster response to **Company A** post-July 1992 would have secured a much better licence from Unilever's perspective. But equally it might have been that locked into an expensive licence, **Company A** might have more aggressively pursued validity, consumed more of Unilever's resources in litigation and potentially invalidated the Shanks patents, knocking out the revenue stream entirely. The only certain fact is that the approach taken by Unilever and the work of Mr Tate in particular secured licenses from all but one of the major players worth millions of pounds to Unilever.
- 143 Overall, it appears that Unilever did not devote a relatively great (for itself) deal of effort and energy into licensing the Shanks patents, but it kept the patents in force and did put in a serious effort which secured the non-negligible (to put it at its lowest) returns it did. It is clear that there was significant effort and skill in the licensing negotiations, albeit not at the level a dedicated skilled licensing team would have provided.

Expense incurred by Unilever in relation to the invention

- 144 The actual costs to Unilever incurred as a result of the invention were not greatly in dispute, although there was disagreement between the parties and their experts on the margins relating to the breakdown and recouping of costs incurred in developing the FCFD devices and how they were separated out. There was a more

fundamental dispute between the parties as to whether and how these costs should impact on the “benefit”, which I consider later.

145 In terms of research and development costs, Professor Birch calculated on the basis of his experience as to how the various groups were staffed and run, and some figures relating to the salaries of researchers etc., values of:

- £700,000 as the proportion of the cost of running the Biosensors Section incurred between 1984 and 1987 attributable to the ECFD technology.
- £1,055,887 as the proportion of the cost of running the Sensors Group incurred between 1988 and 1994 attributable to the ECFD technology.

146 I accept these figures, which appeared to be calculated on a sensible basis. There was some suggestion by the defendants that a significant portion of the Sensors Group work was related to testing products for infringement etc., but no specific breakdown was given. It did not appear from Professor Birch’s evidence that this was the majority of its work, however. In the absence of evidence, I do not think that it could have been a substantial part of the approximately £1 million compared to the research and development work.

147 In addition, Dr Osborn estimated, from his experience of licensing £200,000 for the costs of running the licensing programme for the Shanks patents between 1991 and 2001, with an estimate that the majority of these costs were incurred between 1993 and 1997. Dr Osborn further estimated the cost of filing, prosecuting and maintaining the Shanks patents and Birch patents at £150,000. Dr Osborn worked on the basis of a third of this cost, i.e. £50,000 being attributable to the Shanks patents. Mr Emanuel came to the same numerical figure at 1998 values.

The Sale of Unipath to IMI

148 Unipath was sold to Inverness Medical Innovations (IMI) in December 2001 for a figure of £103 million. As far as Mr Welch could remember it was around August or September 2000 when internal discussions began on the possible sale of Unipath. In April 2001 the Executive Committee approved the sale of Unipath by auction. However even in June 2001 Mr Welch’s evidence is that half the Board still did not know of the plans to sell Unipath.

149 The sale of IMI’s glucose testing business to Johnson & Johnson (J&J) was announced to the market in May 2001. This is important because, as I explain later, experts from both parties used this sale in different ways to argue about the value of the Shanks patents to IMI. According to Mr Welch, Mr Zwanziger, the Chief Executive and moving spirit of IMI, could not have known anything of plans to sell Unipath at that time as at that point no one outside of Unilever knew of the plans to sell Unipath. An information memorandum produced by Deutsche Bank set out details of the sale of Unipath and was dated August 2001. Mr Welch said that a teaser went out a few days before this memorandum which would have been the first public announcement of the sale of Unipath.

150 In the absence of any evidence pointing to the contrary Mr Welch's evidence is persuasive on this point. I therefore conclude that there was no link between the sale of IMI's glucose testing business to J&J and the sale of Unipath to IMI. There was no overlap between the negotiation of the two deals and Mr Zwanziger could not have known that Unipath would shortly be available for sale when he negotiated the sale of part of IMI to J&J. Furthermore, when bidding for Unipath, Mr Zwanziger would have been aware of restrictions placed on IMI by the sale to J&J, as I explain further below.

Income received by Unilever

151 As explained above, Unilever never managed to develop a commercial product based on the Shanks patents. Its income from the Shanks patents came from two sources: the licensing fees it obtained and the portion of the price paid by IMI for Unipath which can be attributed to the Shanks patents.

Licence Fees

152 It is common ground between the parties that the total sum arising from licensing deals concerning the Shanks patents is £20,325,056.50, broken down as in Confidential Annex 1.

153 However, there is a complication in that [] several licensing deals [] also included licences for the Birch patents². The parties agree that some discount to the total sum is appropriate to arrive at the proportion attributable to the Shanks patents, but differ on how much. The defendants, supported by evidence from Dr Osborn, argue for a 15%; the claimant, supported by evidence from Mr Emanuel, argues for a 5% reduction.

154 I prefer the evidence of Mr Emanuel. Dr Osborn's approach to this question is rather sweeping and is primarily based on an assertion, without specific reasoning, that on reading the licensing files he came to the view that 20-25% was an appropriate value but he settled on a "conservative" 15% in light of one licensee (**Company D**) reducing their payment when they decided they did not want the Birch patents. Mr Emanuel, by contrast, analysed the licences on an individual basis, and made more comprehensive comparisons between what the different licensees were willing to pay with the Birch patents included with a final price agreed with them excluded.

155 I therefore hold that the total licensing income received by Unilever attributable to the Shanks patents was £19,526,580.65, [].

The Unipath Sale

156 As noted above, the Shanks and Birch patents were included in the sale of Unipath to IMI in December 2001. The terms of the sale included **Company E** being the beneficiary of expected licence payments of \$4.5 million, i.e. £2,944,000 from **Company F**. The parties, and their witnesses Dr Osborn and Mr Emanuel, were agreed that that this sum should be attributed as part of the benefit to Unilever as

² I have not included a license to **Company C** because, given the small amount of royalties received, for the purposes of this application, Unilever admitted that the entirety of this sum is attributable to the Shanks patents in Confidential Schedule 10 of their Re-Re-Amended Counter Statement.

part of the purchase price clearly attributable to the Shanks and Birch patents. Dr Osborn, in line with his approach above, applied a 15% discount to this value to account for the value attributable to the Birch patents. Mr Emanuel applied a 5% discount for the Birch patents, and a further 5% discount for the credit risk that **Company F** might not in the event pay. In line with my findings above, I adopt Mr Emanuel's 5% discount for the Birch patents and also adopt his 5% discount allowing for the risk IMI was taking on, giving a value for the licenses of £2,656,960.

- 157 The parties were more divided on whether any further proceeds of the sale should be attributed as part of the purchase price – i.e. whether the sale price was inflated further by the inclusion of the Shanks patents over and above the expected licensing revenue.
- 158 The claimant, backed by evidence from Mr Emanuel, advanced two primary reasons why IMI would have been willing to pay more:
- Freedom to use the ECFD technology themselves.
 - Ability to obtain licenses from others.
- 159 It was apparent from the evidence, and relied on by witnesses from both sides that £[] million of the purchase price was allocated to “IPR assets”. It was also common ground that this included more than just the Shanks and Birch patents, in particular including patents relating to the Rapid Assay Technique which lay behind the pregnancy testing kits at the heart of Unipath's business.
- 160 The actual reasons for how the £[] million was arrived at remained somewhat obscure. It was apparent from the evidence that this figure was finalised only late on in the sale negotiations, and in addition appears – from the evidence of Mr Welch, who was involved in the negotiations – to have, at least from Unilever's perspective, to have been based primarily on the potential value of IP licences even though the category covered the assets generally. On this basis, the £[] million would not, from Unilever's perspective, have included the potential value of being able to use the technology.
- 161 Mr Welch's evidence, which I accept, was that the licensing revenue was based on an overall view of the total licensing revenue known in the immediate future, and similar levels then being projected forward, with the expectation that the specific patents providing the revenue would change over time.
- 162 Much of Mr Emanuel's argument in his expert report was based on the idea that the Shanks patents would have been useful to IMI in the sale of its diabetes-testing business to J&J, referred to above. However, it became apparent during the hearing, particularly during the cross-examination of Mr Welch, that the dates of key events did not accord with this. As I held above, by the time IMI started negotiating to buy Unipath, they had already sold the diabetes business, part of which involved agreeing not to compete with J&J in that area for ten years. I accept Dr Osborn's analysis of this and of the lack of capability of IMI to deploy the technology in other areas in his third expert report was convincing, and I accordingly find that IMI would have been willing to pay a negligible sum for the ability to use the patented invention.

- 163 Mr Emanuel's reasoning on the value of the ability to licence others for use of the ECFD invention was based on subtracting the £4 million he deemed (incorrectly in my view) that IMI would have paid for right to use the invention from the £[] million, and then equally dividing the remaining sum equally between the Shanks patents, and two other key parts of Unipath's portfolio: the pregnancy-testing technology, and the "persona" technology.
- 164 In terms of the revenue expected specifically from the Shanks patents, Mr Welch's recollection was that apart from the known licence revenue referred to above, the remaining potentially significant licensee was **Company G**. His evidence, backed by a contemporaneous email, was that Unilever anticipated potentially a £[] licence from **Company G** was possible, but might require litigation to obtain, requiring a discounting for risk and litigation costs. Dr Osborn attempted to quantify this as []% risk discount and £[] million costs (3rd expert report).
- 165 Dr Osborn attempted a number of different approaches to attempting to estimating the appropriate value. From estimating it from Unilever's perspective, he adopted essentially the approach above, which he further discounted for his view of the contribution from the Birch patents. From the IMI perspective, he pointed to the fact that **Company G** never actually took a licence and considered that, in particular in view of that fact, that Unilever overvalued the potential in a way IMI may not have done. He therefore considered IMI would have attached little value to the potential for licensing fees, and that this would be the more appropriate figure to take.
- 166 While I agree to some degree that the key question is what IMI was willing to pay (although this is mitigated to an extent in that they needed to account for what others might have bid), it seems to me that ultimately all we have on that score is speculation. The only real evidence we have goes to how Unilever saw the potential value from future licensing at the time – and I accept Mr Welch's and Dr Osborn's evidence on this score. That valuation seems to me to be not unreasonable and is a contemporaneous assessment from a party with an incentive to get it right, allowing that valuations of this nature are always going to be an inexact science. I therefore adopt it as the best estimate of the actual value attributable from the sale in this respect. In line with my approach above, I discount it by 5% to allow for the value of the Birch patents. This leaves £2,375,000 attributable in income to Unilever.
- 167 Finally, I note there was some suggestion from Mr Green that the inclusion of the Shanks patents in the sale was particularly important because it turned projected income in the immediate future for Unipath from profit into loss. In a sense this is true, but equally it is true of any arbitrary division of Unipath's assets. To the extent that the Shanks patents made a difference, that has been accounted for in my calculations above.
- 168 This gives a total income for Unilever, spread over several years, of £24,558,540.65 from the Shanks patents.

Whether to grant compensation

- 169 The law on employee compensation is intended to provide a means by which employees can obtain a share of an "outstanding benefit" made by one of their

inventions. It is governed by Section 40 of the Patents Act 1977. Professor Shanks is making his claim under Section 40(1):

40(1) Where it appears to the court or the comptroller on an application made by an employee within the prescribed period that the employee has made an invention belonging to the employer for which a patent has been granted, that the patent is (having regard among other things to the size and nature of the employer's undertaking) of outstanding benefit to the employer and that by reason of those facts it is just that the employee should be awarded compensation to be paid by the employer, the court or the comptroller may award him such compensation of an amount determined under section 41 below.

- 170 This section (and others quoted in this decision) were amended by the Patents Act 2004, but the amended Sections apply only to patents applied for on or after 1 January 2005 and therefore do not apply to the present case.
- 171 There is no dispute between the parties that the Shanks patents are for an invention belonging to the employer. Equally, Unilever accepts that if I were to find (contrary to the Unilever's contentions) that the Shanks patent are indeed of outstanding benefit to the employer, then it would be just for compensation to be awarded.
- 172 The first question that I must therefore resolve is whether "the patent is (having regard among other things to the size and nature of the employer's undertaking) of outstanding benefit to the employer". This gives rise to two prior questions: "what is the benefit?" and "what is the size and nature of the employer's undertaking?"

The Benefit

Section 41(2)

- 173 The level of compensation for employees' inventions are set out in Section 41 of the Patents Act 1977. This reads in relevant part as follows:

41(1) An award of compensation to an employee under section 40(1) and (2) above in relation to a patent for an invention shall be such as will secure for the employee a fair share (having regard to all the circumstances) of the benefit which the employer has derived, or may reasonably be expected to derive, from the patent or from the assignment, assignation or grant to a person connected with the employer of the property or any right in the invention or the property in, or any right in or under, an application for that patent.

41(2) For the purposes of subsection (1) above the amount of any benefit derived or expected to be derived by an employer from the assignment, assignation or grant of -

(a) the property in, or any right in or under, a patent for the invention or an application for such a patent; or

(b) the property or any right in the invention;

to a person connected with him shall be taken to be the amount which could reasonably be expected to be so derived by the employer if that person had not been connected with him.

- 174 This last part, section 41(2), is an "anti-avoidance" section intended to deal with the situation where, as here, inventions and patents are assigned between related companies for nominal sums for accounting reasons. The section operates so that the "benefit" of the patent is considered to be what it would have been if the

assignment had been made without the existence of a relationship between the companies concerned.

175 The precise meaning of this section was the subject of my earlier decision³. That decision was overturned on appeal to the Patents Court by Mann J⁴, whose judgment was in turn overturned by the Court of Appeal⁵.

176 The Court of Appeal judgment explains that the words “that person” above refers to the actual purchaser (but considered as though there were no direct connection), rather than a hypothetical entity. Following this judgment, the parties were agreed that the “benefit” for the purposes of Sections 40 and 41 should, as a result of the operation of Section 41(2), be taken to be the actual benefit received by the Unilever group as a whole. This appears to me to be a sensible approach and appears to give effect to the apparent anti-avoidance intent of the statute.

“Gross” benefit

177 The benefit is to be considered in terms of money or money’s worth, as set out in Section 43 of the Act:

43(7) In sections 40 and 41 above the section “benefit” means benefit in money or money’s worth.

178 Above I have held that Unilever’s total income from the Shanks patents was £24,558,540.65. This is a clear starting point for determination of the benefit. The parties advanced various arguments that would increase or decrease this figure.

Costs of the Invention

179 Mr Alexander argued strongly that the costs relating to the ECFD invention (broken down as I have set out above) should be subtracted from the benefit to find the actual benefit received by Unilever. He prayed in aid specifically the Comptroller’s acceptance that he was concerned with the “net” benefit in *GEC*⁶, and also Floyd J’s approach in *Kelly*⁷ as supporting this.

180 Mr Green’s argument was, in essence, that there really were no invention costs to Unilever. He argued that Professor Shanks came up with the patented invention himself at no cost to Unilever. He acknowledged that Unilever did spend money after the patent application was filed on developing the invention, but argued this was irrelevant as none of the benefit came from it. He also acknowledged there were costs in obtaining and maintaining the Shanks patents, but considered that these could be taken into account in determining the “fair share”.

181 I have to say that I do not believe *Kelly* supports Mr Alexander’s contention in the way he suggested. To quote paragraphs 130-132:

³ *Ian Shanks v Unilever Plc, Unilever UK Central Resources Limited, and Unilever NV* (BL O/138/09)

⁴ *Shanks v Unilever Plc* [2010] RPC 11

⁵ *Shanks v Unilever Plc* [2011] RPC 12

⁶ *GEC Avionics Ltd’s Patent* [1992] RPC 107

⁷ *Kelly and Chiu v GE Healthcare Ltd* [2009] RPC 12

130. *Mr Purvis submitted firstly that the evidence established that, without patent protection, the Heart Project would not have gone ahead at all, and that one can therefore ascribe all the profits of Myoview to the patents.*

131. *I think this argument, which even Mr Purvis was inclined to describe as "nihilistic", is bad. It fails to account for the fact that the patents were just one of the causes of Myoview's success, and fails to provide any basis for apportioning the profits between the multiple causes.*

132. *I think a much better way of isolating the actual benefit which it is possible to ascribe to the patents, as opposed to other causes, is to assume that Myoview has gone ahead, but unprotected by patents, and compare an estimate of how it would have performed with the actual profits.*

182 I respectfully agree with this approach, and believe that it applies equally in this case. Certainly, the sums of money that Unilever invested in the invention are by the defendants' own account of the order of £2 million which by their own submission is a not a large sum by Unilever's standards, and I saw no real suggestion in the evidence that a lack of a patent would have meant no pursuit of research in this area. What I should therefore do, as Floyd J did in *Kelly*, is assume that the work had gone ahead, but there were no Shanks patents, and consider how Unilever's income would have been affected.

183 This is far more straightforward than it was in *Kelly*. Without the patents, the licensing income and benefit from the Unipath sale would have been zero – all the income determined is directly attributable to the patents. Equally, the expenditure on licensing and related work would not have taken place, so these costs should be deducted from the benefit. The other work would have happened anyway by the above hypothesis, so the cost of doing so should not be deducted from the benefit. From my earlier findings as to the costs, this gives a total benefit of £24,558,540.65 - £250,000 = £24,308,540.65.

184 Mr Alexander argued that an approach such as I have taken above could lead to an absurd result. He hypothesized a company which lost a lot of money on marketing an invention, but which made significant money from licensing being forced to pay out. He appeared to consider this self-evidently absurd.

185 I have to say that I disagree. If in fact a company would have lost an outstanding amount of money but for a patent covering an invention, then the company has had an outstanding benefit from the patent. It is important to bear in mind that s40 as we are considering it here (pre-Patents Act 2004) is concerned only with benefit from the patent, not with that from an invention. The counterpart of needing to deduct (as in *Kelly*) any monies made from the invention that would have been made without the patent from the gross sales of an invention, is that costs of the invention unrelated to the patent do not detract from the benefit received from the patent. Looking at *Kelly*, Floyd J considered the gross sales figures of the relevant products, and determined what proportion of those were attributable to the patent. He did not consider the costs of the invention in this (see paragraphs 168-170). Indeed, he rejected an approach suggested by the claimants that attempted to calculate a percentage of the profits. (It is noticeable he does not appear to have taken into account the costs of patenting either – but these will have been small relative to the benefit in any event and his valuation of the benefit was already, as he said, "rock bottom").

Tax

- 186 Dr Osborn in his evidence discounted all benefit values by 30% to allow for corporation tax. Mr Alexander supported this approach, in line with his general argument that it was the “net” benefit that should be considered, and specifically that Dr Osborn’s approach was reasonable and avoided complicated tax calculations.
- 187 Mr Green objected strongly to this approach, objecting both to the principle of allowing for taxation (particularly given that Unilever would be able to offset any payment to the claimant against tax), and to taking a blanket approach of 30%.
- 188 I agree with Mr Green. Dr Osborn’s approach appeared too arbitrary to be justified, and I was particularly unconvinced by his failure to discount losses made in years that no income was received on the grounds that Unilever overall was profitable and so paid tax in those years. That may be so, but equally it would have saved some tax payment on his logic as a result. (This particular point does not have a direct effect as I held above that costs should not in fact be taken into account and so these losses and tax savings were not relevant – but it well illustrates the arbitrariness of his calculation). In particular, for the purpose of determining whether the benefit was outstanding, the comparators, as near as I could discern, did not appear to have taken tax into account. I further note that in *Kelly*, which looked at sales values for the relevant products, no account seems to have been taken of tax.

Value of Money

- 189 The claimant argued, on the basis of evidence from Mr Emanuel, that account should be taken of the value to Unilever of having had the money received in future years – the point being, put crudely, that Unilever was able to take this money and use it to make more money. (I note that the defendants made a similar increase to the costs incurred, based on Dr Osborn’s evidence). Several year-on-year percentage increases were suggested for this value. I return to this below in my consideration of “fair share”, but I believe that the crucial argument regarding this with respect to outstanding benefit was made by Mr Alexander: any increase of the benefit on this account would have to be matched by an equal percentage increase to the rest of Unilever’s income that it is being compared to. I see this as a needless complication that would add nothing to the comparison.

Conclusion on value of benefit

- 190 I therefore conclude that the benefit to Unilever was approximately £24 million in money terms, over a period of years.

The Employer’s undertaking

- 191 There was disagreement between the parties as to what “the employer’s undertaking” in this case was. The claimant pointed out that no explanation of “undertaking” is given in the Act. He pointed to the Companies Act 2006⁸ where it meant either a body corporate or an unincorporated association carrying on a trade

⁸ Section 1161(1) Companies Act 2006

or business, with or without a view to profit. He further cited employment law cases⁹ where it has been held to refer to a production unit or as an identifiable “stable economic entity, that is to say, an organised grouping of persons and assets facilitating the exercise of an economic activity which pursues a specific objective.”

192 From this, the claimant argued for the undertaking to be various subsets of CRL, viz:

- Measurement Control and Automation Section; or if not
- Process Engineering Division; or if not.,
- Colworth Research Laboratory; or if not,
- CRL.

193 The defendants, by contrast, argued that the Unilever group as a whole should be considered to be the undertaking. They argued that, in accordance with *British Steel*¹⁰ (p122 lines 14-17), the tribunal should look to the business in which the employer is involved and which gave rise to the patent and/or the benefits derived from it, and not be distracted by ownership structures. In the present case, looking at the work being done, they argue that this was central research work and the work that led up to the Shanks patents and developed it was group work undertaken at Colworth for the group as a whole.

194 The claimant argued further that the operation of section 41(2) described above points away from the whole group being the “undertaking”. Mr Green submitted that since the determination of the benefit relied on CRL not being connected to Plc it would seem counter-intuitive to assume complete unity between CRL and the Group when identifying the relevant undertaking.

195 In contrast, the defendants argued that this actually reinforced the argument that the group as a whole should be considered as the undertaking, as it was in fact (because of 41(2)) the benefit to the group as a whole which was being considered. I have some sympathy with this point: the purpose of Section 41(2) is to prevent the company structures from enabling a defendant to hide this reality (by claiming the only benefit is a nominal assignment fee) in an effort to obscure the real benefit obtained. It would be equally wrong to enable a claimant to pick an arbitrarily small subsection of the group (and the tiered proposals by the claimant somewhat smack of this) and by attributing the benefit obtained by the entire group to that subsection magnify its apparent significance. However, I do not believe it is a complete answer, as I can conceive of situations where an undertaking may be a subset of the company as a whole (as in *Kelly*).

196 In the event, on the facts of this case I find that the reality of the situation is that described by the defendants: regardless of how the various companies in the Unilever group have been structured, researchers at Colworth (employed by CRL) were doing work which was going to be exploited by the group as a whole. Indeed, it is notable that the whole benefit from the Shanks patents was generated by licensing

⁹ *Kapur v Shields* [1976] 1 All ER 873, [1976] ICR 26, QBD and *Oxley v Tarmac Roadstone Holdings Ltd* [1975] IRLR 100

¹⁰ *British Steel Plc's Patent* [1992] RPC 117

activity operated out of the central Unilever companies. Having regard to the size and nature of the employer's undertaking therefore requires me to have regard to whether the benefit from the patents is outstanding in the context of the Unilever group as a whole.

197 I should also mention that in closing submissions, Mr Green advanced Unipath as an alternative for the "undertaking" on the basis of the value the patents played in putting Unipath's accounts into the black and their role in Unipath's sale. I find this argument unconvincing: the transfer of management responsibility of the Shanks patents to Unipath came some considerable time after the invention was made and patented. To allow these sorts of reorganisations within a group to determine the nature of the undertaking would be to do the very thing section 41(2) seeks to avoid.

Was the benefit "outstanding"?

198 There is no definition of "outstanding" in the Act. In *Kelly*, Floyd J (drawing on the words of Aldous J in *Memco-Med Ltd's Patent* [1992] RPC 403) stated (paragraph 60(iv)):

"Outstanding" means "something special" or "out of the ordinary" and more than "substantial", "significant" or "good". The benefit must be something more than one would normally expect to arise from the duties for which the employee is paid;

199 Further, as submitted by Mr Alexander, Floyd J also outlined a number of factors which are not relevant to this determination:

- Whether the invention itself is outstanding (para 60(vi))
- The effort and skill exhibited by the employee (para 60(vi))
- The level of remuneration paid to the employee (para 58)

200 The claimant makes an initial point regarding Floyd J's holding in *Kelly* that under section 41(1) the employee will only succeed where, with the benefit of hindsight, the disparity in benefit between employee and employer is extreme. The claimant argues that this is surely satisfied as Unilever have received tens of millions of pounds and Professor Shanks nothing more than his contracted remuneration and £100 assignment fee. In simple numerical terms, this is plainly so, but I do not read Floyd J as meaning to create an alternative test to "outstanding"; there is a need to consider the disparity in the overall context of the size and nature of the employer's undertaking.

The benefit in light of Unilever's profits and turnover

201 The defendants argued that in context the benefit was clearly not outstanding. To make this point, Mr Alexander submitted a graph illustrating revenue from the Shanks patents compared to Unilever's overall profits, together with the remark "The Comptroller may be wondering why the bars for the licence income and the sum attributed to the Unipath sale in the years 1996 to 2004 can hardly be seen. Nothing has gone wrong with the printing. Even with an elongated y axis, they are so small as to be virtually invisible – and for the majority of its life there was no annual income realised at all". Less colourfully, Dr Osborn made a number of comparisons on the

benefit as a percentage of Unilever's and CRL's profits, turnover, or R&D budget either considered over the lifetime of the Shanks patents, the years in which licensing income was received, or considered relative to a single year. He was using a value of the benefit about half what I have found above, but the essential point is the same as Mr Alexander's.

- 202 Mr Samuel took this line in his evidence, stating that a £18 million additional write-down had not required a restatement of the accounts and that £23 million is not even material at management group level. In my view, he somewhat overstated his case and was challenged in cross-examination being shown evidence of top-level Unilever management being concerned about losses of £15 million in another context ("Project Hyacinth") which he admitted being surprised by. However, I have no difficulty finding that the size of benefit being considered in this case is small compared to Unilever's overall profits. But that does not mean that Mr Alexander's argument immediately carries the day.
- 203 Mr Green characterised Mr Alexander's approach as "too big to pay". He argued that given the size of companies such as Unilever, on one level it would be impossible for any benefit to be "outstanding" in the context of profits of hundreds of millions of pounds and more. An approach such as urged by the defendants would inevitably mean that any claim against a large company would fail, and it was impossible that this was the legislature's intention. Furthermore, he argued, such an approach had not been followed in *Kelly*, where the defendants, GEC, had even higher turnovers than Unilever, and yet a benefit of £50 million had been found outstanding. Mr Green also referred to the comments of Jacob LJ in the Court of Appeal's judgment in *Shanks v Unilever*, where he had thought it unlikely that a large company could escape liability in such a way.
- 204 I observe firstly that I believe the point about GEC to be a red herring; Amersham was acquired by GEC after Amersham obtained an outstanding benefit from the patents in *Kelly*. That is an entirely different situation from the present case, where all the benefit considered accrued directly to the Unilever group.
- 205 Turning to the words of Jacob LJ in *Shanks v Unilever*, the relevant paragraph in the judgment reads:

17. *In oral argument Mr Green somewhat modified his submission: he suggested that the "putative benefit" applied essentially only at the threshold stage. Unilever were (and according to Mr Alexander still are) contending that although £23m royalties might be a lot for some companies, by Unilever standards it is not a lot and so the patent was not of outstanding benefit to Unilever. He pointed to the words in s.40(1) "having regard to the size and nature of the employer's undertaking", suggesting they meant that inventor/employees of big companies had to show a larger benefit to their employer than inventor/employees of smaller companies. I am far from convinced that Parliament meant that inventor/employees of large companies should get less or no compensation for a particular invention compared with what they would get if they had been employed by a small company. It may indeed be the other way round in that a large payment may be too much for a small company to be able to afford and that was what Parliament had in mind. The point does not immediately arise – the Comptroller will have to consider it in due course if it is persisted in.*

- 206 The question is thus squarely before me. I note also that Mr Green disclaimed the argument that whether the benefit was outstanding would be affected by a smaller company's ability to pay.

207 I agree with Mr Green to the extent that I think it is too simplistic to simply look at overall turnover, or profits, of an employer's undertaking and then simply state that a given benefit is a small percentage of that. At the same time, it is necessary, as the statute says, to take account of the size and nature of the employer's undertaking. Different undertakings will have different leverage to be able to make more or less benefit out of their activities. I see this as being illustrated by Mr Emanuel's comment in evidence that £50,000 would be an excellent return for a small company to get from licensing its patents. Clearly, that would not be an excellent return for Unilever, which by its nature, for example by being able to contemplate greater expenditure on litigation, is able to get higher returns in negotiations than a smaller entity would, as Mr Emanuel conceded. So it seems totally logical to me that a given monetary benefit might be outstanding for a small entity, but not for a larger one.

208 Ultimately, I do not think this reduces to a simpler test than that laid down in the statute – it is a matter of looking at the benefit in the overall context and determining whether in view of all the facts the benefit to the employer was outstanding. Sometimes that might be because of the benefit being in fact a large portion of the employer's profits or turnover. Other times it may be possible to see the outstanding nature from the effect it had – for example in *Kelly*, where Floyd J is able to determine the benefit is outstanding before determining its precise value in money terms.

209 With this in mind, I turn to considering a number of different possible comparisons suggested by the witnesses.

The benefit in relation to patents in general

210 Dr Osborn compared the Shanks patents, and his valuation of them against other patents in the medical and diagnostic sectors. His conclusions were that even though the income from the Shanks patents was significant both in straight monetary terms and in comparison with average patent values (amongst the top 5% or so in terms of revenue generated) he did not consider them, in his opinion, to be an example of an outstanding patent in terms of value. Following up on this, Mr Green took Mr Emanuel to some figures on patent values in an appendix to Dr Osborn's report. Mr Emanuel commented that in the context of these values Professor Shanks' patent was very, very unusual. Reading the report in context, however, it is apparent that Dr Osborn was there referring to average values from patents sold in bundles, in which key patents would carry much of the value, above the average.

211 Mr Emanuel considered that experienced licensing executives would regard the benefit of the Shanks patents as outstanding (the "licensing perspective"). In the technology transfer field Mr Emanuel considered £50,000 to be exceptional. The present case went beyond that, particularly given that it was a bare patent outside of the pharmaceutical field. Mr Emanuel considered this to be extraordinary.

212 I do not believe these comparisons are of much assistance. The question of outstanding benefit must be considered in the context of an employer's undertaking. A patent might very well provide outstanding benefit in that context even if it did not stand out among patents generally. Conversely, I find it hard to see how a benefit of £50,000 could be considered an outstanding benefit in the context of Unilever's overall budget, even if generally patents are licensed for much less.

The benefit in the context of Unilever's licensing activities

- 213 In the context of Unilever's business, which is in making products and not substantially engaging in patent licensing, Mr Emanuel agreed in cross-examination that if it gets any significant level of fees from the odd patent license, that is always going to be unusual because that is not its business, and he commented that if it is a substantial amount of money then it is remarkable. It would "stand out". He emphasised that Unilever don't normally do this, but on this occasion, not only did they do it but they made "a ton of money" out of it.
- 214 There was scant evidence in relation to Unilever's other licensing activities. In particular, no examples were provided of other licensing deals which have provided Unilever with income at or above the levels of the Shanks patents. Dr Mulder's evidence was that Unilever is not a licensing out company but rather a company focussed on products. It therefore seems, as Mr Emanuel said, that the Shanks patents could "stand out" in terms of the licensing income they have brought in.
- 215 It does not however follow that the benefit, in money or money's worth, is outstanding. On this I agree with the point Mr Alexander put forward, which was that how the benefit was made is not relevant to whether it is outstanding – what matters is whether the benefit in money or money's worth is outstanding in the context of the undertaking as a whole. Just because a company does not usually make money in a certain way does not mean that any sum, no matter how small relative to the size of the company's usual business, is of outstanding benefit for it.

The benefit in view of Unilever's patent activities

- 216 In an effort to assess the benefit obtained from the Shanks patents to that from other patents owned by Unilever, Dr Mulder provided some evidence in relation to patent value and patent metrics based on an attempt he had made some years previous to "value" Unilever's patents. However, in cross-examination he conceded that this was not really related to the money value of the patents as such, more their value in general terms, relating patents to relevant products sales value rather than determining the value of the patent compared to the product. I do not consider this evidence to be of great assistance.
- 217 Mr Emanuel commented that if Unilever had provided evidence that there were a high number of patents which had a clear value attributable to them similar in size to that of the Shanks patents (e.g. 20 of them in the last year), then the Shanks patents would not be exceptional, although if there were only one or two a year they may be exceptional. Emphasizing this point in cross-examination, he said:
- "I think a fairer comparison is how many other people have produced patents or intellectual property of similar value in Unilever (in fact, I have looked elsewhere as well) and if the answer is very, very few, then this is pretty special. You might also say how many very special situations like this would you expect within a huge company like Unilever over a period of two or three decades? Three, four, two, one, five? You would expect, within a huge organisation like Unilever, with creative people, with a big research institution, to have one or two pretty exceptional inventions."
- 218 I think to an extent that this suffers from the same problem I identified looking at only licensing above – Unilever generally uses patents to protect its products, so the value of a patent is only going to be a subset of the value of the product – and for

determining outstanding benefit it is going to be necessary to compare with the benefits obtained from those products. Had Dr Mulder's efforts to disaggregate the benefit from patents shown convincingly that other patents were more beneficial than the Shanks patents that might have pointed away from the Shanks patents providing outstanding benefit. Dr Mulder's failure to do that does not, I think, indicate anything one way or the other.

The benefit compared to Unilever's activities in general

- 219 Dr Mulder in his evidence, in a part he was not challenged on, identified a number of highly successful products manufactured by Unilever, including Vienetta ice cream, spreads and deodorants. He referred to incomes of "many billions of pounds" over the lifetime of the patents protecting the products, "with profits over the same period of at least many hundreds of millions of pounds." I believe that this gives some indication of the sorts of benefits generated by highly successful products, and so the sorts of sums which can be considered to be of great benefit to Unilever, which are an order of magnitude greater than the benefit in this case.
- 220 There is one noticeable difference between the benefit in cases such as Vienetta and the present case: the amount spent by Unilever to get the benefit. Profits of "hundreds of millions" on revenues of "billions" necessarily implies expenditure in the hundreds of millions. In this case, even on the defendants' case, the expenditure was no more than around £2 million. Under my own approach, which is to look at the benefit of the patent, even most of those costs can be ignored, giving a very high rate of return. I agree with the suggestion from the claimant that this is relevant in his favour, but bear in mind that under this approach all successful patents will have a high rate of return, and a small sum generated by a still smaller sum is still a small sum.
- 221 Finally, Mr Emanuel gave evidence considering the average revenue generated per person in Unilever. He considered someone ultimately generating more than £23 million for Unilever in the first six months or year they arrive to be "a little outstanding from the general run of Unilever people". That argument seems to me to fall into the trap of considering the inventor's skill or effort. Whether or not the benefit is outstanding does not depend on whether that benefit was created by the work of one person or a thousand – although the distinction would assuredly matter when considering a question of "fair share".

Conclusions on whether the benefit is outstanding

- 222 Considering the totality of the evidence, I was left with a clear impression. The benefit provided by the Shanks patents was a substantial and significant one in money terms – the sort of sum Unilever would, on the evidence, worry about (cf. Project Hyacinth). Furthermore, in comparison to the benefit from other patents to Unilever, from the evidence before me it does, in Mr Emanuel's words "stand out". But Unilever makes profits at an order of magnitude greater on other inventions – albeit primarily by manufacture and at a much lower rate of return than was provided by the Shanks patents. Further, this is not such a case as *Kelly*, where Floyd J held that without the patents in that case, Amersham would have faced a crisis. There was no suggestion from either party that the Shanks patents were crucial to Unilever's success.

- 223 In my view, taking account of the size and nature of Unilever's business, the benefit provided by the Shanks patents falls short of being outstanding.
- 224 I note that this conclusion is not driven by the specific figure I arrived at for the benefit above. Putting aside the time value of money argument (which as I explained does not assist in making the necessary comparisons), the claimant's arguments for the total benefit, ignoring all costs and allowing approximately £8 million for the Unipath sale, gave a total of about £32 million, which would in my view not make a significant difference to the outcome of the comparisons.
- 225 This is sufficient to decide the case. However, in view of the extensive evidence I heard relating to fair share, I think it worthwhile to express my views on what a fair share of the benefit would have been had I held the benefit to have been outstanding to the employer, particularly in terms of the relevance of the evidence in anticipation of the possibility of appeal.

Fair Share

- 226 The level of compensation for employees' inventions are set out in Section 41 of the Patents Act 1977. This reads in relevant part as follows:

41(1) An award of compensation to an employee under section 40(1) and (2) above in relation to a patent for an invention shall be such as will secure for the employee a fair share (having regard to all the circumstances) of the benefit which the employer has derived, or may reasonably be expected to derive, from the patent or from the assignment, assignment or grant to a person connected with the employer of the property or any right in the invention or the property in, or any right in or under, an application for that patent.

...
41(4) In determining the fair share of the benefit to be secured for an employee in respect of an invention which has always belonged to an employer, the court or the comptroller shall, among other things, take the following matters into account, that is to say –

- (a) the nature of the employee's duties, his remuneration and the other advantages he derives or has derived from his employment or has derived in relation to the invention under this Act;
- (b) the effort and skill which the employee has devoted to making the invention;
- (c) the effort and skill which any other person has devoted to making the invention jointly with the employee concerned, and the advice and other assistance contributed by any other employee who is not a joint inventor of the invention; and
- (d) the contribution made by the employer to the making, developing and working of the invention by the provision of advice, facilities and other assistance, by the provision of opportunities and by his managerial and commercial skill and activities.

- 227 Taking each of the sections of 41(4) in turn:

The nature of the employee's duties, his remuneration and the other advantages he derives or has derived from his employment or has derived in relation to the invention under this Act

228 Professor Shanks was employed to invent. For this, he received, initially, £18,000 and a Volvo car, rising later to £29,000 and a BMW. Both parties appeared to accept this as a standard rate for the sort of job done by Professor Shanks. In addition, Mr Alexander put forward the opportunity to build up a career in science outside of optoelectronics, and thus a stepping stone for his later career at Thorn EMI.

229 Professor Shanks was clearly employed to invent and appropriately remunerated for it. He does not appear to have gained any particular advantage from the invention, (in contrast to the claimants in *Kelly*, for example). This criterion therefore appears neutral.

The effort and skill which the employee has devoted to making the invention

230 Mr Alexander sought to downplay the effort and skill used by Professor Shanks, arguing that all he produced, in effect, was the kernel of the invention, with far greater work being done by his co-inventors, and more experimental work being done to secure licenses than by Professor Shanks in coming up with the design.

231 Mr Green, by contrast, emphasized the significance of the invention as portrayed by Professor Turner, and argued that the reason Unilever got any benefit from the Shanks patents despite what he argued was a weak licensing effort was because the invention was so significant.

232 I believe that it is not right to focus too mechanistically on the amount of time Professor Shanks spent developing the invention. Invention, by its nature, is at its heart the inventor having an insight. It may take a greater or lesser amount of work to fully develop that insight, but that should not detract from a significant insight. I have held above that the invention was significant in the field, as is illustrated by the fact that at the end of the day most significant players in the field were willing to play millions of pounds for freedom to use it. I have also held that the key broad concepts of the Shanks patents originated with Professor Shanks.

233 At the same time, it is abundantly clear from the evidence that, as Mr Alexander also argued, the sort of skill and effort on Professor Shanks' part is nowhere near that involved in *Kelly*. There, the claimants were key players in a sustained team effort to develop the invention, making "monumental efforts". In comparison to *Kelly*, it is clear that this factor counts much less significantly for the present claimant.

The effort and skill which any other person has devoted to making the invention jointly with the employee concerned, and the advice and other assistance contributed by any other employee who is not a joint inventor of the invention

234 I have found above that Professor Shanks contributed the key aspects of the patented invention. His co-inventors clearly had a role in fleshing out the invention sufficiently for the ultimate patent application, but this was a lesser role. Mr Alexander pointed also to the role of the patent department in making sure the Shanks patents were sufficiently robust. This is undoubtedly true on one level, but equally must be true of any patents which survive to make significant benefit.

The contribution made by the employer to the making, developing and working of the invention by the provision of advice, facilities and other assistance, by the provision of opportunities and by his managerial and commercial skill and activities

- 235 The defendants' contribution here was mainly significant in its work to obtain licenses for the Shanks patent. Unilever made a very small effort (by its standards in money terms) to commercialise the invention. The licensing efforts I have found to be serious, but not exceptional in terms of commitment made. There was no significant risk to the defendants as a result of their efforts. Certainly the defendants' efforts pale in comparison to the funding of the full research programme in *Kelly*, and the amount Amersham had potentially to lose had the research failed.
- 236 Looking at the last three factors together, and comparing with *Kelly*, in the light of all the evidence I am left with the clear impression that the contributions made on all sides are far less than those made in *Kelly*, with the result that the balance of effort is much the same, with the risk assumed by Amersham far greater than that of Unilever.
- 237 Varying suggestions were put forward by the parties and their witnesses as to the appropriate base percentage an employee should receive as a "fair share", based on company and university employee compensation schemes.
- 238 None of the witnesses professed themselves experts in the field of employee compensation. Professors Turner and Shanks offered anecdotal evidence, Professor Turner of his experience of a case-by-case approach at Pelikan Technologies Inc and also of a 30% policy at Cranfield University.
- 239 Mr Emanuel referred to having carried out a survey of employee compensation schemes at universities, NASA and research institutions in 2003 in the context of another section 40 case. He said that a broad consensus emerged for the third / third / third approach – a third for the institution, a third for the department and a third for the inventor. Specific rates varied from 22% to 50%. Mr Emanuel considered Colworth to be similar to a research institution in its operation. He did not seriously consider the industrial sector in his survey because he considered it highly unlikely that companies would have specific policies which he could get hold of, and he did not appear to have much in the way of specific examples of experience of employee compensation schemes in the industrial sector. An example was mentioned in his expert report of a lab assistant who "earned a lot of money" from a patented innovation. It was apparent from his oral evidence that he did not know how much money she got or on what basis (e.g. a percentage) that money was paid. I can therefore infer little from this example in terms of general principles.
- 240 Dr Osborn disagreed with Mr Emanuel that a comparison with university revenue sharing arrangements had any relevance to the Shanks patents situation. He considered there to be a fundamental difference in respect of the expectation and opportunity to protect and exploit one's research between the role of a researcher at a university and one within a R&D based business such as Unilever. He provided evidence of public sector research institutions with much lower rates of reward for employees (2.5%-10%). He also provided a summary of a literature survey. A UK article in the Journal of the Chartered Institute of Patent Attorneys referred to a fair rate as being in practice between 1 and 3%. One paper referred to German rates in

their well-established scheme varying between 0.71% and 3.97% with a mean of 1.76%, although in cross-examination he was taken to higher German figures of 7% and above and appeared to accept them.

241 Mr Green took me to Floyd J's comment in *Kelly*, referring to a potential award of up to 33%:

"193 I do not think that the position of academic inventors is comparable with the position of the inventors in the present case. I suppose if an inventor in industry made an invention which created an entirely new product and income stream for his employer without any substantial input from the employer, a share in this region or even higher might be justifiable. But that would be a very different case. "

242 He argued that this was just such a case.

243 Mr Alexander for the defendants argued that 1% was the highest possible award, given what he characterised as the very limited skill and effort Professor Shanks had put in compared with the work of his co-inventors and those involved in the licensing. He argued that it would certainly be wrong for the claimant to receive an amount greater than that received by Dr Kelly in *Kelly*, given the immense amount that Dr Kelly had done. Such an award would, he argued, seriously upset the settled business understanding of employee compensation levels, and would deter research industry from the UK.

244 I agree with the defendants that Professor Shanks' position was very different from that of an academic, whose primary role is not to produce commercialisable inventions. I do not accept Mr Green's assertion that this is a case of an employee creating an entire new product and income stream for the employer without any substantial input from the employer as Floyd J was contemplating in *Kelly* – it seems to me that the judge was thinking of a situation where an employee had done far more than Professor Shanks did in terms of developing a product. As I found above when considering the section 41(4) factors, the proportional contribution made by Professor Shanks appears similar to that of Dr Kelly, although in the context of far less having been done by all. At the same time, I must take account of the fact that Unilever did not put substantial resources at risk.

245 As a result, I would consider 5% would have been an appropriate fair share of the benefit for the claimant had I held the benefit to be outstanding.

Other arguments relating to fair share

Time Value of money

246 As I mentioned above, the claimant argued for the amount of the benefit to be increased to take account of the time value of money. This would, of course, have the effect of increasing in money terms any percentage award of the benefit I was inclined to make. Mr Emanuel put forward 7.5% as a rate of return for a reasonably cautious investor (which would compound year on year). He justified this by reference to Dr Osborn's increase of costs year-on-year by 16%, which in turn was based on rates from his experience working within a large research company and which Mr Emanuel considered somewhat high. Mr Green argued for a value in the range 5-9%

- 247 Mr Alexander pointed out that this approach was absent from Mr Emanuel's original expert report – appearing only in his second, made after the Court of Appeal's decision in *Shanks v Unilever* ruled out the possibility of a much higher “putative benefit” based on what Unilever could have made if it had exploited the Shanks patents differently. In his first expert report, Mr Emanuel seems happy to take the approximately £23 million benefit from the licences as simply that, without a time value of money uplift.
- 248 My view on this is that is that trying to determine how much money the defendants would have been able to reap as a result of the income they received is highly speculative given the evidence available. As Mr Alexander pointed out, there was no evidence as to what Unilever had actually done with any of the benefit (or, put another way, what they would have not done if they had not had it). Perhaps they would, absent the benefit from the Shanks patents, simply have made lower dividend payments to shareholders – in which case, they did not benefit from any time value of the money at all. The speculative nature of all this was illustrated, in my view, by Mr Emanuel's neglect of it in his first expert report, and by the somewhat meagre justification he gave. It seemed to me that framed as a factual issue, there was not enough evidence to justify increasing the benefit in any way.
- 249 I should note that Mr Alexander objected to this approach as a matter of law, arguing that it was effectively asking the comptroller to award interest, something he argued the Comptroller (and indeed the court) lacked jurisdiction to do under s40. Mr Green disagreed, citing *Sempra Metals*¹¹ as authority that awards of compound interest on statutory relief do not conflict with this bar. As I have decided not to make an award, this question of law falls away.

Litigation costs

- 250 A further argument was raised by Mr Green quite late in the proceedings which related to whether the “fair share” should take account of the costs of litigation involved. Before the comptroller, the losing party generally makes only a contribution to the winner's costs in accordance with the comptroller's standard scale. There is no doubt that this would be a very small proportion of the costs actually expended.
- 251 Mr Green's argument related to the claimant's use of a conditional fee arrangement to pay for his litigation. As is usual for such arrangements, the claimant would owe nothing to his representatives in the event of a loss, but in the event of a win, would need to pay for their work along with an uplift to allow for the risk of a loss (and thus not being paid) the representatives had taken. Before the courts, this could be recovered from the other party, but a scale award from the comptroller would not do that. Mr Green invited me to find that as a matter of law, this could be taken into account if necessary – i.e. if I were minded to make an award to the claimant which would be wiped out by his legal fees. He argued this was necessary to ensure inventors such as the claimant could feel able to take on well-resourced employers, citing the claimant's rights under Article 6 of the European Convention on Human Rights (and the subsequent duties of a tribunal under the Human Right Act 1998).

¹¹ *Sempra Metals Ltd. v Inland Revenue & Anor* [2007] UKHL 34 and [2008] 1 AC 561 (House of Lords)

He indicated the claimant would be willing to provide details of costs incurred if I were to find for him on this point of law.

252 Mr Alexander strongly objected to this argument, pointing out that the claimant had chosen to bring this case before the comptroller, who would usually award scale costs (and so the claimant was protected from paying the defendants' costs in the event of losing), rather than to the court. He argued I had no jurisdiction to do as Mr Green asked, and that there was no conflict with the Human Rights Act in the claimant paying his own costs.

253 In the event, as I have decided against the claimant, this point falls away. However, I have some scepticism about Mr Green's argument. As Mr Alexander pointed out, it would mean that the meaning of "fair share" differs depending on whether the court or the comptroller is asked, and such a situation would seem hard to justify. But I make no decision on this point.

Confidentiality

254 These proceedings have involved a significant amount of commercially significant information, which resulted, as noted above, in some of the proceedings being held in private. I will therefore give both parties the opportunity to make submissions on what redactions may be needed to this decision to enable it to be published while preserving any necessary confidentiality.

Costs

255 Both sides argued that in the event of their winning they would seek an award of costs beyond that usually provided by the Comptroller's scale. I will therefore give both parties an opportunity to make submission on the question of costs.

Conclusion

256 The claim for compensation under Section 40 fails.

Appeal

257 The Act provides an automatic right to appeal this decision to the court. The parties have 28 days from the date of this decision to file such an appeal if they wish to do so.

J ELBRO

Divisional Director Acting for the Comptroller