THE AFTERMATH OF CREATIVE V AZTECH : FAIT ACCOMPLI OR FIASCO?

The Singapore Court of Appeal appears to have outlawed reverse engineering by disassembly in Singapore by its recent decision of *Creative Technology Ltd* v *Aztech Systems Pte Ltd*.[1] Given that reverse engineering by disassembly is a crucial step in the development of computer programs, this decision may potentially emasculate the local computer software industry. This article seeks to examine whether or not this decision should be regarded as conclusive authority for the proposition that reverse engineering by disassembly *per se* by a corporate entity is an infringement of copyright without any defences. In particular, this article will focus on the availability of the defence of fair dealing for the purpose of private study under section 35 Copyright Act (Cap 63, 1988 Ed).[2] The penultimate draft of this article was written prior to the Copyright Amendment Bill (No 4 of 1998) which was passed by Parliament on 19 February 1998. The effect of the amendments on the defence of fair dealing in Singapore will also be reviewed. The legality of black-box reverse engineering[3] is however beyond the scope of this article.

1 *Creative Technology Ltd* v *Aztech Systems Pte Ltd* [1997] 1 SLR 621, [1997] FSR 491 (Court of Appeal, Singapore). Hereafter "*Creative* v *Aztech*".

2 All statutory provisions cited hereafter, unless otherwise stated, are provisions of the Singapore Copyright Act (Cap 63, 1988 Ed).

3 Black-box reverse engineering is to be distinguished from reverse engineering by disassembly. Black-box reverse engineering is "a process in which the desired information about how a program functions is obtained by inputting data to the computer system, running the program and then looking at the results of the program. Through an iterative process of changing the input and watching the resulting output changes, it is possible to determine, in outline, how the original program functions. The observer of the black-box process then uses the results obtained to design an independently-created program to achieve the same functional specification as that of the target program *without ever looking at its source code or object code*." (Emphasis added.) (Hart, "Legal Protection of Computer Programs : Decompilation, Reverse Engineering and the EC Directive" [1993] 1 The International Computer Lawyer 10 at 10.) It will be seen that reverse engineering by disassembly *invariably* involves a reproduction of and access to the source code of the target program, which consequently leads to copyright infringement. But black-box reverse engineering may or may not involve such a reproduction and almost *invariably does not* involve any access to the source code of the program, thus it would be very unusual for a finding of copyright infringement through such a process. (But see *Autodesk* v *Dyason* (No 2) (1993) 25 IPR 33 (High Court of Australia) for the proposition that such a process may result in copyright infringement.)

I. INTRODUCTION

The Parties.

The plaintiff, Creative Technologies Ltd (a public listed company, listed both in Singapore and the United States) manufactures and sells high quality computer peripherals including the SoundBlaster soundcard. The SoundBlaster soundcard is sold on the market bundled with, *inter alia*, a program called 'TEST-SBC'. The soundcard itself contains a computer chip which comprises a random-access memory element, a read-only memory element and an arithmetic and logic unit.[4] There is another program (hereafter 'the firmware program') stored in this read-only memory element of that computer chip.

The defendant, Aztech Systems Pte Ltd, wanted to develop soundcards compatible with the existing industry standards at that time. Creative's SoundBlaster soundcard embodied one such standard. In March 1992, Aztech launched its first generation of SoundBlaster-compatible soundcards, the Sound Galaxy BX and NX soundcards. Shortly, Creative developed and launched its next generation of SoundBlaster cards. Within a short space of five months, Aztech developed and launched its own second generation SoundBlaster-compatible soundcard, the Sound Galaxy NX PRO, which was, unlike the first generation Sound Galaxy cards, 'capable of responding in a sophisticated way to a full range of Creative's undocumented commands'.[5]

Creative brought proceedings against Aztech for copyright infringement of both its firmware program and TEST-SBC program. Creative alleged that Aztech must have disassembled the firmware program and the TEST-SBC program in order to develop the compatible soundcards. Aztech denied extracting and disassembling the firmware but admitted running TEST-SBC with a decompiler[6], DEBUG.[7] Accordingly, Aztech sought the following defences for their admitted act of infringement: the fair dealing defence under section 35, the non-derogation from grant defence under *British Leyland Motor Corporation Ltd* v *Armstrong Patents Co Ltd*[8], the exhaustion of rights doctrine from *Belts* v *Willmott*[9] and an implied licence.

4 *Aztech Systems Pte Ltd* v *Creative Technology Ltd* [1996] 1 SLR 683, 687D–F (High Court, Singapore).

5 *Supra* note 1 at 626 paragraphs 5 & 6.

6 A decompiler (technically known as a 'disassembler') is used to automate the process of converting a computer program in object code into source code. The necessity of this process will be discussed shortly — see main text accompanying note 19.

7 It will be demonstrated that disassembly invariably leads to copyright infringement (subject to availability of defences). Thus this admission by Aztech was perhaps unwise on hindsight. *Supra* note 4 at 699F–I.

8 *British Leyland Motor Corporation Ltd* v *Armstrong Patents Co Ltd* [1986] 2 WLR 400 (House of Lords).

9 *Betts* v *Willmott* (1871) 6 LR Ch App 239.

The High Court decision.[10]

His Honour, Lim Teong Qwee JC found that Aztech had no access to the firmware program and it did not disassemble the firmware program. He found that it was more likely that Aztech had black-box reverse engineered the firmware program without extracting it from the ROM chip that contained it.[11] Consequently, his Honour found that there was no copyright infringement of the firmware.[12]

However, because Aztech admitted to running the TEST-SBC program with a decompiler, known as DEBUG, his Honour found that there was copying of TEST-SBC into the memory of a computer and this constituted copyright infringement.[13] Nevertheless, despite the finding of infringement of TEST-SBC, the judge held that Aztech had the defence of fair dealing for the purpose of 'private study' and Aztech's plea that Creative had exhausted its rights in the articles sold also succeeded. Creative appealed.

The Court of Appeal decision.[14]

The Court of Appeal decision was delivered by the learned Lai Kew Chai J. The Court of Appeal overturned the High Court's findings of fact and found that Aztech had access to Creative's firmware and had disassembled Creative's firmware program.[15] Creative thus succeeded on its claim that the *process of* disassembly of the firmware was an infringing act. But the Court denied Creative's independent claim of infringement of the firmware, *ie* that the 4% similarity between the Aztech's resulting program and Creative's firmware program constituted substantial taking of Creative's work.[16] In other words, Aztech's *product* was not a reproduction of Creative's firmware within the meaning of section 26(1)(a)(i). On the defences to infringement concerning disassembly of TEST-SBC, the Court of Appeal refused to import the doctrine of exhaustion of rights into Singapore copyright law. The Court of Appeal further refused to countenance the possibility of Aztech's reliance on section 35 when the 'private study' was for commercial purposes.

The Impact of *Creative* v *Aztech* on the Software Industry

Reverse engineering by disassembly involves loading the program under investigation into the memory of a computer. It will be shown that this is *prima facie* an infringing reproduction of the copyright in the program.

10 *Aztech Systems Pte Ltd* v *Creative Technology Ltd* [1996] 1 SLR 683, [1996] FSR 54 (High Court, Singapore). Hereafter "*Aztech* v *Creative*".
11 *Supra* note 10 at 692C–D and 6981.
12 *Ibid*, at 699D–E.
13 *Ibid*, at 699H.
14 *Supra* note 1.
15 *Ibid*, at 633 paragraphs 56 & 58.
16 *Ibid*, at 633 paragraphs 56 & 57.

This being the case, the legality of reverse engineering by disassembly will be determined by the availability of defences. Consequently, the Court of Appeal's denial of defences to infringement by Aztech would also preclude corporate entities, who engage in disassembly when commercially motivated, from seeking these defences. Given, as will be shortly demonstrated, the importance of reverse engineering by disassembly to software development, the unavailability of any defences could detrimentally affect the software industry in Singapore. The Court of Appeal's decision has not been explicitly overturned with the passing of the Copyright (Amendment) Bill No. 4 of 1998. The amendments concern only the 'research' limb of section 35, whereas *Creative* v *Aztech* was primarily concerned with the 'private study' limb. Therefore, *Creative* v *Aztech* may remain a binding precedent on the construction and application of the 'private study' limb of section 35 in Singapore. It is therefore further proposed to re-examine the case of *Creative* v *Aztech*,

II. THE NECESSITY OF DISASSEMBLY

A. Technical/Practical Necessity of Disassembly for Development of Software.

Reverse engineering of a computer program is motivated by the pursuit of knowledge concerning the internal workings of that computer program (hereafter 'the specimen program').

Computer programs are invariably marketed in object code.[17] This means that the information contained therein is inaccessible to humans.[18] To facilitate the process of understanding the internal workings of the specimen program, the reverse engineer will decompile the object code into a higher level language that humans can more easily understand - the reconstructed source code.[19] Yet the reverse engineer's job is not finished. He still has to apply his specialist skills, experience and

17 Andrew Johnson-Laird, "Reverse Engineering of Software: Separating Legal Mythology From Actual Technology" (1992) 5 Software Law Journal 331 at 343: The object codes look like 'tables of random numbers' which are machine readable.

18 But there are statements to the contrary. An expert witness in *Sega Enterprises Ltd* v *Accolade, Inc* 977 F.2d 1510 (9th Cir. 1992) at 1525 testified that 'a reverse engineer can work directly from the zeros and ones of object code'. See also *supra* note 17 at 343: object code is difficult to understand because it has been stripped of all high level abstraction information and not merely because it is in object code, for "a programmer can decipher object code and create a list of human readable machine instructions."

19 The original source code is written by the original programmer in a higher level language with can be understood by humans. This original source code often includes labels, comments and other notes that the programmer may include to assist the development of the program. This source code is then 'compiled' by a computer program, called a 'compiler', into a lower level language which the computer can understand. This is the object code. In this form, the object code is stripped of all the labels, comments and other notes that the original programmer had written into the

knowledge to analyse and interpret the reconstructed source code to discover how the specimen program works.[20]

The original programmer often does not disclose all the information[21] other programmers need to develop compatible[22] or interoperable[23] software.[24] He will often regard most, if not all, of such information as proprietary trade secrets.[25] Thus other programmers are compelled by necessity to reverse engineer due to this dearth of alternative sources of information.

It must be emphasised that the market demands near-perfect compatibility or interoperability. Nothing less will do.[26] Yet such compatibility or interoperability cannot be achieved without a similar near-perfect

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original source code. This stripping is a technical consequence of the process of 'compiling'. Consequently, the reverse engineer will not have access to these labels, comments and notes if he 'decompiles' that object code back into source code. Hence this 'reconstructed source code' needs to be distinguished from the 'original source code' which contained these labels, comments and notes. There is judicial recognition of this in *Aztech* v *Creative supra* note 10 at 691E–G and in *Creative* v *Aztech supra* note 1 at 633 paragraph 52.

20 *Supra* note 17. It is often misunderstood that disassembly is easily achieved with a click of a button. This overlooks the tremendously tedious process of analysis and interpretation which is an integral part of reverse engineering.

21 *Supra* note 17 at 342. 'There are only four sources for this information: the technical documentation available on the commercial market in the original product manuals; information in technical magazines and books; experimentation with a legitimately acquired copy of the program, running it on a computer to observe what it does and the kinds of files it creates; and finally, information gathered by analysing the inner workings of the original program. … Software manuals and specifications are by definition, incomplete, inaccurate, and out-of-date. They are normally written before the software is completed and are therefore a statement of intent rather than a description of fact. Even when they are written after the product has been completed, they never succeed in describing all aspects of the product, nor are they error free.'

22 When program A is said to be 'compatible' with program B, it means that program A will provide the same function as program B through the same interfaces. (See Jacobs, "Copyright And Compatibility" (1989) 30 Jurimetrics Journal 91, 92.) An 'interface' is 'nothing more than a *pro* forma method of interconnecting two different computer programs. The interface designer creates a documented method of handling information from one module to another, and another for returning responses. An interface has two characteristics: data structure and data content. For accurate communication [between program A and program B], both structure and content must be correct.' (*Supra* note 17 at 339) Hence 'compatibility' is the ability of program A to perform the same function(s) as program B through the same interfaces.

23 'In today's computers, from microcomputer to mainframe, a single program must operate in the company of many other software components in what is essentially a software commune. ... Interoperability implies peaceful co-existence between two programs.' (*Supra* note 17 at 338–340.) Hence, 'interoperability' may simply be stated as the ability of program A to work alongside programs B, C and D without 'anti-social behaviour' that may result in loss of data, or even a systems crash.

24 *Supra* note 17 at 342.

25 See for example *Stac Electronics* v *Microsoft Corporation* (1994, unreported) and Vinje, Threat To Reverse Engineering Practices Overstated [1994] 8 EIPR 364.

26 *Supra* note 17 at 336–342.

knowledge of the specimen program. There are often no other alternative sources of information but disassembly. Black-box reverse engineering is not an alternative to disassembly.[27] Black-box reverse engineering is convenient and time-saving[28] only if the software or device being studied is relatively simple.[29] Black-box reverse engineering will be virtually impossible in certain instances where the program or device only has one unvaried response or where the specimen program is very complex.[30]

The only viable alternative to obtain complete accurate information about the internal workings of the specimen program is disassembly.[31] Thus the necessity of disassembly is manifest.

B. Economic Necessity of Allowing Disassembly

Disassembly is an 'extremely tedious, time-consuming and expensive' process[32]. The pursuit of knowledge through disassembly is in turn motivated by the hope of the financial gain in and the commercial success of a competing or interoperable product. Given the technical and practical necessity of disassembly, the development of a commercially successful product will be greatly impeded if the practice of disassembly is disallowed.

It has been said that the non-disclosure of functional aspects of a computer program by the original programmer will grant him a *de facto* monopoly over uncopyrightable aspects of the program.[33] The following explains the point.

> Commercially developed software products are typically published in the form of object code that is intelligible only to a computer. The source code, examination of which would reveal to erstwhile competitors such matters as the unprotected ideas contained therein and use of public domain subroutines, is meanwhile locked away in the copyright proprietor's vault, far removed from rivals' scrutiny. Because normal use of the product, in its object code configuration,

27 *Ibid*, at 346, 347.
28 *Supra* note 10 at 691, 692.
29 See for example the AutoCAD Lock in *Autodesk* v *Dyason* (1989) 15 IPR 1 (FC, Australia) where the simplicity of the Lock allowed the reverse engineer to rely on black-box reverse engineering.
30 *Supra* note 17 at 346–354.
31 *Ibid*, at 346–354.
32 *Supra* note 10 at 691F–G.
33 Ng-Loy, "Reverse Engineering of Computer Programs — Rethinking Its Prohibitions" (1994) 6 S. Ac. L. J. 131. It is trite that copyright protects expression not ideas. An absolute prohibition against disassembly would in effect grant the original programmer 'a monopoly over *functional principles which constitute the idea*(*s*) underlying the program', (at 134) See *Sega Enterprises Ltd* v *Accolade, fnc* 977 F.2d 1510 (9th Cir. 1992). See also Singapore's obligations under Arts 9(2) and 10(2) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs Agreement).

> will reveal almost nothing as to its unprotected high level structure, its incorporation of public domain components, its use of algorithms in which ideas merges with expression, and like circumstances of authorship, publication of the software does not open its unprotected elements to scrutiny in the manner that publications of a "low tech" variety afford.[34]

These uncopyrightable aspects of the program may be made available through the process of reverse engineering. It may be noted that the major exporters of IT products are the developed countries, in particular, the largest exporter, the United States. But the ruling of our Court of Appeal seems to favour the developed countries by giving their products a vastly superior protection not found even within their own jurisdictions. For example, in the United States, disassembly is accorded the fair use defence under section 107 US Copyright Act[35] by the 9th Circuit Court in *Sega Enterprises Ltd* v *Accolade, Inc*.[36] In the EC, the Council Software Directive of 14 May 1991 has obligated member states to legislate decompilation rights in their respective copyright laws.[37] The position in Singapore ought not to be different because of our obligations under the TRIPs Agreement. Article 9(2) of the TRIPs Agreement exempts certain elements[38] from copyright protection. The effect of the restrictive reading of section 35 adopted by our Court of Appeal unfortunately extends the copyright monopoly beyond these limits, a result which the court perhaps never intended.

34 Nimmer, *Nimmer on Copyright*, Vol. 4 at 13–230.

35 s107 — Limitation on exclusive rights : Fair Use
Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of the work in any particular case is a fair use the factors to be considered shall include —
(1) the purpose and character of the use, including whether such use is of a commercial nature or is for non-profit educational purposes;
(2) the nature of the copyrighted work;
(3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
(4) the effect of the use upon the potential market for or value of the copyrighted work.

36 *Sega Enterprises Ltd* v *Accolade*, *Inc* 977 F.2d 1510 (9th Cir. 1992).

37 An example of such domestic legislation is s 5OB UK Copyright, Designs and Patents Act 1988.

38 Art 9(2) TRIPs: "Copyright protection shall extend to expressions and not to ideas, procedures, methods of operation or mathematical concepts as such." See also Art 10(2) where 'data' is also precluded from copyright protection.

Moreover, there is acceptance of black-box reverse engineering[39] and disassembly[40] as being 'indispensable to obtain the necessary information to achieve the interoperability of independently created programs with other programs.'[41] Reverse engineering has always been regarded by the software industry as an accepted and fair practice.[42] It is undesirable that the decision of *Creative* v *Aztech* appears to illegitimize this practice. The present position in Singapore calls for a critical examination of the decision of *Creative* v *Aztech.*

III. *CREATIVE* V *AZTECH* REVISITED

A. Should Disassembly *per se* be Sufficient tor Infringement?

Reproduction of the specimen program during the process of disassembly can take place in one or two instances. Firstly, if the specimen program is contained in a medium from which it cannot be directly accessed, for example a ROM chip, then the specimen program has to be extracted from that medium and stored in another more accessible medium. The process of extraction and storage may constitute reproduction. Secondly, the specimen program may already be stored in a more easily accessible form, for example in a CD-ROM or a floppy diskette. In this case, all that is required is to load that medium into the computer and then load the specimen program into the computer's memory to decompile it. Again, this loading of the specimen program into a computer's memory is likely to constitute reproduction. But should this latter form of reproduction be regarded as reproduction in material form?[43] Set out below are some of the objections against regarding this form of reproduction as an infringing act.

1. Intermediate Copying

The first objection is that such reproduction of the specimen program is merely intermediate or incidental. It is merely a means to an end and the end-product may well be totally dissimilar from the specimen program. However, the 9th Circuit Court in *Sega* v *Accolade* rejected such a submission on the basis that the US Copyright Act gave the copyright owner the exclusive right to reproduce and prepare derivative works based upon the copyrighted work. Such an exclusive right does not 'distinguish between unauthorised copies of a copyrighted work on the basis of what stage of the alleged infringer's work the unauthorised copies represent.'[44]

39 E.g. see EC Council Directive, *supra* note 37 and accompanying text, Art 5(3).
40 E.g. see EC Council Directive, *Ibid*, Art 6.
41 EC Council Directive Preamble, *Ibid*, paragraph 21.
42 *Kewanee Oil Co.* v *Bicron Corp* 416 US 470 (1974). See *supra* note 17 at 332.
43 It is not proposed to examine whether the act of extraction should be regarded as an infringing act under the Copyright Act.
44 *Supra* note 36 at 1518.

2. Transient Reproduction

The second objection is that such a reproduction is merely transient. The reproduction does not have the permanence commonly understood of material objects. The reproduction in the RAM of a computer is volatile and disappears once the electrical power is switched off. This objection was easily answered by the 9th Circuit Court in *Sega* v *Accolade* for the express words of section 101 US Copyright Act does not require such a high degree of permanence. It merely requires the work to be 'fixed in any tangible medium'[45] and that it is 'sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration.'[46] This objection was also refuted in a rather interesting way in *Advanced Computer Services* v *MAI Systems*[47]. The court held that

> one only need imagine a scenario where the computer, with the program loaded into RAM, is left on for extended periods of time, say months or years, or indeed left on for the life of the computer. In this event, the RAM version of the program is surely not ephemeral or transient; it is, instead, essentially permanent and thus plainly sufficiently fixed to constitute a copy under the Act.

3. Prohibiting the Product vs the Process?

The third objection is that a finding of infringement against the process and not the product of disassembly is contrary to the *policy* behind the intellectual property in copyright. Copyright is said by one author[48] to be designed 'to allow recoupment for the initiative of creating the material and the investment risked in producing and marketing [an artistically creative work].' This is also said to be premised on 'society's deep desire for artistic creativity'.[49] Consequently, the focus vis-a-vis infringement should be upon the *product* of the infringement and not the *process*, since it is the former that will have, in embodying 'new information, new aesthetics, new insights and understandings', have a greater capability of enriching society. If the independently created end-product, albeit using the knowledge and information gained from disassembly, should prove

45 S 102(a) US Copyright Act.

46 A similar conclusion was reached by *Vault Corporation* v *Quaid Software Ltd* 847 F.2d 255 (5th Cir. 1988) at 260. The court alluded to the fact that 'the act of loading a program from a medium of storage into a computer's memory creates a copy of the program'. This passage was cited with approval in *MAI Systems Corporation* v *Peak Computer, Inc* 991 F.2d 511 at 519 (9th Cir. 1993). The 9th Circuit Court in this case stated that 'since ... the copy created in the RAM can be "perceived, reproduced, or otherwise communicated," we hold that the loading of software into the RAM creates a copy under the Copyright Act 17 USC s 101.'

47 845 F.Supp. 356 at 363 (E.D.Va. 1944).

48 Cornish, "*Intellectual Property*" (3rd ed 1996) at 320.

49 *Ibid*, at 318.

to be a productive use (rather than merely a reproductive use)'[50] of that knowledge, then surely the intermediate or incidental infringement should be foreshadowed by the resulting contribution to the advancement of the state of the art. By myopically focussing on the infringing process, the advancement of the art is too often sacrificed for the monopolistic claims of the copyright owner.

4. Material Fixation under the Singapore Copyright Act

The above objections will now be reviewed in the context of the Singapore Copyright Act. The first objection just mentioned can be easily dealt with. The answer to the first objection given by the 9th Circuit Court in *Sega* v *Accolade* would apply in like manner to the Singapore context since the exclusive right of the copyright owner under the Singapore Copyright Act also does not 'distinguish between unauthorised copies of a copyrighted work on the basis of what stage of the alleged infringer's work the unauthorised copies represent.[51] The third objection is more

50 This idea of productive use of copyright material, as opposed to mere reproduction is best encapsulated in the American 'transformative use' doctrine. This doctrine was developed by the American courts under the first fair use factor of s107 : the 'purpose and character of the use'. (See *supra* note 35.) The US Supreme Court in *Campbell* v *Acuff-Rose Music, Inc* 114 S Ct 1164 at 1171 (1994) held that "the goal of copyright ... is generally furthered by the creation of transformative works ... the more transformative the new work, the less will be the significance of other factors, like commercialism, that may weigh against a finding of fair use." A 'transformative use' of a copyrighted work is best described by District Judge Leval. Referring to first fair use factor, his Honour wrote: 'Factor One's direction that we consider the purpose and character of the use raises the question of justification. Does the use fulfil the objective of copyright law to stimulate creativity for public illumination? This question is vitally important to the fair use inquiry, and lies at the heart of the fair user's case. ... I believe the answer to the question of justification turns primarily on whether, and to what extent, the challenged use is *transformative.* The use must be productive and must employ the quoted matter in a different manner or for a different purpose from the original. A quotation of copyrighted material that merely repackages or republishes the original is unlikely to pass the test, it would merely supercede the objects of the original. If on the other hand, the secondary use adds value to the original — if the quoted matter is used as raw material, transformed in the creation of new information, new aesthetics, new insights and understandings — this is the very type of activity that the fair use doctrine intends to protect for the enrichment of society. ... The first fair use factor calls for a careful evaluation whether the particular quotation is of the transformative type that advances knowledge and progress of the arts or whether it merely repackages, free riding on another's creations.' (Leval, "Toward A Fair Use Standard" (1990) 103 Harv L Rev 1105 at 1111–1116.) Nimmer also commented: "Unless there is a 'productive use' in the sense that the copier himself is engaged in creating a work of authorship whereby he adds his own original contribution to that which is copied, the defence of fair use may not be invoked." (*Nimmer on Copyright*, Vol 4 at section 13.05[A][1][b]) See also *Universal City Studios, Inc* v *Sony Corp of America* 659 F 2d 963 (9th Cir 1981) and *American Geophysical Union* v *Texaco Inc* 802 F Supp 1 at 11, 12 (SONY 1992).

51 S 26(a)(i).

appropriately considered in the context of the defence of fair dealing since it concerns primarily whether or not the dealing in question was fair.[52] This will be discussed later in this article.

However, the second objection, which is premised on the transiency of the reproduction, merits greater discussion. While the US decisions, based on the US Copyright Act, may have correctly held that the act of disassembly, which involves loading the specimen computer program into the RAM of a computer, is *prima facie* an infringing act, the matter is not so easily resolved under our Copyright Act.

Material fixation is a requirement under our Copyright Act for both copyrightability[53] and infringement[54]. But the requisite degre e of permanence to constitute 'material form' is not clearly explicated in our Act. The opportunity arose in *Creative* v *Aztech* for the Court of Appeal to make an authoritative pronouncement but it would appear that this issue was not put before the court.

In *Creative* v *Aztech*, the Court of Appeal decided that the process of disassembly amounts to an infringing reproduction of the plaintiff's copyrighted work. It is commendable that the result of the judgment was that the Court distinguished between the infringing process (disassembly of the firmware) and the alleged infringing product (Aztech's firmware).[55] However, the Court of Appeal did not state the reason for holding that disassembly amounts to infringement. All that the court said was:

> disassembly ... involves a degree of reproduction and adaptation having a greater impact in terms of revealing the ideas and interfaces of a copyright holder's program, insights which would not otherwise have been obtained by independent development or empirical observation within a given time frame.[56]

It is regrettable that the court did not elaborate on this statement. The phrase 'a degree of reproduction and adaptation' further begs the question: is the degree of reproduction a matter of qualitative or quantitative assessment? This uncertainty is further exacerbated by the cursory dismissal of Creative's claim of independent infringement[57] which

52 It was also in this context that the American doctrine of 'transformative use' was developed. *Supra* note 50.

53 S 16(1): "A reference in this Act to the time when, or the period during which, a literary ... work was made shall be read as a reference to the time when, or the period during which, as the case may be, the work was first reduced to writing or to some other material form."

54 S 26(a)(i) read with s31(1).

55 *Supra* note 1 at 634 paragraphs 57–58.

56 *Ibid*, paragraph 58.

57 *Ibid*, paragraph 57. This claim is independent of the allegation of infringement by disassembly and is premised instead on the 4% similarity between Creative's work and Aztech's product. The court dismissed Creative's claim because 'only 4% or less ... of Aztech's code was actually identical to Creative's code.'

appears to suggest a quantitative analysis[58] and the existence of a *de minimis* threshold in our copyright law.[59] These difficulties coupled with the objections previously enumerated, suggests that there may be room to argue that the process of disassembly *per se* should not be an act of infringement.

Notwithstanding the uncertain basis of *Creative* v *Aztech* on this point, it is submitted that the Court was correct in concluding that the transient or incidental copying involved in disassembly is reproduction in material form. The wording of the Singapore Copyright Act is sufficiently wide to accommodate such a construction. Furthermore, this conclusion is consistent with Article 9(1) of the TRIPs Agreement, which imports Article 9 of the Berne Convention[60]. Under the latter Article, it may be argued that reproduction of a computer program in RAM will fall within the meaning of the words 'reproduction in *any* manner or form.' (Emphasis added.) It is also consistent with the position taken in several other jurisdictions, namely the United States[61], the United Kingdom[62], Australia[63] and Malaysia[64]. On the bases of these generous approaches

58 This is contrary to *Ladbroke* v *William Hill* [1964] 1 WLR 273 (House of Lords) that stated the necessity for qualitative substantial taking.

59 It is unclear if the court had in mind the deeming provision of s 35(3)(b) where the 4% could be regarded as a 'reasonable portion' of the copyrighted work. But in any case, any reasonable portion taken under s 35(3) must still be for either of the stated purposes of research or private study. In the light of the court's decision concerning the construction of s 35(1), it is difficult to explain this apparent *de minimis* standard as being based upon s 35(3).

60 Art 9(1) TRIPs Agreement provides *inter alia* that 'Members shall comply with Articles 1 through 21 of the Berne Convention (1971) and the Appendix thereto.' Art 9 Berne Convention (1971) provides, *inter alia*: '(1) Authors of literary and artistic works protected by this Convention shall have the exclusive right of authorising the reproduction of these works, in any *manner or form.*'

61 S101 US Copyright Act. A work is considered 'fixed' if 'sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration.'

62 S17(2) CDPA 1988 is not restrictive for it uses the words 'any material form' and it further stated that 'this includes storing the work in *any medium by electronic means.*' (Emphasis added)

63 The 1994 Amendments to the Australian Copyright Act after the decision of *Computer Edge* v *Apple Computers* [1986] FSR 537 (High Court Australia) suggests that a more generous approach concerning material fixation is required. The High Court had held that a computer program in object code stored in a ROM chip as electrical impulses could not be regarded as copyrightable because the work was not even a literary work capable of human appreciation as the electrical impulses could not be perceived by human senses. That the amendments were designed to abrogate the requirement of visibility thus rendering such programs stored in ROMs copyrightable suggests that the same generosity may be extended to computer programs stored in RAM. See Lahore, *Copyright & Designs* (1996) at [50,075].

64 It was held in *Creative Purpose* v *Integrated Trans* [1997] 2 MLJ 429 at 437 (High Court, Malaysia) that '[a] set of instructions which is embedded into an integrated circuit is conferred protection. … It is my finding that the definition of s3 of the Act should be read broadly so as to include all manifestations of that set of instructions which can be read by a computer in *whatever converted form.*'

taken in other jurisdictions, it is suggested that the words 'material form in section 16(1) should be read generously and not restrictively in order that transient reproduction be included in the copyright owner's range of exclusive rights.

B. The Fair Dealing Statutory Defence: Section 35 Copyright Act

For ease of reference, the salient portions of section 35 are set out here.

> Fair dealing for purpose of research or study.
>
> **35.—**(1) A fair dealing with a literary, dramatic, musical or artistic work, or with an adaptation of a literary, dramatic or musical work, for the purpose of research or private study shall not constitute an infringement of the copyright in the work.
>
> (2) For the purposes of this Act, the matters to which regard shall be had, in determining whether a dealing with a literary, dramatic, musical or artistic work or with an adaptation of a literary, dramatic or musical work, being a dealing by way of copying the whole or a part of the work or adaptation, constitutes a fair dealing with the work or adaptation for the purpose of research or private study shall include —
>
> (a) the purpose and character of the dealing, including whether such dealing is of a commercial nature or is for non-profit educational purposes;
>
> (b) the nature of the work or adaptation;
>
> (c) the amount and substantiality of the part copied taken in relation to the vyhole work or adaptation; and
>
> (d) the effect of the dealing upon the potential market for, or value of, the work or adaptation.
>
> ...
>
> (5) In this section, "research" shall not include industrial research or research carried out by bodies corporate (not being bodies corporate owned or controlled by the Government), companies, associations or bodies of persons carrying on any business.

1. The Interpretations Adopted by the Courts

The High Court in *Aztech* v *Creative* held that Aztech could avail itself of the defence of fair dealing for the purpose of 'private study' notwithstanding that it was for a commercial purpose. The learned Lim Teong Qwee JC contrasted 'private' with 'public' so that any study or any knowledge gained from such study that is not generally made available to the public can be said to be 'private study'. His Honour held,

> I have been referred to the *Oxford English Dictionary* and this is one of the definitions of the word 'study' which I think is appropriate : 'the devotion of time and attention to acquiring information or knowledge.' … It seems to me that a study is private if the study and the information and knowledge acquired through it are kept or removed from public knowledge or observation and this is so even if the purpose may be of a commercial nature. The commercial nature of the purpose is a matter to be taken into consideration along with others to determine if the copying in a particular case constitutes fair dealing for the purpose of private study and it does not follow that the defence is excluded in every case where the purpose of the copying may be categorised as being of a commercial nature.[65]

Having read 'private study' this way, there is no conflict with section 35(5) which precludes 'industrial research or research carried out by bodies corporate, companies, associations or bodies of persons carrying on any business'. This meant that 'private study for commercial purposes' will not be precluded from being a 'dealing' within the meaning of section 35(1). Instead, it fell to be considered under section 35(2)(a) so as to assess whether the commercial purpose rendered the dealing unfair.

The Court of Appeal reached a very different conclusion. It held,

> '"Private study' should be construed to refer only to individuals actually performing a study. In order to come within the 'private study' exception, the dealing (usually copying) must be undertaken by the student himself: *University of London Press Ltd* v *University Tutorial Press Ltd* [1916] 2 Ch 601 and *Sillitoe & Ors* v *McGraw-Hill Book Co (UK) Ltd* [1983] FSR 545. … [75] *If one were to adopt a broader construction of* '*private study*' *to extend to* '*private study for commercial purposes', this interpretation would render otiose the specific exclusion of commercial research under s 35(5), in that all commercial research will almost inevitably be private study as well.* It could not have been the intention of Parliament to propagate this non-distinction.'[66] (Emphasis added).

The Court of Appeal drew a distinction between 'research' and 'study'.[67] It held that 'research' and 'study' were qualified separately under section 35. However, no attempt was made to define the meanings of both words. The court read section 35(5) as a statutory exclusion of 'commercial

65 *Supra* note 10 at 700E–F and at 701C–E.
66 *Supra* note 1 at 637 paragraphs 74 and 75.
67 This is correct in the light of *De Garis* v *Neville Jeffress Pidler Ply Ltd* (1990) 95 ALR 625, 18 IPR 292. See also *Re AC (British-Columbia) and Messier* (1984) 8 DLR (4th) 306.

research'[68] and concluded that 'study' was to be similarly qualified by the word 'private' to exclude 'commercial study'. It held that the extended construction of the phrase 'private study' by the High Court would equate it with all forms of commercial research, constituting the 'non-distinction'. Consequently, since section 35(5) only qualifies 'research' and not 'study', commercial research by corporations will circumvent the statutory exclusion under section 35(5) by being alternatively categorised under the 'private study' limb of section 35(1). Hence the Court of Appeal adopted a restrictive construction of the phrase 'private study' to exclude 'private study for commercial purposes' so that section 35(5) is not rendered otiose.

2. Difficulties in the Court of Appeal's Construction

a. Industrial Research or Commercial Research

From the passage just reproduced, it is evident that the restrictive reading of 'private study' by the Court of Appeal was premised on its perception that a wide reading will render section 35(5) otiose. Section 35(5) was said to be a statutory exclusion of commercial research from the 'research' limb of section 35(1). However, no authority was cited in support of this interpretation. Looking at the words of section 35(5), it is difficult to see how the court could have arrived at this conclusion. The clear language of section 35(5) excludes '*industrial* research' and not '*commercial* research'. Commonly understood, the words 'commercial research' would refer to profit-oriented research. Likewise, 'industrial research' would refer to research that is of industrial application. The two phrases are not necessarily synonymous. Moreover, Parliament appears to have consistently used the words 'commercial' and 'industrial' disjunctively, justifying a presumption that the two words should have separate and distinct meanings.[69]

It is suggested that the source of this confusion may have been an erroneous reproduction of section 35(5) in the judgment as reading:

> (5) In this section, 'research' shall not include *commercial* research ....[70]

68 *Supra* note 1 at 637 paragraphs 70 and 73.

69 See for example: s 3(2)(d) & (f) Air Navigation Act (Cap 6, 1985 Ed), s 31(1) Banking Act (Cap 19, 1994 Ed), s 61(1)(n) Fire Safety Act (Cap 109A, 1994 Ed), ss 23(1) & 26(1) Finance Companies Act (Cap 108, 1995 Ed), 2nd Schedule of Goods & Services Tax Act (Cap 117A, 1997 Ed), s 12(7)(b) Income Tax Act (Cap 134, 1996 Ed), s 5(1)(c) Land Acquisition Act (Cap 152, 1985 Ed), s 8(2)(a) Monetary Authority of Singapore Act (Cap 186, 1985 Ed), s 55 Patents Act (Cap 221, 1995 Ed).

70 *Supra* note 1 at 636 I. It is noted that this error was replicated in Stanley Lai, "Recent Developments in Copyright Protection And Software Reverse Engineering In Singapore" [1997] 9 EIPR 525.

Given that section 35(5) only operates to preclude industrial research, 'private study for commercial purposes' if admitted under the study limb of section 35(1) is not likely to outflank section 35(5) and render section 35(5) otiose. Consequently, the primary objection of the Court of Appeal to the High Court's interpretation is robbed of its barb.

b. The Indolence of Section 35(2)(a)

The Court of Appeal read 'private study' restrictively to exclude 'private study for commercial purposes' so as to avoid the mischief of rendering section 35(5) otiose. It is submitted that the effect of this restrictive construction will commit the same mischief that it sought to avoid.

Section 35(2) prescribes certain factors for the court to take into consideration when determining whether or not a dealing is fair. Under section 35(2)(a), the court has to take into account the 'purpose and character of the dealing, including whether such dealing is of a commercial nature'. The use of the word 'shall' in section 35(2) renders the consideration of these factors mandatory.

By precluding commercial studies from 'dealing for the purpose of private study', the court has peremptorily excluded any form of commercial study from section 35(1).[71] By the court's interpretation of section 35(5), any commercial research will similarly be excluded. The consequence is that the 'commercial nature' aspect of section 35(2)(a) factor which the court *shall* consider, vis-a-vis the fairness of the dealing, will *never* be considered, save in the situation where the defendant is a government owned or controlled organisation.[72] This severely narrows the scope of section 35(2)(a) to the extent of virtually rendering it otiose. Thus the very problem concerning section 35(5) which the Court of Appeal was attempting to avoid has been replicated in relation to section 35(2)(a).

c. The Resurrection of a Non-distinction

Even if the Court of Appeal's interpretation of section 35(5) is accepted, the reasoning of the Court of Appeal presents another difficulty. The restrictive reading of 'private study' will avail the defence of fair dealing only to defendants, who are individuals, performing studies for their own academic edification.[73] The 'research' limb of section 35(1) as qualified by section 35(5) will also require defendants, who *inter alia* are not bodies

71 This point will be dealt with below in the section titled 'The Hierarchy Within Section 35.'

72 Ng-Loy Wee Loon, "Legitimizing Reverse Engineering Of Computer Programs In Copyright Law — How Far Have We Gone In Singapore?" (1996) 4 International Journal of Law and Information Technology 48 at 58.

73 *per* Lai J, *supra* note 1 at 638 B.

corporate,[74] to perform the research for themselves in order for the defence to be available. In addition, by virtue of the Court of Appeal's interpretation, both limbs would not include studies or researches for commercial purposes. The upshot of this is to render the 'private study' limb and the 'research' limb virtually identical but curiously qualified by disparate ways. This seems to create the same 'non-distinction' between the two limbs that the court itself disapproved of.

d. Private: Non-public or Non-commercial?

The Court of Appeal rejected the High Court's construction of 'private study' which was wide enough to include 'private study for commercial purposes'. Instead, the Court of Appeal construed 'private study' to refer only to 'individuals actually performing a study.'[75] This statement was allegedly based on the authorities of *University of London Press Ltd* v *University Tutorial Press Ltd* and *Sillitoe* v *McGraw-Hill Book Co (UK) Ltd.* This in effect is a rejection of the 'private-public' dichotomy drawn by the High Court in favour of a 'private-commercial' dichotomy. The Court of Appeal appears to suggest that its narrower construction of 'private study' is likely to avoid the problem caused by the High Court's 'broader interpretation'[76], namely rendering section 35(5) otiose.

The Court of Appeal's reading of 'private' in contradistinction to 'commercial' is however difficult to justify. The word 'private' is commonly used and understood to mean 'non-public'. Moreover, looking at Hansard[77], as permitted under section 9A Interpretation Act[78], it is observed that there is some suggestion that the inclusion of the word 'private' may have been directed to exclude studies for profit.[79] But this did not appear to be the basis of the Court of Appeal's decision. Furthermore, the two cases cited by the Court of Appeal also do not appear to support the 'public-commercial' dichotomy.

74 S 35(5): unless those bodies corporate are 'owned or controlled by the Government'. See Daniel Seng, "Reviewing The Defence of Fair Dealing For Research Or Private Study" [1996] SJLS 136 for a discussion of the problems posed by this qualification.

75 *Supra* note 1 at 637 paragraph 74.

76 *Ibid*, paragraph 75.

77 This would include the Singapore Parliamentary Debates and the Report of the Select Committee on the Copyright Bill. The Parliamentary debates on the Second Reading of the Copyright Bill may be referred to under s 9A(3)(c). The Report of the Select Committee on the Copyright Bill may be referred to either under s 9A(3)(a) or (b). The Parliamentary debates on the Third Reading of the Copyright Bill may be referred to under s 9A(3)(d).

78 (Cap 1, 1985 Rev Ed).

79 This will be elaborated upon below in the section titled 'Parliamentary Intention'.

In the case of *University of London Press Ltd* v *University Tutorial Press Ltd*, Peterson J, commenting on section 2(1) of the UK Copyright Act 1911, held,

> It could not be contended that the mere republication of a copyright work was a 'fair dealing' because it was intended for purposes of private study; nor, if an author produced a book of questions for the use of students, could another person with impunity republish the book with the answers to the questions. Neither case would, in my judgment, come within the description of 'fair dealing'.[80]

His Lordship was clearly referring to the *fairness* of the dealing. He was not saying that the phrase 'private study' required the defendant to be conducting the study for himself. The defendant in that case could not resort to the defence of fair dealing because the judge thought that the infringing act was not a *fair* dealing. He did not seem to suggest that the use of the copyrighted work was not a 'dealing' because it was for a commercial purpose.

In *Sillitoe* v *McGraw-Hill Book Co* (*UK*) *Ltd*, it was held that,

> Mr. Jeffs contended that s 6(1) is widely drawn and not limited to the actual student, so that if a dealing is fair and for the purposes of private study the subsection applies whether the private study in mind is one's own or that of somebody else. ... To my mind s 6(1) authorises what would otherwise be an infringement if one is engaged in private study or research. The authors of the Notes, when writing the Notes and thus 'dealing' with the original work, were not engaged in private study or research. To my mind *University of London Press Ltd* v *University Tutorial Press Ltd* affords some support for this view.[81]

This case seems to suggest that the use of the copyright work was not a dealing because the user was not the one conducting the study. The refusal of the fair dealing defence here again does not seem to be based upon the fact that the use of the copyrighted work was commercial.

These two cases do not seem to exclude a student who performs the infringing act in the course of pursuing a study for his own edification from the defence even if his study is commercially motivated. There is also no suggestion in these decisions that precludes a body corporate from the defence. Hence there appears to be scant support for the 'private-commercial' dichotomy adopted by the Court of Appeal.

80 *University of London Press Ltd* v *University Tutorial Press Ltd* [1916] 2 Ch 601 at 613, *per* Peterson J.

81 *Sillitoe* v *McGraw-Hill Book Co (UK) Ltd* [1983] FSR 545 at 558, *per* Judge Mervyn Davies QC.

e. The Hierarchy Within Section 35

The decision of the Court of Appeal evinces yet another difficulty. In its judgment, the court held,

> "... we take the view that s35(1) excludes commercial research, as well as private study for commercial purposes ..."[82]

This statement suggests a misunderstanding of the operation of section 35(2) which becomes clearer when read with another passage from the Court's judgment:

> Aztech, however, submitted that such an interpretation would not be consistent with one of the guidelines in s 35(2) SCA, which, as they contend, contemplates that there may be fair dealing for the purposes of private study where the purpose is commercial. *We do not regard this argument as tenable, since a proper reading of s 35(2)(a) would suggest that where dealing is of a commercial nature, it is a factor operating against a finding of fair dealing. Moreover the subsection contemplates that the commercial nature of the dealing, or otherwise, is one of many aspects to be considered, when determining the overall 'purpose and character' of the dealing.* Let us take, for example, the difference between a university researcher undertaking private study for a project commissioned by an external commercial enterprise on the one hand and a person who undertakes private study in the pursuit of academic edification. The latter dealing, which falls under the rubric of 'research and private study', arguably has a better prospect in arguing that such a dealing is 'fair' under s 35(2).[83] (Emphasis added.)

This statement was made in response to Aztech's argument that a restrictive reading of 'private study' to exclude 'private study for commercial purpose' will render section 35(2)(a) redundant. This passage does not seem to address Aztech's submission directly. Instead, the Court of Appeal appears to be saying that since section 35(2) will in any event preclude 'private study for commercial purpose', hence whether or not there is any inconsistency is not important. If so, the Court may have overlooked the fact that section 35(2) is a sequential provision to be applied only *after* the dealing is shown to be a dealing for one of the two purposes in section 35(1). If this reading of the court's decision is correct, then it is submitted that the decision is inconsistent with the scheme of the fair dealing defences in our Copyright Act.

82 *Supra* note 1 at 637 paragraph 73.
83 *Ibid*, paragraph 76.

The three fair dealing provisions in the Copyright Act indicate that there are two categories of purposes to be considered under these defences. The 'prevailing' purposes that have been deemed important enough to warrant a defence have been laid out by Parliament in sections 35, 36 and 37. There are the five 'prevailing' purposes of 'research', 'private study', 'criticism'[84], 'review'[85] and 'reporting of current events'[86]. These purposes circumscribe the scope of the respective dealings in the defences. Apart from these, there are the 'subsidiary' purposes which do not define the scope of the defence but are merely factors to be applied when considering the fairness of the dealing. This is found by express provision in section 35(2) as applying to the first two 'prevailing' purposes. Although there are no express provision for 'subsidiary' purposes to be considered under the remaining three 'prevailing' purposes, case law has nevertheless provided similar guidelines.[87]

Hence the general scheme of the fair dealing defences in the Copyright Act evinces a hierarchy of purposes which are of relative importance. The nature of the provisions is such that the 'prevailing' purposes are exhaustively laid out but the 'subsidiary' purposes are not. What the Court of Appeal has done is to elevate the "commercial purpose" (albeit misconstrued from section 35(5)), which is merely 'subsidiary', to a 'prevailing' purpose. This does not fit well within the general scheme of the fair dealing defences.

C. Deletion of Section 35(5) — Legislative Intervention?

The Copyright (Amendment) Bill (No 4 of 1998) was read the first time in Parliament on 14 January 1998 and duly published in the Government Gazette Bills Supplement on 15 January 1998. Clause 5 of the Bill proposed to amend section 35 by the deletion of section 35(5) (hereafter 'the amendment'). The accompanying Explanatory Statement reads:

> [the] deletion is to make available the defence under s35 to persons undertaking research, whether or not commercial, so long as their dealing with the copyright work is fair.[88]

This Bill was passed by Parliament on 19 February 1998 without any changes.

84 S 36.
85 *Ibid.*
86 S 37.
87 For 'criticism' and 'review', see for example, *Hubbard* v *Vosper* [1972] 2 QB 84 and *Beloff* v *Pressdram* [1973] RPC 765.
88 The Copyright (Amendment) Bill (No 4 of 1998) at 45.

Henceforth, bodies corporate would no longer be disqualified from seeking the defence of fair dealing for the purpose of research, whether or not the research was industrial. The Explanatory Statement further makes it clear that corporate entities are not precluded from recourse to the 'research' limb even through the dealing was for commercial purposes.

In *Creative* v *Aztech*, Aztech, a body corporate, was forced to resort to the 'private study' limb of the fair dealing defence because of section 35(5). With the deletion of that sub-section, the 'research' limb of the defence can now be relied upon by a body corporate engaged in reverse engineering by disassembly. Such a body corporate will no longer need to rely on the 'private study' limb. This would emancipate the fair dealing defence for the purpose of research vis-a-vis reverse engineering by disassembly by bodies corporate. This is surely a welcomed development for reverse engineers in the local computer software industry.

However, the amendment may have even wider repercussions. Although the amendment does not directly address the scope of the 'private study' limb of the defence, nevertheless, it is submitted that the amendment has the effect of reversing the decision of *Creative* v *Aztech*. The Court of Appeal relied heavily on section 35(5) in its reasoning. This sub-section was a cornerstone of the Court of Appeal's decision to reject the High Court's construction of 'private study'.[89] Even though the amendment made no specific reference to the 'private study' limb, the deletion of section 35(5) would in effect undermine the entire edifice of the Court of Appeal's reasoning. Whilst this may conceivably be the result of the amendment, it is unclear whether this result was in fact contemplated by Parliament when it adopted the Bill. This point is further discussed below.

IV. A PROPOSED CONSTRUCTION

It is proposed to construe the new section 35 in this part. In adopting a purposive approach to construction, it is proposed first to ascertain the intention of Parliament behind section 35. Attempts will then be made to arrive at a construction of section 35 that would not defeat but would further the Parliamentary intention.

89 The 'broader interpretation' of 'private study' taken by the High Court which could include 'private study for commercial purpose' was rejected because it renders section 35(5) otiose.

A. Section 9A Interpretation Act[90]

It is evident that the source of the controversy in the case of *Creative* v *Aztech* is the uncertain meaning of the word 'private'. Even with the deletion of section 35(5) the controversy remains. A reference to statutory guidelines on construction is relevant at this point.

Section 9A Interpretation Act provides that a purposive interpretation is to be preferred. It further permits reference to Parliamentary materials as extrinsic aids to construction. Section 9A(2)(a) permits reference to extrinsic construction aids 'to confirm that the meaning of the provision is the ordinary meaning'. And section 9A(2)(b) allows the court to 'ascertain the meaning of the provision when it is 'ambiguous or obscure', or 'the ordinary meaning ... leads to a result that is manifestly absurd or unreasonable'. Hence a reference to Parliamentary materials to determine the parliamentary intent concerning the drafting of section 35 will be justifiable.

B. Parliamentary Intention

1. The Copyright Bill No. 8 of 1986

a. The Report of the Select Committee

The word 'private' was absent in the Copyright Bill in the Second Reading in Parliament. It was introduced upon the recommendations of the Select Committee at the Third Reading.

A reference to the Report of the Select Committee[91] suggests that the inclusion was made in response to the representations of CSIAC[92], BCC[93] and IIPA[94]. They were concerned with the possible abuse of section 35 by parties who engage in infringing profit-making activities. They appear more concerned with the profit-making *activities* than with the *entities* conducting those activities.[95] On this basis, there is a cause for saying that the word 'private' was added to prevent abuse by persons engaging in profit-oriented activities. But if this was indeed the parliamentary intention, it was really out of 'an abundance of caution' to include this provision.[96] For the section 40 Australian Copyright Act, which our section 35 was modelled upon, was amended to exclude the word 'private' because

90 (Cap 1, 1985 Rev Ed).

91 The Official Report of the Select Committee on the Copyright Bill (Bill No. 8/86) Parl. 9 of 1986, presented to Parliament on 22 December 1986. Hereafter 'the Report'.

92 International Confederation of Societies of Authors and Composers.

93 British Copyright Council.

94 International Intellectual Property Alliance.

95 Their respective representations may be found in the Minutes of Evidence in the Report at B–4 paragraphs 28 & 29, B–24 paragraph 137 and B–49 paragraph 258.

96 Daniel Seng, "Reviewing The Defence of Fair Dealing For Research Or Private Study" [1996] SJLS 136, 150.

the Franki Committee[97] was of the view that section 40(2) (which is substantially similar to our s 35(2)) was adequate to curb such abuse. Moreover, it is noted that another reason given for the deletion of the 'private' in Australia was to parallel the changes to the copyright law in US at that time.[98] The Australian section 40(2) was not adopted in our Copyright Act. Instead our present section 35(2) appears to be more closely modelled after section 107 US Copyright Act 1976.[99]

It is further observed that sub-section 35(5) was also absent from the Copyright Bill. This subsection has been criticised by another author to have introduced 'unmanageable distinctions'[100] into section 35. The reason for its inclusion is not found in the Report. It has been suggested that this provision was added as a legislative afterthought especially since section 35(5) is not even mentioned under section 109 of our Act.[101]

Hence it is suggested the Report is of no assistance in the ascertainment of a Parliamentary intention.

b. The Third Reading in Parliament[102]

The Debates of Parliament on the third reading of the Copyright Bill did not specifically touch on the changes made to section 35. Nevertheless, the general policy behind the adoption of the Bill as evinced by the speeches may be relevant to our present inquiry. The salient passages are herein set out.

Professor Jayakumar (Minister For Law), in his opening speech:

> The Select Committee also took into account the fast-changing technology and the need for a copyright regime which is responsive to technological change. In this regard, it took into account that *outdated legislation will impede economic growth, particularly since*

97 The Report of the Copyright Law Committee on Reprographic Reproduction, Canberra, 1976 at 30, paragraphs 2.62 to 2.64. Notably, the Australian Copyright Law Review Committee ("CLRC") was recently invited to consider a re-introduction of the word 'private' into s40. In "Simplification of the Copyright Act 1968: Part 1 — Exceptions to the exclusive rights of copyright owners" (September 1998) at paragraphs 6.116 & 6.117, the CLRC recommended against such a re-introduction because 'the distinction between private and commercial activities undertaken for research or study is often unclear, and it considers that the public interest would be maximised if fair dealing for the purpose of research or study did not necessarily exclude some commercial activities.'

98 The Report of the Copyright Law Committee on Reprographic Reproduction, Canberra, 1976 at 30, paragraph 2.64.

99 *Supra* note 35.

100 The difficulties caused by section 35(5) have already been stated by another author, see *supra* note 96 at 152 *et seq.*

101 *Supra* note 96 at 152.

102 *Singapore Parliamentary Debates, Official Report,* 26 January 1987.

> *our economy is increasingly service-oriented, with an increasingly important role for the creation, transmission and processing of information. Modern copyright legislation would also serve to attract investments, particularly in the field of computer software and information technology.* The Bill, as amended by the Select Committee, is in accord with our objective of promoting Singapore as a regional research and development centre.[103] (Emphasis added.)

Mr Chiam See Tong (Member of Parliament for Potong Pasir):

> The Member for Queenstown has mentioned … about the Japanese buying motorcars, cameras … and stripped them and tried to copy and make similar products. And since then they have improved and they even make better and cheaper motorcars. *This reverse engineering ... is not illegal. Reverse engineering is a bonafide business activity which can be done.* ... We must make it part of our economic activity.[104] (Emphasis added.)

Professor Jayakumar in his closing speech:

> As with all legislation, so too the copyright legislation must find its justification in our national interest. So the question is, does the new Copyright Bill serve our national interest? I would like to emphasise that it does, because with the passage of this Bill conditions are created which are advantageous for the development of our publishing industry, for the growth of our computer software industry, and for the development of Singapore as an information centre.[105] … When [Member for Queenstown] raised the general question as to whether the copyright legislation is going to hinder the bright Singaporeans from engaging in reverse engineering, I would say that the answer given by the Member for Potong Pasir is correct, that this has got nothing to do with that and it does not impede and will not hinder such development in Singapore because a different branch of law, particularly the patent law, governs the subject matter which he is referring to.[106]

It is apparent that Parliament was not blind to the effects of the new Copyright Bill on reverse engineering in the software industry. Instead, Parliament passed the Bill in the belief and with the intention that it should promote research and development in Singapore and particularly in the software industry. Thus any construction by the court so far as the language of the provisions permit should promote and not inhibit reverse engineering in this industry.

103 *Ibid,* col 967.
104 *Ibid,* col 981.
105 *Ibid,* col 986.
106 *Ibid,* col 987.

2. The Copyright (Amendment) Bill (No 4 of 1998)

a. The Explanatory Statement[107]

It is suggested that the amendment has the effect of reversing the Court of Appeal's decision.[108] However, the Bill offers no clear Parliamentary intention that may assist in the construction of the scope of section 35(1).

It is submitted that the Bill suggests an intention to extend the fair dealing defence to bodies corporate conducting commercial research. However, no attempt was made to define the full ambit of the 'research' limb when section 35(5) is removed. Furthermore, the express words in the Explanatory Statement were confined to the 'research' limb. The amendments were not directed specifically at the 'private study' limb, which was the bone of contention in *Creative* v *Aztech.* Any effect that the amendments may have on the 'private study' limb appears indirect at best. The Court of Appeal's interpretation of 'private study' could easily be altered by Parliament through amendments relating *directly* to the 'private study' limb. Yet any Parliamentary intervention to reverse the decision of Creative v Aztech appears redundant in the light of the difficulties inherent in the Court of Appeal's reasoning as enumerated above. In the absence of evidence demonstrating a clearer Parliamentary intention, it is perhaps too speculative to suggest that the Bill was solely to reverse *Creative* v *Aztech* through such a periphrastic approach.

b. The Second Reading In Parliament[109]

It is again noted that Parliament was concerned only with the 'research' limb of section 35. The following extracts suggests that Parliament is anxious to realign our copyright laws with those of the United States, United Kingdom, the EC and Australia. Unfortunately, the distinction between the 'research' and 'study' limbs of section 35 was not emphasised. The case of *Creative* v *Aztech*, which ruled on the scope of the 'private study' limb, was also not mentioned at all in this respect.

Professor Jayakumar (Minister For Law) in his opening speech made the following comment on the proposed amendments:

> ... the deletion by clause 5 of section 35(5) of the Act will bring us in line with the United States, the United Kingdom, other European Union countries, Hong Kong and Australia, *which do not bar the use of copyright materials for commercial research.*[110] (Emphasis added.)

107 *Supra* note 88 and accompanying main text.
108 *Supra* note 89 and accompanying main text.
109 *Singapore Parliamentary Debates, Official Report,* 19 February 1998.
110 Col 314.

Only Assoc. Professor Chin Tet Yung (Member of Parliament for Sembawang GRC) made any mention of *Creative* v *Aztech.* In support of the Bill, he said,

> It is very important to ensure that there is a fair balance in any Copyright Bill between the interests of holders of rights in "cutting edge" software and the interests of competitors who want to design and market non-infringing competing programmes *(sic)* which interface or are inter-operable with the basic programmes *(sic).*
>
> The Court of Appeal's decision in *Creative Technology* v *Aztech* established that currently Singapore's copyright law does not permit most kinds of reverse engineering. Companies cannot decompile programmes *(sic)* to establish how they were put together and armed with that knowledge to develop new inter-operable programmes *(sic).* Whether competitors should be able to reverse engineer and, if so, to what extend, is a very difficult matter to resolve. It seems clear, however, that most countries in the world are trying to draw a line between those two differing computer industry groups so that those who own the copyright in the leading programmes *(sic)* can maintain their strong copyright protection over their software but that in certain circumstances others may decompile because there is a public interest in doing so.[111]

3. The Parliamentary Intention

As seen from the Parliamentary debates during the Third Reading of the Copyright Bill, it would appear that Parliament thought that the Copyright Bill 1986 would not illegitimize reverse engineering. With the passing of the Copyright (Amendment) Act 1998, we are left only with Parliament's manifest intention, as embodied in Professor Jayakumar's speech, that commercial research by bodies corporate should not be unduly fettered by the constraints of copyright. No further assistance in relation to the scope of either limbs of section 35 can be derived. Nevertheless, it is submitted that the defence of fair dealing for the purpose of research should be broadened according to this manifest intention. Any construction of the new section 35 as amended by the Copyright (Amendment) Act 1998 should 'promote the purpose or object underlying the written law (whether that purpose or object is expressly stated in the written law or not)'.[112]

111 Cols 319–320.
112 S 9A Interpretation Act (Cap 1, 1985 Rev Ed).

C. The Proposed Construction

1. The Scope of 'Dealing' Under Section 35(1).

The Court of Appeal and the High Court accepted that the two limbs of 'private study' and 'research' under section 35(1) are distinct. Indeed the contrary was not argued. It is submitted that this distinction is supported by authority.[113]

The following approach for the application of the fair dealing defence under section 35 is proposed. First, the infringing act must fall within one of the 'prevailing' purposes exhaustively laid out in the Copyright Act to determine whether or not the act may be regarded as a 'dealing' under section 35(1). This necessitates a distinction between 'research' and 'private study' to be drawn. Second, if the act falls within either the 'research' or 'private study' limb, then it should be asked whether or not there is room for the application of section 35(3). If not, then the enumerated factors and any 'subsidiary' purposes under section 35(2) must be weighed to determine whether the dealing was fair. No guidelines are provided by statute as to how much weight is to be accorded to each factor. Assistance should therefore be drawn from case law.

Modelled upon section 40 of the Australian Copyright Act, the word 'private' was later introduced to our section 35 so that the resulting provision again resembled the English position under section 29(1) CDPA[114]. The fair dealing factors under section 40 of the Australian Act was also replaced with the American fair use factors under section 107 US Copyright Act. The peculiar ancestry of our section 35 suggests that a hybrid approach to its construction should be adopted.[115] The Australian and English case law may therefore assist in the construction of the scope of the dealing under section 35(1).

The American case law pertaining to the application of the fair use factors will be persuasive when the factors under our section 35(2) are weighed. It is to be noted that the emphasis in the United States appears to be on the fair use factors themselves rather than the six 'prevailing' purposes under section 107 US Copyright Act.[116] The 'prevailing' purposes of

113 *De Garis* v *Neville* Jeffress *Pidler Pty Ltd* (1990) 95 ALR 625, 18 IPR 292. See *also Re AG* (*British-Columbia*) *and Messier* (1984) 8 DLR (4th) 306.

114 UK Copyright, Designs and Patents Act 1988. Section 29(1) merely states: 'Fair dealing with a literary, dramatic, musical or artistic work for the purposes of research or private study does not infringe any copyright in the work or, in the case of a published edition, in the typographical arrangement.' See *supra* note 96 at 147-149.

115 Another author has already embarked on a comparative analysis of the respective positions under the UK, US and Australian legislation — *supra* note 96.

116 See generally, William F Patry, *The Fair Use Privilege in Copyright Law* (1995, 2nd Ed) at 413 *ff*.

section 107 are said to be 'illustrative and not limitative' so that the court can introduce a type of use not enumerated in the provision as a fair use.[117] In consequence, it is not proposed to adopt the American approach to construe the scope of the 'dealing'. For the 'prevailing' purposes in Singapore, like Australia, are exhaustively laid out, leaving no room for judicial discretion to recognise new 'prevailing' purposes, thus it is unacceptable to de-emphasise the 'prevailing' purposes to enlarge the role of the 'subsidiary' purposes.

a. Meanings of 'Research' & 'Study'.

There is a dearth of precedent defining the words 'research' and 'study' in local case law. Given that our section 35(1) was modelled on the section 40 Australian Copyright Act, the Australian cases will be persuasive to the construction of these words.

There is no suggestion that the words 'research' and 'study' have acquired special meanings. Indeed, the words has been stated to have their ordinary dictionary meaning. In the case of *De Garis* v *Neville Jeffress Pidler Pty Ltd*, the court held:

> diligent and systematic enquiry or investigation into a subject in order to discover the facts or principles ... 'research' in s 40 is intended to have this dictionary meaning.[118]

Later the court said:

> 1. application of the mind to the acquisition of knowledge, as by reading, investigation or reflection. 2. the cultivation of a particular branch of learning, science, or art ... 3. a particular course of effort to acquire knowledge ... 5. a thorough examination and analysis of a particular subject. ... 'study, where used in s 40 is intended to have this dictionary meaning.[119]

Similarly, the case of *Re AG (British-Columbia) and Messier* defined 'research' relying on the Shorter Oxford Dictionary as:

> 1. the act of searching (closely or carefully) for or after a specified thing or person; 2. an investigation directed to the discovery of some fact by careful study of a subject; a course of critical or scientific inquiry ...[120]

117 *Rogers* v *Koons* 960 F 2d 301 at 308 (2nd Cir), *cert denied*, 113 S Cl 365 (1992).
118 *De Garis* v *Neville Jeffress Pidler Pty Ltd* (1990) 95 ALR 625 at 629, (1990) 18 IPR 292 at 298.
119 *Supra* note 118 at 630 and 298 respectively.
120 *Re AG (British-Columbia) and Messier* (1984) 8 DLR (4th) 306 at 309.

And 'study' was defined as

> [the] application of mind to the acquisition of learning ... the cultivation of a particular branch of learning or science ... The action of studying (something specified or implied) ...

It is noted that in New Zealand, an attempt was also made to define the meanings of the words 'research' and 'study'. The observations of the High Court in *Television New Zealand* v *Newsmonitor Services Ltd* are helpful to the present inquiry and warrant being set out at length. The judge held,

> What is meant by the expression 'research or private study'? The defendants, by means of the *Oxford Dictionary*, defined research as the searching into a matter or subject or the investigation or close study of it. That definition seems appropriate. 'Research' and 'study' are obviously connected with one another. Research involves the study of things, including written materials or those captured in electronic form. [After quoting the definition of 'research' in *De Garis* v *Neville Jeffress Pidler Pty Ltd*, the judge went on ...] It is significant that the word 'private' qualifies only the word 'study'.
>
> 'Private study' connotes a form of study which is personal to the person undertaking it. Although I am inclined to think that a corporation can engage in private study, as when its personnel endeavour to place themselves in a position to be better able to perform their functions in or related to the corporation, 'research' is even more clearly something of which a business organisation is capable. The word is commonly used in business, as in the phrase 'research and development'. It is ultimately intended to enable commercial exploitation or is, perhaps, defensive in character - to improve a product, for example, and thus avoid loss of sales or even product liability litigation. Ultimately, the product of the research is likely in some form to be made public. So I conclude that a fair dealing for purposes of research within s19(1) can be something done with a commercial end in view. Nor can I see any reason to exclude research for political purposes in the widest sense.[121]

b. The Scope of 'Private Study'

It has been held in *Sillitoe* v *McGraw-Hill Book Co (UK) Ltd*[122] that the defendant *himself* must be engaged in research or private study in order to rely on the defence of fair dealing under this section. If the defendant is not engaged in research or private study for which purpose the

121 (1993) 27 IPR 441 at 463.
122 *Supra* note 81.

infringing act was committed, he is not entitled to the defence even if he committed the infringing act for the benefit of someone else who is. This case has generally be accepted as correctly stating the law.[123]

However, the study limb seems to be qualified by 'private'. This word does not appear to be the basis for the proposition made in *Sillitoe.* Concerning the meaning of the word 'private', the High Court in *Aztech* v *Creative* held,

> Among the definitions of 'private' given by the *Oxford English Dictionary* is 'kept or removed from public knowledge or observation'. I think that 'private' has been used in this sense. Copying for use by educational institutions is provided for by s40 as is copying for libraries in Division 5 of Part III of the Act. These are examples *of public* studies or *public* purposes. ... It seems to me that a study is *private* if the study and the information or knowledge acquired through it are kept or removed from public knowledge or observation ...[124]

It is humbly submitted the word 'private' ought not to be interpreted according to its ordinary meaning in this way. Firstly, by the High Court's interpretation, both the study *and* the information or knowledge obtained from the study must be kept removed from public knowledge or observation in order to qualify as 'private study'. This in effect means that disclosure of the information gained from the study would render the study non-private and disqualify the student from a defence to infringement. But this appears to confer some measure of copyright protection on the information itself without regard to whether copyrightable expression was copied in the act of disclosure.[125] Secondly, if the information or knowledge gained from an infringing act is *subsequently* disclosed to the public, the subsequent disclosure may constitute an independent infringing act if copyrightable expression is used. But this infringing act of disclosure is a subsequent act and should have no immediate bearing on whether or not the fair dealing defence is available for the prior infringing act by which the information was obtained.

123 *De Garis* v *Neville Jeffress Pidler Pty Ltd*, *supra* note 118; *Television New Zealand* v *Newsmonitor Services Ltd* (1993) 27 IPR 441 (High Court of New Zealand); *Longman Group Ltd* v *Carrington Technical Institute Board of Governors* (1990) 20 IPR 264 (High Court of New Zealand).

124 *Supra* note 10 at 701 C to E.

125 Raw data or information is generally regarded to be unprotectable under copyright. See *Ladbroke* v *William Hill (supra* note 58) and *Feist Publications Inc* v *Rural Telephone Service Co Inc* (1991) 20 IPR 129 (Supreme Court, United States).

It is suggested that 'study' should be read in conjunction with the word 'private' as a term of art. It has been stated that,

> [whilst] it is difficult to understand the scope of what is comprehended by the term 'private study', the limitation seems to have been intended to distinguish use of copyright material for private study *from classroom instruction.*[126]

Some support from this may be found in the passage just cited from *Television New Zealand* v *Newsmonitor Services Ltd* where the judge held

> It is significant that the word 'private' qualifies only the word 'study'. ... 'Private study' connotes a form of study which is personal to the person undertaking it.[127]

Such a construction avoids the difficulties that the High Court's interpretation would create. The focus will not be on a subsequent act of disclosure but rather on whether the user of the copyrighted work is a student studying for his own benefit or an educator instructing others. Such a construction will not necessitate a distinction between the two limbs just so that a 'private' qualification may be imposed upon one limb and not the other. Thus construed as a term of art, this meaning of 'private study' will be consistent with the construction by the case of *Sillitoe.*

2. The Fairness of the 'Dealing'.

If the 'dealing' has been shown to be for the relevant 'prevailing' purpose, then the fairness of the dealing remains to be considered.

a. Presumption of Fairness: Section 35(3).

> Section 35(3) Notwithstanding subsection (2), a dealing with a literary, dramatic or musical work, or with an adaptation of such a work, being a dealing by way of the copying, for the purposes of research or private study —
>
> (a) if the work or adaptation comprises an article in a periodical publication, of the whole or a part of that work or adaptation; or
>
> (b) in any other case, of not more than a reasonable portion of the work or adaptation,
>
> shall be taken to be a fair dealing with that work or adaptation for the purpose of research or private study.

126 *Supra* note 97 at paragraph 2.64.
127 *Supra* note 121.

This sub-section creates a statutory presumption that the dealing was fair. There is no equivalent in the US Copyright Act.

It is arguable that reverse engineering by disassembly is not precluded from recourse to this presumption notwithstanding that disassembly invariably involves copying of virtually the whole specimen computer program. The presumption of reasonableness should not be rebutted merely by the fact that the infringing act of disassembly involved 100% copying of the protected work. Section 35 is a defence to a finding of infringement. Infringement necessitates substantial copying. It is illogical to preclude section 35(3) by reason of the quantity copied.

It is further submitted that the 'reasonableness' of the amount taken must be assessed according to the entire circumstances of the case, including, the availability of alternative non-infringing sources of acquiring the information. Where the copyright owner has failed to provide reasonable access to the information contained in his work that he seeks to protect, protection of his work should accordingly be adjusted to preserve a balance which is 'advantageous ... for the growth of our computer software industry, and for the development of Singapore as an information centre'.[128] *A fortiori*, where disassembly is necessary, and where the end-product is a transformative use of the information thus acquired, it will be in our national interests to regard such a dealing as 'fair'.

b. Factors Under Section 35(2).

The factors enumerated under section 35(2) are very similar to the wording of section 107 US Copyright Act.[129] It would be acceptable here to draw assistance from the American cases concerning how these factors are to be weighed against each other to assess the fairness of the dealing.

Concerning section 107, it was stated in *Nimmer on Copyright*, a leading American text on the law of copyright, that 'the defence of fair use' 'permits courts to avoid rigid application of copyright statute when, on occasion, it would stifle the very creativity which the law is designed to foster.'[130] It further stated:

> Strictly speaking, Section 107 does not attempt to define "fair use". Rather, it lists "the factors to be considered for the purpose of "determining whether the use made of a work in any particular case is a fair use." It does not, and does not purport to, provide a rule that may automatically be applied in deciding whether any particular use is "fair". This is so for several reasons. First, the factors contained in Section 107 are merely by way of example, and are not any

128 *Per* Professor Jayakumar, Singapore Parliamentary Debates, *supra* note 102,
129 *Supra* note 35.
130 Niramer, "Nimmer on Copyright" [s13.05] at 13-149.

> exhaustive enumeration. This means that factors other than those enumerated may prove to have a bearing upon the determination of fair use. ... In addition, Section 107 gives no guidance as to the relative weight to be ascribed to each of the listed factors. Finally, each of these factors taken alone is defined in only the most general terms, so that the courts are left with almost complete discretion in determining whether any given factor is present in any particular case.[131]

We are constrained under the exhaustive wording of section 35(1) to give due emphasis to the 'prevailing' purposes as laid out. It is noted that the American courts are not so constrained as section 107 does not attempt to lay out these 'prevailing' purposes exhaustively.[132] However, even within these constraints, there is still room for flexibility when considering the fairness of the dealing. The flexibility of section 35(2) will permit the court in a case like *Creative* v *Aztech* to decide in favour of the defendant. As seen above, the offending act was not the making of the *product* but the *process* of disassembly. Where the end-product is not an infringing article, it will be contrary to parliamentary intention that these factors are construed against reverse engineering. *A fortiori*, where the product is a 'transformative use' of the copyright work, all other factors including the commercial motivation for the dealing should diminish in importance.[133] To decide otherwise will be to prohibit the process of disassembly. Furthermore, this is the present position in the United States[134] and the EC[135]. It will be contrary to our interests to accord copyright protection wider than is necessary to attract foreign investments in this area.

The adoption of the Copyright (Amendment) Bill 1998 suggests that Parliament is prescribing a de-emphasis on the 'commercial nature' of the fair use defence, at least vis-a-vis 'research'. This may be offered in support for the application of the American 'transformative use' doctrine as stated by the US Supreme Court in *Campbell* v *Acuff-Rose Music Inc* under section 35(2)(a). The Supreme Court in that case, referring the first factor, held that

> [the] central purpose of this investigation is to see ... whether and to what extent the new work is 'transformative'.[136] Although such transformative use is not absolutely necessary for a finding of fair use, the goal of copyright, to promote science and the arts, is

131 *Ibid*, at 13–152 to 13–154.
132 See accompanying main text of note 116.
133 *Supra* note 50.
134 *Supra* note 36.
135 *Supra* note 37 and the accompanying main text.
136 The US Supreme Court cited Leval, *supra* note 50 at 1111.

> generally furthered by the creation of transformative works. Such works thus lie at the heart of the fair use doctrine's guarantee of breathing space within the confines of copyright and the more transformative the new work, the less will be the significance of the other factors, like commercialism, that may weigh against a finding of fair use.[137]

V. CONCLUSION

The decision of the Court of Appeal has the unfortunate consequence of illegitimizing reverse engineering by disassembly by corporate entities in Singapore. Its prohibition of reverse engineering does not sit comfortably with the positions taken by other jurisdictions, nor does it reflect the software industry's view that reverse engineering is an accepted and fair practice. It cannot be overemphasised that reverse engineering by disassembly is a critical part of computer software development. Its prohibition in Singapore would unfairly prejudice our computer software engineers, creating an uneven playing field in the global IT market. The timely adoption of Copyright (Amendment) Bill No. 4 of 1998 has resolved this problem.

This notwithstanding, Parliament has failed to clearly circumscribe the full ambit of each limb. Presently, the law is equivocal as the exact scope of section 35. The scope is left to the courts to define through the device of statutory interpretation. Although, it is submitted, this may now be performed unfettered by *Creative* v *Aztech*, the retention of the word 'private' may yet create difficulties in the future. Perhaps Parliament may shed some light on the matter by providing working definitions of 'research' and 'private study' where the opportunity arises. If Parliament intends to legitimize reverse engineering by disassembly, it is suggested that a more unequivocal approach would have been the creation of a specific defence for reverse engineering like what the English Parliament has done via section SOB UK CDPA. It would be unfortunate if the present amendment should later come to be regarded as merely a half-hearted attempt by Parliament to clarify the true ambit of the fair dealing defence in Singapore.

LIM KOK YEOW LARRY*

137 127 L Ed 2d 500 at 515–516. Further elaboration of the 'transformative use' doctrine may be found *supra* at note 50.

* LLB (Hons)(NUS).

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