Institut Pasteur and Another v Genelabs Diagnostics Pte Ltd and Another [2000] SGHC 53

Case Number : Suit 1762/1998

Decision Date : 31 March 2000

Tribunal/Court : High Court

Coram : Tay Yong Kwang JC

Counsel Name(s) : Tony Yeo, Gerald Koh and Celeste Ang (Drew & Napier) for the plaintiffs; Tan Tee Jim S C, Jason Chan and Tan Wee Meng (Allen & Gledhill) for the defendants

Parties : Institut Pasteur; Pasteur Sanofi Diagnostics — Genelabs Diagnostics Pte Ltd; Nagase Singapore (Pte) Ltd

JUDGMENT:

GROUNDS OF DECISION

1 The First Plaintiff is a non-profit making private foundation registered in France. The Second Plaintiff is a company incorporated in France. The First Defendant is a company incorporated in Singapore. The Second Defendant is also a Singapore company.

2 The First Plaintiff is the proprietor of a European Patent designating United Kingdom No. O 239 425 in respect of, inter alia, retrovirus of the type HIV-2 capable of inducing the Acquired Immune Deficiency Syndrome ("AIDS") and the antigenic and nucleic acid components thereof. The Second Plaintiff is the exclusive licensee of the First Plaintiff in respect of this Patent. The said European Patent was granted on 2 November 1989 and re-registered in Singapore on 15 January 1993 and allocated the number 9190285-8.

3 The Plaintiffs claimed that the said Patent was valid, subsisting and in force in Singapore at all material times by virtue of the transitional provisions in the Patents (Amendment) Act 1995 and that the Defendants had, since the registration of the Patent in Singapore and before the issuance of the Writ of Summons (on 5 October 1998), infringed the Patent and threatened and intended to continue to do so in the manner specified in the Particulars of Infringement (see below). They also claimed that the Defendants had knowledge of their rights in the Patent and that the Defendants' infringements had caused loss and damage to the Plaintiffs and were calculated to cause further loss and damage.

4 The Plaintiffs therefore claimed the following relief:

> (1) a declaration that Patent No. 9190285-8 was valid and had been infringed by the Defendants;
>
> (2) an injunction to restrain the Defendants, whether by themselves, their directors, officers, servants, agents or any of them or otherwise howsoever from doing the following acts:
>
> > (a) making, disposing of, offering to dispose of, using, importing and/or keeping whether for disposal or otherwise products which infringed the Patent;
> >
> > (b) using and/or offering for use any process or processes that infringed the Patent; and

(c) disposing, offering to dispose, offering to sell, selling, using, importing and exporting of products obtained directly by means of any process or processes that infringed the Patent;

(3) an inquiry as to damages; alternatively, at the Plaintiffs' option, an account of profits made by the Defendants as a result of the infringement of the Patent;

(4) an order for the delivery up and/or destruction, to be verified on oath, of all infringing articles;

(5) full discovery on all matters relating to this action; and

(6) costs.

5 The Plaintiffs' "Particulars of Infringement" stated the following:

"1. Subsequent to the registration in Singapore of the Patent referred to in the Statement of Claim and prior to the issuance of the Writ in this action, the Defendants have infringed the Patent, and in particular, the following claims in the specification of the Patent:

1 Claim 12

2 Claim 13

3 Claim 19

4 Claim 20

5 Claim 22

6 Claim 24

5 Claim 33

6 Claim 34

7 Claim 35

8 Claim 38

9 Claim 39

by doing in Singapore without the consent of the Plaintiffs in relation to the patented inventions, the following things, that is to say:

(A) (i) making;

(ii) disposing of;

(iii) offering to dispose of;

(iv) using;

(v) importing; and/or

(vi) keeping (whether for disposal or otherwise) products as claimed in claims 12, 13, 19, 20, 22, 24, 38 and 39 of the Patent;

(B) using; and/or offering to use processes as claimed in claims 33, 34 and 35 of the Patent.

2. In particular, the Plaintiffs' complain of the following acts of the First Defendants:

(A) making at various times, for commercial purposes, the Human Immunodeficiency Virus – 2 ("HIV-2") diagnostic kits known as GENELABS DIAGNOSTICS HIV BLOT 2.2;

(B) offering to dispose by way of sale to the Plaintiffs' private investigators through the Second Defendants the said GENELABS DIAGNOSTICS HIV BLOT 2.2 on or about 11 July 1998;

(C) alternatively, offering to dispose by way of sale to the Second Defendants the said GENELABS DIAGNOSTICS HIV BLOT 2.2 between 11 and 17 July 1998;

(D) disposing by way of sale to the Plaintiffs' private investigators the said GENELABS DIAGNOSTICS HIV BLOT 2.2 on or about 17 July 1998;

(E) further and alternatively disposing by way of sale to the Second Defendants the said GENELABS DIAGNOSTICS HIV BLOT 2.2 between 11 and 17 July 1998;

(F) making at various times, for commercial purposes, the HIV-2 diagnostic kits known as GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 1.2);

(G) offering to dispose by way of sale to the Plaintiffs' private investigators through the Second Defendants the said GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 1.2) on or about 11 July 1998;

(H) alternatively, offering to dispose by way of sale to the Second Defendants the said GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 1.2) between 11 and 17 July 1998;

(I) disposing by way of sale to the Plaintiffs' private investigators the said GENELABS DIAGNOSTICS HIV-2

WESTERN-BLOT (VERSION 1.2) on or about 17 July 1998;

(J) further or alternatively disposing by way of sale to the Second Defendants the said GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 1.2) between 11 and 17 July 1998;

(K) using the patented process in claims 33, 34 and 35 in the manufacture on various occasions of the said GENELABS DIAGNOSTICS HIV BLOT 2.2;

(L) using the patented process in claims 33, 34 and 35 in the manufacture on various occasions of the said GENELABS DIAGNOSTIC HIV-2 WESTERN-BLOT (VERSION 1.2);

(M) offering for use the patented process in claims 33, 34 and 35 in the manufacture on various occasions of the said GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 2.2);

(N) offering for use the patented process in claims 33, 34 and 35 in the manufacture on various occasions of the said GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 1.2).

3. As against the Second Defendants, the Plaintiffs' complain of the following acts in particular:

(A) offering to dispose by way of sale to the Plaintiffs' private investigators the said GENELABS DIAGNOSTICS HIV BLOT 2.2 on or about 11 July 1998;

(B) disposing by way of sale to the Plaintiffs' private investigators the said GENELABS DIAGNOSTICS HIV BLOT 2.2 on or about 17 July 1998;

(C) offering to dispose by way of sale to the Plaintiffs' private investigators the said GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 1.2) on or about 11 July 1998;

(D) disposing by way of sale to the Plaintiffs' private investigators the said GENELABS DIAGNOSTICS HIV-2 WESTERN-BLOT (VERSION 1.2) on or about 17 July 1998;

4. The Plaintiffs are at present unable to give particulars of all the Defendants' infringements of the Patent but will seek relief at the trial of this action in respect of each and every such infringement.

5. With respect to the instances of infringement 2(A), 2 (F), 2(K), 2(L), 2(M) and 2(N) the Plaintiffs are not at present able to state the precise dates and locations of when such acts were undertaken by the First Defendants, such

particulars being within the First Defendants' knowledge.

6. With respect to the instances of infringement 2(K), 2(L), 2(M) and 2(N), the First Defendants well knew at all material times and further or alternatively the Plaintiffs will say that it was obvious to a reasonable person in the circumstances that the use of the said process in Singapore without the Plaintiffs' consent would be an infringement of the Patent.

PARTICULARS OF KNOWLEDGE

Hereunder the Plaintiffs will rely upon the following facts and matters as the best particulars which can be given before discovery:

(a) It was common general knowledge in the trade that the process was a patented process of the Plaintiffs;

(b) The processes which are patented are the very first commercial processes ever devised for the vitro detection of the presence of antibodies induced in man infected by the HIV-2 retrovirus and every reasonable person must have known it was patented;

(c) The Plaintiffs also rely upon the documents in these proceedings for giving the Defendants knowledge as to the future."

6 In their Defence and Counterclaim, the Defendants acknowledged that the Plaintiffs were granted the said European Patent but denied that they had infringed any of the claims referred to in paragraph 1 of the Particulars of Infringement, that each of the acts complained of in paragraphs 2 and 3 of the Particulars of Infringement constituted an infringement of the Patent and that they well knew at all material times or that it was obvious to a reasonable person in the circumstances that the use of the processes referred to in paragraphs 2(K), 2(L), 2(M) and 2(N) of the Particulars of Infringement or any of them in Singapore without the Plaintiffs' consent would be an infringement of the Patent.

7 The Defendants also claimed that the Patent was invalid for the reason set out in their Particulars of Objection, which was amended at the opening of the trial, with leave of the Court, to encompass Claim 19 of the Patent. The Amended Particulars of Objection read:

"1. The alleged invention the subject of the Patent in suit is not a patentable invention in that it is not specifically limited to the isolated and deposited HIV-2 strains and covers other known antigens of other viruses such as, but not limited to, HIV-1 and SIV.

Particulars

A. Lack of Novelty

Claims 19 & 33 of the Patent and all dependent claims thereof in the alleged invention formed part of the state of the art prior to its priority date by reason of the following facts and matters:

(1) Prior publication.

(2) Prior common general knowledge.

Prior Publication

The Patent has been published in various scientific publications, journals and patent documents, including but not limited to the following:-

(a) Kanki et al., Science 228:1199, 1985

(b) Daniel et al., Science 228:1201, 1985

(c) Kanki et al., Science 230:951, 1985

(d) Barin et al., Lancet II: 1389, 1985

(e) Essex et al., WO87/02892

(f) Franchini et al., Nature 328:539, 1987

(g) Chakrabarti et al., Nature 328: 543, 1987

B. Lack of
inventive step

Claims 19 & 33 of the Patent and all dependent claims thereof in the alleged invention was obvious having regard to each or all of the foregoing matter forming part of the state of the art.

2. The specification of the Patent does not disclose the invention clearly enough and completely enough for it to be performed by a person skilled in the art.

Particulars

(1) Claim 19 does not cover tiny fragments of the disclosed sequence. Further, the Patent does not teach a person skilled in the art which specific fragment of the disclosed amino acid sequence is able to raise a specific immunological reaction with the antibodies against a HIV-2 retrovirus as claimed in Claim 19, and therefore no claim can be made to all parts of the said sequence, including tiny fragments thereof.

(2) Claim 33 of the Patent purports to claim all processes for the in-vitro detection of antibodies induced in the affected man by a human HIV-2 retrovirus. The Patent does not teach a person skilled in the art all the processes which incorporate all possible different antigens which may react with the antibodies induced in man infected with a human HIV-2 retrovirus."

8 The First Defendant admitted knowledge that the rights in the Patent were granted to the First Plaintiff but the Second Defendant denied such knowledge and averred that it had no reasonable

grounds for supposing that the Patent existed.

9 Further, the Defendants alleged, the Plaintiffs were guilty of prolonged, inordinate and inexcusable delay in bringing this action and seeking the relief herein and had acquiesced in the matters complained of and caused or permitted the Defendants to believe that the Plaintiffs did not intend to make such claim(s) and the Defendants had acted in their prejudice because of such belief. The particulars given in support of this averment included the facts that the First Defendant had been exhibiting and selling its HIV-2 Western Blot (Version 1.2) diagnostic kits since 1987 and its HIV Blot 2.2 diagnostic kits since 1991, that the First Defendant had presented papers concerning their HIV Blot 2.2 diagnostic kits at various international conferences attended by the Plaintiffs' representatives since 1991 and that scientific papers mentioning both diagnostic kits were published in 1992 and 1993.

10 The Plaintiffs were also aware that the First Defendant was interested in obtaining a licence of the Patent from the Plaintiffs in order to exploit further research and product possibilities in the market and had engaged in negotiations with the First Defendant which were unilaterally terminated by the Plaintiffs in 1993. The Plaintiffs were also said to be barred by laches, acquiescence and/or delay from claiming the relief sought and it would be inequitable and unjust to grant them the said relief.

11 The Defendants relied on their Amended Particulars of Objection and counterclaimed for a revocation of the Patent and costs. They did not admit the Plaintiffs' assertion that it was never known before the first priority date (22 January 1986) that HIV-2 existed and that it was possible to use an antigen to recognize an antibody induced in a man infected by a HIV-2 human retrovirus.

THE PLAINTIFFS' CASE

12 Mr Alain Gallochat, a European Patent Attorney and Trademark Attorney, has been the General Counsel of the First Plaintiff since 1987. The First Plaintiff and the Second Plaintiff entered into a Collaboration Agreement on 26 March 1981 which was subsequently renewed on 11 July 1990 pursuant to which the Second Plaintiff became the exclusive licensee of the Patent and of foreign filings for a number of countries including Singapore.

13 He explained that the European Patent in question covered a pioneer invention made by Professor L Montagnier and his co-workers at the First Plaintiff relating to the HIV-2 virus. The application for the Patent was filed with the European Patent Office ("EPO") on 22 January 1987 and was granted on 2 November 1989 after substantive examination at the EPO. One of the countries designated in the EPO filing was the United Kingdom. The substantive examination was aimed at verifying conformity of the claimed invention with the main European patentability requirements of novelty, inventive step, industrial application and sufficiency of disclosure. Many prior art references were considered in the process.

14 Opposition to the Patent was lodged by Abbott Laboratories sometime in August 1990 but that was subsequently withdrawn in September 1991. When Abbott Laboratories lodged the opposition, it had already obtained a sub-licence of the rights to the Patent. The fact of withdrawal could be construed as a clear recognition of the Patent's validity. Further, the Opposition Division of the EPO could have examined the case of its own motion under Article 114(1) of the European Patent Convention but did not exercise such right and the Patent was maintained unamended.

15 The Patent was registered under the Registration of United Kingdom Patents Act in Singapore on

the basis of the United Kingdom part of the European Patent. The Patent was in force at all material times under the Patents Act and the First Plaintiff was therefore entitled to all privileges and rights in the Patent in Singapore subject to the conditions provided in the Act.

16 Insofar as the subject matter of the Patent was concerned, the Plaintiffs summarized the claims of the Patent as covering the following:

(1) Claims 1 to 9 - the HIV-2 virus and variants thereof;

(2) Claims 10 to 19 - the antigens of HIV-2;

(3) Claims 20 to 32 - the compositions for in vitro detection of HIV-2 antibodies;

(4) Claims 33 to 37 - the processes for the in vitro detection of, inter alia, HIV-2 antibodies;

(5) Claims 38 to 40 - diagnostic kits for the in vitro detection of, inter alia, HIV-2 antibodies.

17 Mr Gallochat explained that the Patent was the first to claim a novel type of Human Immuno-deficiency Virus (HIV-2) and was therefore a pioneer invention of considerable significance. This new type HIV retrovirus was capable of causing AIDS in man. Previously, the only known virus that was pathogenic to man was the HIV-1 virus.

18 The Patent also claimed all further aspects of patentable nature connected with, and/or derived from, the HIV-2 retrovirus, in particular, specific HIV-2 viruses deposited with depository institutions in France and in the United Kingdom and variants thereof, antigens of such viruses, assay methods and kits based on such antigens for the in vitro detection of HIV-2 antibodies, i.e. for the diagnosis of HIV infection. The Patent also claimed nucleic acid sequences of the HIV-2 genome and recombinant vectors comprising of the said sequence.

19 Mr Gallochat then proceeded to explain the various technical terms used. A retrovirus is a polyprotein made up of a long sequence or chain of building blocks called amino acids. 21 different amino acids (each designated individually by a letter in the alphabet, e.g. A, F, R) are known to exist and make up proteins. Some proteins have some sugar content and these are called glycoproteins.

20 A lysate is a disordered mixture of proteins produced when a virus is split under strong denaturing conditions such as heating.

21 Certain short portions or lengths of amino acid units distributed all along the whole sequence of a viral polyprotein show immunological functionality in that they are recognized specifically by antibodies formed and released in the blood of a person infected by the virus. In this manner, infected human blood sera contain antibodies against the infecting virus and these antibodies recognize the said short portions or lengths of amino acid units in the same way as a sophisticated key recognizes and fits its corresponding lock. Such short portions or lengths of amino acid units showing immunological functionality are known as epitopes or antigenic determinants. When an epitope is found within a longer chain of amino acids, such a chain therefore has immunological behaviour or reactivity and is known as an antigen.

22 Antibodies are polyproteins which are formed and released in blood sera in response to the introduction of an extraneous or foreign agent into the body of a human or an animal. This foreign

agent may be an antigen or a whole virus which contains a variety of antigens. Such antibodies aim to neutralize the harmful effect of the antigen or virus on the body. They are therefore highly selective for the antigen which induced their production and specifically recognize it by binding to it or reacting with it when the two are brought into contact. Such a reaction is termed an immunological reaction.

23 The formation of such specific antigen-antibody pairs or complexes or immunological complexes or immunological conjugates has been the basis of modern immunological methods and kits for use in diagnostics.

24 One of the modern immunological methods makes use of the Western Blot or Immunoblot technic, whereby a viral lysate is submitted to an electrophoresis which, in turn, is a method to separate components such as proteins in a given solution by means of an electrical field in which single components separate from each other based on their net electrical charges. By this, the proteins, which were a disordered mixture in the lysate, are separated into pure protein bands and affixed to a suitable medium such as nitrocellulose strips.

25 A monoclonal antibody is a type of antibody whose specificity for its corresponding antigen is very high. It may therefore be used in recognizing and detecting a specific part or fraction (i.e. the epitope) of its target antigen. Some diagnostic methods, known as immuno assays, are therefore able to detect the presence of specific antibodies in serum by using a specific bacterial or viral antigen, thus demonstrating that the person in question is infected by the corresponding bacterium or virus.

26 As the Patent's Claims 16 to 19 cover antigens which contain all or a part of the sequence of the antigenic proteins in Claims 10 to 15, fragments of these proteins (peptides), which are parts of the whole sequence of the HIV-2 virus and which comprise at least one immunologically functional length or epitope capable of binding to HIV-2 antibodies, are encompassed by Claims 16 to 19.

27 In 1996 or thereabouts, the Plaintiffs became aware that HIV tool kits were being manufactured and sold by the First Defendants. In or about April 1998, the Plaintiffs instructed solicitors in Singapore to conduct further investigations into the suspected infringement of the Patent. On 30 June 1998, private investigators were instructed to conduct a trap purchase of the First Defendant's HIV-2 Western Blot 1.2 and HIV Blot 2.2 test kits. They managed to purchase the kits from the Second Defendant on 17 July 1998.

28 On 29 July 1998, the First Plaintiff sent the said kits to Professor Jacques Henri Max Cohen, Professor of Immunology at the Centre Hospitalo – Universitaire of Reims, for testing. Mr Gallochat also studied the instruction manuals found in the packaging of the First Defendant's two test kits together with Professor Cohen's findings. Both kits were subsequently found to have infringed the Patent. In particular, the First Defendant's HIV Blot 2.2 test kit and its use were found to have infringed Claims 19, 20, 33, 34, 35, 38 and 39 and the HIV-2 Western-Blot 1.2 test kit and its use were found to have infringed Claims 12, 13, 20, 22, 24, 33, 34, 35, 38 and 39.

29 The Patent claimed priority from the French application which was registered on 22 January 1986. Before this first priority date of the Patent, only one group of retroviruses was known to be infectious and pathogenic to humans, i.e. the virus known as HIV-1. The First Plaintiff never intended the Patent to cover HIV-1 and this could be seen from the description of the Patent which expressly acknowledged HIV-1 as prior art.

30 Mr Gallochat then discussed the documents and publications cited by the Defendants as evidence of lack of novelty in their attack on the validity of the Patent and concluded, with Professor Cohen,

that they did not destroy the novelty of Claims 10 to 19 relating to antigens, Claims 20 to 23 on compositions, Claims 38 to 40 on kits containing them and Claims 33 to 37 on immuno assays.

31 Further, nothing in the cited documents made Claim 33 and its dependent Claims obvious or lacking in inventive step.

32 The First Plaintiff had to overcome two major difficulties in making the invention, including Claim 33. The first was the conceptual difficulty because at the time of the invention, it was simply inconceivable or at least not shown that another type of HIV other than HIV-1 existed. The other was the factual and practical difficulty involved. The inventors had access to African AIDS patients from Cape Verde Islands and Guinea Bissau who either could not be or were very weakly detected as seropositive by conventional HIV-1 antibody tests. This intriguing finding, that patients with overt AIDS symptoms but who were not HIV-1 antibody reactive, which led to the invention was a fundamental chance event which could not be predicted at all. The inventors had to exercise their skill and expertise to surmise that it was not HIV-1 that was causing AIDS in these African patients but a different pathogen. The First Plaintiff's work to isolate this new virus incurred much in terms of time, money and research. The importance of this discovery could be seen in the wealth of scientific research generated and the interest of numerous firms in obtaining a licence for the Patent. The World Health Organization has also made it compulsory to test for HIV-2 in blood screening programmes sanctioned by it.

33 As a result of the Defendants' amendment to their Particulars of Objection to include a challenge to the novelty and inventive step of Claim 19 of the Patent, Mr Gallochat was given leave to affirm a Second Affidavit of Evidence-in-Chief ("AEIC") after the first tranche of trial dates.

34 In this second AEIC, Mr Gallochat said that the EPO had examined and allowed all the Claims of the Patent by applying the test of whether a person skilled in the art found the Claims novel and inventive, in the same way it would have applied the test in an attack on the validity of the Claim.

35 In the EPO, a person skilled in the art would be presumed to be an ordinary practitioner aware of what was common general knowledge in the art at the priority date claimed by a Patent. It would also be presumed that he had access to everything in the state of the art and had at his disposal the normal means and capacity for routine work and experimentation.

36 In particular, where biotechnology was concerned, this notional person could be represented by a team of specialists oriented towards practicalities and the development of the art normally expected of him did not include solving technical problems by performing scientific research in areas as yet unexplored. In genetic engineering, the skilled person was not to be defined as a Nobel Prize laureate, even if a number of scientists working in this field at that time were actually awarded the Nobel Prize.

37 It followed therefore that, in 1986, a skilled person in the field of AIDS research was an average technician having a good knowledge of this field and general knowledge. He did not need be an opinion leader. Instead, he would follow the advice of the known opinion leaders in the field. In 1986, AIDS was a new field which had not been well explored.

38 An invention would be considered new if it was not part of the state of the art which comprised all that was publicly available before the priority date here (22 January 1986). Novelty was to be determined by considering whether all the claimed subject matter could be found in its entirety in the prior art document. Before something could be said to be lacking in novelty, all the distinctive features or characteristics of the claimed subject matter must be completely and clearly disclosed in a given prior art document or can be clearly, directly and unambiguously derived by the skilled person

from the said prior art document.

39 An invention would be considered as involving an inventive step, if, having regard to the state of the art, it was not obvious to a person skilled in the art. The inquiry was not whether the skilled person could have performed the invention but whether he would have done so at the priority date, in the expectation of solving the underlying technical problem. It was often possible to show after an invention had been developed that a person skilled in the art could have been led to it by combining separate pieces of prior art, but such considerations would have to be disregarded since they resulted from ex post facto analysis.

40 The fact that other teams or persons were working contemporaneously on the same project might suggest that it was obvious to try or that it was an interesting area to explore but that did not necessarily imply that there was a reasonable expectation of success, which was not the same as hoping to succeed. A reasonable expectation of success implied the ability of the skilled person to predict rationally, on the basis of the knowledge existing before a research project was started, the successful conclusion of the project within acceptable time limits.

41 The law applied by the EPO, as stated above, was the same or substantially the same as that of the United Kingdom.

42 Applying Professor Cohen's conclusions in his second AEIC on the cited prior art documents and the abovestated principles, nothing in those documents could be construed as adversely affecting the novelty of Claim 19. Similarly, applying Professor Cohen's conclusion on "inventive step" and the relevant principles, nothing in those documents made Claim 19 obvious either.

43 In cross-examination, Mr Gallochat explained that a European Patent could be revoked only at the EPO in an opposition proceeding. However, a Patent could be declared invalid by a national Court. National Courts have also differed from decisions of the EPO.

44 In the Abbott Laboratories' opposition to the Patent, the case went no further than the notice of opposition and the reply by the proprietor of the Patent. There was no oral hearing and no opinion given by the EPO on the merits. However, in Mr Gallochat's view, the EPO's decision not to proceed, although it had the power to, after Abbott Laboratories' withdrawal of its opposition showed that the EPO was convinced by the First Plaintiff's reply.

45 Mr Gallochat declined to answer questions relating to science as he was skilled in the art of Patent, not in science. The scientific statements contained in his AEIC were there because of what the scientific experts had told him.

46 Claim 19 was a product claim. It contained two parts – the structural (amino acid sequence) and the functional claims. For infringement of the claim to take place, both parts must have been infringed. Infringement would take place if the sequence or part of the sequence was reproduced, so long as it raised the immunological reaction. One could not escape infringement just by adding or subtracting some part. In contrast, Claim 33 was a process claim. If Claim 19 was infringed, Claim 33 would also be infringed. However, Claim 33 could be infringed without infringing Claim 19.

47 Professor Jacques Henri Max Cohen has been Professor of Immunology at the Centre Hospitalo-Universitaire of Reims since 1993. He was conferred the degrees of Doctor of Medicine in 1983 and of Doctor of Philosophy in Human Biology in 1989. He has been involved in the study of immunology for the last two decades.

48 His relationship with the Plaintiffs was a purely scientific one due to the fact that the First Plaintiff was one of the major scientific research foundations in France. He was engaged on an independent basis. On 29 July 1998, the Plaintiffs asked him to perform studies with the First Defendant's said two diagnostic kits.

49 Professor Cohen explained that the Patent in issue covered a major invention by Professor L. Montagnier and his team relating to the HIV-2 virus isolation and ensuing applications such as the diagnosis of HIV infection or the screening of blood donations. The invention was of great significance as it related to AIDS and provided screening means where none existed before.

50 The Patent made available to a person skilled in the art all the information needed for using this virus or a fragment thereof (such as a peptide or protein) for in vitro diagnosis of HIV-2 infections. It enabled a person to use any strain of the virus or a desired fragment to design, inter alia, antigens reacting specifically with the antibodies contained in the sera of patients infected with this new AIDS pathogen. In particular, the Patent had information on the virus and the variants thereof, the well characterized genome organization and viral antigenic proteins, peptide and nucleic sequences (for those who wished to work on peptides of any sizes or on nucleic acids) and reference procedures which a person skilled in the art would know how to apply or modify easily.

51 The Patent also provided the full amino acid sequence of the antigen contained in the viral envelope of HIV-2 and taught that compositions containing glycoprotein gp 36 could be used in HIV-2 infection diagnosis.

52 The aim of Professor Cohen's study was to evaluate whether the First Defendant's kits used the invention covered by the Patent. On 12 and 13 August 1998, experiments were performed by a technician under Professor Cohen's direct supervision. HIV-infected blood was brought into contact with the nitrocellulose test strips provided in both kits.

53 HIV-1 and HIV-2 have three basic levels of proteins – gag (core), pol (polymerase) and env (envelope). Both viruses share some similarities at the level of their gag and pol proteins and less at the env protein level. The first two levels of proteins would therefore display a higher degree of cross-reactivity than at the env level.

54 The experiments, detailed in Professor Cohen's first AEIC, showed that both kits were able to specifically detect HIV-2 antibodies in serum samples. The 2.2 kit was, in addition, able to differentiate HIV-2 antibody positive samples from HIV-1 antibody positive samples.

55 A second series of experiments was conducted to identify the particular HIV-2 env peptide used in the 2.2 test kit. The analysis of the antigens on the strips tested with a monoclonal antibody proved that the HIV-2 env synthetic peptide used in the 2.2 kit contained an amino acid sequence or a part thereof which raised a specific immunological reaction with HIV-2 antibodies and which was covered by Claim 19 of the Patent. In making a suitable synthetic peptide for specifically detecting HIV-2 antibodies, a manufacturer would invariably incorporate at least one reactive epitope. Other amino acids on the peptide would not be involved in the immunological reaction but were added for other reasons, such as to stabilize the entire peptide or to facilitate their binding to the nitrocellulose strips.

56 The results of the experiments confirmed that both kits and the use of the assay procedure were within the claims of the Patent.

57 Professor Cohen went on to explain the differences among HIV-1, HIV-2 and SIV. Retroviruses like these could infect a variety of mammals such as man, monkeys and cats. The retrovirus that opened

the way to multiple infections which could eventually kill the host (AIDS) was called the Immune Deficiency virus, the one which attacked and infected man being termed Human Immune Deficiency virus or HIV. The two major types identified were HIV-1 and HIV-2 but as retroviruses mutated frequently, many variants or isolates of these two types were known. HIV-1 was more pathogenic to man than HIV-2 although both could cause AIDS in man. HIV-1 had long spread worldwide whereas HIV-2 was found more frequently in West Africa and secondarily in Europe.

58 The Immune Deficiency Viruses that infected monkeys were termed Simian Immune Deficiency Viruses or SIV. A variety of such SIV have been named according to the host animal which would appear as an abbreviated subscript. For instance, SIV_{MAC} would refer to SIV in the macaque monkey and SIV_{AGM} would be the SIV in the African Green Monkey and that in the Chimpanzee would be termed SIV_{CPZ}.

59 A family tree or phylogenic tree could be drawn to show the relationship of some of the most well-known HIV and SIV viruses, which probably derived from a yet unidentified common ancestor. Such a tree was based on the compared sequences of the constitutive RNA (ribonucleic acid) of the various Immune Deficiency Viruses. The closer any two viruses appeared in the phylogenic tree, the greater would be the identity shared by their respective RNA sequences.

60 One peptide sequence in the envelope transmembrane protein is very important diagnostically because it is highly immunogenic (i.e. it induces the host's production of a lot of antibodies against it and raises a specific immunological reaction with antibodies so produced) and because it is rather well-conserved among the different HIV-1, HIV-2 and SIV viruses and isolates. This highly immunogenic peptide sequence is also known as the immunodominant region.

61 When comparing the immunodominant region in HIV-1, HIV-2 and SIV, all SIVs had at least the LNA sequence whereas $HIV\text{-}2_{ROD}$ (the HIV-2 prototype of the Patent) had the LNS sequence. The 2.2 test kit clearly made use of a peptide located in the immunodominant region with the LNS sequence. That was exactly that of the patented $HIV\text{-}2_{ROD}$ virus included in the sequence of Claim 19 and not a sequence extracted from a SIV published in January 1990.

62 Professor Cohen then went on to address the issue of lack of novelty. Before the priority date of 22 January 1986, only HIV-1 was known to be pathogenic to humans. At that date, a retrovirus discovered in a diseased macaque monkey was identified and called SIV/STLV-III interchangeably. Having studied the five prior publications cited by the Defendants in their Particulars of Objection, Professor Cohen concluded that the publications contained a few characteristics of SIV but did not reveal the existence or characteristics of HIV-2. It was clear that HIV-2 was neither known nor available to the public before the earliest priority date of the Patent. Consequently, its antigens could not have been identified.

63 On the issue of lack of inventive step as far as Claim 33 and its dependent claims were concerned, Professor Cohen relied on his earlier discussion on the prior art publications. He reiterated that the virus whose existence had been envisaged by Barin was one not pathogenic to humans. Furthermore, it was then found that this HTLV-IV retrovirus was in fact a SIV_{MAC} retrovirus which contaminated a cell culture. Even if one disregarded this error, mere knowledge of a HIV virus would not have made it possible on 22 January 1986 to surmise the existence of a pathogenic HIV virus different from HIV-1. Consequently, the question of producing such a virus never arose. Barin in fact referred to a hypothetical virus which was not pathogenic to man. His article contained nothing whatsoever which could have led the man skilled in the art to predict the existence of retrovirus groups other than HIV-1.

64 It was therefore clear that prior to the claimed invention, the only known agent responsible for AIDS in humans was HTLV-III or HIV-1 as it is now called. The prior art articles cited by the Defendants did not suggest the existence of a problem at the root of the invention – i.e. that the inventors had observed that serological studies carried out with HTLV-III lysate led to the observation that some patients, who had clinical and immunological signs of AIDS, nevertheless showed seronegative or very faintly positive reactions. The solution to this problem (i.e. the identification and the production of the HIV-2) was not disclosed. This showed that Claims 1 to 9 of the Patent provided evidence of inventive step. Since the other claims of the Patent were directly or indirectly related to Claims 1 to 9, this was sufficient proof of the inventive step of the subsequent claims.

65 On sufficiency of disclosure, Professor Cohen stated that the Patent did enable a person skilled in the art to select a suitably reactive fragment/epitope as it taught everything the skilled person needed in order to prepare and identify a sequence fragment able to raise a specific immunological reaction with the antibodies against a HIV-2 retrovirus as claimed in Claim 19. The Patent did not need to teach things which were part of the common general knowledge. The Patent also taught that the HIV-2 envelope antigens were little or not recognized by HIV-1 antibodies.

66 Further, the Patent suggested clearly that the envelope was the best target antigen in terms of detection efficiency and taught that the envelope glycoprotein was the protein antigen of choice in which epitopes were to be looked for and identified.

67 The Patent's teachings taken together with common general knowledge allowed the man of ordinary skill in the art to obtain peptides or epitopes which would specifically react with antibodies against the HIV-2 retrovirus as claimed in Claim 19.

68 As for the Defendants' averment that the Patent purported to claim all processes for in vitro detection of HIV-2 antibodies but in fact did not teach a skilled person how to identify every single immuno-reactive epitope, Professor Cohen explained that a single process for in vitro diagnosis of HIV-2 required only one immuno-reactive epitope. The skilled person did not need to incorporate every single immuno-reactive epitope into his diagnosis process/kit. Nevertheless, if such a person needed to find further immuno-reactive epitopes, he could use well-known methods such as Pepscan to do so.

69 In response to the First Defendant's averment that its synthetic peptide was first synthesized on 14 January 1990 and that its LNS sequence was found in many strains of SIV, Professor Cohen said that at that time, taking into account the then SIV sequences, only the HIV-2 envelope sequence had the exact sequence of the First Defendant's synthetic peptide. That peptide was and still is a HIV-2 peptide covered by Claim 19. Few SIV sequences were published in January 1990 and they all at least had the LNA sequence whereas HIV-2_{ROD} had the LNS sequence. One could not look at sequences of SIVs now known when the selection of the peptide was said to have been made in January 1990. The choice available in January 1990 was not the same as that today.

70 In his second AEIC which was affirmed to address the challenge to Claim 19, Professor Cohen discussed the seven prior art documents cited by the First Defendant, out of which only four were relied on by the First Defendant in evidence (Daniel, Kanki-1, Kanki-2 and Barin). The other two were published in 1987 which was obviously after the priority date. The remaining one (Essex), published in November 1985, was not cited in evidence by the First Defendant. In any event, it stated about the same things as Kanki-2 did and his comments on Kanki-2 would apply thereto.

71 Professor Cohen stated:

"Prior art

Daniel

8. The article Daniel et al., Science 228:1201, 1985 ("Daniel") disclosed the isolation of a simian retrovirus – now named SIV_{MAC} – identified in macaques. This article only dealt with the isolation, cultivation, morphological properties of the virus. Nothing was said regarding its antigenic properties. Clearly, Daniel did not anticipate the HIV-2 envelope antigen claimed in claim 19 of the Patent.

Kanki-1

9. The article Kanki et al., Science 228:1199, 1985 (Kanki 1) disclosed the serological properties of the simian retrovirus, SIV_{MAC} referred to in Daniel. Kanki 1 disclosed the entire envelope proteins of SIV_{MAC} designated GP160 and GP120 but not the fragments. The sequence of these proteins was not disclosed. In fact, nothing in Kanki 1 indicated that either of these proteins had the sequence of claim 19.

10. As agreed by Professor Letvin when he gave evidence in Court, nothing in Kanki 1 stated that SIV_{MAC} could infect man. Consequently, there was no statement that SIV_{MAC} GP160 and GP120 was used or could be used as antigen to detect in humans infection by a human immunodeficiency virus – i.e. a virus capable of causing AIDS in man.

11. In addition, to the best of my knowledge, at the priority date, the SIV_{MAC} virus was not deposited, in an official cell collection such as, for example ATCC (American Type Culture Collection). Therefore there was no way for the skilled person before the priority date, firstly, to determine the sequence of SIV_{MAC}'s GP160 and GP120, and, secondly, to establish clearly whether the SIV_{MAC}'s GP160 and GP120 proteins could raise a specific immunological reaction with antibodies directed against a human immunodeficiency virus other than HIV-1.

Kanki 2

12. The article Kanki et al., Science 230:951, 1985 ("Kanki 2") disclosed the isolation of a simian retrovirus identified in African green monkeys, named $STLV\text{-}III_{AGM}/SIV_{AGM}$. I agree with Professor Letvin's position, when he gave evidence in Court that nothing in Kanki 2 stated that SIV_{AGM} could infect man and that the only "closely related viruses" considered in the article only referred to immunodeficiency viruses then known, namely HIV-1/HTLV III, SIV_{MAC} and SIV_{AGM} and not to any other immunodeficiency virus.

13. As a matter of fact, when Kanki 2 indicated in page 953, right hand column, lines 1 – 5:

> "As is the case of HTLV III-infected people, the gp160/120 appear to be the best serologic markers for infection by these closely related viruses."

there was no statement that SIV_{AGM}'s GP160 and GP120 was used or could be used to detect in humans infection by a human immunodeficiency virus other than the only then known, HIV-1/HTLV III.

14. Kanki 2 disclosed the entire envelope proteins of SIV_{AGM} – (which was later known to be a culture contamination of SIV_{MAC}) – designated GP160 and GP120 as only assessed by Western Blot immunoanalysis using polyclonal sera from infected subjects without any indication of sequence, immunodominant fragments or epitope mapping. The sequence of these proteins was not disclosed either and therefore the antigen of claim 19 having the "envrn" sequence was not anticipated.

15. It must be noted that after the priority date of the Patent it was shown by Franchini et al (see page. 911 of the Agreed Bundle Volume III) in 1987, that the genomic structure of $STLV\text{-}III_{AGM}$ differs from those of HIV-2. Franchini demonstrates that "*$STLV\text{-}III_{AGM}$ and $HIV\text{-}2_{ROD}$ are (more) closely related to each other*" but not identical. This is an additional clear evidence that the antigen of claim 19 was new in view of what was revealed in Kanki 2.

Barin

16. Barin disclosed, 4 years after the first identification of AIDS (June 1981), serological studies made in Senegal, West Africa, a region where AIDS or AIDS-related diseases had not yet been observed. HTLV III and $STLV\text{-}III_{AGM}/SIV_{AGM}$ Western Blot tests were performed on a variety of healthy subjects in Senegal. The SIV_{AGM} GP160 and GP120 proteins were shown to react with serum from healthy human subjects. The results suggest that some Senegalese people, while being healthy, i.e. with no symptoms of AIDS or AIDS-related diseases, had been exposed to a virus-designated "$STLV\text{-}III_{AGM}$ – like virus" – that was more closely related to STLV-III than to HTLV-III/HIV-1.

17. As agreed by Professor Letvin when he was giving evidence in Court, in this article, unlike the other three (3) articles, no virus had been isolated, purified, let alone deposited and therefore no "$STLV\text{-}III_{AGM}$ – like virus" had been made available to the public. In 1985, no skilled person was able to clone and sequence a virus or isolate its envelope protein without first having the virus at hand, or at least its nucleic acid in the form of an homogenous strain or cloned nucleic acids. The difficulty was in the obtaining the virus. Consequently, no GP160 and GP120 proteins from this so-called "$STLV\text{-}III_{AGM}$ – like virus" had been directly disclosed, isolated or purified and no fragments thereof or the sequence of these proteins either disclosed.

18. Additionally nothing in Barin stated that the putative "$STLV\text{-}III_{AGM}$ – like virus" GP160 and GP120 proteins were used or could be used to detect in humans infection by a human immunodeficiency virus, capable of causing AIDS in man, other than the only one then known, HIV1/HTLV III. Clearly, the SIV_{AGM}-like GP160 and GP120 proteins were not disclosed in Barin at the epitope or sequence level and did not anticipate the antigen of claim 19 in the Patent."

72 Professor Cohen concluded that as none of the prior art documents anticipated the HIV-2 antigen of Claim 19, the latter must be considered novel.

73 On the question of inventive step of Claim 19, Professor Cohen stated that it was not obvious to arrive at the HIV-2 antigen when looking at the prior art documents mentioned above. Prior to 22 January 1986, the only known virus capable of causing AIDS in humans was HIV-1.

74 Of utmost importance was the fact that none of the prior art documents had identified, or had been faced with, the intriguing and challenging situation the inventors were facing – the fact that some samples from Western African patients having clear AIDS symptoms gave seronegative or very weakly positive reactions with conventional HIV-1 based reagents. The problem of the possible existence of other human pathogenic viruses had never been raised before the priority date.

75 Barin, the closest prior art, in fact taught away from the patented HIV-2 invention by stating that HIV-1 caused AIDS in man and that human beings also harboured a virus close to STLV-III, so called STLV-III_{AGM} or SIV_{MAC}, that did not cause any pathology. On the teachings of Barin, a skilled person could not predict rationally nor come to the conclusion that another virus existed which caused AIDS in man and that an antigen having the ENVRN sequence existed enabling detection of infection of the said virus in the samples from the West African patients.

76 The prior art documents, taken alone or in combination, did not suggest the antigen covered by Claim 19, which could not therefore be said to be obvious. Accordingly, Claim 19 involved an inventive step.

77 The First Defendant's expert witness, Professor Norman Letvin, had given evidence that it was obvious that HIV-2 could cause AIDS in man because SIV_{MAC} = SIV_{SM} = HIV-2 and SIV_{MAC} caused AIDS in macaques. In response, Professor Cohen pointed out that there were papers published shortly after the priority date which showed that both SIV_{SM} and the Essex team's so-called HTLV-IV were considered to be harmless to sootey mangabeys and to man respectively.

78 Applying the principles that an invention must be new, must involve an inventive step and must be disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, Professor Cohen opined that Claim 19 met those requirements and was therefore valid.

79 Professor Cohen elaborated in oral testimony on the HIV-2's 18 mer sequence. This sequence was now known to be present in many isolates of SIV but, surprisingly, not in the closest sub-type, SIV_{MAC}. SIV_{MAC} was the closest to HIV-2 but there was at present no SIV_{MAC} sequence matching the 18 mer exactly. As at 22 January 1986, no SIV sequence had been published. The First Defendant's nitrocellulose strip had a 23 mer sequence but the antigenic part was the 18 mer sequence of the Patent. The extra five amino acids were merely to allow the antigen to be correctly attached to the strip.

80 In cross-examination, Professor Cohen agreed that the American term HTLV-III was now known as HIV-1 and that the official nomendature for STLV-III was now SIV. Before the priority date, it had been suggested but never demonstrated that other HIVs existed. Professor Cohen disagreed with the First Defendant's case that it was already known before the priority date that this other HIV was more closely related to SIV than to HIV-1. He asserted that this virus was not known as Barin did not succeed in getting a stable strain. Serological data suggested however that the place of this virus among the HIV family might be close to that of a SIV. Data to suggest that a retrovirus from the HIV family could have been transmitted from monkeys to man in evolution also existed but there was no

definitive evidence.

81 Professor Cohen also disagreed that HIV and AIDS researchers at the priority date were alerted to the possibility that SIV could cause AIDS in humans. He maintained that it was nothing more than a hypthothesis. There was nothing in the publications that would have alerted the researchers in this manner.

82 Asked whether Barin's article having been published in December 1985 and the Patent having been filed on 22 January 1986 indicated that Barin or other teams were about to reach their destination by December 1985, Professor Cohen explained that by 19 December 1985, the First Plaintiff's virus had been registered with the depository to obtain the priority and the rights. At the end of the day, the First Plaintiff got to the finishing line ahead of the others. Professor Cohen disagreed that the invention was obvious at the priority date following the teachings of the four cited prior art documents, in particular Barin, because Barin was stating the opposite hypothesis that a non-pathogenic virus closely related to SIV could be present for a long time in humans. Barin was interested in finding such a virus to obtain an attenuated strain that might have been useful in vaccination to prevent HIV infection.

83 Professor Cohen agreed that the data from Genbank showed that 69 of 109 HIV-2 sequences contained the identical 18 mer sequence and that 40 did not but were considered HIV-2 nonetheless. The 40 were however recorded after the priority date. The 18 mer sequence in HIV-2 could be found in some SIVs but that was not known at the priority date. At the priority date, the only SIV known was SIV_{MAC} and no SIV sequence was known. The 18 mer used by the First Defendant was not prior art because it was first described by the Patent. The first time that the HIV-2 sequence was published was in Guyader's article of 16 April 1987.

84 The use of molecular weight to distinguish viruses was now obsolete. Sequences were now used.

85 The virus used in the four prior art documents was actually SIV_{MAC}. In Kanki-2 and Barin, it was referred to as $STLV_{agm}$ but that was subsequently discovered to be a contamination which started in Kanki-2 and went on to Barin.

86 Commenting on the First Defendant's expert's testimony that while the articles did not say that SIV_{MAC} could infect man, he and his colleagues' understanding was that it could cause AIDS, Professor Cohen said they might have taken major precautions but likened the precautionary measures to putting astronauts who returned from the moon in quarantine although there was no evidence that there was something on the moon that could affect man. It was the position taken by the Harvard Medical School Safety Committee and history had indeed shown that SIV_{MAC} could infect man but that was long after the priority date. Professor Cohen tried to find SIV_{MAC} deposits in the depositories before the priority date but did not manage to find any.

87 The third witness for the Plaintiffs was Mr Christian Policard, Chairman and CEO of the Second Plaintiff. He gave evidence on behalf of both Plaintiffs. He testified that the Second Plaintiff was appointed exclusive licensee to the Patent in the field of in vitro diagnostics pursuant to a collaboration agreement dated 26 March 1981 and renewed on 11 July 1990. The Second Plaintiff's exclusive rights included the right to grant sub-licences to the Patent in all countries of the world except the USA, Canada, Mexico, Australia, New Zealand and India. A third company, Genetics Systems Corporation, now affiliated to the Second Plaintiff and incorporated in the USA, had the exclusive rights to grant sub-licences in these six countries.

88 Genetics Systems Corporation's work was to find partners in the field of viral blood disease diagnosis, especially for blood bank markets. The company therefore had contacts with Genelabs Diagnostics Inc. ("GDI") and Genelabs Technologies Inc. ("GTI") in the USA. Sometime in 1992, Genetics Systems Corporation ("GSC") held discussions with GDI and/or GTI over the possibility of sub-licensing of the Patent in its territories. The First Defendant was wholly owned by a Singapore company known as Genelabs Asia Pte Ltd which, in turn, was wholly owned by GTI.

89 In 1993, Mr Christian Mignon, then executive vice president of the Second Plaintiff, reported to Mr Policard that some representatives of Genelabs Diagnostics SA of Switzerland ("GDSA"), another of the First Defendant's related companies, had approached him to seek, among other things, a sub-licence of the Patent. Negotiations ensued between the Second Plaintiff and GTI and/or GDI (whose names were used interchangeably) until December 1993 when the Second Plaintiff decided it was not in its interest to accede to the request of GTI/GDI/GDSA. Accordingly, Mr Policard instructed Mr Mignon to convey to GTI the Second Plaintiff's decision to end negotiations.

90 The letter dated 23 December 1993 from the Second Plaintiff to GTI was in the following terms:

> "Re: HIV 2 license agreement.
>
> Dear Sir,
>
> Referring to our various conversation concerning an HIV 2 licence agreement, we notify you our decision to put an end to our negotiations regarding PSD territory HIV 2 rights for Genelabs or its affiliate Diagnostics Biotechnology.
>
> As a result, we would like to draw your attention to the fact that if your Company continues, directly or indirectly through the medium of any affiliate, to manufacture and/or sell products which could infringe our rights, it does so at its own risk, as we are committed to take whatever legal action is necessary to protect and enforce our valuable rights.
>
> Mr Bieker, as President of Genetics Systems will communicate separately very soon with you concerning its exclusive HIV-2 licensing territory."

91 Further correspondence followed in which GTI asked both the Second Plaintiff and GSC for the opportunity to discuss the matter further. The Second Plaintiff reiterated its stand that it was not possible to discuss any further the question of a sub-licence to GTI or its affiliates. On 25 February 1994, GSC wrote to GTI's Mark Van Asten to emphasize that GSC had no desire or ability to sub-license to GTI in the abovesaid six countries and warned that "any activities of your company that infringe upon Genetic System's rights related to HIV-2 should cease immediately".

92 It was clear from the above that it was the First Defendant's related companies, GDI/GTI/GDSA, that were trying to obtain the sub-licence from the Second Plaintiff and such request for a sub-licence showed knowledge of the Patent and recognition of the need for a licence. Since licence fees could be substantial, it would be normal to expect any party requesting a licence to have investigated the validity of the Patent.

93 The Plaintiffs did not have any evidence of the commercialization of the First Defendant's infringing products until sometime in 1996 and were not aware of the publications relied upon in the Defence to infer knowledge on the part of the Plaintiffs. At any rate, the said publications did not disclose information on the processes and compositions of the assays or on the commercial availability of the

items. Even if the Plaintiffs' representatives had attended the conferences mentioned by the First Defendant, they would have been marketing personnel and not patent or scientific experts and they would not have the requisite knowledge to scrutinize products exhibited at the conferences for evidence of infringement.

94 It was in 1996 that the Plaintiffs received information that a certain party in Singapore was manufacturing and commercializing infringing products without a sub-licence. Shortly thereafter, the Plaintiffs obtained photocopies of the package inserts of infringing products being marketed in Europe and discovered that the manufacturer thereof was the First Defendant.

95 In May 1997, the Plaintiffs were informed by their subsidiary in Taiwan that Genelabs had filed an application to have its HIV Blot 2.2 kit registered at the Department of Health in Taiwan. The First Plaintiff then sent Genelabs Taipei Liaison Office a warning letter on 30 June 1997 and informed the Taiwan Department of Health about the infringing kits.

96 On 28 July 1997, Genelabs Biotechnology Co Ltd of Taiwan replied to say that they did not believe that their "activities in Taiwan with HIV Blot 2.2 test kits fall within the scope of this Taiwan patent".

97 The Plaintiffs did not commence legal proceedings against the First Defendant immediately for three reasons:

> (1) The Plaintiffs were very far from Singapore and did not have enough information to reach a reasoned decision whether to sue;
>
> (2) The Plaintiffs did not have any operations or a representative office here making it difficult to make inquiries here and were therefore relying on their sub-licensees for information;
>
> (3) The Plaintiffs' attention at that time was focused on other infringement cases in important markets in other parts of the world, such as Europe.

By the first half of 1998, the Plaintiffs decided to take steps to put an end to the First Defendant's infringing activities and therefore appointed solicitors and private investigators for this purpose.

98 Mr Policard underlined the importance of the Patent to both Plaintiffs by stating that 90% of the HIV diagnostic kits sold in the world were sold under licence from the Plaintiffs. The huge revenues generated were shared by the Plaintiffs equally to fund the research work of the First Plaintiff.

99 Mr Tan See Wei was one of the private investigators instructed by the Plaintiffs' solicitors. His evidence was accepted without cross-examination. In June 1998, the firm, Commercial Investigations, was instructed to conduct a trap-purchase of the HIV test kits in question and to establish where they were manufactured. Having been told that only specialized laboratories in Singapore carrying out HIV tests would purchase such kits, Mr Tan decided that the best way to go about his work was to try and buy from the First Defendant or its distributor on the pretext that the kits were meant for overseas customers.

100 On 3 July 1998, he sent a request from a trading front used by Commercial Investigations called Walter & Mark Trading to the First Defendant to purchase one set each of the 2.2 and 1.2 kits purportedly on behalf of an Indonesian customer. He was informed by the First Defendant that enquiries concerning supply of these kits in Indonesia had to be directed to its exclusive distributor in Indonesia.

101 On 9 July 1998, Mr Tan contacted the First Defendant again via the said trading front on the pretext that he wanted to buy the kits for customers in Malaysia. On the same day, the First Defendant's Regional Sales Executive provided the name of the Malaysian distributor, Nagase (Malaysia) Sdn Bhd, and gave its address in Kuala Lumpur and the contact person and telephone numbers.

102 Mr Tan then contacted the Malaysian company for quotations on the two kits, informing the company that the trading front was a Singapore business purchasing for customers in Malaysia. The trading front then received a fax dated 11 July 1998 from the Second Defendant whose letterhead showed the Second Defendant's name with the Kuala Lumpur address of Nagase (Malaysia) Sdn Bhd. At the bottom of the fax, however, the words "Singapore Office: …" followed by a Singapore business address and telephone number were printed. The fax was said to be from one Kon E' Wa but was signed by one Peter Lim, Medical and Healthcare Manager. It gave the unit price of the kits in Malaysian Ringgit and stated the following:

> "Price : Nett Delivered, Malaysia.
>
> Delivery : 17/07/98 (Friday). Own collection.
>
> Terms : COD.
>
> Validity : 31st October 1998.
>
> Remarks : HIV Blot 2.2 and HIV-2 Blot 1.2 from Nagase (Malaysia) Sdn Bhd to be supplied within Malaysia only."

103 A confirmation order was sent by the private investigator to Ms Kon E' Wa of the Second Defendant and copied to the said Peter Lim.

104 On 17 July 1998, Mr Tan proceeded to the address of Nagase (Malaysia) Sdn Bhd and collected the two kits. A "Performa Invoice" from Nagase (Malaysia) and a Delivery Note from the Second Defendant, both dated 17 July 1998, were handed over at the same time. Ms Kon E' Wa, the representative of Nagase (Malaysia), informed Mr Tan that the original invoice from the Second Defendant would be sent to him by post. The kits were then delivered by him to the Plaintiffs' solicitors in Singapore.

105 On 11 September 1998, Mr Tan received a telephone call from one Billy Goh, a representative of the Second Defendant, informing him that the original invoice was ready for collection. He told Billy that he would collect it from his office at about 12 noon that day.

106 When he arrived at the place of business of the Second Defendant, Billy was waiting for him at the reception area and handed him a Tax Invoice and a Delivery Order both signed by the said Peter Lim and bearing the Second Defendant's letterhead with its Singapore business address and telephone numbers stated. The Delivery Order, under "Delivery Instructions", stated "Via : Road, Vessel/Flight : By Lorry" and that the Country of Origin was from Singapore to Selangor, Malaysia. Both documents stated the delivery date as 1 August 1998.

107 On 14 September 1998, Mr Tan made another telephone call to the First Defendant to enquire whether the kits could be purchased from the First Defendant direct. He was informed that the kits should be purchased from the Second Defendant, the Singapore distributors.

THE DEFENDANTS' CASE

108 Professor Norman L. Letvin is a Professor of Medicine at Harvard Medical School and the Chief, Division of Viral Pathogenesis, Beth Israel Deaconess Medical Centre in Boston, Massachusetts. He has studied AIDS at Harvard since 1982 and has published extensively on AIDS, HIV and SIV.

109 He testified that the antigen used in HIV Blot 2.2 was a synthetic peptide that included the 18 mer found in many isolates of SIV and HIV-2. A search of all SIV and HIV-2 sequences reported to Genbank as of 20 April 1999 revealed that 38 of 116 SIV sequences and 69 of 109 HIV-2 sequences contained the identical 18 mer sequence. Genbank is a database of publicly available genetic information maintained and administered by the National Institutes of Health in USA. Five out of the 23 amino acid peptide used by the First Defendant were not found in any corresponding position in any sequence disclosed in the Patent. The 23 amino acid peptide was not found in any isolate of HIV-2 or SIV and not disclosed in the Patent.

110 SIV was first isolated from macaques with an AIDS-like syndrome but which were not infected with HIV-1, and HIV-2 was first isolated from cells of humans with clinical AIDS but with no evidence of HIV-1 infection.

111 Before the priority date (22 January 1986), Professor Letvin co-authored an article isolating and characterizing the envelope glycoprotein of SIV_{MAC} in Science on 7 June 1985. The envelope glycoproteins GP160 and GP120 from SIV were isolated and purified by radio immunoprecipitation (RIP). These proteins were shown to be strongly immuno-reactive with sera obtained from the blood of SIV-infected monkeys. Interestingly, these proteins were also shown to be weakly immuno-reactive with sera from confirmed HIV-1 infected patients. To the best of his knowledge, this was the first public disclosure of the isolation and purification of the SIV envelope glycoproteins. The 18 mer used in the HIV 2.2 kit was actually found in the envelope glycoprotein of many strains of SIV. In the same volume of the journal, Professor Letvin and his co-authors also reported on the isolation and characterization of SIV from captive macaques inflicted with an immune deficiency disorder similar to AIDS. To the best of his knowledge, that was the first public disclosure of any SIV strain.

112 On 22 November 1985, Kanki-2 described the isolation and characterization of a second SIV strain from wild-caught African green monkeys. The authors also wrote that the envelope glycoprotein of SIV might be useful in diagnosing infection by SIV and other closely related viruses. In the Patent, the First Plaintiff acknowledged the teaching of the Kanki-2 prior art, i.e. that SIV envelope glycoproteins were useful in detecting HIV-2 infection. Since the 18 mer was found in the envelope glycoprotein of many strains of SIV, the First Defendant's use of the SIV 18 mer to detect HIV-2 infection constituted practice of public domain art disclosed in Kanki-1 and Kanki-2.

113 Barin, on 21 December 1985, presented serological evidence that a virus closely related to SIV infected humans in West Africa. Sera from 20 Senegalese prostitutes and five surgical patients, all of whom were deemed healthy and apparently infected with some strain of HIV, were examined for the presence of antibodies to HIV-1 and SIV_{AGM}. The antibodies present in the sera from the patients reacted more strongly with SIV_{AGM} proteins than with HIV-1 proteins. Barin studied the viruses obtained from the Senegalese prostitutes and patients and reported that the virus they found was more closely related to SIV_{AGM} (or $STLV_{AGM}$) than to reference strains of HIV-1 (or HTLV-III). Barin therefore represented the first report of HIV-2 and the first purification of the envelope glycoprotein of HIV-2.

114 Kanki-1, Kanki-2 and Daniel suggested the possibility of using SIV envelope glycoproteins for detecting viruses related to SIV and Barin actually demonstrated that sera from humans infected with a SIV-like virus (HIV-2) was immuno-reactive with SIV envelope proteins.

115 Professor Letvin went on to say that the First Defendant's 2.2 kit used a prior art SIV sequence (the 18 mer) and that the use of SIV antigens to detect viral infection was suggested in the prior art. For Claim 19, a person skilled in the art would not be able to a priori select the 18 mer out of the 891 amino acids provided in that Claim as a useful antigen in detecting HIV-2 infection. There was no teaching in the Patent that would lead a skilled person to look at this specific 18 mer when there were 873 contiguous distinct 18 mers in the envelope glycoprotein. Further, the antigen used in the 2.2 kit was one not found in the Patent or in any HIV-2 or SIV strain.

116 Professor Letvin was of the opinion, along with many other experts, that the various strains of HIV-2 were in fact SIV strains that crossed into humans from simians. The possible transmission of SIV into humans was also recognized by Barin and others as far back as 1989. It is now widely accepted by most of Professor Letvin's colleagues that HIV-2 represented zoonotic transmission of SIV into humans. Thus all of the viral strains identified as HIV-2 were in fact SIV strains transmitted to humans from simians.

117 During the prosecution of the Patent, the First Plaintiff had relied on alleged differences in the molecular weights of SIV and HIV-2 proteins to prove that the two were not the same virus. However, the assertion that SIV and HIV-2 proteins did not match was contradicted directly at least twice in the Patent specifications where the First Plaintiff characterized the envelope glycoproteins of SIV and HIV as having the same molecular weight of 130-140 kilodaltons and having the same immuno-reactivity. The assertion that the distinguishing characteristic between SIV and HIV-2 was molecular weight was thus unfounded. The molecular weights of every SIV and HIV-2 protein in fact fell within a 10% range. Every protein found in HIV-2 was also found in SIV and could not be distinguished based on molecular weight nor by immunological properties.

118 It was not surprising that the molecular weights and immunological properties of the proteins of the two viruses were indistinguishable as SIV and HIV-2 were strains of the same virus, HIV-2 being SIV that crossed over into humans from monkeys.

119 In oral testimony, Professor Letvin explained further that we now know that all of the viruses that caused AIDS in man originated in non-human primates, i.e. the African monkeys and apes. In their natural host species, these viruses caused no disease. However, when they crossed over to man and to Asian monkeys, AIDS could occur. The HIV-1 originated in the chimpanzee, which did not develop AIDS, and spread from there throughout mankind. Similarly, a naturally occurring virus in the sootey mangabey resulted in HIV-2 when it was transmitted from monkeys to man. SIV_{SM} caused no disease in its natural host but when it infected Asian monkeys, they developed AIDS.

120 The SIV_{MAC} was a SIV_{SM} transmitted into the Asian macaque monkey. SIV_{SM} = HIV-2 and SIV_{SM} = SIV_{MAC}. Accordingly, all three viruses were essentially the same virus. There were minor variations in the genetic sequences but they were so closely related that they ought to be viewed as different isolates of the same virus.

121 After isolating the first SIV_{MAC}, it was known that it could cause AIDS. Everyone therefore treated the virus as a potentially lethal virus for man. It was reported in two publications in 1990 and 1991 that SIVs clearly could infect humans. It was also currently known that SIV_{SM} could infect humans and cause AIDS. While there was no published literature on this, the Centre for Disease

Control in Atlanta, Georgia, USA had documentation of humans infected with SIV_{SM} who clearly had AIDS. This was not surprising since SIV_{SM} = SIV_{MAC} = HIV-2.

122 Each taken by itself, the prior art articles of Daniel, Kanki-1, and Barin, did not necessarily predict that a virus similar to SIV_{MAC} could infect and cause AIDS in man. However, taken together, the observations in the three articles clearly indicated to the scientific community that a SIV-like virus infected and could well cause AIDS in man. Taken together, Daniel and Kanki-1 indicated that a new virus (SIV_{MAC}) existed and could cause AIDS in monkeys and Barin's observation that humans could be infected by a virus closely related to SIV_{MAC} predicted very clearly at that time that an AIDS virus related to SIV_{MAC} would be found in humans.

123 At the time of publication of Barin's article, while some of Professor Letvin's colleagues hoped that this virus would not cause AIDS in man, many of them assumed that it would eventually cause AIDS in humans, based on the knowledge that there could be an average ten-year gap between infection and the onset of AIDS for HIV-1. Anyone skilled in the art should have expected the possibility of an AIDS illness in humans infected with a virus similar to SIV_{MAC}.

124 HIV-1 makes a protein called vpu and not vpx while HIV-2 does not make vpu but vpx. SIV_{MAC}, like HIV-2, also does not make vpu but vpx, showing a very close relationship between these two.

125 In cross-examination, Professor Letvin said that his five existing patents and five pending ones related mainly to AIDS and to immunology observations and discoveries. He agreed that some people might say that he possessed an inventive mind but disagreed that he was thereby more than the notional man skilled in the art. In his opinion, there were many people working in AIDS research who would have brought the same understanding and perspective as he had.

126 Professor Letvin agreed that the test kits available as at the priority date of 22 January 1986 were intended for testing HIV-1 only. Test kits, however, always lacked behind the knowledge in AIDS research. The available commercial kits were inefficient for detecting the SIV and HIV-2 family.

127 Professor Letvin co-authored Daniel's article published on 7 June 1985. He agreed that there was nothing in that article which stated that SIV_{MAC} could be used to test for AIDS in humans or that SIV would infect humans. However, since the first isolation of that virus occurred in his laboratory, there was concern among fellow researchers that it could infect man and cause AIDS. Extensive guidelines on how the virus must be worked with were established by the Harvard University Committee on Biological Safety even before the publication of Daniel. The article did not mention the terms HIV-2 or SIV as those terms did not exist then. There was no discussion in Daniel of this virus infecting humans or of the viral proteins. Neither was there any mention of amino acid sequences, in particular the 18 mer.

128 Professor Letvin also co-authored Kanki-1 published also on 7 June 1985. His comments concerning Daniel would apply to Kanki-1 as well. However the proteins of SIV_{MAC} and consequently of HIV-2 were revealed here. Asked to point out where the 18 mer appeared in Kanki-1, Professor Letvin said he could not show it but there was a description in Daniel and Kanki-1 of a virus and those skilled in the art would have been able to clone and sequence the amino acids of that virus. One could predict the 18 mer or at least devise a series of peptides similar to the 18 mer.

129 Kanki-2 published on 22 November 1985 was not co-authored by Professor Letvin. The virus there was SIV_{AGM} (or $STLV\text{-}III_{AGM}$). Again, no sequence was revealed here but Professor Letvin's earlier

comments on Kanki-1 were applicable here. There was also no statement in the article that the virus caused AIDS in humans but the Harvard Committee had determined at that time that any virus associated with the African green monkey must be treated as though it could cause AIDS in man.

130 Barin was published on 21 December 1985. Professor Letvin was not one of the authors. Most readers of Barin felt that a virus of this type in the Senegalese women might well cause AIDS in humans. While no virus isolation was described in Barin, anyone learned in this field could have isolated the virus. It could be inferred from the article that Barin hoped that the virus would not cause AIDS but many serious scientists discussing this at meetings and over the telephone at that time were not as optimistic. The proteins of what was now called HIV-2 could be clearly inferred from Barin.

131 Although a subsequent article revealed that the virus in Barin's was actually a contaminated SIV_{MAC} culture, that did not take away Barin's conclusion that humans infected by an AIDS virus reacted with SIV_{MAC}. Professor Letvin disagreed that todate no one knew exactly what the virus in the Senegalese women in Barin's article was. It had been shown that it was very closely related to the SIV_{MAC} and one could assume that it was what was now called HIV-2.

132 Professor Letvin was then referred to an article communicated in July 1985 and published in October 1985 in which he was a co-author. This was published just before Kanki-2 and Barin and three months before the priority date of the Patent. Asked whether the authors of this article thought that SIV differed from HIV, Professor Letvin said he was referring to HIV-1 and was comparing SIV_{MAC} with HIV-1 when he referred to the "human AIDS virus" as there was much controversy then on the terminology to use. He agreed that he thought SIV_{MAC} was different from HIV-1.

133 Professor Letvin disagreed that the discovery of HIV-2 was a major turning point for AIDS research as 98% of all AIDS cases worldwide were due to HIV-1. The discovery of HIV-2 was important for screening bloodbanks and for studying the epidemiology worldwide. If he was so concerned with patents, he would have patented SIV_{MAC} but he did not because he was a scientist not concerned so much with personal gain.

134 According to Professor Letvin, SIV_{MAC} had been described before the priority date and HIV-2 was therefore not new since it was SIV_{MAC}. HIV-2 was also obvious because in December 1985, Barin had indicated that that virus was in human populations. Once the virus was described before the priority date, the cloning, the sequence and the prediction of the peptides were obvious to anyone skilled in the art. The sequence of SIV_{MAC} and of SIV_{AGM} were not in the literature before the priority date. The first time the HIV-2 sequence was published appeared to be on 16 April 1987 in Guyader's article. A skilled man would then be able to look for the 18 mer.

135 Professor Letvin agreed that he had not referred to SIV_{SM} in his AEIC but only in oral testimony in Court.

136 Asked whether there was evidence of zoonotic transmission of the SIV to man, Professor Letvin replied that it could be readily inferred from the data that such a transmission had taken place. In the wild, sootey mangabey monkeys were infected with SIV_{SM} universally but did not become ill. This suggested strongly that sootey mangabey was the reservoir for the HIV-2. It was known at the priority date that SIV_{MAC} and HIV-2 were so similar as to be indistinguishable. He based his conclusion on zoonotic transmission on an article by Hirsch published on 1 June 1989.

137 The second witness for the First Defendant was Dr Guan Ming, the Manager of the Product Development Division in the First Defendant. Dr Guan Ming graduated with a Ph.D. in biological sciences from the University of Exeter in 1989 and has been with the First Defendant since January 1990.

138 Dr Guan Ming stated that the First Defendant was principally involved in the research, development, manufacture and sale of diagnostic kits for the detection of infectious diseases, its core business being the manufacture and sale of Western Blot HIV and HTLV diagnostic kits and associated instruments/software. When he joined the First Defendant, he was involved with a team doing research, development, manufacture and commercialization of peptides for diagnostic use. In 1986 or so, the First Defendant started research on the development of a diagnostic kit for the detection of HIV-2 infection. In 1988, research work was also started in collaboration with DuPont on the development of a diagnostic kit for the detection of HIV-1 and HIV-2.

139 Dr Guan Ming then provided some explanation of terms such as virus, retrovirus and HIV genome and gave a brief history of HIV and SIV. In 1983, researchers at the National Cancer Institute, USA and in Paris, France co-discovered the HIV-1. The French researchers called the new virus LAV (Lymphadenopathy Associated Virus) while the Americans referred to it as HTLV-III (Human T-Cell Lymphotropic Virus III). An international commission subsequently standardized the name to HIV to avoid confusion.

140 In mid-1985, a group of research scientists at Harvard School of Public Health (which included Professor Letvin) isolated a new simian retrovirus from a macaque closely related to HIV-1. They named it STLV-III or SIV. They reported later in December 1985 that human sera from West Africa contained antibodies which reacted more readily with SIV than with HIV-1. This was serological evidence of a strain of SIV which had the capacity to infect humans and which they subsequently named HTLV-IV. These findings were echoed by another group of researchers who isolated a virus from West African patients which was found to be more closely related to SIV than to HIV-1, both in molecular weight and in immunological properties. This second group named the virus HIV-2.

141 HIV attacks the immune system in the human body. When a person was infected with HIV-1 or HIV-2, he would develop virus-specific antibodies in his bloodstream, usually within a few weeks. Hence, diagnostic kits to detect the presence of such antibodies were used to test whether a person was infected with HIV.

142 Immuno assay is one of the methods used for the serological diagnosis of infection. The ELISA method is one such assay for the detection of specific antibodies. Although it is relatively inexpensive and simple to use, there may be cases where a positive or negative assessment may be difficult. It is also subject to cross-reactivity by non-specific antibodies. The screening results of ELISA are usually confirmed by additional highly specific tests which, if performed or interpreted properly, usually do not produce false biologic positive results. One of these confirmatory tests is the Western Blot.

143 The Western Blot is generally considered the gold standard for confirming the presence of HIV. It works on the same principle of antigen-antibody reaction. If the relevant antibody has formed a complex with any of the banded HIV proteins on the nitrocellulose strip, a colour reaction occurs at the band site. While the ELISA can only provide a Yes or No answer, the Western Blot can provide information on the presence of a specific antibody or antibodies.

144 The First Defendant's 1.2 kit incorporates the HIV-2 antigenic proteins on the test strip. The 2.2 kit incorporates bands of HIV-1 antigenic proteins on the test strip to confirm HIV-1 infection. It also includes a synthetic peptide band to detect HIV-2 infection. This is a unique feature of the 2.2 kit.

While other kits could detect only HIV-1 or HIV-2, the 2.2 kit could detect both.

145 The complete genetic sequence of HIV-2 comprises about 9900 nucleotides. It could not be said with certainty where all the antigenic sites were on the HIV-2. Not all parts of the virus had antigenic effect. Determining the antigenic sites was an expensive and time-consuming exercise. The First Defendant was guided by the literature available which allowed for an educated trial and error approach, in particular an article by John Gnann in Science 1987. Gnann had a 12 mer peptide sequence.

146 Eventually, the First Defendant, after extensive research, development and consultation, used a HIV-2 synthetic peptide component supplied by DuPont pursuant to a development agreement. After much experimentation, the First Defendant discovered the 18 mer sequence which included Gnann's 12 mer peptide sequence. Further, to improve the binding effect of the peptide to the strip and hence improve the efficiency and accuracy of the test, five additional amino acids were added to one end of the 18 mer sequence to produce a 23 mer peptide. This sequence of five amino acids was not found in any part of the sequence of amino acids in the HIV-2.

147 The peptide was first synthesized on 14 January 1990 and tested for 15 months. The First Defendant then started selling the 2.2 kit in the second quarter of 1991 and filed a patent application for a HIV-1/HIV-2 viral detection kit and method in the USA, which was subsequently granted.

148 Despite the publication of the First Plaintiff's Patent, researchers in 1991 were still struggling to identify the antigenic sites in the HIV virus. There was nothing in the Patent that taught or directed researchers that the 18 mer would be useful in detecting HIV-2 infection and that it had the ability to distinguish between HIV-1 and HIV-2 infection.

149 Dr Guan Ming's views on Claim 19 were that it was so wide it could cover antigens not only from HIV-2 but also SIV that could react with HIV-2 antibodies. There was also insufficient disclosure as it did not pinpoint which specific part or parts of the sequence was able to raise a specific immunological reaction with the HIV-2 antibodies. As stated earlier, researchers were still trying in 1991 to establish which proteins could be used for the specific detection of HIV-2. It could not be that the First Plaintiff could claim rights over all parts of the virus having antigenic effect when it could not identify what they were and hence did not disclose them in the Patent.

150 The First Defendant's 23 mer did not fall within any of the First Plaintiff's Claims.

151 As for Claim 34 concerning processes, Dr Guan Ming was of the opinion that it covered processes using antigens disclosed in the prior art which could react with HIV-2 antibodies. There was also insufficient disclosure.

152 Accordingly, Dr Guan Ming concluded, the First Defendant had not infringed the First Plaintiff's Patent.

153 Asked in cross-examination what peptide DuPont gave to the First Defendant, Dr Guan Ming replied that he did not have the records concerning that but it was a peptide that the First Defendant did not use. The team in the First Defendant derived a peptide themselves, relying on Gnann's teachings. (DuPont had been sued as an infringer of the Patent in 1988 and had to take a licence from the Plaintiffs in 1990 as part of a settlement agreement). Dr Guan Ming was not aware of the suit against DuPont and did not know why the collaboration with DuPont was halted. The First Defendant learnt from DuPont's peptide that size made a difference. The First Defendant had made many peptides before the DuPont peptide was provided.

154 Dr Guan Ming agreed that the additional five amino acids were for the purpose of improving the binding effect of the 18 mer. Their hydrophilic properties (i.e. the ability to dissolve into water more easily) had been known for a long time. The five amino acids helped in sticking and in dissolving. Although they had no immuno-reactivity of their own, their absence would affect the performance of the peptide testing. They therefore improved the performance of the peptide a great deal.

155 The First Defendant did not take the 18 mer from the SIV_{MAC} sequences.

156 Dr Guan Ming agreed that Guyader's article in April 1987 was in the first occasion that the complete sequence of HIV-2 was published and that Gnann's article in July 1987 acknowledged Guyader's when Gnann came up with his 12 mer immunodominant region. He said however that he had received very confusing information in that there were people looking for a workable peptide even in 1991.

157 Mr Eric Mun Ping Kuen is the Managing Director of the First Defendant. He informed the Court that the First Defendant was a fully-owned subsidiary of Genelabs Technologies Inc of Redwood City, California. The First Defendant has fully-owned subsidiaries in other countries which function as marketing and sales organizations. The First Defendant employs more than 60 employees of whom some 54 are located in Singapore. The company has an average turnover of US$10 million for the past three years. Its products are widely accepted and well regarded all over the world. It has also received various research grants from statutory boards here. The company and its parent have applied for and obtained a number of patents worldwide and the First Defendant also holds licences from other patent owners.

158 The First Defendant's 1.2 and 2.2 diagnostic kits were launched in late 1987 and in 1991 respectively.

159 The Second Defendant was appointed the First Defendant's exclusive distributor in Malaysia in June 1997. At no time did the First Defendant discuss with the Second Defendant the subject of patent rights, particularly the Patent in issue.

160 The First Defendant and its parent company had on-going business relationships with the Second Plaintiff since 1990 or so. Since late 1991, there were negotiations between the First Defendant and the Second Plaintiff on the use of the HIV-2. The First Defendant had developed and launched the 2.2 kit then and knowing that the Plaintiffs had a patent on the HIV-2, assumed that a licence would be required. The negotiations included the possibility of cross-licensing of the HIV-2 Patent with the First Defendant's parent company's patents. After two years of negotiations, the Second Plaintiff unilaterally and abruptly terminated discussions in late December 1993.

161 The First Defendant attempted to re-open discussions in 1994 and 1995 but was rebuffed. Todate, the First Defendant and the Second Plaintiff or its related companies still enjoy a mutually beneficial business relationship.

162 Mr Eric Mun went on to state that the Plaintiffs' inactivity and apparent disinterest in their Patent over the past nine years made it inequitable for the Plaintiffs to now seek the relief sought and to stop the First Defendant from selling products contributing at least 25% of the company's revenue. Substantial time and money had been invested over the last decade on the two kits which could have been spent on other projects had the Plaintiffs not led the First Defendant to believe that they did not object to the use of the HIV-2. Any injunction or damages ordered would have a severe impact on the continued viability of the company.

163 In cross-examination, Mr Eric Mun said he was aware of the Second Defendant's letter dated 23 December 1993 warning against Patent infringement but the First Defendant did not normally discuss patent issues with its distributors. It was the company's general policy to have an indemnity clause for distributors in distribution agreements.

164 He stated that there was no record of any authorization from the Plaintiffs that the First Defendant could market its test kits. Asked about the First Plaintiff's letter dated 30 June 1997 to its sister company in Taiwan, Mr Eric Mun agreed that it was a warning letter. However, the First Defendant's head office had responded by saying that their activities did not fall within the scope of the Taiwan patent.

165 Mr Eric Mun explained further that as a small company which was beginning to launch its products, it was the general practice to ask for licences, cross-licences and collaborations. The First Defendant was not in the business of challenging the validity of Patents. Because of the long relationship with the Plaintiffs, the First Defendant negotiated without questioning the Patent. Further, the First Defendant needed the approval of the USA Food and Drug Administration ("FDA") for its product and did not want its product to be hampered by Patent issues. Since 1987 and 1991, the First Defendant had advertised and promoted its products in trade journals and at AIDS conferences.

166 Mr Mark Van Asten joined the First Defendant in 1993. He held discussions with the President of the USA Subsidiary of the Second Plaintiff on the possibility of a cross-licensing arrangement in respect of the HIV-2 Patent. Prior to his joining the First Defendant, the company had initiated some informal communication with the Plaintiffs on the possibility of obtaining a licence for the HIV-2. The commercial intent of the First Defendant was to enter the USA market for which approval from the FDA was necessary. As the approval process would take time and require a high level of investment, it made strategic sense and was prudent to approach the Plaintiffs regarding the HIV-2 Patent. No agreement was reached but the Second Plaintiff appeared seriously receptive to the proposals.

167 It came as a surprise to the First Defendant when it learnt that a letter dated 23 December 1993 had been received from the Second Plaintiff terminating all negotiations on the HIV-2 and warning against infringement. Mr Van Asten therefore wrote on 11 January 1994 to find out the cause for the sudden change in position and attitude. His attempts to meet with the Second Plaintiff for further discussions were rejected although the door to other matters were left open.

168 On 25 February 1994, he received a letter from the Second Plaintiff's subsidiary stating that it did not wish to license its HIV-2 rights to the First Defendant in the six territories (mentioned earlier in this judgment) and again warning against infringement.

169 On 18 March 1994, he wrote to the Second Plaintiff on further proposals. When the First Defendant heard nothing from the Second Plaintiff or its subsidiary after that, the First Defendant continued to manufacture and sell the testing kits.

170 In an article printed in AIDS 1993 (a foremost specialized medical journal on AIDS), the First Defendant's test kits were listed among the types of test kits available in the USA market together with the Second Plaintiff's test kits.

171 Between 1991 and 1997, the First Defendant also advertised, exhibited and promoted its test kits at several international conferences, most of which were attended by the Plaintiffs' representatives. The First Defendant also published and presented scientific papers on its test kits in 1992 and 1993.

172 From the termination of negotiations in late 1993 until the letter of demand dated 25 September

1998 from the Plaintiffs' solicitors in Singapore, the Plaintiffs had not raised any issue nor complained to the First Defendant about its manufacture and sale of the test kits.

173 Asked whether he would, as a prudent businessman, confirm the validity of a Patent before requesting a licence, Mr Van Asten remarked that there was a host of factors to consider, such as the business relationship with other companies, besides the question of royalty fee. At the internal meetings of the First Defendant, no reason to be concerned about infringement for the 2.2 kit surfaced. That had been marketed between 1991 to 1993 without objection or complaint from the Second Plaintiff. The launching of the product in the USA was the primary concern for discussing with the Second Plaintiff. After the termination of negotiations, the First Defendant went ahead with the sale of the kits because it believed that there was no infringement of the Patent. His subsequent letters to the Second Plaintiff were to explore business opportunities, not necessarily in respect of HIV-2, and were not attempts to get the HIV-2 licence or to develop business opportunities concerning only the HIV-2. The First Defendant's internal legal counsel's concerns about the need to disclose to the Security Exchange Commission the inability to obtain the HIV-2 licence (as part of the financial disclosure) were expressed in the context of the situation as at end of December 1993 when the First Defendant had received only the first warning letter.

174 Mr Van Asten was not aware of the First Plaintiff's letter dated 25 June 2997 to the Taiwanese authorities when he said there was no complaint between 1993 until the letter of demand in 1998.

175 Although neither the Second Plaintiff nor its subsidiary authorized nor informed the First Defendant that it could sell the kits, the First Defendant was in fact doing so without any legal action being taken against the company. The First Defendant believed there was no infringement. Some 12 months after the warning letters, the Second Plaintiff's principal officers visited the First Defendant's parent company without raising the issue of the Patent in any form. In Mr Van Asten's view, the 1993 and 1994 letters were "posturing" rather than warning letters.

176 In the light of all the matters between 1991 to 1993 that he had testified about, he found it difficult to believe that the Plaintiffs did not realize that the First Defendant was selling the kits until 1996.

177 The only witness from the Second Defendant was Mr Peter Lim Kee Hock, the General Manager of the Second Defendant's Chemical and Healthcare Division. The Second Defendant was incorporated in 1975 and has been principally in the business of distributing engineering and commodity plastics and chemicals. On 1 June 1997, the Second Defendant entered into an agreement with the First Defendant to be the sole distributor in Malaysia of the First Defendant's HIV diagnostic kits. Most of the sales were made to hospitals, clinics and laboratories.

178 Until the Second Defendant received the Plaintiffs' solicitors' letter of 25 September 1998 concerning alleged Patent infringement, the Second Defendant was not aware of the Patent at all. No one had informed the Second Defendant about the Patent, that a patent existed for such products or about the owners of the Patent. Prior to the appointment, Mr Peter Lim had been informed by the First Defendant that it had been distributing the test kits since 1988 in Singapore without any problems. Surprised by the said letter, he forwarded a copy thereof to the First Defendant on 30 September 1998. The kits had been approved for sale by the health authorities and there was nothing which indicated that they could not be sold. The Second Defendant has been selling the kits for two years in Malaysia.

179 Mr Peter Lim testified that he had not seen the correspondence between the First Defendant or its affiliates and the Second Plaintiff or its affiliates concerning licensing of the Patent or warning

about infringement thereof. This was the first time that the Second Defendant had entered the health product business and it was therefore not familiar with patent issues at all. If the First Defendant had disclosed the failed negotiations to him, the Second Defendant would not have entered into the distribution agreement. He assumed that the First Defendant did possess the necessary rights since it signed the agreement.

THE DECISION OF THE COURT

180 Before the advent of our present Patents Act, there was no machinery for examining patent applications here. A party seeking patent protection here had to obtain a patent in the United Kingdom and then register it under the Registration of United Kingdom Patents Act. On 23 February 1995, the Patents Act (save for a couple of sections) came into operation. The transitional provision in Section 116(3) of the Act preserves patents registered under the repealed Registration of United Kingdom Patents Act as if they were granted under the Patents Act, which is modelled on the United Kingdom Patents Act 1977.

181 Section 82(1)(a) of the Patents Act provides that the validity of a patent may be put in issue by way of defence in proceedings for infringement of the patent. The onus of proving invalidity is on the alleged infringer because validity is presumed. Section 82(3) provides that the only grounds on which the validity of a patent may be put in issue are those on which the patent may be revoked under Section 80. Section 80, in turn, allows the Registrar of Patents to revoke a patent on various grounds, the relevant ones of which are:

> "(a) the invention is not a patentable invention;
>
> ...
>
> > (c) the specification of the patent does not disclose the invention clearly and completely for it to be performed by a person skilled in the art;
> >
> > ..."

182 What then is a patentable invention? This is defined in Section 13(1) as one that satisfies the following conditions:

> "(a) the invention is new;
>
> (b) it involves an inventive step; and
>
> (c) it is capable of industrial application."

Condition (c) is not in issue in these proceedings.

183 On the issue of newness, the challenge to which is usually referred to as anticipation or lack of novelty, Section 14 explains as follows:

> "14. (1) An invention shall be taken to be new if it does not form part of the state of the art.

(2) The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in Singapore or elsewhere) by written or oral description, by use or in any other way.

(3) The state of the art in the case of an invention to which an application for a patent or a patent relates shall be taken also to comprise matter contained in an application for another patent which was published on or after the priority date of that invention, if the following conditions are satisfied:

(a) that matter was contained in the application for that other patent both as filed and as published; and

(b) the priority date of that matter is earlier than that of the invention."

184 On the second condition of inventive step, Section 15 provides:

"An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of Section 14(2) and without having regard to Section 14(3)."

185 The priority date in the present case is undeniably 22 January 1986.

186 Section 113(1) defines "invention" as:

"113. (1) For the purposes of this Act, an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpretated by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly."

Section 25(4) stipulates that the specification of an application shall disclose the invention in a manner which is clear and complete for the invention to be performed by a person skilled in the art. Section 25(5) provides that the claim or claims shall:

(a) define the matter for which the applicant seeks protection;

(b) be clear and concise;

(c) be supported by the description; and

(d) relate to one invention or to a group of inventions which are so linked as to form a single inventive concept.

<u>The validity of the Patent.</u>

187 A prior art document should be construed as at the date it was published. In construing such a document, one must guard against interpreting it with hindsight or with knowledge that is acquired after the priority date. An invention lacks novelty or is anticipated if it has been disclosed to the public before the priority date. In *General Tire & Rubber Co. v Firestone Tyre & Rubber Co Ltd* [1972] RPC 457, the English Court of Appeal said:

> "To determine whether a patentee's claim has been anticipated by an earlier publication it is necessary to compare the earlier publication with the patentee's claim. The earlier publication must, for this purpose, be interpreted as at the date of its publication, having regard to the relevant surrounding circumstances which then existed, and without regard to subsequent events. The patentee's claim must similarly be construed as at its own date of publication having regard to the relevant surrounding circumstances then existing. If the earlier publication, so construed, discloses the same device as the device which the patentee by his claim, so construed, asserts that he has invented, the patentee's claim has been anticipated, but not otherwise."

Although this case concerns the United Kingdom Patents Act 1949, it is considered good law under the United Kingdom Patents Act 1977 and has been followed and applied (*Asahi Kasei Kogyo KK's Application* [1991] RPC 485; *PLG Research Ltd v Ardon International Ltd* [1993] FSR 197; *Merrell Dow Pharmaceutical Inc v Norton & Co Ltd* [1995] RPC 233).

188 The law concerning anticipation is strict to the patentee and to the challenger of the patent. A claim is invalid if it covers any item of the prior art which has been disclosed to anyone (except in confidence), by any means (written or oral or by use), anywhere in the world, at any time in history (before the priority date). Even availability to a single member of the public will suffice. Similarly, availability to the public is satisfied if the document can be found on the shelves of a public library. It is irrelevant whether anyone knew it was available or had inspected it. [*Vitoria, Encyclopedia of United Kingdom and European Patent Law*] Anticipation can therefore encompass a disclosure which the inventor was totally ignorant of.

189 Similarly, anticipation does not include vague disclosures or near misses. As the Court of Appeal in *General Tire* said:

> "To anticipate the patentee's claim the prior publication must contain clear and unmistakable directions to do what the patentee claims to have invented".

190 Anticipation must be found within the document alleged to have anticipated the invention. It is not permissible to combine the teachings of two or more documents except where one of these directs the reader to study the other. One cannot create a "mosaic of extracts" from documents spread over a number of years [*Von Heydon v Neustadt* (1880) 50 LJ Ch. 126]. Similarly, "it is not open to you to take a packet of prior documents and by putting a puzzle together produce what you say is a disclosure in the nature of a combination of the various elements which have been contained in the prior documents. … it is necessary to point to a clear and specific disclosure of something which is said to be like the patentee's invention" [*Lowndes' Patent* (1928) 45 RPC 48].

191 Applying the principles pertaining to novelty, the prior art documents relied on by the Defendants, read individually or collectively, do not clearly and unmistakably disclose any antigen having the amino acid sequence or a part thereof as described in Claim 19. The said Claim also deals with the function of detecting HIV-2. Claims 1 to 9 on the novelty of the HIV-2 have not been impugned. It would

therefore be illogical to claim that prior art has already revealed the function of detecting a virus unknown to the prior art.

192 Claim 33 is concerned with a process to detect a new virus. As stated above, if the virus is new or novel, the process to detect it must have the same attribute.

193 On the issue of inventive step or obviousness, *General Tire* advocated an objective test. Again, one must guard against looking at the issue with hindsight.

194 "A person skilled in the art", like the "reasonable man", is a notional one. He is not "the mechanician of genius nor … the mechanical idiot" (*Van der Lely N.V. v Bamfords Ltd* [1961] RPC 296). He is "assumed to be of standard competence at his work without being of an imaginative or inventive turn of mind" (*General Tire*) or "the normally skilled but unimaginative addressee in the art at the priority date" (*Windsurfing International Inc v Tabur Marine (Great Britain) Ltd* [1985] RPC 59). He is "not the man of inventive imagination who might see straightaway what was required, but a hypothetical unimaginative technician skilled in the particular art" (*Van der Lely N.V. v Ruston's Engineering Co Ltd* [1985] RPC 461). Where more than one type of skill is required, this notional person may be a composite entity or a team.

195 The proper approach to the question of obviousness is best summarized by the EPO Guidelines C-IV 9.9 thus:

> "It should be remembered that an invention which at first sight appears obvious might in fact involve an inventive step. Once a new idea has been formulated it can often be shown theoretically how it might have been arrived at, starting from something known, by a series of apparently easy steps. The examiner should be wary of *ex post facto* analysis of this kind. He should always bear in mind that the documents produced in the search have, of necessity, been obtained with foreknowledge of what matter constitutes the alleged invention. In all cases he should attempt to visualize the overall state of the art confronting the skilled man before the applicant's contribution and he should seek to make a 'real life' assessment of this and other relevant factors."

196 It is axiomatic that the person skilled in the art will also possess common general knowledge which he will call upon.

197 Inventiveness is not synonymous with complexity. An invention may well be one because it is such a simple solution to what appears a highly complex problem. It may sometimes be paradoxical that a simple solution ought to have been so obvious but was not. Inventiveness may also reside not in designing a device to produce a particular result but in appreciating what the result ought to be. Understanding the nature of a problem may be part of the process of invention of a product needed to solve that problem.

198 Bearing all this in mind, the inventive concept of Claim 19 was that an antigen having the stated amino acid sequence had been discovered which was capable of specifically bringing about the solution to a newly discovered problem, i.e. the HIV-2. At the priority date, only two types of primate immunodeficiency virus were known with another putative virus suggested in Barin which is unknown todate. It was also a problem to find the HIV-2 and to identify and sequence the antigen of Claim 19.

199 Did Barin reveal a virus which caused AIDS in man other than the known HIV-1, thereby rendering the HIV-2 obvious? Barin did not think the virus in question was pathogenic to man. Some six months

later, the same team of researchers was still looking for a non-pathogenic human infecting retrovirus. With respect, if Professor Letvin and his colleagues felt differently from Barin, it was at best their hypothesis which was subsequently proven correct. It could not be said that Barin made the existence of HIV-2 obvious. That being the case, it must follow that it was not obvious to invent an antigen with the specified sequence capable of detecting that virus.

200 None of the prior art writings contained any amino acid sequence, let alone the 18 mer. All the SIV 18 mer sequences were submitted to Genbank after the priority date. At that date, no SIV sequence was known. The HIV-2_{ROD} was the first sequence with the 18 mer. It was not possible for the prior art to envisage the use of SIV envelope glycoprotein to diagnose infection by HIV-2 when that virus was not even known before the priority date.

201 Where Claim 33 was concerned, the difference between the state of the art and the invention was that there was previously no process for detecting HIV-2 (being something not known then) and there was one invented in the Patent now. The inventiveness was manifested in the recognition that a new virus was responsible for causing AIDS in the West African patients and providing the means to detect it by using an antigen. The First Plaintiff had discovered the "lock" and its "key" at one go. Claim 33 covers any antigen, including SIV ones, only if that is used to reproduce the process stated therein.

202 I now come to the issue of sufficiency of disclosure. Disclosure under Section 25 of the Patents Act does not entail minute, step by step directions. The person skilled in the art is expected to display a reasonable degree of skill and common knowledge of the art and does not have to be told what is self-evident or part of common general knowledge (*Valensi v British Radio Corporation* [1973] RPC 337; *Mentor Corp. v Hollister Inc* [1993] RPC 7). In *Biogen Inc. v Medeva PLC* [1997] RPC 1, the House of Lords held that sufficiency of disclosure was to be determined as at the date of filing of the application. An insufficient application cannot therefore become sufficient because of general developments in the state of the art after that date.

203 Claim 19 clearly covers a part of the entire sequence whatever the size. Immuno-reactive epitopes could be selected by using the Patent in conjunction with some or all of the information which was common general knowledge at the priority date, namely that the envelope glycoprotein of HIV-2 was the best target antigen for detection efficiency, that the HIV-1 envelope transmembrane protein p41 was useful in finding antigens, that an 82 amino acid peptide from gp41 of HIV-1 could successfully detect 99% of HIV-1 infected patients and the use of the Pepscan method.

204 Within some five months after the Claim 19 sequence was published after the priority date by Guyader, one of the inventors of the Patent, Gnann was able to identify the 12 mer.

205 Where Claim 33 is concerned, a process to detect HIV-2 antibodies requires only one immuno-reactive antigen. It was not necessary for every reactive antigen to be included. The Patent also discloses that the envelope glycoprotein gp140 of HIV-2 is a suitable antigen for use in detecting HIV-2 antibodies.

206 The Defendants' attempts to impugn the validity of the Patent's Claims 19 and 33 must therefore fail. I also note that the Patent was granted by the EPO after substantial examination to ensure that the application met the European requirements for patentability which are essentially the same as those in our Act. The four prior art documents were examined by the EPO which did not consider them to be prejudicial to the validity of the Patent. Although the EPO's views and decision are not binding on this Court, it would be churlish of me if I were to disregard such impartial expert opinions altogether. As far as Abbott Laboratories' withdrawn opposition was concerned, in the absence of

clearer evidence, I would not read too much into it as withdrawal of claims or opposition could be based on commercial rather than legal or technical considerations.

Infringement of the Patent

207 Section 66 of the Patents Act defines infringement in the following way:

> "66. (1) Subject to the provisions of this Act, a person infringes a patent for an invention if, but only if, while the patent is in force, he does any of the following things in Singapore in relation to the invention without the consent of the proprietor of the patent:
>
> > (a) where the invention is a product, he makes, disposes of, offers to dispose of, uses or imports the product or keeps it whether for disposal or otherwise;
> >
> > (b) where the invention is a process, he uses the process or he offers it for use in Singapore when he knows, or it is obvious to a reasonable person in the circumstances, that its use without the consent of the proprietor would be an infringement of the patent;
> >
> > (c) where the invention is a process, he disposes of, offers to dispose of, uses or imports any product obtained directly by means of that process or keeps any such product whether for disposal or otherwise."

208 In *Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183, the House of Lords sets out the following precepts in considering the question of infringement by a variant:

> (1) A patent specification is to be treated as an unilateral statement by the patentee, in words of his own choosing, addressed to persons skilled in the art, by which he informs them what he claims to be the essential features of the new product or process. These features constitute the "pith and marrow" of the claim.
>
> (2) A patent specification should be given a purposive construction rather than a purely literal one.
>
> (3) The question in each case is: whether persons with practical knowledge and experience of the kind of work in which the invention was intended to be used, would understand that strict compliance with a particular descriptive word or phrase appearing in a claim was intended by the patentee to be an essential requirement of the invention so that any variant would fall outside the monopoly claimed, even though it could have no material effect upon the way the invention works.

209 In *Improver Corporation v Remington Consumer Products Ltd* [1990] FSR 181, Hoffmann J approached this issue by asking the following series of questions:

"(1) Does the variant have a material effect on the way the invention works?

(2) Would it have been obvious to a man skilled in the art that a variant would work in the same way?

(3) Would the skilled reader nevertheless have understood that the patentee intended to confine his claim to the primary meaning of (the product)."

210 The First Defendant's case of non-infringement is essentially that only 2% of the whole amino acid sequence in Claim 19 is found in the synthetic peptide in the 2.2 kit and that 20% of the synthetic peptide is not found in Claim 19. In respect of the 1.2 kit, the First Defendant's position amounts to nothing more than a general denial of infringement. Even Professor Letvin was not aware of the 1.2 kit and was testifying only in respect of the 2.2 kit.

211 I accept Professor Cohen's evidence that the test kits of the First Defendant infringe the relevant pleaded Claims of the Patent. The 18 mer is a highly immuno-reactive portion of the amino acid sequence of Claim 19 and is therefore an essential part of the Patent. The other five amino acids in the First Defendant's 23 mer do not alter the character of the Plaintiffs' 18 mer but only serve the function of being a fixing and stabilising agent for the all-important 18 mer on the nitrocellulose strip.

Laches and Acquiescence Defences

212 Laches refers to the position that the delay in pursuing the remedy has brought about and not to the delay itself. The Defendants must establish that there was unreasonable delay in the commencement of proceedings and that, in all the circumstances of the case, the consequences of such delay render the grant of relief to the Plaintiffs unjust. Regard must be had to whether the Plaintiffs have gained an unjust advantage or whether there is any change in the Defendants' position to their detriment which has resulted from the delay in commencing action (*Spry, The Principles of Equitable Remedies 4th Edition, 1990*).

213 The starting point in computing the length of delay is the point in time when the Plaintiffs came to know of the relevant facts giving rise to the cause of action.

214 To establish the defence of acquiescence, two conditions must be met:

(1) an express or implied representation by the Plaintiffs that they do not intend to enforce their rights or an assent or lying by on their part; and

(2) in consequence of the above, it is unjust to grant the relief sought. (see *Spry*, supra).

215 In *Syed Ali Redha Alsagoff v Syed Salim Alhadad* [1996] 3 SLR 410, Warren Khoo J said:

"The twin essential requirements for a case of acquiescence in the circumstances of this case are knowledge, actual or constructive, of the wrongful acts of the defendants in relation to the plaintiff's property and a conscious omission to stop them or prevent them from taking place or a knowing condonation of them."

216 Can the defences of laches and of acquiescence apply to deny relief to the Plaintiffs here? In the same case cited above, Warren Khoo J said:

> "Laches is essentially an equitable defence in answer to a claim in equity. Here, the claim by the plaintiff as the administrator de bonis non is a claim to assert rights at law of the estate over the property. It seems to me that the defence of laches has no place in this context. It seems to me that this is a case where the maxim equity follows the law aptly applies."

217 The above views found favour with the Court of Appeal on appeal in *Scan Electronics (S) Pte Ltd v Syed Ali Redha Alsagoff* [1997] 2 SLR 13. At paragraph 19 of the judgment, the Court of Appeal said this in relation to the arguments on laches and acquiescence:

> "The learned judge dealt with this question at pp 422 and 423 of the report of his judgment. We entirely agree with what he said."

However, at paragraph 20 of the judgment, the Court of Appeal appears not to have endorsed what Warren Khoo J said about laches. The Court of Appeal stated:

> "Thus, unreasonable delay or negligence in pursuing a right or claim, particularly an equitable one, may be held to disentitle the plaintiff to relief."

The Court of Appeal went on to agree with the learned trial judge's views that there was no factual foundation for laches or acquiescence to stand on in any case.

218 The Plaintiffs say that the defence of laches is not applicable where a statutory limitation period has been prescribed. However, Section 32 of the Limitation Act and the decision in *British and Malayan Trustees Ltd v Sindo Realty Pte Ltd* [1998] 2 SLR 495 go against such a contention. Lai Siu Chiu J in that case held that such an argument was clearly misconceived because of the said Section 32 which provides:

> "Nothing in this Act shall affect any equitable jurisdiction to refuse relief on the ground of acquiescence, laches or otherwise."

219 The Plaintiffs seek to distinguish *British and Malayan Trustees Ltd* on the ground that the Court was dealing with the grant of specific performance of a contract which is an equitable remedy. They argue that Section 32 Limitation Act and the above case concern equitable rights.

220 If the Plaintiffs are right, their claim for a declaration and an injunction (equitable remedies) in respect of infringement of their Patent (rights at law) would conceivably also come within the ambit of the said Section 32 although such remedies are provided for in Section 67(1) of the Patents Act. As shown above, the Court of Appeal in *Syed Ali Redha Alsagoff* did not appear to have held that equitable remedies are precluded in actions to enforce rights at law. On my part, I will deal with the equitable defences here on the basis that they can apply to a case such as this.

221 I accept the Plaintiffs' evidence that they did not know of the infringing activities of the First Defendant until sometime in 1996 and had proceeded with reasonable despatch thereafter. There is no duty on the part of proprietors of patents to scan and survey the market constantly and vigilantly for infringers and to pounce on them immediately when they are sighted. The Plaintiffs did not nip the First Defendant in the bud not because they did not care but because they did not notice this wild flower blossoming in the far reaches of their world garden. The Plaintiffs had made their position

abundantly clear to the First Defendant in late 1993 and in 1994. It was the considered decision of the First Defendant to carry on with the manufacture and commercialization of the test kits after negotiations had come to a halt, abrupt though it might have been. The Plaintiffs had never turned a blind eye to the activities of the First Defendant. When they met up with the First Defendant or its affiliated companies in the USA after negotiations had been called off, it was to discuss their other business arrangements and not to check on the First Defendant. In the context of the existing cordial relationship, the Plaintiffs surely could not be expected to enquire whether the First Defendant was infringing the Patent while they were visiting. The First Defendant had also never intimated to the Plaintiffs that it was going ahead with its test kits despite the lack of a licence. I therefore fail to see how the First Defendant was misled or lulled into continuing with their production and sale of the infringing test kits or why equity should intervene on the side of the First Defendant in any way.

The Second Defendant

222 Innocent infringement is no defence to a claim for infringement of a Patent save for the question of whether damages are to be awarded. It is patently clear that the Second Defendant was the conduit between the First Defendant in Singapore and Nagase (Malaysia) in Kuala Lumpur. Some documents pertaining to the trap-purchase had the letterhead of the Second Defendant. It issued the tax invoice and the delivery order in Singapore. The delivery order shows that the test kits were transported from Singapore to Malaysia. The Second Defendant had therefore, in Singapore, disposed of or offered to dispose of or, at the very least, had kept the infringing kits for disposal or otherwise within the meaning of Section 66(1)(a) of the Patents Act. Disposal in this context would include sale but the word has wider meaning in the section. The Second Defendant need not have disposed of the kits to the ultimate buyer. It is sufficient if it is the conduit.

223 The Second Defendant relies on *Kalman v PCL Packaging (UK) Ltd* [1982] FSR 406 for the proposition that the offer to dispose must be one made in Singapore to dispose of the infringing product in Singapore. Since the quotation clearly states that the test kits would be supplied within Malaysia only and the sale did take place in Malaysia, the Second Defendant argues there was no infringement.

224 In *Kalman*'s case, it was argued that the carriers had infringed by warehousing (keeping for disposal) or carrying the goods into the United Kingdom. This argument was rejected by Falconer J who was not persuaded that what British Airways had done in relation to the goods in carrying or warehousing and delivering them constituted an infringing disposal. The Second Defendant argues that its case is even stronger as the kits were allegedly carried out of rather than into the jurisdiction.

225 In my view, a proper reading of Section 66 does not support the contention that the offer to dispose must be made in Singapore to dispose of the product in Singapore. The words in Section 66(1) – "he does any of the following things in Singapore …" – must be interpreted to read "In Singapore, he makes, disposes of, offers to dispose of …". I do not think it is correct to juxtapose another "in Singapore" at the end of each verb. Further, it would make little sense where the other verbs are concerned to say "in Singapore, he uses or imports the product in Singapore". The only place in Section 66 where there is a repeat of "in Singapore" is in Section 66(1)(b) and that is inapplicable to our case here.

226 It is also plain that the Second Defendant here is not a mere warehouseman or carrier unlike *Kalman*'s case. It was obviously intimately involved in the transaction between the private

investigator and Nagase (Malaysia).

227 Although the Second Defendant has infringed the Patent, I accept that it was not aware and had no reasonable grounds for supposing that the Patent existed. Pursuant to Section 69(1) of the Patents Act, no damages shall be awarded nor an account of profits ordered against the Second Defendant.

Section 75 Patents Act

228 One final point emerges in the Closing Submissions of the Defendants. They rely on Section 75 Patents Act and submit that the Second Plaintiff cannot recover damages or obtain an account of profits because of its failure to register the Collaboration Agreement it had with the First Plaintiff. Section 75 states:

> "75. Where by virtue of a transaction, instrument or event to which section 43 applies a person becomes the proprietor or one of the proprietors or an exclusive licensee of a patent and the patent is subsequently infringed, the court or the Registrar shall not award him damages or order that he be given an account of the profits in respect of such a subsequent infringement occurring before the transaction, instrument or event is registered unless –
>
> > (a) the transaction, instrument or event is registered within the period of 6 months beginning with its date; or
> >
> > (b) the court or the Registrar is satisfied that it was not practicable to register the transaction, instrument or event before the end of that period and that it was registered as soon as practicable thereafter."

Section 43 applies to the assignment of a patent or application therefor or a right therein and to the grant of a licence or sub-licence, among other things.

229 The Defendants argue as follows. The Patent was granted on 2 November 1989. The Collaboration Agreement was signed on 26 March 1981 and renewed on 11 July 1990. The Patents Act came into operation later on 23 February 1995 but applies by virtue of the transitional provision in Section 116(3). One of the obligations is for a proprietor or an exclusive licensee to register the relevant document. Assuming that the Patents Act does not apply and the repealed Registration of United Kingdom Patents Act is applicable, Section 11 of the repealed Act required registration as well, the failure to do which rendered the document inadmissible in any Court as evidence of the title to the rights and privileges. The Second Plaintiff registered the Collaboration Agreement only on 1 June 1999, shortly before the trial commenced. No explanation has been offered as to why it was not done earlier. The fact of registration indicates the Second Plaintiff's acknowledgement of the need to do so. The Defendants therefore submit that the Second Plaintiff is not entitled to damages or an account of profits.

230 The short and simple answer is that no explanation was given as none was asked for. This issue about Section 75 was not pleaded or alluded to in any way throughout the trial. The rules of procedure dictate that the Defendants should not be allowed to raise this issue now but, as submissions have been made on it, I shall deal with it nevertheless.

231 If the repealed Act applies, the Second Plaintiff has complied before the trial and was entitled to admit the Collaboration Agreement. Section 75 of the present Act could not have been intended to apply to past transactions such as the document in question here. The sub-paragraphs clearly contemplate documents made on or after the coming into operation of the Act.

The Orders

232 I therefore gave judgment for both Plaintiffs against the Defendants except that no damages or account of profits would be ordered against the Second Defendant by virtue of Section 69(1). The Counterclaim was accordingly dismissed. The First Defendant was ordered to pay full costs to both Plaintiffs in respect of the Claim and the Counterclaim while the Second Defendant was ordered to pay 90% of the costs for the same as it had succeeded on the Section 69 issue. However, there would be only one set of costs in respect of the entire proceedings. I also ordered that costs of the assessment of damages be reserved to the Registrar concerned.

The Defendants' Stay Application

233 On 18 February 2000, pursuant to the Defendants' application, I ordered that the assessment of damages be stayed pending the appeal to the Court of Appeal but that taxation and payment of the costs of the trial should proceed. The injunction and the order for delivery up of the infringing test kits were also stayed pending the Defendants' appeal. The First Defendant was ordered to state on affidavit the number of test kits sold in the six years preceding the date of the Writ of Summons as well as the number of test kits ordered as at the date of the affirmation of the affidavit, which was to be filed and served within three weeks. The First Defendant was, pursuant to its proposal, ordered to pay an interim fee of US$2.20 per unit test sold and delivered. The costs of this application will abide by the decision of the Court of Appeal.

TAY YONG KWANG

JUDICIAL COMMISSIONER

31 March 2000

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