Determining Liability for Infringement of Mask Work Rights under the Semiconductor Chip Protection Act

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INTRODUCTION

The Semiconductor Chip Protection Act of 1984 (SCPA)\(^1\) creates a new form of intellectual property law\(^2\) designed to protect mask works\(^3\) of semiconductor chips against piracy and

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2. Intellectual property law is generally considered to consist of copyright and related law, on the one hand, and industrial property law, on the other. Copyright and related law is directed primarily at the personal literary and artistic creations of authors and artists, and it tends to reflect the personal values of authors and artists and society's interest in encouraging such creative activity. Industrial property law, of which the SCPA is an example, is directed primarily at mass-produced articles of commerce. It therefore tends to reflect the economic values of manufacturers and sellers of such articles and society's interest in encouraging innovation and investment.
3. SCPA § 901(a)(2) defines "mask work" as follows:
   [A] "mask work" is a series of related images, however fixed or encoded—
   (A) having or representing the predetermined, three-dimensional pattern of metallic, insulating, or semiconductor material present or removed from the layers of a semiconductor chip product; and
   (B) in which series the relation of the images to one another is that each image has the pattern of the surface of one form of the semiconductor chip product . . . .

17 U.S.C. § 901(a)(2) (Supp. II 1984). "Semiconductor chip product" is defined as:
the final or intermediate form of any product—
(A) having two or more layers of metallic, insulating, or semiconductor material, deposited or otherwise placed on, or etched away or
unauthorized copying. The SCPA is neither a patent nor a copyright law; rather, it is a hybrid form of intellectual property law that combines some aspects of patent and copyright law with new elements of its own. It is the first enactment of a form of intellectual property law devised specifically to meet the legal needs of a new technology, and its peculiar combination of elements reflects the business and technological realities of the semiconductor industry.

This Article analyzes the SCPA and its relation to existing patent and copyright law to determine when a manufacturer or seller of a semiconductor chip product is liable for infringement of mask work rights under the SCPA. The first part of the Article discusses the elements of a claim for relief under the SCPA. The second part examines the defenses to a claim of infringement of mask work rights and the immunities from and limitations on liability.

PART ONE: ELEMENTS OF A CLAIM FOR RELIEF UNDER THE SCPA

Section 905 of the SCPA\(^4\) confers on the owner\(^5\) of a mask work

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otherwise removed from, a piece of semiconductor material in accordance with a predetermined pattern; and

(B) intended to perform electronic circuitry functions...

Id. § 901(a)(1). The terms “chip,” “semiconductor chip,” “integrated circuit,” and “monolithic integrated circuit” are also commonly used to refer to a semiconductor chip product.

4. Section 905 provides as follows:

The owner of a mask work provided protection under this chapter has the exclusive rights to do and to authorize any of the following:

(1) to reproduce the mask work by optical, electronic, or any other means;

(2) to import or distribute a semiconductor chip product in which the mask work is embodied; and

(3) to induce or knowingly to cause another person to do any of the acts described in paragraphs (1) and (2).

Id. § 905.

5. Section 901(a)(6) defines the “owner” of a mask work as follows:

The “owner” of a mask work is the person who created the mask work, the legal representative of that person if that person is deceased or under a legal incapacity, or a party to whom all the rights under this chapter of such person or representative are transferred in accordance with section 903(b) [governing ownership, transfer, licensing, and recordation of mask work rights]; except that, in the case of a work made within the scope of a person’s employment, the owner is the employer for whom the person created the mask work or a party to whom all the rights under this chapter of the employer are transferred in accordance with section 903(b)...

Id. § 901(a)(6). The owner of a mask work is typically the employer of the de-
work the exclusive right to exclude or prohibit others from doing any of the following: reproducing the mask work in any form, importing semiconductor chip products embodying the mask work, and distributing semiconductor chip products embodying the mask work. A person who does any of these things without the permission or authorization of the mask work owner is liable for infringement of mask work rights.

Part One of this Article examines the substantive elements signer of the chip. For a discussion of ownership of rights in mask works, see R. Stern, Semiconductor Chip Protection § 3.11 (1986).

7. Id. § 905(2).
8. Id. A fourth exclusive right, the right to use chips embodying a protected mask work, was included in the original versions of the Senate and House bills, see S. 1201, 98th Cong., 1st Sess. § 4, 129 Cong. Rec. S5992-93 (daily ed. May 4, 1983); H.R. 1028, 98th Cong., 1st Sess. § 4, 129 Cong. Rec. H643 (daily ed. Feb. 24, 1983), but it was eliminated from both bills at an early stage. The use provision was originally included to reach domestic purchasers and users of pirated chips who did not resell or otherwise distribute the chips or equipment containing them.

The provision created a storm of protest from copyright law purists, who maintained that such a use right was foreign to traditional copyright law and who termed it an illegitimate offspring of patent law notions. In the main, use rights are foreign to copyright law, but copyright law’s display and performance rights, see 17 U.S.C. § 106(4)-(5) (1982), are types of use rights. In contrast, patent owners have the exclusive right to make, use, and sell the patented article. See 35 U.S.C. § 271(a) (1982); see also Bauer & Cie v. O’Donnell, 229 U.S. 1, 12-15 (1913) (contrasting patent and copyright law).


9. 17 U.S.C. § 910(a) (Supp. II 1984). These three basic rights are supplemented by two additional exclusive rights. The owner may exclude others from “inducing” any person to violate any of the owner’s exclusive rights. Id. § 905(3). Anyone who induces a violation of the mask work owner’s exclusive rights is liable for infringement of mask work rights. Id. § 910(a). Finally, “knowingly causing” another person to violate a mask work owner’s exclusive rights is also an infringement of mask work rights. Id. §§ 905(3), 910(a).
of a claim for relief under the SCPA. The plaintiff in such an action must first establish ownership and registration of the mask work alleged to have been infringed. Next, the plaintiff must establish that the defendant has infringed upon the plaintiff's exclusive rights. Whether "copying" the protected work must also be proved and whether a person or organization accused of direct infringement must have acted with scienter are issues not yet resolved.

I. OWNERSHIP

The plaintiff in an infringement action under the SCPA must first establish ownership of the mask work alleged to have been infringed. This element of the plaintiff's case does not warrant extensive discussion because of the relative ease with which the plaintiff can establish ownership, usually by submitting the certificate of registration issued by the Copyright Office. If the plaintiff is not the original registrant, the plaintiff's chain of title should be established as well.

Unless the defendant denies that the certificate of registration is genuine, a presumption arises that all of the matters set forth in the certificate are correctly stated and, therefore, that

10. The exclusive rights granted to the owner of a registered mask work are enforceable through an action for infringement of mask work rights in an appropriate federal district court and through proceedings before certain federal administrative agencies. For a discussion of what is an appropriate district court, i.e., of venue and jurisdiction, see R. Stern, supra note 5, ch. 7. For a discussion of administrative enforcement of the SCPA, see id. ch. 8.

11. See infra notes 16-20 and accompanying text.

12. See infra notes 21-101 and accompanying text.

13. See infra notes 102-131 and accompanying text.

14. See infra notes 61-73 and accompanying text.

15. Establishing actual injury and the right to particular relief, such as an injunction, damages, or an accounting for profits, are subjects beyond the scope of this Article. For a discussion of remedies under the SCPA, see R. Stern, supra note 5, ch. 6.

16. Typically, the certificate of registration will be annexed to the complaint. For a discussion of mask work registration, see R. Stern, supra note 5, ch. 3.

17. SCPA § 910(b)(1) permits an exclusive licensee of all rights in the mask work to sue for infringement of mask work rights, since the legal status of an exclusive licensee of all rights is equivalent to that of an owner. See 17 U.S.C. § 910(b)(1) (Supp. II 1984). Such a plaintiff must prove its status, for example, by introducing into evidence the certificate of registration and the exclusive license. Nonexclusive licensees and licensees of less than all rights in the mask work may not bring an infringement action. See 130 Cong. Rec. S12,916-17 (daily ed. Oct. 3, 1984) (Explanatory Memorandum—Mathias-Leahy Amendment to S. 1201) [hereinafter cited as Mathias-Leahy Explanatory Memorandum].
the registrant has complied with the statute and regulations.\textsuperscript{18} To qualify for protection under the SCPA, however, a mask work must satisfy the “novelty” requirements of section 902(b): the design must not be staple, familiar, or commonplace.\textsuperscript{19} The Copyright Office is not required, nor is it practically able, to determine compliance with the novelty requirement at the time an application for registration is submitted for examination.\textsuperscript{20} Hence, the presumption created by the registration certificate has only limited force as to novelty.

II. DIRECT INFRINGEMENT

The exclusive reproduction, distribution, and importation rights of owners of registered mask works\textsuperscript{21} concern a type of conduct designated “direct infringement.” The term “direct infringement” applies when the person or organization charged with violation of an intellectual property right has himself or itself directly committed the infringing act.\textsuperscript{22} For example, an equipment manufacturer that imports infringing chips and incorporates them into equipment that the manufacturer then sells directly violates both the distribution and importation rights. If the manufacturer imports infringing chips and incorporates them into equipment that the manufacturer keeps and

\begin{enumerate}
\item See 17 U.S.C. § 908(f) (Supp. II 1984); Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917-18. The certificate apparently constitutes prima facie evidence that the registrant owned the mask work at the time of registration, that the mask work was first commercially exploited on the date and at the place stated, that the mask work was original with the registrant, and that the registrant was a national of the country stated. See infra notes 179-182 and accompanying text.
\item Unless the applicant states in the application that the mask work is unoriginal or that it is merely staple or commonplace, the Copyright Office ordinarily has no basis on which to consider such issues. Because the Copyright Office does not have the means for examining this aspect of an application, failure to satisfy the requirements of SCPA § 902(b) is ordinarily an issue that can be raised for the first time only in litigation, either as a defense in an infringement action or as the basis for a claim of invalidity in a declaratory judgment action. See House Report, supra note 8, at 19 n.38, 24-25, 1984 U.S. Code Cong. & Ad. News at 5768 n.38, 5773-74; Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917; R. Stern, supra note 5, § 3.6. For a discussion of challenges to the validity of a mask work registration, see infra notes 140-198 and accompanying text.
\item Direct infringement, although the most common, is not the only form of infringement of intellectual property rights. A person may also indirectly or vicariously infringe intellectual property rights by culpably causing another person to commit direct infringement. For a discussion of “indirect infringement,” see infra notes 39-60 and accompanying text.
\end{enumerate}
uses only within its own business, it directly violates only the importation right.23 Importation or distribution of infringing chips that are already incorporated into equipment is also a direct violation of the mask work owner’s exclusive importation or distribution right.

In intellectual property law, the term “exclusive right” refers to the power of the owner of the exclusive right to secure the aid of the courts in excluding unauthorized persons from engaging in the conduct that is the subject of the exclusive right. Thus, the owner of the exclusive right to reproduce a mask work is entitled to court orders against persons who reproduce the mask work without authorization.24 The owner is also entitled to other legal relief against infringers of the exclusive right, such as an award of damages or an accounting for profits.25 Owning the exclusive right to reproduce a mask work does not necessarily mean being entitled to reproduce the work, as distinguished from being entitled to exclude others from doing so. Exclusive rights are sometimes mutually “blocking,” so that none of the owners of the various rights can practice the subject matter without the others’ authorization. Although this situation is uncommon, it highlights the point that an exclusive right is a right to exclude others, not a right to do something affirmative oneself.

A. Reproduction

The reproduction right granted to mask work owners by section 905(1) is the most general and pervasive of the SCPA’s exclusive rights. It is the exclusive right to “reproduce the mask work by optical, electronic, or any other means.”26 The

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23. If the same manufacturer were to purchase the semiconductor chip products in the United States from an importer, the manufacturer would not directly violate the importation right, although the importer would be liable for a direct infringement under SCPA § 905(2). See 17 U.S.C. § 905(2) (Supp. II 1984). In some circumstances, however, a court could find that the manufacturer had induced or knowingly caused the importer’s direct infringement; the manufacturer would then be liable under SCPA § 905(3) for indirect infringement. See id. § 905(3).
24. Id. § 911(a).
25. Id. § 911(b).
26. Id. § 905(1). Section 905(1) therefore prohibits the reproduction of a mask work without the owner’s permission or authorization by any of the following means: making or copying a composite drawing; making or duplicating a data base tape; making or copying a mask; using a mask to manufacture a chip by photolithography; using a data base tape to operate a computer-driven electron or light beam device, thereby directly polymerizing resist on a wafer into a mask work pattern; or photographing a chip after removing the outer
reproduction right under section 905(1) of the SCPA is broader than that of section 106(1) of the Copyright Act, which forbids unauthorized persons from "reproducing the copyrighted work in copies ...." Copyright case law establishes that infringing "copies" do not include material objects made to the casing. Both the House and Senate Reports emphasize that it was the intention of Congress to provide a reproduction right broad enough to include foreseeable advances in semiconductor chip technology. For example, both reports expressly mention electronic storage of mask works in media other than masks. The Senate Report states:

Although the use of masks to manufacture chips is the most prevalent technology today, it is not the only one. The bill is thus not limited to the manufacture of chips by means of masks. Rather, it covers any means of fixing the images of a mask work into semiconductor material. ... Thus, directly impressing the images into silicon, germanium, gallium arsenide, or any other semiconductor material by an electron beam in conjunction with a data base tape in which a mask work was stored would be within the coverage of S. 1201, even though no actual mask was used.

SENATE REPORT, supra note 8, at 16 (citations omitted) (emphasis added). The Senate Report then goes on to declare that the reproduction right is intended to be inclusive of all means of embodying the images of a mask work onto a chip. This includes not only the use of masks to do so, but also new technological processes of impressing the images of a mask directly onto the chip with the aid of a computer-driven light beam or electron beam, where the images of the mask work are previously fixed or stored in "digitized" form in a computer tape and where in manufacturing there is not use of an actual mask. The Committee intends this provision to have sufficient breadth to cover foreseeable advances in chip manufacturing technology, so that pirates will not be encouraged to try to exploit loopholes in the law.

Id. at 20 (emphasis added). In the same vein, the House Report states:

Optical means, such as conventional mask lithography, are the most common means for reproducing a mask work in a semiconductor chip product .... However, electronic means of reproduction are also in use at this time. For example, a mask work can be stored in a data base tape, so that the coordinates of various points in the semiconductor chip product are recorded. The mask work can then be reproduced in a semiconductor chip, in a mask, or in another tape by means of the data base tape. The tape can be utilized, also, ... to drive an electron gun that directly etches patterns in the semiconductor chip product, or to drive a light beam that polymerizes "resist" on the surface of the chip during the manufacturing process so that a pattern can then be etched onto the surface. The language of paragraph (1) [§ 905(1)] is intended to include all of these and any other means of reproducing mask works.

HOUSE REPORT, supra note 8, at 20, 1984 U.S. CODE CONG. & AD. NEWS at 5769 (emphasis added). The House Report also states that copying a data base tape violates the reproduction right of § 905(1). Id. at 17, 1984 U.S. CODE CONG. & AD. NEWS at 5766. The Senate accepted the House's wording of the exclusive rights provisions of § 905 because "[s]ection 905 is at least as comprehensive as S. 1201's Section 4" dealing with exclusive rights. Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.

specifications in a copyrighted work or by copying something depicted in a copyrighted picture. The SCPA, however, expressly extends its exclusive rights to material objects made in accordance with a protected design or layout. The patent laws, in contrast to the copyright laws, do prohibit unauthorized persons from making a patented invention. In this regard, the effect of section 905(1) is to track the patent laws rather than the copyright laws.

B. DISTRIBUTION

The exclusive distribution right of section 905(2) of the SCPA covers not only the sale of chips, but also other commercial transfers such as bailments, leases, and loans. The distribution right is subject to a significant limitation, however. When the owner of mask work rights consents to the sale, or equivalent transfer, of semiconductor chip products embodying the mask work, for example, by selling the chip or by licensing another to do so, the redistribution of all chips so distributed is immune from the SCPA. It should be noted that the distribution right of section 905(2), as contrasted with the prohibition against inducing distribution in section 905(3), can be violated only by the distributor, not by the distributee. Both the Sen-

28. See Baker v. Selden, 101 U.S. 99 (1879). A number of decisions to this effect are cited in the House and Senate Reports. See HOUSE REPORT, supra note 8, at 8 n.19, 1984 U.S. CODE CONG. & AD. NEWS at 5757 n.19; SENATE REPORT, supra note 8, at 19 ("[A] copyright on a picture of a dress or a bridge or on blueprints for a house does not prohibit others from making the dress or building the bridge or house.") (emphasis in original). See also 17 U.S.C. § 101 (1982) (definition of "pictorial, graphic, and sculptural works" excludes mechanical and utilitarian aspects of work).


30. The concept of distribution was left undefined until the final stages of the legislative process, when the following definition was added to SCPA § 901: "To 'distribute' means to sell, or to lease, bail, or otherwise transfer, or to offer to sell, lease, bail, or otherwise transfer . . . ." 17 U.S.C. § 901(a)(4) (Supp. II 1984).

31. See id. § 906(b). Of course, this provision does not apply to chips stolen from the mask work owner, or to chips made and sold by a pirate. The limitation does apply, however, to chip transfers not denominated as sales but nonetheless having the quality of sales, as, for example, when the transferee has substantially unlimited actual control over the transferred chips.

32. This principle also applies in copyright law. See Foreign & Domestic Music Corp. v. Licht, 196 F.2d 627, 629 (2d Cir. 1952) (cited for this proposition in HOUSE REPORT, supra note 8, at 24, 1984 U.S. CODE CONG. & AD. NEWS at 5773).
ate and House Reports expressly make this point.33 Finally, distribution of a semiconductor chip product includes distribution of equipment containing the semiconductor chip product.34

C. IMPORTATION

Section 905(2) of the SCPA gives the mask work owner the exclusive right to import semiconductor chip products embodying the mask work.35 Consequently, it is a direct infringement to import pirated chips into the United States,36 either as chips or as part of equipment.37 As with the distribution right, there is a significant limitation on the exclusive importation right created by the “exhaustion” provisions of section 906(b). When the mask work owner sells semiconductor chip products or licenses another to do so, those semiconductor chip products are no longer covered by the exclusive importation right.38

III. INDUCING INFRINGEMENT OF MASK WORK RIGHTS

In addition to prohibiting direct infringement, discussed in the preceding section, the SCPA protects mask work owners against various forms of indirect infringement, i.e., conduct that culpably causes others to commit direct infringement. In deter-

35. Id. § 905(2). The original House and Senate bills did not expressly mention an importation right. See S. 1201, 98th Cong., 1st Sess., 129 CONG. REC. S5992-93 (daily ed. May 4, 1983); H.R. 1028, 98th Cong., 1st Sess., 129 CONG. REC. H643-44 (daily ed. Feb. 24, 1983). Those bills were amendments to the Copyright Act, however. Under the Copyright Act, any unauthorized importation of a copyrighted article is an automatic violation of the copyright owner's distribution right. See 17 U.S.C. § 602 (1982). It was therefore unnecessary to deal separately with importation in the original bills.
A subsequent House bill, H.R. 5525, 98th Cong., 2d Sess., 130 CONG. REC. H5489-91 (daily ed. June 11, 1984), rejected the copyright approach and created sui generis protection of mask works independent of the Copyright Act. See House Report, supra note 8, at 5, 1984 U.S. CODE CONG. & AD. NEWS at 5754. H.R. 5525 initially did not cover importation, although importation became an independent factor to consider once the SCPA was rewritten as a noncopyright law. The omission was corrected when the House and Senate bills were merged to form the SCPA. See 17 U.S.C. § 905(2) (Supp. II 1984).
37. SCPA § 901(b) provides that the importation of a product incorporating a semiconductor chip product is an importation of a semiconductor chip product. Id. § 901(b).
38. Id. § 906(b). For a more detailed discussion of first sale and exhaustion rights, see infra notes 278-328 and accompanying text.
mining the liability of a person for causing another to engage in infringement of mask work rights, the focus is on the factors that distinguish "culpably" from "nonculpably" (a term that is, as will be seen, broader than "innocently") causing infringement.

Under section 905(3), it is a violation of the exclusive rights of the owner of a mask work "to induce or knowingly to cause another person to [violate the mask work owner's exclusive reproduction, importation, or distribution rights]." The legislative history of section 905(3) is sparse. The absence of more detailed legislative history and express statutory definitions of inducing infringement and knowingly causing infringement should not create any serious problem in interpreting the Act, however, because the concepts are already familiar in intellectual property law. The patent, copyright, and trademark laws all have similar doctrines concerning the liability of indirect infringers.

A. INDUCING INFRINGEMENT

The concept of inducing infringement is borrowed from patent law. Section 271(b) of the Patent Act provides that anyone who "actively induces infringement of a patent shall be liable as an infringer." Although section 905(3) of the SCPA does not use the word "actively," this distinction would seem inconsequential because the idea of "inducing" another to do

Paragraph (3) makes contributory infringement of the reproduction, distribution, and importation rights an act of infringement. Such a provision has no statutory analogue in the Copyright Act. Paragraph (3) does follow, however, a contributory infringement standard described generally in Sony Corp. v. Universal City Studios, 104 S. Ct. 774 (1984), and Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476 (1964).

HOUSE REPORT, supra note 8, at 21, 1984 U.S. CODE CONG. & AD. NEWS at 5770. The Senate floor memorandum is even more terse. It only mentions the "distribution of pirated masks" as an example of inducing or knowingly causing infringement under SCPA § 905(3). See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.

42. 35 U.S.C. § 271(b) (1982).
something necessarily connotes active, not passive, conduct. The precedents under the patent laws emphasize the nonpassive character of this type of wrong. For example, they uniformly hold a supplier of materials not liable for merely filling a customer's order without any exhortation or, at least, suggestion to the customer that it commit infringement.\footnote{See Honeywell, Inc. v. Metz Apparatewerke, 509 F.2d 1137, 1141-42 (7th Cir. 1975); Goodwall Constr. Co. v. Beers Constr. Co., 216 U.S.P.Q. 1006, 1009-11 (N.D. Ga. 1981); Marston v. L.E. Gant, Ltd., 351 F. Supp. 1122, 1124-25 (E.D. Va. 1972); Aluminum Extrusion Co. v. Soule Steel Co., 260 F. Supp. 221, 224 (C.D. Cal. 1966).}

Inducing infringement of mask work rights can occur in two principal contexts.\footnote{Perhaps a "disinterested intermeddler" could in some way induce infringement of mask work rights, but the two scenarios described in the text accompanying notes \ref{fn:45-46} would seem to exhaust the realistic possibilities.} A party charged with "inducing" may have supplied materials to someone who then reproduced a protected mask work, for example, by making infringing chips or photomasks.\footnote{Examples would include supplying materials such as photoresist, silicon wafers, photographic steppers, or ovens; furnishing facilities or equipment for making pattern generation tapes, masks, or other tooling; and providing information or engineering services to someone who uses them to reproduce a protected mask work.} Alternatively, the "inducing" party may have procured goods from someone who, in supplying them, violated a reproduction, distribution, or importation right.\footnote{Examples would include procuring the preparation and supply of infringing masks from a mask house, supplying pattern generation tapes to a silicon foundry in order to procure infringing chips made by means of the tapes, and persuading an importer to import infringing chips into the United States.} The goods need not be incapable of noninfringing uses, since the graveness of inducing infringement is the accused party's "inducing" conduct, not the character of the goods.\footnote{See, e.g., Fromberg, Inc. v. Thornhill, 315 F.2d 407, 411 (5th Cir. 1963); Burlington Indus., Inc. v. Exxon Corp., 379 F. Supp. 754, 757 (D. Md. 1974).}

\section{B. Knowingly Causing Infringement}

The legislative history of section 905(3) equates knowingly causing infringement with contributory infringement and incorporates by reference the doctrine of contributory infringement described by the Supreme Court in \textit{Aro Manufacturing Co. v. Convertible Top Replacement Co.}\footnote{377 U.S. 476 (1964).} and \textit{Sony Corp. of America v. Universal City Studios, Inc.}\footnote{464 U.S. 417 (1984).} In Aro, the Supreme Court extensively reviewed the elements of an action for con-
tributory infringement under the patent laws. The Court stressed that to hold the defendant liable, the product that the defendant supplied must have been unsuitable for any substantial noninfringing use and the defendant must have known that the product was especially adapted for infringing use.50

In Sony, the Supreme Court held that the test for contributory infringement was the same in copyright as in patent law. Although the Court never mentioned its decision in Aro, it applied the Aro test to a claim that a defendant was liable for furnishing its customers with equipment potentially usable, and probably used to some extent, in committing copyright infringement. The Court held that doing so was not a culpable act if the product had any substantial noninfringing use.51

1. Beyond Contributory Infringement

The Supreme Court's decisions in Aro and Sony are the most important precedents in interpreting the "knowingly causing infringement" provision of section 905(3) of the SCFA, because Congress expressly referred to them in explaining the provision.52 Whether the scope of section 905(3) is the same as or broader than patent/copyright contributory infringement is not yet settled. "Knowingly cause" could arguably include conduct where there is "but for" causation even though the accused party does something other than knowingly furnish a direct infringer with goods incapable of a substantial noninfringing use.

The courts will probably equate "knowingly causing infringement" and "contributory infringement," as Congress appears to have done. The question is not free from doubt, however, and it is difficult to predict the business risks with confidence. The courts will probably decide that the word "cause" in "knowingly cause infringement" refers to "proximate cause" rather than "but for" cause. The concept of prox-

50. Aro, 377 U.S. at 488-90. The 5-4 majority held that this second requirement meant that the alleged contributory infringer must know that the customer's product infringes the patent, i.e., the infringer must know of the patent and that the use actually infringes it. Id. at 489-91.


52. See HOUSE REPORT, supra note 8, at 21, 1984 U.S. CODE CONG. & AD. NEWS at 5770. The relevant passage is quoted supra note 40.
mate cause involves, of course, a policy determination. Courts hold certain kinds of causal acts culpable and others not culpable, depending, in part, on the foreseeability of the consequences and also, in part, on the degree of regulation of private conduct that courts consider socially acceptable. The difficult question then is charting the boundaries of what conduct the courts will consider sufficiently culpable to make it a "proximate cause" of another person's infringement.53

2. Trademark Precedents

In trademark law, there may be a critical difference between the situation in which the supplier of a product capable of innocent use merely suspects that a buyer is pirating a mask work owner's chips and that in which he actually knows that the buyer is doing so. In a recent trademark decision, the Supreme Court stated, in dictum, that suppliers could become liable for continuing to supply products to persons whom they knew, or had reason to know, were mislabeling the products with the plaintiff's trademark. The Court stated, however, that the mere fact that the defendant "could reasonably anticipate" infringement would not be legally sufficient to make the

53. The possible conflict of interests and policies may be illustrated by two hypothetical cases:

A supplies ordinary, staple silicon wafers to B, who uses them in committing chip piracy. A does not urge B to do anything.

First case: Assume that A only suspects B of piracy.

Second case: Assume that A is on notice from mask work owner C that B is pirating C's chips, so that A knows or should know that B is using the wafers in pirating C's chips.

If the Aro-Sony standard, discussed supra notes 48-51 and accompanying text, is the beginning and end of the analysis, there is clearly no liability in either case, since the silicon is capable of substantial noninfringing use. Moreover, under patent law precedents, there would be no theory of liability under which C could prevail against A. There are some copyright and trademark precedents, however, which suggest a more extensive field of potential liability. They suggest that if someone knows or has reason to believe that a third party is engaged in infringement, he will be culpable if he deals with that third party. See, e.g., Inwood Laboratories, Inc. v. Ives Laboratories, Inc., 456 U.S. 844, 853-54 (1982) (trademark); Famous Music Corp. v. Bay State Harness Horse Racing and Breeding Ass'n, Inc., 554 F.2d 1213, 1215 (1st Cir. 1977) (copyright); Dreamland Ball Room v. Shapiro, Bernstein & Co., 36 F.2d 354, 355 (7th Cir. 1929) (copyright). The writer's opinion is that the courts will probably not apply these copyright and trademark precedents to cases involving infringement of mask work rights, but prudent counsel should, nonetheless, consider the possibility that they might do so.

The concurring opinion of Justice White strongly attacked the "reasonably anticipate infringement" test and noted that a "general consensus" exists in the law today that suppliers need not refuse to deal with customers "who merely might pass off" the product and thus commit trademark infringement.

Under the rule obtaining in trademark law, therefore, a court would probably not hold liable as having knowingly caused infringement a silicon wafer supplier who merely suspected that a buyer was pirating chips. On the other hand, depending on the surrounding facts, a court might find the silicon supplier liable if he had been on notice from the mask work owner that the silicon buyer was pirating the owner's chips. It is doubtful, however, that courts will extend the trademark law's "knew or should have known" rule to SCPA cases.

The trademark doctrine probably creates greater liability for suppliers than section 905(3) intends. The SCPA requires proof that the accused party "knowingly caused" infringement of mask work rights, which is conceptually quite different from merely supplying ordinary articles of commerce to a known wrongdoer, i.e., a person whom the supplier knows or should know will use the article in committing infringement of mask work rights. Most courts would probably view the chip pirate's individual volition as a substantial intervening cause that prevents the supplier's act from being the proximate cause of the infringement. Simply facilitating infringement falls short of "causing" it.

Certainly, Congress could have used other, less narrow words than "cause" if it desired a more expansive concept than that developed in Aro. If Congress had desired the semiconductor equivalent of a "dram shop" law, it could have used such words as "aid," "facilitate," or "make possible" instead of "cause," a word that invites the modifier "proximate." Alterna-

55. Id. at 854 n.13 (quoting a comment by the court of appeals that generic manufacturers "could reasonably anticipate" illegal substitution of their drugs, see Ives Laboratories, Inc. v. Darby Drug Co., 638 F.2d 538, 543 (2d Cir. 1981)).

56. Inwood Laboratories, Inc. v. Ives Laboratories, Inc., 456 U.S. 844, 861 (1982) (emphasis in original). Moreover, in Sony, the Supreme Court observed that because of the considerable differences between trademark law, on the one side, and patent and copyright law, on the other, the contributory infringement standard of Inwood, id. at 854, does not apply to copyrights. Sony, 464 U.S. at 439. The Court also noted that Sony's conduct did not meet the Inwood test, because Sony did not "supply its products to identified individuals known by it to be engaging in continuing infringement of respondent's copyrights . . . ." Id.
tively, Congress could simply have made third parties liable for knowingly supplying materials used to infringe mask work rights. It seems fair to conclude that the policies served by the trademark laws and the SCPA are sufficiently different that different rules would apply. Under trademark principles, a silicon supplier who had been on notice that a buyer was pirating the owner's chip would be liable for supplying the pirate; the supplier who only suspected that the buyer was pirating chips would not be. In contrast, neither silicon supplier would be liable under section 905(3).

3. Copyright Precedents

In copyright law, the liability of third parties is even more unpredictable, and the value of copyright precedents, which have been developed mainly in the lower federal courts, to interpretation of the SCPA is more uncertain. As the House Report noted, there is no explicit statutory basis for vicarious liability. The case law, however, has recognized vicarious liability, as well as the concept of the "related defendant." The related defendant doctrine is probably much broader than section 905(3), and the copyright case law is, therefore, probably mostly immaterial. If the copyright doctrine of third-party liability for involvement in copyright infringement were carried

57. The differences may possibly stem from the relative social values of the protected forms of intellectual property and of the challenged conduct of the accused suppliers. Differences may also be attributed to the relative difficulty of determining whether the supplies will be used in committing infringement, and to the comparative extent of or irreparability of the harm done to the intellectual property owner in the two contexts.


59. An illustration of the broad reach of the related defendant doctrine can be drawn from a line of cases involving owners of entertainment establishments. Owners of entertainment establishments are liable for copyright infringements that occur on their premises if they actively operate or supervise the operations on their premises, even though they do not select the works performed. The fact that they directly or indirectly benefit from the infringement suffices to make them liable. See, e.g., Famous Music Corp. v. Bay State Harness Horse Racing and Breeding Ass'n, Inc., 554 F.2d 1213, 1215 (1st Cir. 1977); Dreamland Ball Room v. Shapiro, Bernstein & Co., 36 F.2d 354, 355 (7th Cir. 1929).

These cases do not involve suppliers, unless the chain store or other third party could be considered a supplier of premises. Yet, the rationale of these cases arguably extends to suppliers. Certainly, the supplier of silicon benefits from the infringement, just as the store whose concessionaire commits infringement benefits from the unlawful conduct. It could therefore be argued that if it makes sense to hold the one liable, it makes equal sense to hold the other liable. This argument assumes, incorrectly in this author's opinion, that
over to the SCPA, however, suppliers who were on reasonable notice of pirating and those who merely suspected pirating would probably both be liable.60

IV. ROLE OF SCIENTER IN INFRINGEMENT OF MASK WORK RIGHTS CASES

As indicated in the preceding section on indirect infringement,61 "inducing" infringement under section 905(3) has an implied scienter or culpability element, because "inducing" connotes one person's actively urging or encouraging another person to infringe mask work rights. Moreover, scienter is an express statutory requirement for "knowingly causing" infringement. There is no parallel scienter requirement in the direct infringement prohibitions of sections 905(1) and (2).62

the policy behind the related defendant doctrine of copyright law applies with equal force to infringement of mask work rights.

Moreover, liability of this type has been found even where the "related defendant" did not know that the activities were copyright infringements. See Shapiro, Bernstein & Co. v. H.L. Green Co., 316 F.2d 304, 308 (2d Cir. 1963) (store liable for copyright infringement by independent concessionaire because store may have been able to police conduct of concessionaire). This judicially created rule of copyright law thus appears to be inconsistent with Congress's use of the word "knowing" in SCPA § 905(3), 17 U.S.C. § 905(3) (Supp. II 1984), and with the Supreme Court's decision in Aro, discussed supra note 50 and accompanying text.

60. The outer reach of the related defendant doctrine in copyright law may have been suggested in a record piracy case, in which a district court held that an advertising agency that places ordinary advertisements for the sale of records that it knew or should have known infringe plaintiff's copyright is liable as a related defendant. The court also indicated that a radio station that broadcasts the advertisements while knowing of the infringement may be liable. See Screen Gems-Columbia Music, Inc. v. Mark-Fi Records, Inc., 327 F. Supp. 788 (S.D.N.Y. 1971) (decision on the merits); Screen Gems-Columbia Music, Inc. v. Mark-Fi Records, Inc., 256 F. Supp. 399, 404-05 (S.D.N.Y. 1966) (denying defendants' motions for summary judgment). The theory is that liability is established when the defendant's conduct aids the copyright infringement. Whatever validity this position has under copyright law, it seems to go far beyond the concept of "knowingly causing" mask work infringement under SCPA § 905(3). In all probability, a court would find that merely aiding in an act of infringement by supplying staples would be short of knowingly causing it.

61. See supra text accompanying notes 42-43.

62. See 17 U.S.C. § 905(1)-(2) (Supp. II 1984). SCPA § 905(1)-(2), involving the unauthorized reproduction of mask works and the distribution and importation of semiconductor chip products that are unauthorized reproductions of mask works, has no scienter requirement. Neither do the direct infringement provisions of the patent and copyright laws. For example, printers and manufacturers have long been held liable under the Copyright Act for printing infringing books or manufacturing infringing articles without knowledge of the copyright infringement. See Belford v. Scribner, 144 U.S. 488, 507-08 (1892);
The purpose of the Act, to curb chip piracy, suggests that Congress intentionally omitted the scienter requirement for defendant competitive manufacturers and distributors of infringing chips, except where they could show innocent infringement under section 907. One could argue that the case is less clear for mask houses which may innocently reproduce mask works by making unauthorized masks, for silicon foundries innocently reproducing mask works by making unauthorized chips, and for others in the same moral position as suppliers of staples such as silicon or photoresist. These are persons who are not in direct competition with the mask work owner but whose conduct, even though innocent, may nonetheless facilitate another person's directly competitive piracy. When this occurs, they are literally violators of the reproduction right of section 905(1), absent a scienter requirement, and thus, to recover for infringement, the mask work owner need not sue them under section 905(3), the “inducing or knowingly causing” section, which has an express scienter requirement. The argument may be advanced, however, that scienter or culpability of some kind should nonetheless be shown before they are held liable for infringement of mask work rights.

In some cases, such as that of the innocent mask house, an argument based on the following anomaly may be advanced. If the mask work owner chose to sue the mask house for distributing the unauthorized mask set to the pirating customer, rather than for reproducing the mask work as a set of masks, which would, of course, be a serious tactical error for the mask work owner, the mask house could defend on the ground that it neither induced nor knowingly caused any infringement. Thus, there is the anomaly that the mask house can or cannot urge its nonculpability as a defense, depending on which paragraph of Section 905 the mask work owner chooses to rely. A similar but more involved argument can be made for the silicon foundry.

Moreover, if a customer innocently furnished a foundry with unauthorized tapes or masks, and the foundry innocently made chips from them for the customer, the customer could assert the innocent infringement defense of section 907, because


the mask work owner could sue the customer only for distribu-
tion (assumedly, suing the innocent customer for "knowingly"
causing infringement is futile). The mask work owner could
sue the foundry for reproduction or distribution, as it chose. In
either case, scienter would be immaterial and innocent in-
fringement no defense.64 Again, the argument may be made
that the result is anomalous and therefore unfair.

If some changes are made in the fact pattern, additional
anomalies may appear. The conduct may be brought outside
the scope of sections 905(1) and (2) and become actionable, if at
all, only under section 905(3), for which scienter is a prerequi-
site. Suppose that the innocent silicon foundry or mask house
is able to restructure the way it does business so that the ar-
rangement becomes one like a “tolling” or “leased plant” con-
tract. Suppose also that the court does not regard this
arrangement as a sham.65 Then the customer is the one who
reproduces the mask work as a mask set or as chips, rather
than the foundry or mask house. There is no distribution of
the chips, either, by anyone but the customer. Hence, the lia-
bility, if any, of the foundry or mask house is under section
905(3) and depends on culpability. The mask work owner
would have to prove scienter. This consequence leads one to
question whether the result should depend on form, and, if so,
whether that suggests a defect in the rule as to scienter.

These anomalies may lead the observer to two conclusions.
One is that foundries, mask houses, and suppliers of similar
technical services may wish to restructure their business ar-
rangements, where feasible, so that they themselves do not risk
becoming liable for customers' infringements66 by reproducing
mask works or by distributing semiconductor chip products.67

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64. The innocent customer does not itself violate the mask work owner's
reproduction right. It unknowingly causes the foundry to violate the repro-
duction right, and it innocently violates the distribution right when it resells
the infringing chip as part of equipment or otherwise. Its innocence termi-
nates upon notice of the mask work owner's rights, however.

The foundry innocently violates the owner's reproduction and distribution
rights, but innocent infringement is not a defense to violation of either of
these rights. SCPA § 907 applies only to persons who buy and resell an in-
fringing chip, not to persons who make and sell an infringing chip. See 17

65. Even if the court did not consider the arrangement a sham, there is
still the risk that it would invoke the related defendant doctrine discussed
supra notes 59-60 and accompanying text.

66. Here again, there is the risk that the court will invoke the related de-
fendant doctrine. See supra notes 59-60 and accompanying text and note 65.

67. Other alternatives are "hold harmless" agreements, see U.C.C. § 2-
The other is that some courts may not interpret the SCPA literally, but instead may import a scienter requirement into the Act in situations such as those involving an innocent foundry or mask house.

In the long run, the latter development would be unfortunate. It would be an example of seemingly hard cases making bad law. It is not clear that these are hard cases, however, and if they are, there is a better way to deal with the problem.68 To add an implied scienter element to sections 905(1) and (2), contrary to patent and copyright law, would be to supply what Congress consciously omitted. Congress created a limited innocent infringement exemption for equipment manufacturers and other chip purchasers and resellers in section 907.69 Congress rewrote that section several times and struck manufacturing rights from it in doing so. Congress also rewrote section 905 and, by adding paragraph (3), imposed the section's only scienter requirement.70 If Congress had wanted a more expansive innocent infringement exemption or a more pervasive scienter requirement, it easily could have explicitly created one. The omissions were the product of a negotiated compromise, not an oversight.

There are two apparent rationales for injecting scienter where Congress did not provide it, as an element of an infringement of mask work rights in cases against a foundry or mask house. The first is the reluctance "harshly" to hold a foundry or mask house liable for an infringement of mask work rights induced or caused by a customer, of which only the customer, if anyone, had knowledge. The second is the concern that making mask houses and foundries "act at their risk" will chill innovation and hinder semiconductor progress.

There are several problems with adding a scienter requirement to address these concerns. There is no rationale for confining the addition of a scienter requirement to only those cases involving foundries, mask houses, and others who are induced by customers to commit infringement of mask work rights. Hence, there is no rationale for not also injecting scien-

68. See infra text accompanying notes 72-73.
ter into all cases involving infringement of mask work rights, such as those between rival chip manufacturers. Doing so would gravely undermine the SCPA, however.

Even if limited to foundries, mask houses, and the like, the approach is flawed. The SCPA is a remedial statute designed to curb chip piracy and, by doing so, to encourage semiconductor innovation by the potential victims of chip pirates. As in the patent and copyright laws, Congress omitted scienter as an element of ordinary or direct infringement and included it as an element of contributory infringement. This is part of the balance that Congress struck among all of the competing interests at stake, just as the exemptions for reverse engineering and innocent infringement are part of that balance. It is inappropriate for the courts to upset the balance that Congress struck, by adding a nonstatutory element that weighs against mask work owners and in favor of the other parties playing a role in the industry.

Moreover, the analysis is not furthered by claiming that it is "harsh" to impose liability on innocent reproducers of mask works. This is an economic regulatory statute, not a civil rights law. The choice of how to allocate liability is an economic judgment, within the decision-making ambit of Congress, not the courts. The question is whether the chip innovator/mask work owner or the foundry/mask house/services supplier should bear the economic risk of loss from infringement of mask work rights. The chip innovator can just as well claim that it is "harsh" to make it suffer for someone else's infringing conduct. It is perfectly rational, although of course not inevitable, to allocate the risk between two innocent parties as the SCPA, on its face, allocates it. Nor is it necessarily inimical to progress in the semiconductor industry to make foundries and mask houses assume the risk of liability when their customers cause them to reproduce protected mask works. Again, it is simply a matter of how Congress elects to allocate a business risk. Perhaps either choice would have been reasonable, but it is hardly irrational for Congress to have chosen to resolve the marginal case in favor of the chip innovator.\footnote{Holding printers liable for copyright infringement when they print infringing books has apparently not chilled first amendment rights or stifled progress in publishing books.} The decision is appropriately legislative and should not be disturbed.

Finally, there is a better way to deal with the problem than by requiring the courts to read an implied element of scienter
into sections 905(1) and (2). There is no legitimate objection to injunctions in these cases. Once the defendant’s innocence terminates, as it does when an infringement complaint is served, there is no reason to project further infringements into the future. Any problem of harshness goes only to monetary remedies. Section 911(b) provides for an award to the mask work proprietor of its actual damages caused by the infringement and the profits of the defendant “attributable to the infringement.” Alternatively, the mask work proprietor may elect a civil penalty set by the court in its discretion. A sympathetic court could help an innocent foundry or mask house by finding intervening operative causes, such as the piratical customer’s conduct, of any actual damage; by not substantially attributing the defendant’s profits to the infringement of mask work rights; and by exercising its discretion soundly as to any civil penalty. These would be much better ways of dealing with the case of the innocent foundry than would be rewriting section 905 to require scienter.

V. ACTIONABLE SIMILARITY

The concept of infringement under the SCPA is different from the concepts of both patent infringement and copyright infringement, although in some ways it parallels the concept of copyright infringement. The concept of patent infringement is based on the existence of a patent, an explanatory document describing the invention and setting forth “claims,” which in verbal terms define the metes and bounds of the patentee’s right to exclude other persons from the patented subject matter. In principle, the claims allow a comparison between the allegedly infringing device and the invention as defined by the patent claims; the device infringes the patent if and only if the device falls within the scope of the claims. Application of this system to semiconductor chip products is impractical, however. One cannot expect a precise verbal description of what is original in a chip design.

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72. 17 U.S.C. § 911(b) (Supp. II 1984). For a discussion of remedies under the SCPA, see R. STERN, supra note 5, ch. 6. For a discussion of damages and profits, see id. § 6.4-5.
73. 17 U.S.C. § 911(b) (Supp. II 1984). For a discussion of civil penalties under the SCPA, see R. STERN, supra note 5, § 6.6.
75. SCPA § 902(b) allows protection of mask works only insofar as their designs are original and not, when considered as a whole, staple, familiar, or commonplace. 17 U.S.C. § 902(b) (Supp. II 1984).
The claimant of mask work protection could perhaps file a diagram of the chip with the Copyright Office, showing the new parts circled in red. Even if such a suggestion were practical, it would work only with revisions of existing chips. In most cases, however, the chip designer would feel that the whole chip, that is, the design considered as a whole, is novel or that the undepictable relation of the parts, perhaps commonplace in themselves, to one another is new. In that sense, the design simply “is”; all the designer can articulate to describe his contribution is “lo and behold.” This is also generally the case with copyrighted works. Hence, copyright systems do not require copyright claimants to describe with any precision the nature of their original contributions. In most countries, copyright holders do nothing at all but wait until litigation to assert the nature of their rights. In the United States, unlike most other countries, the copyright claimant must deposit a copy of the work with the Copyright Office at some time before suing anyone so that the court can compare the two works.76 That is essentially how the SCPA operates as well.77 As a result, the concept of infringement of mask work rights parallels that of copyright infringement, in that proof of infringement reflects not only the way that rights are defined by the statute but also how they are identified under it. Neither the SCPA nor the Copyright Act require a precise or verbal definition of the protected work; instead, both rely on an overall comparison of the two works to determine whether the second is so close to the first that it is to be considered an infringement.78

An underlying principle of both the Copyright Act and the SCPA is that the similarity between two works is actionable only when the similarity is substantial. An infringement of mask work rights occurs when the accused semiconductor chip product embodies mask work patterns and configurations that are “substantially similar” to those of the protected mask work.79 This is similar to the concept of actionable similarity

76. 17 U.S.C. §§ 408, 411 (1982); see also Washingtonian Publishing Co. v. Pearson, 306 U.S. 30, 42 (1939) (no action may be maintained until copies are filed with register of copyrights).
77. For a general discussion of registration and deposit procedures under the SCPA, see R. STERN, supra note 5, ch. 3.
78. In the case of a patented article, it would be as if the court had no patent or claims to read and simply made a physical or visual comparison of the two parties’ products.
79. HOUSE REPORT, supra note 8, at 20, 25-27, 1984 U.S. CODE CONG. & AD. NEWS at 5769, 5774-76; see also SENATE REPORT, supra note 8, at 16-18.

The Senate bill, as originally introduced and as passed by the Senate, and
under the copyright laws. There are, however, significant differences between copyright infringement and infringement of mask work rights. Therefore, applying copyright infringement principles to mask works may produce misleading results.


The SCPA follows H.R. 5525 on this point. The language quoted above from section 2 of S. 1201 and H.R. 1028 is not in the SCPA because the SCPA does not define “mask.” The term “mask” is only rarely and unambiguously used in the SCPA, whereas S. 1201 and H.R. 1028 used the term prominently in their exclusive rights sections. See S. 1201, 98th Cong., 1st Sess. § 4, 129 Cong. Rec. S5993 (daily ed. May 4, 1983); H.R. 1028, 98th Cong., 1st Sess. § 4, 129 Cong. Rec. H643 (daily ed. Feb. 24, 1983). The provisions relating to the reproduction right were extensively amended and greatly condensed. In the process, the words “substantially similar” were deleted from SCPA § 905(1). See 17 U.S.C. § 905(1) (Supp. II 1984).

80. For a discussion of the substantial similarity requirement under copyright law, see 3 M. NIMMER, NIMMER ON COPYRIGHT § 13.03 (1985).

81. At the very least, applying copyright infringement principles to mask works requires attention to subtle nuances. First, mask works, like copyrights, have no claims or explanatory specifications, as mechanical patents do; the legally protected metes and bounds of mask works are not described verbally or conceptually. Hence, the only way to compare two semiconductor chip products or their mask works for infringement is to make a visual examination, from which must be made a determination of whether the two things are, in whole or in economically significant parts, “substantially similar.” That similarity is not easily quantifiable, however, or even readily verbalized, and how similar is “too similar” is uncertain. Second, aspects of mask works that are dictated by chip function are not protected. Third, copying that would be impermissible (infringing) under the copyright law is tolerated under the SCPA, particularly in the context of reverse engineering. Fourth, and this point is reflected particularly in the SCPA’s treatment of reverse engineering, the primary values protected by the SCPA are the investments of effort and expense that innovative semiconductor firms devote to the development of new or improved chips, rather than, as under copyright law, the literary, artistic, or personal values of the individuals who do the actual work.
A. THE REQUISITE DEGREE OF SIMILARITY

Although the House and Senate Reports both explain infringement of mask work rights in terms of the copyright concept of "substantial similarity," they both carefully note that the concept must be applied differently in regard to mask works.\(^\text{82}\) Both the legislative history and common sense lead to the conclusion that the similarity between two semiconductor chips must be quite close for them to be actionably or infringingly similar to one another. If the rule were otherwise, the SCPA might be used to protect the "idea" of a chip layout rather than just the mask work owner's investment in personnel-hours devoted to preparing an "expression" of the idea. To protect the former would clearly run counter to the policy of the SCPA.\(^\text{83}\)

The principle is clearly laid down that actionable similarity


While the Committee believes that the courts may usefully consider the copyright law precedents concerning substantial similarity, the Committee also intends that the courts should have sufficient flexibility to develop a new body of law specifically applicable to semiconductor chip infringement. Moreover, the concept of substantial similarity varies depending upon the nature of the work.

House Report, supra note 8, at 26, 1984 U.S. Code Cong. & Ad. News at 5775 (footnote omitted). As to the last of these points, the Senate Report had already stated:

[E]ven though no percentage "rule of thumb" can be stated, some qualitative observation is in order. It is generally recognized in copyright law that the degree of similarity two works must share in order for one to be considered "substantially similar" to, and therefore an infringement of, the other, may depend on the subject matter.

Senate Report, supra note 8, at 17.

Both the Senate and House Reports give examples that illustrate different standards of substantial similarity for different types of work. When the case involves a play or a highly creative drawing, the court may consider a broad range of paraphrases to be substantially similar to the copyrighted work. See id. at 17. Fictional and imaginative works may also be broadly protected against paraphrase. See House Report, supra note 8, at 26, 1984 U.S. Code Cong. & Ad. News at 5775. But the copyright in a plastic toy, commercial document, or lace design, where the quantum of originality is modest, will extend only to almost identical copying. See Senate Report, supra note 8, at 17. The similarly narrow copyright in fact-based works, such as histories and directories, also is infringed only by very close copying. See House Report, supra note 8, at 26, 1984 U.S. Code Cong. & Ad. News at 5775.

83. See 17 U.S.C. § 902(c) (Supp. II 1984) ("In no case does protection under this chapter for a mask work extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work . . . ").
for SCPA purposes is greater than that required by copyright law for infringement of highly creative works, of which even "paraphrases" are deemed infringements. The SCPA provides no specific standard, however. Indeed, the Senate Report expressly disclaims the existence of any "percentage 'rule of thumb' for determining substantial similarity."84

The legislative history asserts that the absence of a bright line distinction between substantial similarity and insubstantial similarity is not a matter for concern in administering the SCPA.85 If the legislative history is correct, then, litigation under the SCPA should not be impeded by lack of a clearer standard for separating substantial similarity from insubstantial similarity.

B. CELL LIBRARIES

A special problem in determining substantial similarity may exist for "cell libraries." Cell libraries are collections of parts of semiconductor chip products, such as counters, registers, or oscillators, that can be transported from the layout of one chip to that of another. A chip designer may select and call up the configuration of such a component stored in a memory bank, in order to incorporate it into a current chip layout. Any single such component may represent only a small percentage

84. Senate Report, supra note 8, at 17. The Senate Report simply observes that "[t]he case of semiconductor chips falls [somewhere] between these two extremes" of imaginative plays and mere toys. Id. at 18. The House Report states:

No black letter rule of law can be formulated to draw a precise boundary between substantial similarity and insubstantial similarity under this chapter. This is a classic type of legal question to be put to the judge or jury.


85. The Senate Report states:

The Committee believes, however, that the question is more theoretical than real, because of the business realities of the chip industry. The economics of chip copying appear to favor either wholesale copying or else none at all; it is not economical for a pirate to copy only a small part of a chip and then incur the expense of engineering other parts.

Senate Report, supra note 8, at 17. See also id. at 21 ("[A]s a practical matter, it does not make economic sense for a pirate to appropriate the fruits of a chip innovator's mask design labor unless the appropriation is wholesale."); Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917 ("[A]s a practical matter, copying of an insubstantial portion of a chip and independent design of the remainder is not likely . . . ."). The same point was made by the principal sponsor in the House when he introduced H.R. 1028, see 129 Cong. Rec. H645 (daily ed. Feb. 24, 1983) (statement of Rep. Edwards).
of the entire "silicon real estate" on the chip.\textsuperscript{86}

It is not clear whether appropriating parts of a cell library can lead to infringement liability under the SCPA. Both the Senate and House Reports suggest that it can. The Senate Report observes that copying only a single chapter of a copyrighted book may create copyright infringement liability,\textsuperscript{87} and notes that, similarly, "copying individual copyrighted 'cells' forming part of a 'cell library' of building blocks for chips may be an infringement. This would be so only if the cells' layouts were not functionally dictated, and if the copying were otherwise close enough to meet the substantial similarity test."\textsuperscript{88} In the same spirit, the House Report observes: "Mask works sometimes contain substantial areas . . . (so-called 'cells') whose layouts involve creativity and are commercially valuable. In appropriate fact settings, the misappropriation of such a cell . . . could be the basis for an infringement action under this chapter."\textsuperscript{89} Hence, it would seem that near-identical copying of a whole cell would be actionable under the SCPA. This would be particularly likely if the cell were separately registered as a mask work, so that the near-complete identity of the two parties' products were apparent.\textsuperscript{90}

\textsuperscript{86} For further discussion of cell libraries and legal problems relating to their exploitation, see R. Stern, \textit{supra} note 5, § 12.5; Stern, \textit{MicroLaw}, IEEE Micro, June 1985, at 73.

\textsuperscript{87} Senate Report, \textit{supra} note 8, at 17.

\textsuperscript{88} Id. at 17 n.8. See also Mathias-Leahy Explanatory Memorandum, \textit{supra} note 17, at S12,917 ("mask work owners are protected not only from wholesale copying but also against piece-meal copying of substantial or material portions of one or more mask works").


\textsuperscript{90} If copyright law applied, rather than the SCPA, the interplay of two principles would be significant, perhaps determinative. On the one hand, the copyrightability of compilations of facts or preexisting materials, e.g., directories, mathematical tables, books on parliamentary procedure, histories, collections of game rules, and cookbooks, is based on the act of selecting particular alternatives from the many choices available. \textit{See generally} Patry, \textit{Copyright in Collections of Facts: A Reply}, \textit{COM. AND THE LAW}, Oct. 1984, at 11, 25-34.

On the other hand, as the size of the work diminishes, so too does the plausibility of its status as a work of authorship. Expressions such as "[a]pply hook to wall" have been considered too slight to qualify as copyrightable works. \textit{See E.H. Tate Co. v. Jiffy Enters., Inc.}, 16 F.R.D. 571, 573 (E.D. Pa. 1954). The Copyright Office has taken the position that slogans are not copyrightable for the same reason. \textit{See U.S. Copyright Office, Copyright Office Circular R-I: The Nuts and Bolts of Copyright} 4 (1983).

It must be recognized, however, that copyright law precedents are of limited utility in industrial property law, and that the SCPA has its own legisla-
C. Functionally Dictated Substantial Similarity

Any similarity between two chips or their mask works that results from the requirements of the technology of the product is not actionable similarity under the SCPA. The Senate Report states that if there are only a limited number of ways to make a chip in order to achieve a particular function, then another chip would not be infringing because it used the same pattern.91 The Senate Report identifies a line of precedent to this effect under the Copyright Act.92 Under these decisions, substantial similarity dictated by function is either not substantial similarity for the purposes of the Copyright Act, or else the copyright is invalid insofar as it is sought to be extended to the parts of the work dictated by function.93 In discussing the relevance of copyright precedents to the SCPA, the House Report reaches the same conclusion, suggesting that “idea” and “ex-

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91. The Senate Report states:

[I]f the pattern of part of a mask were dictated by function, so that only one or a few ways existed in which to make the chip in question, then another chip would not be infringing merely because it used that pattern. . . . [I]f a defendant in a chip copyright infringement case convinces the fact-finder that the copied chip or part of a chip was capable of expression in only one or a few ways, then the defendant would prevail on the charge of copyright infringement of the functionally dictated copied part.

92. See Senate Report, supra note 8, at 16-17. See also House Report, supra note 8, at 26 & n.49, 1984 U.S. CODE CONG. & AD. NEWS at 5775 & n.49 (“'Moreover, where there are only a limited number of ways to express an idea, there may be no protection for the particular expression.'”) (quoting Morrissey v. Proctor & Gamble Co., 379 F.2d 675, 678 (1st Cir. 1967)).

93. Senate Report, supra note 8, at 16. The concept of functionality under the SCPA appears broad enough to extend to whatever is useful or economically valuable. Thus, a layout that minimized use of chip area (so-called “silicon real estate”) would apparently be functional. So, too, would be layouts that improved product yield, thermal stability of the circuit, freedom from noise, or that otherwise lowered cost or improved reliability.

Achieving “form, fit, and function compatibility” appears to be a legitimate activity, defensible either under SCPA § 906(a)’s reverse engineering privilege, discussed infra notes 199-261 and accompanying text, or as form dictated by function. See, e.g., House Report, supra note 8, at 22, 1984 U.S. CODE CONG. & AD. NEWS at 5771 (“this practice fosters fair competition and provides a frequently needed ‘second source’ for chip products”). Hence, layout aspects that are dictated by compatibility considerations, such as pin layout and placement of blocks near their pins, would not contribute to actionable similarity. The rule in the case of copyrighted software, in contrast, is less clear. See Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1253 (3d Cir. 1983) (need for compatibility not part of function), cert. dismissed, 464 U.S. 1033 (1984).
pression" merge "when function dictates form." 94

It is unclear whether function dictating form is a real or only theoretical possibility for semiconductor chip products protected under the SCPA. Several witnesses at the Senate hearings testified that the function of a semiconductor chip product rarely or never dictates its form, and that there are usually a vast number of different ways to lay out a chip. 95 Other witnesses, however, expressed the concern that chip protection under the copyright laws "might be exploited to create patent-type monopolies over functional features of semiconductor chips, without the requirements of the patent law [examination for novelty and invention] having first been satisfied." 96 The Senate Report did not attempt to resolve the factual dispute, but instead concluded that proper application of the form-dictating-function aspect of the "substantial similarity requirement should allay that concern." 97

Moreover, both the Senate and House Reports emphasize the importance of using expert testimony in determining substantial similarity—a departure from copyright law principles. 98

94. HOUSE REPORT, supra note 8, at 26, 1984 U.S. CODE CONG. & AD. NEWS at 5775.
95. SENATE REPORT, supra note 8, at 17 n.7.
96. Id. at 16-17. The problem may become more significant in the case of dynamic RAM (DRAM) or EPROM cells, or other small, highly replicated modules.
97. Id. at 17. Both groups were probably right, but as to different aspects of chip layouts. At the two extremes of the general "floor plan" (the overall layout), on the one hand, and of the cells or even transistors of the chip, on the other, functional considerations and accepted engineering practice may cause designs to converge. Between these two extremes, however, there is usually considerable room for individual choice and thus variation of design. For an illustration of chip design, see R. STERN, supra note 5, § 1.1[C] n.17.
98. This reliance on expert testimony is a very significant departure from traditional copyright law. A number of copyright precedents point to mandatory use of a highly subjective "lay observer" test in determining whether the similarity between two works causes copyright infringement liability. See Atari, Inc. v. North Am. Philips Consumer Elecs. Corp., 672 F.2d 607, 614 (7th Cir. 1982); Peter Pan Fabrics, Inc. v. Martin Weiner Corp., 274 F.2d 487, 489 (2d Cir. 1960); see also 3 M. NIMMER, supra note 80, § 13.03[E], at 13-46 to 13-47 (collecting cases). Thus, the Senate Report observes:

Some courts have declined to permit expert testimony in copyright litigation on the issue of substantial similarity, believing the question to be determinable only by an overall subjective evaluation based on the spontaneous impression of a lay observer.

SENATE REPORT, supra note 8, at 18.

Regardless of whether such decisions are sound in the copyright context, they are not applicable to the SCPA and mask work infringement actions. The Senate Report notes that it was the Committee's intention that expert testimony on the question of substantial similarity be admitted in cases arising
This stress on the importance of expert testimony in mask work infringement litigation should also tend to allay the concern that courts might be misled into according mask work protection to functional aspects of semiconductor chip products. A semiconductor expert may usefully explain whether function dictated the form of a mask work; whether apparent similarities in two mask works involve staple, familiar, or commonplace design choices; and whether that which seems quite similar to the inexpert observer actually involves subtle design nuances that significantly distinguish the two mask works.\footnote{For further discussion of the use of expert testimony, see R. STERN, supra note 5, at § 7.7. Finally, in connection with the defense of function dic-}

under the Act. The Senate Report states what it describes as “the better view” as “expressed in the hearing record by one expert on chip technology” as follows:

“[I]t has been said that even very subtle mask changes may represent significantly different and original designs. This is true. It has been further said that exactly the sort of tests that demonstrate such differences are specifically disallowed as defenses in copyright infringement cases. . . . I feel that evidence of this type should be allowed in semiconductor chip copyright infringement cases and hope that the legislative history of S. 1201 would include a statement endorsing use of expert testimony to show subtle functional differences in circuit layouts.”

Id. (quoting an expert on chip technology). The Senate Report concludes that “it would ordinarily be appropriate to permit expert testimony on all aspects of the ‘substantial similarity’ or copyright infringement issue in cases arising under this bill.” Id.

Accordingly, both the plaintiff and the defendant in a mask work infringement case would probably rely heavily on expert testimony in presenting their respective sides of the case. The plaintiff’s expert would probably emphasize that the similarities between the defendant’s chip and the plaintiff’s reflect defendant’s appropriation of the most creative and important aspects of the plaintiff’s layout. The plaintiff’s expert might also assert that a multitude of design choices were available, and that the defendant simply tried to cut corners and reduce its design costs by appropriating the plaintiff’s work.

The defendant’s expert would probably emphasize that most of the similarity between the two chips relates to the staple, commonplace aspects of the design; that the defendant made subtle changes in layout that were highly creative and beneficial to performance, even though they are not immediately apparent to the lay observer; and that the other similarities between the two chips occurred because there are only a few possible ways to lay out such circuits. For example, the defendant’s expert might point out that good engineering practices dictated the following aspects of the “floor plan”: that thermally sensitive circuitry be kept far away from heat-producing circuitry; that circuits with many interconnections with one another be adjacent or at least close to each other; that input and output circuits be near their pins, and thus on the outer periphery; and that cross-overs be minimized. At the subcircuit level, the defendant’s expert might argue that engineering and economics dictated the following: use of minimum area layouts; use of high yield layouts; avoidance of sharp turns and edges; and selection of transistor sizes reflecting output power requirements.
D. Reverse Engineering

The test of actionable or infringing similarity under the SCPA is modified in reverse engineering situations. When there is proof of reverse engineering, that is, when there is proof that the defendant has expended substantial toil and investment in developing its version of the semiconductor chip product, it is not enough for the plaintiff to show substantial similarity between the two parties' chips. To establish a case of infringement of mask work rights when there is such proof, the plaintiff must show substantial identity. This is a major departure from copyright law.

To summarize the provisions of the SCPA on actionable or infringing similarity: There is no percentage rule of thumb for actionable similarity under the SCPA, but the degree of similarity required for mask work infringement is nearer to identity than that required under the Copyright Act for infringement of imaginative works (as compared with toys, designs, and directories). If the function of a chip dictates the

100. The reverse engineering defense is discussed infra notes 199-261 and accompanying text.

101. See infra notes 235-248 and accompanying text.
form of the chip layout, the resulting similarity is not actionable as an infringement of mask work rights. If actual reverse engineering is involved, the similarity necessary for a finding of infringement of mask work rights is substantial identity.

VI. COPYING

Copying is an element of copyright infringement under the Copyright Act,102 but is not an element of patent infringement under the Patent Act.103 Although it is not yet settled, it would also appear that copying is not an element of a claim for relief under the SCPA. If the courts were to decide that copying is an element of infringement of mask work rights, two consequences would follow. The plaintiff would have to establish that the defendant copied the plaintiff's mask work, by showing that the defendant had access to the mask work and impermissibly took substantial parts of it. In addition, because independent creation of a semiconductor chip product would be inconsistent with copying, either the plaintiff would have to show, as part of its affirmative case, that independent creation did not occur, or the defendant would prevail if it showed that independent creation had occurred. It is unclear which party would have the burden of proof on this issue.

A. INDEPENDENT CREATION UNDER COPYRIGHT LAW

Ordinarily, in a copyright infringement case, the copyright owner must first prove substantial similarity between the works and then, to establish that the defendant could have copied the plaintiff's work, that the defendant had access to the plaintiff's work.104 From that evidence, particularly when the similarity of the works is too close to be believed a mere coincidence, the fact finder may infer that copying occurred.105

Independent creation of a substantially similar work is not copyright infringement. Thus, according to the established mythology of copyright law, it is said that if a person who had never read Keats's "Ode on a Grecian Urn" were to create that same poem independently,106 that person would not be guilty of

102. See 3 M. Nimmer, supra note 80, § 13.01, at 13-3.
103. See 35 U.S.C. § 271 (1982); see also Thurber Corp. v. Fairchild Motor Corp., 269 F.2d 841, 849 (5th Cir. 1959) (infringement does not require deliberate act such as copying).
104. 3 M. Nimmer, supra note 80, §§ 13.01-.03.
105. Id. § 13.02, at 13-9.
106. Apparently, this hypothetical is based on the supposed statistical the-
copyright infringement. Hence, under copyright law, if the defendant can convince the fact finder that the defendant independently created the accused work, the defendant is not liable for infringement. Moreover, a copyright plaintiff must convince the court that copying did occur. If the plaintiff's evidence of access by the defendant is weak, the defendant may still prevail despite great similarity between the two works.

The rationale for the doctrine of independent creation has not been well articulated. One theory is that "copyright" means "right to copy," and therefore copyright protection does not extend to coincidental duplications of a copyrighted work. This is not a theory, however, but an unthinking appeal to etymology. It is a refusal to analyze why copyright is so limited and whether so limiting the right makes sense. The more sophisticated rationale for independent creation comes from the context in which the traditional subject matter of copyright, i.e., belles lettres and fine arts, is created—a context far from the industrial setting of Silicon Valley or that of other industrial property laws such as the Patent Act. It is argued that we should not stifle the creativity and self-expression of the second author of the "Ode on a Grecian Urn," because creativity and self-expression enrich the quality of life. Permitting independent creation as a defense, or making plaintiffs prove copying, gives that creativity and self-expression some breathing room by resolving doubts and close cases in their favor. Perhaps, in that context, freedom of speech and freedom of expression are more important than commercial certainty.

ory that if 100 monkeys sit before 100 typewriters for 100 years, one of them will eventually type "Thou still unravished bride of quietness," and so on.


108. See Selle v. Gibb, 741 F.2d 896, 902-03 (7th Cir. 1984). In Selle, the defendant Bee Gees's song ("How Deep Is Your Love") was remarkably like the plaintiff Selle's song ("Let It End"). The Bee Gees denied, and Selle could not prove, access. The court of appeals therefore set aside a jury verdict in the plaintiff's favor. The only expert witness had testified that "the two songs had such striking similarities that they could not have been written independently of one another," but he was unwilling to testify that the similarity had to be the result of copying. Id. at 899. The court of appeals concluded that the evidence of the defendants' access to the plaintiff's music was "virtually de minimis," and that it was therefore conceivable that both songs were descended from a common ancestral source. The court held that the plaintiff could not recover unless he disproved this possibility. Id. at 902-03.
B. Copying Under Patent Law

As indicated above, independent creation is not a defense in patent\textsuperscript{109} or related industrial property law.\textsuperscript{110} Indeed, even an earlier inventor who fails to file for a patent, but instead secretly practices the invention, may be held to infringe the patent of a later inventor who files for and secures a patent, thereby disclosing the invention to the public and promoting the progress of useful arts.\textsuperscript{111} Under most patent systems outside the United States, the right to a patent belongs to the first person to file an application rather than to the first person to complete the invention. Hence, not only is subsequent independent creation of the invention unavailable as a defense, but even earlier independent creation than that of the owner of industrial property rights is not a defense.

The rationale of this rule is the promotion of commercial certainty and security of investment. Business disputes are expensive and a distraction. Rules that increase certainty are, therefore, preferable, unless there are policy reasons mandating other rules. Placing industrial products on the market may require large front-end investments. Unless the investments are relatively secure, fewer, if any, will be made. When pro-

\textsuperscript{109} See, e.g., Schnadig Corp. v. Gaines Mfg. Co., 620 F.2d 1166, 1168 n.3 (6th Cir. 1980) (independent creation is no defense to patent infringement claim); Granite Music Corp. v. United Artists Corp., 532 F.2d 718, 720 (9th Cir. 1976) ("one may therefore infringe a patent by innocent and independent reproduction"); Alfred Bell & Co. v. Catalda Fine Arts, 191 F.2d 99, 103 (2d Cir. 1951) ("independent reproduction of copyrighted work . . . is not infringement, whereas it is vis a vis a patent") (citations omitted).

\textsuperscript{110} See Gambrel, Overview of Ownership Conflicts That Arise With Respect To Intellectual Property, in SORTING OUT THE OWNERSHIP RIGHTS IN INTELLECTUAL PROPERTY: A GUIDE TO PRACTICAL COUNSELING AND LEGAL REPRESENTATION 9, 11 (ABA Sec. Patent, Trademark & Copyright Law, ed. 1980). The field of intellectual property law is generally divided into two main parts: copyright and related law and industrial property law. Patent law is part of industrial property law. See supra note 2. Examples of related industrial property laws are utility model laws and design patent or industrial design laws. A utility model is a lesser, narrower patent covering only a very specific embodiment of a technological advance; the United States does not have utility model laws, but other countries, including Germany, Italy, and Australia, do. See C. FELLNER, THE FUTURE OF LEGAL PROTECTION FOR INDUSTRIAL DESIGN 137, 153, 166 (1985). A design patent covers the ornamental aspects of a useful article. See 35 U.S.C. § 171 (1982).

\textsuperscript{111} See, e.g., Woofter v. Carlson, 367 F.2d 438, 448 (C.C.P.A. 1966); Mason v. Hepburn, 13 App. D.C. 86, 96 (1898). However, when the first inventor practices the invention openly or publishes it, the invention will fall into the public domain. A second inventor cannot then secure a patent that would exclude the first inventor. See 35 U.S.C. § 102(a)-(b) (1983).
gress in technology is an important goal, promotion of commercial certainty and security of investment in industrial property rights is an important subsidiary goal.

Because acceptance of independent creation as a defense tends to decrease commercial certainty and security of investment, it is rejected under industrial property law. The doctrine of independent creation tends to decrease commercial certainty and security of investment in several ways. First, a firm considering whether to invest in a new product which may be protected by industrial property law can make an educated guess as to whether the product will enjoy freedom from competition (i.e., a "monopoly" of some sort), by using ordinary research methods, such as consulting literature, product catalogs, and industrial property registration records. That research, however, will not provide information about whether other persons will subsequently claim independent creation of the same product. That remains an area of uncertainty. Second, the availability of an independent creation defense not only decreases the predictability of infringement litigation, but also decreases by an indeterminable amount the probability that an owner of proprietary rights will succeed in such litigation. Third, the availability of an independent creation defense in infringement litigation increases the probable cost of the litigation, even when the owner of industrial property rights eventually prevails on the merits.112 By the same token, the prospect of such increased costs has an effect, adverse to the interests of the owner of industrial property rights, on the desirability of settling and on the terms of settlement. For these and perhaps other reasons, the availability of the independent creation doctrine tends to decrease

112. Some defendants in infringement cases will seize upon any faintly colorable defense, in the hope of delaying the day of judgment and possibly so confusing the jury that no judgment is returned against the alleged infringer. Courts should measure the likelihood that a defendant will prevail upon a defense against the cost to the judicial system and the parties in determining whether or not a defense should be recognized. Such considerations are a major part of the rationale for per se rules. See, e.g., Northern Pac. Ry. v. United States, 356 U.S. 1, 5 (1958) ("This principle of per se unreasonableness not only makes the ... [law] more certain to the benefit of everyone concerned, but it also avoids the necessity for an incredibly complicated and prolonged economic investigation ... an inquiry so often wholly fruitless when undertaken."); see also Continental T.V., Inc. v. GTE Sylvania, Inc., 433 U.S. 36, 50 n.16 (1977) ("Per se rules thus require the Court to make broad generalizations about the social utility of particular commercial practices ... Cases that do not fit the generalization may arise, but a per se rule reflects the judgment that such cases are not sufficiently common or important to justify the time and expense necessary to identify them.").
the projected return on an investment. To the extent that it does, it shifts the margin in the direction away from investment in new technology. Considerations such as these have led to the rejection of independent creation in patent and other industrial property law.

C. COPYING UNDER THE SCPA

Under the SCPA, there is no express requirement of copying. The SCPA, unlike the Copyright Act,\(^\text{113}\) does not use the word "copy."\(^\text{114}\) There is no express requirement in the SCPA that the defendant "copy" the plaintiff's work, just as there is none in patent law. Under a literal reading of the SCPA, therefore, proving that the defendant copied or had access to the plaintiff's chip or mask work is not part of the plaintiff's case for infringement of mask work rights.

On the other hand, it may be argued that the word "copy" is used as a noun, rather than a verb, in section 106 of the Copyright Act, that only the verb implies plagiarism, and therefore, that the copyright law requirement of "copying" is not based on the statute. If this were the case, the absence of a "copying" requirement in the SCPA might not preclude judicial requirement of proof of copying, meaning the defendant's intentional plagiarism of the plaintiff's chip, or at least the defendant's nonindependent derivation of its chip from the plaintiff's, because such a judicially imposed requirement would be analogous to the requirement imposed by the courts in copyright cases.

A rejoinder to this argument might be that the courts have read no such "copying" requirement into the patent law, which

\(^{113}\) Under section 106 of the Copyright Act, it is an infringement for the defendant "to reproduce the copyrighted work in copies" or "to distribute copies" of the copyrighted work. 17 U.S.C. §§ 106(1), 106(3) (1982) (emphasis added).

\(^{114}\) By contrast, under the SCPA, it is an infringement "to reproduce the mask work" (no reference to "copies") or "distribute a semiconductor chip product in which the mask work is embodied" (no reference to "copies"). 17 U.S.C. § 905(1)-(2) (Supp. II 1984). In the English language, the word "reproduce" does not necessarily connote "copying," although the word is often used that way.

The drafters of SCPA § 905(1) could have avoided this ambiguity by using one of the following phrases: "embody the mask work in a physical object," "make a physical object embodying the mask work," or "copy the mask work in any fixed, tangible form." Whether independent creation negated infringement of mask work rights evidently was not perceived as a problem when SCPA § 905 was drafted. The drafters apparently assumed the answer was obvious and therefore did not address the issue.
indicates that there is no compulsion to read the requirement into the SCPA. Moreover, the noun and verb forms of a word usually have the same, not different, meanings under a single statute.115

Clearly, interpretation of the SCPA as to copying and independent creation cannot be based solely on language arguments of this sort. Rather, the matter must be determined on the bases of the purposes of the Act, the problems or evils that it seeks to remedy, the nature of the technology and the industry, and the consequences of having or not having a "copying" requirement. In turning to that kind of inquiry, one may properly distinguish two contexts: cases involving second sourcing of entire chips and those involving competitive duplication of small parts of chips.

1. Cases Involving Second Sourcing

Cases involving the second sourcing of a semiconductor chip product are almost inevitably far beyond copying, in the copyright sense. Nobody independently creates a second-sourced chip in the manner suggested by the myth of the "Ode on a Grecian Urn."116 Among other reasons, if the second firm independently created its chip in that manner, its chip would not be form, fit, and function compatible with the first chip, and it would therefore be useless for second sourcing. Thus, the defendant in a second sourcing case almost inevitably will have copied the plaintiff's chip, in the copyright sense of the term.

Proof of copying in the copyright sense does not, however, suffice to establish infringement of plaintiff's mask work rights. To infringe on plaintiff's mask work rights, the defendant's copying must result in a similarity much closer than the substantial similarity of an ordinary copyright case. Even then, the

115. But see Lamar v. United States, 240 U.S. 60, 65 (1916) ("The same word may have different meanings in different parts of the same act . . . ."); see also Towne v. Eisner, 245 U.S. 418, 425 (1918) ("It is not necessarily true that income means the same thing in the Constitution and the [income tax] act. A word is not a crystal, transparent and unchanged, it . . . may vary greatly in . . . content according to the circumstances and the time in which it is used.").

116. See supra note 106 and accompanying text. As the General Counsel of the Copyright Office has aptly phrased it: "We do not believe that independent creation is a very useful legal fiction under the SCPA." Remarks of Dorothy Schrader, General Counsel, Copyright Office, Law & Business Symposium on the Semiconductor Chip Protection Act, San Francisco, California (Dec. 12, 1984).
defendant may prevail if it shows enough toil and expense of its own in creating the copied mask work to qualify for immunity under the reverse engineering defense. Copying is not a meaningful part of plaintiff's case under the SCPA when second sourcing is involved, because copying always occurs to some extent. The real questions in such cases are whether the copying is too close and whether the copying is excusable because of the amount of defendant's own further or independent work wrapped up in the copy. Accordingly, in cases involving entire chips or very substantial parts of chips, independent creation is either irrelevant or a sham defense. Requiring the plaintiff to prove access and copying in addition to the requisite degree of substantial similarity would merely prolong and delay the litigation, needlessly and uselessly consuming the court's and parties' resources. In second sourcing cases, therefore, the better view would be that independent creation is no defense

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117. A copyright infringer that adds its own work to the copied work is ordinarily not excused from the copyright infringement. The question is not how much of its own work the infringer added, but how much of the copyright owner's work the infringer took. See, e.g., Walt Disney Prods. v. Air Pirates, 531 F.2d 751, 756 (9th Cir. 1978) ("this Court and others have ... consistently focused on the substantiality of the taking"). The rule in patent law is the same. See, e.g., Sanitary Refrigerator Co. v. Winters, 280 U.S. 30, 43 (1929) (that patent is granted to defendant on improvement product does not excuse defendant's infringement of plaintiff's earlier patent); Ziegler v. Phillips Petroleum Co., 483 F.2d 858, 871 (5th Cir.) ("the grant of a patent on an improvement of a patented article does not excuse infringement of the dominant patent"), cert. denied, 414 U.S. 1079 (1973).

The concept of infringement of mask work rights under the SCPA is more fluid, however. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917. Adding one's own work to that of another may well turn unlawful infringement of mask work rights into permissible reverse engineering. See 17 U.S.C. § 906(a) (Supp. II 1984) (setting out the reverse engineering defense).

118. In some cases, the legal fiction of independent creation, if understood as requiring the plaintiff to prove access and copying, could defeat justice. For example, suppose that a United States distributor-defendant acquired semiconductor chip products from a foreign supplier who was beyond the reach of effective discovery. The plaintiff might then be unable to prove copying. Cf. Selle v. Gibb, 741 F.2d 896 (7th Cir. 1984) (discussed supra note 108).

To be sure, the distributor may be equally unable to acquire evidence. Clearly, someone is put at a disadvantage whichever way the burden of producing evidence is allocated. In the semiconductor chip industry, a chip distributor is probably in a better position to ascertain the facts (or, in the alternative, to secure an effective indemnification agreement) than is a mask work owner asked to prove what went on in the factory of an alleged foreign pirate. Moreover, the relative frequency of piracy as compared with that of independent creation, when there is striking similarity between the layouts of the first and the second source chip, further suggests where the balance of equities lies.
or, at the very least, that mask work plaintiffs should not have to establish that it did not occur.

2. Cases Involving Cells

In the much rarer case when second sourcing is not involved, and the claim of infringement of mask work rights is predicated on the supposed misappropriation of a cell or other small module of the plaintiff's chip or cell library, the question may become more difficult. For example, two parties may both be manufacturing and selling chips containing substantially similar dynamic RAM cells, perhaps a single transistor and a capacitor for storing a binary digit of memory. The question may become more difficult. For example, two parties may both be manufacturing and selling chips containing substantially similar dynamic RAM cells, perhaps a single transistor and a capacitor for storing a binary digit of memory. Two possibilities may occur. The first, and more important, is the possibility that whether the later layout was independently devised or not, this is a case where chip designers would gravitate toward the particular layout because it permits fastest execution or minimal die area, or because the layout has some other functionally significant character that helps to accomplish the desired function and there are not a large number of other ways to accomplish that function. The second possibility is that the later comer may indeed have independently devised the particular layout even though it is substantially similar to the first designer's layout, because the layout is so simple. Even when there are ten equally satisfactory possible layouts for a cell, each time a design is made there is a ten percent probability of coincidence.

When the disputed cell layout is functionally significant, the choice of rule as to independent creation may be important for reasons of public policy. First, there is no examination system under the SCPA. Second, as compared to patent law, the novelty or creativity requirement is low. It may be, therefore, unduly anticompetitive and harmful to the public interest to permit a first comer to monopolize a cell configuration that is the fastest, least expensive, or otherwise functionally important way of accomplishing some semiconductor purpose. There is a great deal of current interest in the registrability of dynamic RAM and EPROM cells for 256K binary digit ('bit') and 1 megabit memory chips. Several major semiconductor chip product manufacturers wish to protect their layouts against competitors, but the Copyright Office creates great obstacles to the registration of cells. See R. Stern, supra note 5, § 3.3. The question of possible independent creation to date has been raised primarily with regard to such memory cells.

119. There is a great deal of current interest in the registrability of dynamic RAM and EPROM cells for 256K binary digit ('bit') and 1 megabit memory chips. Several major semiconductor chip product manufacturers wish to protect their layouts against competitors, but the Copyright Office creates great obstacles to the registration of cells. See R. Stern, supra note 5, § 3.3. The question of possible independent creation to date has been raised primarily with regard to such memory cells.

120. See infra notes 189-192 and accompanying text.

121. There is another approach to such problems, which is beyond the
ter all, the first comer has not satisfied the requirements of the patent system. The first comer was merely the first to design the semiconductor configuration and then to register or commercially exploit it.\textsuperscript{122}

If these were the only pertinent considerations and if the SCPA lacked a different means for dealing with the problem of functionally significant cell layouts,\textsuperscript{123} one might conclude that copying should be made part of the concept of infringement of mask work rights in cells. That is, one might conclude that the plaintiff should be required to prove copying, as under copyright law. Alternatively, one might conclude that the statute should be interpreted to permit the defendant to prove lack of copying, and that, if successful, the defendant should be exonerated. Under the latter rule, \textit{copying} would not be part of the plaintiff's case of infringement of mask work rights, but \textit{lack of copying} would be an affirmative defense.\textsuperscript{124}

An important question that still remains is whether an added element of copying in mask work cases is necessary or desirable at all. This is a question on which reasonable minds may differ. Briefly, the author's view is that for reasons of policy, discussed below, it would be a serious mistake to allow copying and independent creation to be part of either party's case for infringement of mask work rights when second sourcing is involved. As already suggested,\textsuperscript{125} there is no gain and all

\textsuperscript{122} To use an example given previously, see supra note 119 and accompanying text, the one-transistor dynamic RAM (DRAM) cell has been patented by a major corporation. Patent counsel for that corporation has advised the author, however, that there are many ways to lay out the patented DRAM configuration, and that, accordingly, no mask work registration would confer a nonpatent monopoly on the first to register the layout.

\textsuperscript{123} It is suggested below that the doctrine against protecting functionally dictated layouts adequately deals with functionally significant layouts, and that its presence in mask work law makes the doctrine of independent creation at best unnecessary. See infra notes 129-131 and accompanying text.

\textsuperscript{124} The second treatment of copying is preferable because it avoids requiring the plaintiff to prove something that the defendant is in a better position to disprove. Also, it puts the burden of proof on the party less likely to be innocent, given the history of the semiconductor industry.

\textsuperscript{125} See supra notes 116-118 and accompanying text.
detriment in doing so. Although the question is more difficult when substantially similar cell layouts are involved, the author believes that it would still be a mistake to require the mask work owner to prove copying, for similar but somewhat less forceful reasons.

Three different policies have been mentioned as bearing on the value of the independent creation defense. The first, a copyright law policy involving the first amendment and freedom of self-expression, is irrelevant in the semiconductor chip product context. Economic interests, rather than personal interests, predominate under the SCPA. The second, the patent law policy of promoting commercial certainty and security of investment, is disserved by the doctrine of independent creation. The third, that of maintaining competition in functionally significant chip layouts, requires further discussion. It is a relevant and important policy; it can, however, adequately be served by another means—the policy regarding functionally dictated layouts, which is already incorporated into the SCPA. The interplay between the second and third policies suggests that an independent creation doctrine would be both unnecessary and harmful under the SCPA.

The second policy, promoting commercial certainty and security of investment, has already been discussed as it relates to industrial property in general. The same considerations apply to semiconductor chip products. The purpose of the SCPA is to bring about further progress in semiconductor technology by increasing security of investment in chip innovations. Greater assurance that potential investors in the creation and marketing of new chip technology will recoup their investments, as opposed to noninvestors reaping the benefits of those investments, will attract investors. To the extent, then, that commercial certainty and investment security in the marketing of the products of chip technology is lessened, the purposes and policies of the SCPA are contravened.

The third policy, concerning the competitive availability of functional layouts, involves the public interest in competition, recognized by the reverse engineering privilege of SCPA

126. See supra notes 109-112 and accompanying text.
127. See id.
128. The House Report states that "[t]he purpose of the legislation is to protect semiconductor chip products in such a manner as to reward creativity, encourage innovation, research and investment in the semiconductor industry, prevent piracy, while at the same time protecting the public." HOUSE REPORT, supra note 8, at 1, 1984 U.S. CODE CONG. & AD. NEWS at 5750.
§ 906(a).\textsuperscript{129} As already suggested, a mask work owner should not get the equivalent of a patent on some branch of semiconductor technology by monopolizing the only or one of a limited number of means of reproducing a particular circuit in silicon. The public's and competitors' interest in free competition is amply safeguarded, however, by the doctrine of functionally dictated similarity. The SCPA's legislative history makes it clear that a similarity between two mask works that results from the needs of chip technology is not actionable similarity under the SCPA.\textsuperscript{130} Hence, in any case of infringement of mask work rights in which a defendant would invoke the doctrine of independent creation to justify procompetitive conduct, the doctrine of functionally dictated similarity would serve the same purpose. Under that rule, defendants will escape liability if they show that the nature of the technology led to the design. There is no other persuasive reason to import the doctrine of independent creation into mask work law, and there are several reasons not to do so.\textsuperscript{131}

**SUMMARY OF PART ONE**

The SCPA provides owners of mask works with rights against direct infringement similar to those of the copyright laws, although the reproduction right of the SCPA is more extensive in that it extends to useful objects, chips, whose manufacture is classified as reproduction of the protected work. The SCPA's right against indirect infringement appears to be almost identical to that provided by the patent laws. The role of scienter in infringement of mask work rights cases is not yet certain, although it appears probable that it will play the same minimal role it plays in patent and copyright infringement cases.

The concept of actionable or infringing similarity under the


\textsuperscript{130} See supra notes 91-94 and accompanying text.

\textsuperscript{131} The discussion above has focused on functionally significant cell layouts, where the policy reasons for a rule exonerating independent creation are strongest. The possibility of purely coincidental independent creation of a cell layout without functional significance has not been discussed because such unusual cases would have little effect on whether the doctrine of independent creation was read into the SCPA. Considerations of "equity" or fairness might suggest that in such cases the second creator should be excused. These considerations have not generated a doctrine of independent creation in patent law, however. Moreover, these considerations seem to be outweighed by the social interests in promoting commercial certainty and security of investment in new chip technology.
SCPAs is unlike that of either the patent or copyright laws. It
could not be patterned on the patent law model because there
are no claims defining the metes and bounds of a mask work as
there are for a patent. A mask work simply "is," like the sub-
ject matter of a copyright, so that there is no way of verbally
articulating what is protected and what is left to the public do-
main. Nonetheless, there are reasonably well-defined policies
as to competition and technological progress that play a role in
deciding whether an accused chip is actionably similar to an
earlier, protected chip. The second part of this Article will re-
turn to and explore that theme in greater depth.

Finally, the role, if any, of copying in infringement of mask
work rights cases is uncertain. In copyright law, proof of copy-
ing is essential to the claim; in patent law, it is not required.
Because the policies underlying the SCPA seem closer to those
of the patent laws in this respect, the better view would be not
to require the mask work owner to prove copying, but merely
to prove infringingly close similarity.

PART TWO: DEFENSES, IMMUNITIES, AND
LIMITATIONS ON LIABILITY

As explained in Part One, the SCPA is a new form of intel-
lectual property law. It differs from traditional intellectual
property law, such as patent and copyright law, in significant
ways, although the SCPA adopts a number of features from
those bodies of law. The defenses available to a charge of in-
fringement of mask work rights, and the SCPA's provisions for
immunity from and limitation on liability for infringement of
mask work rights illustrate the characteristics peculiar to the
SCPAs. Some of the defenses that an accused infringer may
raise in a mask work infringement case are the same as those
that an accused infringer could raise in a copyright, patent, or
trademark infringement case. Precedents from those fields of
law may be helpful in deciding some aspects of a mask work in-
fringement case or in planning a defendant's trial or negotia-
tion strategy. Other defenses that an accused infringer may
raise in a mask work case have no precedent or parallel in ex-
sting law, because they are peculiar to the SCPA or to the en-
vironment of the semiconductor chip manufacturing industry.
Utilization of these defenses will call for new thinking.

The defenses available in a mask work case may be divided
into three categories: those that the defendant must plead in
the answer to the complaint and then prove at trial, those that
the defendant must specifically plead, lest they be waived, and those subsumed in a general denial of the claim or within a denial of the allegations that the mask work proprietor must make in its complaint. Most of the defenses considered here are in the first category, defenses that the accused infringer must plead and prove by evidence. Rule 8(c) of the Federal Rules of Civil Procedure specifically requires the defendant to plead estoppel, fraud, illegality, laches, license, statute of limitations, waiver, and any other affirmative defense. The major affirmative defenses under the SCPA are invalidity, reverse engineering, first sale, and innocent infringement. The defenses in the second category, those which must be raised before trial to avoid waiver, are not peculiar to mask work litigation. The defenses in the third category, those subsumed within denials, include defective title in the mask work, ineligibility under section 902(a), lack of actionable similarity, absence of effect on commerce, and failure to register the mask work before filing the action. Part Two of this Article is primarily concerned with the first category of defenses, and particularly with the affirmative defenses not listed in Rule 8(c).

I. INVALID REGISTRATION OF MASK WORKS

A mask work registration is invalid if there is a serious, irreparable error in the recitations in the registration. A registration is also invalid if there is a defect in the registrant's

134. See House Report, supra note 8, at 19 n.38, 1984 U.S. Code Cong. & Ad. News at 5768 n.38 ("In the event of mask work infringement litigation, failure to satisfy the requirements of § 902(b) would be a defense.").
136. See id. § 906(b).
137. See id. § 907.
139. The plaintiff must prove ownership as part of its case and should allege ownership in the complaint. See 17 U.S.C. § 910(b)(1) (Supp. II 1984). The defendant thus need not specially plead the plaintiff's lack of ownership; the defendant may simply deny the plaintiff's allegation that the plaintiff owns the mask work that the defendant allegedly infringed. The denial would require the plaintiff to prove ownership at trial. If, however, the plaintiff introduces into evidence a certificate of registration showing the plaintiff as the owner of the mask work, the burden shifts to the defendant to rebut the prima facie evidentiary effect of the certificate. See id. § 908(f).
140. A registration would be invalid if, for example, it misstated ownership or claimed as an original mask work a chip layout that was completely in the
chain of title as mask work owner. Such a defect may be curable by reregistration within a period of two years of commercial exploitation. A registration would also be invalid if the facts recited in the certificate showed on their face, or otherwise, that no registration should have issued. Finally, and most important, the registration would be invalid if the layout of the chip is unprotectable because it is too staple or commonplace. Unprotectability of the layout is a major category under invalidity and one of the most important defenses in mask work litigation.

A. MASK WORK NOT PROTECTABLE UNDER THE SCPA

The layout of a semiconductor chip is not protectable when the mask work "consists of designs that are staple, commonplace, or familiar in the semiconductor industry, or variations of such designs, combined in a way that, considered as a whole, is not original." The SCPA, unlike the patent laws, does not create a system for administratively examining creativity on the merits prior to issuance of a certificate of protection. Instead, the SCPA opts for the low front-end costs of a registration system, leaving the courts to adjudicate validity if and when the mask work is ever the subject of litigation. When litigation arises over infringement of mask work rights, the certificate of registration is prima facie evidence that the mask work meets the law's creativity and originality standard.

The court would not expect the plaintiff to prove the negative proposition that its design, considered as a whole, is not staple, familiar, or commonplace. Rather, the court would expect the defendant to identify the staple, familiar, or commonplace aspects of the plaintiff's design and their antecedents in the public domain. It would then become the plaintiff's responsibility to negate that showing. Thus, the defendant must do more than simply challenge the validity of the registration in the public domain. For a general discussion of registration requirements and procedures, see R. STERN, supra note 5, ch. 3.

142. For example, if the mask work owner were an ineligible foreign national who first commercially exploited the chip abroad, see id. § 902(a)(1), or if the first commercial exploitation of the mask work had occurred more than two years before registration, see id. § 908(a).
143. See id. § 902(b)(2).
144. Id.
145. See infra notes 189-192 and accompanying text; R. STERN, supra note 5, § 3.9.
its pleadings. The defendant must, at trial or in resisting a motion for summary judgment, show some evidence of the staple, familiar, or commonplace character of plaintiff's mask work. Only at that point, and not unless that point is reached, would it become plaintiff's responsibility to negate defendant's evidence, by expert testimony or other satisfactory evidence of creativity.147

1. Concept of "Originality"

To be protectable under the SCPA, a mask work must satisfy the Act's creativity or novelty requirements.148 The word "original" occurs twice in section 902(b).149 Although the question is not completely free from doubt, a mask work is probably "original" for the purposes of section 902(b)(1) if it is not copied from another work.150 This concept of originality, meaning nothing more than failure to plagiarize, is derived from copyright law.151

In section 902(b)(2), however, "original" is used to mean "novel" or "creative," rather than merely "not copied from an-

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147. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917-18.
149. Section 902(b) provides:
Protection under this chapter shall not be available for a mask work that—
(1) is not original; or
(2) consists of designs that are staple, commonplace, or familiar in the semiconductor industry, or variations of such designs, combined in a way that, considered as a whole, is not original.
Id. (emphasis added). The word "original" is also used in § 906(a)(2). See id. § 906(a)(2).
150. A definition of "original" was included in H.R. 5525, see H.R. 5525, 98th Cong., 2d Sess. § 901(4), 130 CONG. REC. H5489 (daily ed. June 11, 1984) ("a mask work is 'original' if it is the independent creation of an author who did not copy it from another source"); HOUSE REPORT, supra note 8, at 17, 1984 U.S. CODE CONG. & AD. NEWS at 5766, but it was omitted from the SCPA. Whether it was omitted as surplusage or for other reasons is not clear from the legislative history.
151. See Alfred Bell & Co. v. Catalda Fine Arts, Inc., 191 F.2d 99, 102-03 (2d Cir. 1951). It should be noted, however, that copyright law's standard of originality is slightly more exacting in the case of a work based on or derivative of earlier works. Then, "something [slightly] more than merely refraining from outright copying is required before a new variation on an old work has sufficient originality to be copyrightable." Vogue Ring Creations, Inc. v. Hardman, 410 F. Supp. 609, 611-12 (D.R.I. 1976). See also Durham Indus., Inc. v. Tomy Corp., 630 F.2d 905, 910-11 (2d Cir. 1980) (Donald Duck toy); L. Batlin & Son, Inc. v. Snyder, 536 F.2d 486, 491 (2d Cir.) (en banc) (toy bank based on similar bank within public domain), cert. denied, 429 U.S. 857 (1976).
other." This novelty or creativity requirement is a major departure from copyright law. Imposing this requirement was a step in the direction of patent law, and was part of Congress's decision to protect chip layouts as industrial property rather than as part of a system for protecting authors' and artists' rights. Under copyright law, an author or artist may have a copyright in his creation, almost without regard to how slight or inferior it may be, as long as he can call it his own. The SCPA, on the other hand, sets a minimum threshold of creativity below which protection is denied. The threshold is not specified with precision; a minimum level of creativity can perhaps never be marked with a bright line. The level of creativity required under the SCPA is somewhat less than that required under patent law and somewhat more than that required under copyright law, although it is probably closer to the latter.

152. The word "original" is also used in SCPA § 906(a)(2), with perhaps a third significance. See 17 U.S.C. § 906(a)(2) (Supp. II 1984). For a discussion of the meaning of "original" as it is used in § 906(a)(2), see infra notes 243-248 and accompanying text. See generally Lamar v. United States, 240 U.S. 60, 65 (1916) (the same word may have different meanings in different parts of a law).


154. Alfred Bell & Co. v. Catalda Fine Arts, Inc., 191 F.2d 99, 103 (2d Cir. 1951). There is a de minimis test, however, under which wholly negligible "creations" are denied copyright protection. Thus, the sentence, "Apply hook to wall," was denied copyright protection. E.H. Tate Co. v. Jiffy Enters., Inc., 16 F.R.D. 571, 573 (E.D. Pa. 1954).

155. The House Report expressly states that the patent system's inventive level is above the SCPA's novelty requirements. HOUSE REPORT, supra note 8, at 19, 1984 U.S. CODE CONG. & AD. NEWS at 5768.

156. According to SCPA § 902(b)(2), the layout of a chip is not protectable when the mask work "consists of designs that are staple, commonplace, or familiar in the semiconductor industry, or variations of such designs, combined in a way that, considered as a whole, is not original." 17 U.S.C. § 902(b)(2) (Supp. II 1984) (emphasis added). The italicized portion of the language of § 902(b)(2) became part of the House bill as an amendment in response to industry concern that, because all chip layouts consist of squares, rectangles, arcs, lines, and other staple elements recombined to meet the needs of the current product, a strict interpretation of the original provision (without the italicized and bold faced words) might make all chips unprotectable. The boldface portion of the language was added to SCPA § 902(b)(2) later when the Senate and House bills were merged. The phrase "considered as a whole" is based on language taken from the House Report, see HOUSE REPORT, supra note 8, at 19, 1984 U.S. CODE CONG. & AD. NEWS at 5768 ("The subject matter of the mask work must be original, when considered as a whole, even though, if the individual elements of the mask work were dissected away from the whole they might appear familiar or commonplace."); which in turn was taken from the patent law's standard for "obviousness" found at Act of July 19, 1952, ch. 950,
The House Report states that two concerns led to the House's adoption of a creativity requirement. First, the House Committee deemed it appropriate to require a minimum level of creativity to qualify a mask work for protection under the Act. Apparently, this requirement was viewed as being consistent with the decision to reject the copyright approach and create sui generis protection for most mask works. Since a "mask work is not a book," the House Committee saw no reason to indulge in "the legal 'fiction' of treating books and mask works similarly."

The House Committee's second concern was to prevent material in the public domain from being usurped and transformed into proprietary, i.e., monopoly, rights. The Committee noted that "[t]here is a fundamental congressional policy against 'recapturing' works in the public domain [and] this legislation pays careful heed to that policy."

In drafting section 902(b)(2), the House recognized that the courts would need some guidance in infringement actions for separating the protectable from the unprotectable. The standard for protectability set forth in the House Report is originality of the subject matter of the mask work, as a whole, even though the component parts of the mask work, when standing alone, may be familiar or commonplace. If familiar and commonplace elements are combined to create an unoriginal mask work, the mask work is not protectable. It is not enough to isolate individual elements of a chip layout and show that earlier chips displayed the same arcs and rectangles or "insubstantial variations" of such designs. It may not be enough even to show that whole "cells" were found in earlier chips. The combination must be unoriginal when it is considered as a whole rather than part by part.

66 Stat. 792, 798 (current version at 35 U.S.C.A. § 103 (West Supp. 1985)). That statute requires a determination of whether the subject matter of the invention, considered as a whole, would have been obvious to a person of ordinary skill in the field of the invention.

157. HOUSE REPORT, supra note 8, at 19, 1984 U.S. CODE CONG. & AD. NEWS at 5768.
158. Id. at 6, 1984 U.S. CODE CONG. & AD. NEWS at 5755.
159. Id.
160. Id. at 19, 1984 U.S. CODE CONG. & AD. NEWS at 5768.
161. Id.
163. The House Report states:
[The Committee recognizes that all chip designs consist of arcs, lines, rectangles, and like staple designs; in a new chip these staple designs are arranged in an original particular way. The key to section
There is a certain inevitable measure of subjectivity in this standard. Considering the whole of a design means balancing the similarities and dissimilarities of different aspects of the design without a common denominator or gauge of comparison. Like the "reasonable man" test of tort law, this standard is incapable of precise formulation, yet it can be applied to specific facts by a jury or other fact finder. Despite the imprecision of the standard, it is probably fair to conclude that any further attempt to make the standard more objective and predictable would fail totally or would result in undue rigidity.

The Senate memorandum on the final bill echoes the

HOUSE REPORT, supra note 8, at 19, 1984 U.S. CODE CONG. & AD. NEWS at 5768 (emphasis added). The Mathias-Leahy Explanatory Memorandum states the same position. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.

164. It is not as subjective, however, as the "spontaneous impression of a lay observer" test of copyright law. See SENATE REPORT, supra note 8, at 18. The Senate Report is quoted in relevant part supra note 98. The SCPA standard is therefore more predictable in application.

165. The Supreme Court stated a procedure for measuring creativity under patent law in Graham v. John Deere Co., 383 U.S. 1 (1966). First, the scope and content of the prior art must be determined. Second, the differences between the present work and the prior art must be ascertained. Third, the level of ordinary skill in the field must be determined. Id. at 17. Against this background of factual information, the obviousness of the subject matter claimed as an invention must be evaluated by the court as a legal question. See id. at 36-37.

Although informative, the Graham decision does not provide a road map for the SCPA. The first two inquiries under Graham, concerning the prior art, are probably analogous to those required for measuring originality under the SCPA. Indeed, the Senate memorandum on the final bill appears to prescribe a similar approach. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917. But the third factual inquiry, concerning the level of ordinary skill in the art, has no parallel in the SCPA. Originality under SCPA § 902(b)(2) clearly does not require ability beyond ordinary skill in the art. Here, Graham is uninformative.

The House Report invites the federal courts to develop a new substantive law in the field: "[T]he courts should have sufficient flexibility to develop a new body of law specifically applicable to semiconductor chip infringement litigation." HOUSE REPORT, supra note 8, at 26, 1984 U.S. CODE CONG. & AD. NEWS at 5775.
House Report while adding a few additional points. One is that the background against which the novelty or creativity of a mask work is to be judged is the prior art existing on the date of registration.\textsuperscript{166} Another is that the factors to be considered in evaluating the work under section 902(b)(2) include whether the work "reflects effort and original contributions resulting in a work that, considered as a whole, is not old and staple."\textsuperscript{167} The memorandum states that the purpose of section 902(b)(2) is to protect the mask work owner who has expended substantial toil and investment to reach a result that is more than an insubstantial variation on the prior art.\textsuperscript{168} This language, which echoes much of the testimony in support of the legislation, is reminiscent of the "misappropriation" doctrine of unfair competition law. According to that doctrine, a right against imitative competition is created by the expenditure of time, money, and effort, for it is inequitable to let one person "reap" where another has "sown."\textsuperscript{169} The doctrine may be regarded as emphasizing the "investive step" rather than the "inventive step."

2. Functionally Dictated Form

As previously discussed,\textsuperscript{170} if the function of a chip dictates the layout, the resulting similarity may not be actionable as infringement. It may be said, alternatively, that the mask work is not protectable under the SCPA insofar as function dictated

\textsuperscript{166} The Senate memorandum on the final bill states that "the evaluation of whether the design is staple, or merely an insubstantial variation on what is staple, should be made in the light of the prior [art] existing at the time of registration." Mathias-Leahy Explanatory Memorandum, \textit{supra} note 17, at S12,917. The same section of the memorandum also states that in a case involving infringement of mask work rights, the court would have to decide whether the allegedly infringed work is just an insubstantial variation of "prior work in the field as it stood on the date of registration." \textit{Id.} The memorandum further states that the purpose of SCPA § 902(b)(2) is to "weed out mere insubstantial or trivial variations on prior mask works," and that the SCPA allows protection of mask works "which contain more than insubstantial variations on the prior mask work art." \textit{Id.} The date of registration is the date on which an application in proper form is "received in the Copyright Office." 17 U.S.C. § 908(e) (Supp. II 1984).

\textsuperscript{167} Mathias-Leahy Explanatory Memorandum, \textit{supra} note 17, at S12,917.

\textsuperscript{168} \textit{Id.}


\textsuperscript{170} \textit{See supra} notes 91-99 and accompanying text.
the layout or that the registration is to that extent invalid. Accordingly, defendants may plead and prove this issue as part of their case as to invalidity, rather than raise the issue only defensively or negatively in opposition to the plaintiff’s proof of actionable or substantial similarity.

3. Evidence of Invalidity

Documentary evidence of prior art is of some help in ascertaining what is staple, familiar, or commonplace. Expert testimony, however, is the sine qua non. It is impossible for a fact finder, unaided by expert testimony, to sort the wheat from the chaff, or even to recognize subtle differences.

In a mask work infringement action, a plaintiff’s expert would probably stress the economic success of the chip, note how it met real economic needs of the computer industry or other target market, and suggest that the new combination of old elements in the plaintiff’s chip was responsible for these results. The plaintiff’s expert would perhaps also argue that if these elements were all old staples combined in an unoriginal way, the defendant or someone else would have combined them himself, instead of waiting for the plaintiff to do it and then copying the plaintiff’s chip.

The defendant’s expert would probably stress the staple quality of each of the elements, perhaps suggesting that such circuitry has been around so long that no one can any longer combine the elements in an original way. The defendant’s expert would try to dissect the mask work into its elements and identify their presence in earlier mask works. To rebut such a showing, the plaintiff’s expert would have to assert that the plaintiff’s chip is more than just the sum of its individual parts and cite the statutory admonition to consider the mask work as a whole.

171. See Senate Report, supra note 8, at 16 (discussing copyright cases in which functionally dictated similarity was not infringing either because functionally dictated similarity is not deemed “substantial similarity” or because the expressions are not copyrightable).

172. It may be tactically advantageous to defendants to take both opportunities to raise or argue the issue.

173. As the Senate Report notes, “‘even very subtle mask changes may represent significantly different and original designs.’” Senate Report, supra note 8, at 18 (quoting an expert on chip technology).

B. UNTIMELY REGISTRATION

Section 908(a) of the SCPA requires that a mask work be registered within two years of its first commercial exploitation or the owner will forfeit its rights.\footnote{175} Obviously, if a date of first commercial exploitation more than two years before the date of application is stated on the application form, the Copyright Office will deny registration. This is unlikely to happen, however. Moreover, section 908(h) places on the defendant the burden of showing the error of the date stated in the registration certificate.\footnote{176} Thus, the defendant presumably must plead and prove invalidity based on section 908(a).

C. BURDEN OF PROOF

Invalidity of the mask work registration and plaintiff’s registration certificate are defenses to an action for infringement of mask work rights,\footnote{177} just as invalidity of a patent or copyright would be a defense in a patent infringement or copyright infringement case. The defendant, the alleged infringer, must prove invalidity, since the plaintiff, the mask work owner, will always put its registration certificate into evidence at an early stage in order to rely on its prima facie evidentiary effect under section 908(f).\footnote{178} The prima facie evidence created by the certificate is that every matter stated in the certificate, such as ownership and relevant dates, is true and that the registrant has satisfied the requirements of the statute and regulations, such as eligible citizenship or domicile, standing to apply, and payment of the requisite fee.\footnote{179}

Several important elements of the validity of a mask work registration are requirements of the statute. One such requirement is ownership,\footnote{180} which is expressly stated in the application and thus in the certificate. Other such requirements are originality and sufficient creativity.\footnote{181} Section 908(f) appears to

\footnote{175} Id. § 908(a).
\footnote{176} Id. § 908(h).
\footnote{177} HOUSE REPORT, supra note 8, at 19 n.38, 1984 U.S. CODE CONG. & AD. NEWS at 5768 n.38; Mathias-Leahy Explanatory Memorandum, supra note 17, at 512,917-18.
\footnote{178} See 17 U.S.C. § 908(f) (Supp. II 1984). It is probably best for the plaintiff to annex a photocopy of the certificate to the complaint as an exhibit.
\footnote{179} See id.
\footnote{180} See id. § 908(a).
\footnote{181} See id. § 902(b). Space 8 on Form MW requires the applicant to state the nature of his “new, original contribution in this mask work for which statutory protection is sought . . . .” The instructions on the back of Form MW
make the certificate prima facie evidence as to all of these matters. Therefore, the certificate appears to create a rebuttable presumption as to all of the important aspects of validity.

To overcome this prima facie evidence or to rebut these presumptions, the defendant must put in enough evidence to shift the burden of persuasion back to the plaintiff. Only in the Senate floor memorandum on the final bill is there any discussion in the legislative history of whether the standard for rebutting these presumptions is a scintilla of evidence, a preponderance of the evidence, clear and convincing evidence, evidence beyond a reasonable doubt, or some other standard. The floor memorandum explains that, on the one hand, mere allegations of invalidity on grounds of lack of creativity or otherwise, without allegations of facts to support them, are not enough to overcome the effect of the registration certificate. Allegations of fact without any documentary or testimonial evidence to support them would also be insufficient, as would be allegations of fact based "on information and belief." Hear-say and noncredible evidence, or even evidence implausible to the fact finder, are also inadequate.

On the other hand, to expect the defendant to produce evidence beyond a reasonable doubt is clearly asking too much in a civil case. The clear and convincing evidence that some patent decisions have required to overcome the presumption of validity is also too much. As the floor memorandum explains,

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182. Section 908(f) provides:

In any action for infringement under this chapter, the certificate of registration of a mask work shall constitute prima facie evidence (1) of the facts stated in the certificate, and (2) that the applicant issued the certificate has met the requirements of this chapter, with respect to the registration of claims.


183. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,918.

184. See id.

185. See id. Where, however, the mask work owner is clearly in control of all the evidence on the matter, allegations of fact on information and belief should be enough to justify discovery against the mask work owner. If discovery turned up nothing, however, the matter would have to be dropped.

186. See id. (rebuttable presumption of validity "may only be overcome by probative, plausible evidence").

patents are issued "on inventions after an examination of their novelty, unobviousness, and compliance with other substantive requirements; the examination is carried out by persons supposed to be of skill in the relevant field of technology, so that the decision to issue a patent reflects a considered and expert judgment on the merits." 188 In contrast, mask work registration certificates, like copyright registration certificates, issue after an examination of only the face of the application form (which becomes the registration certificate) and the material accompanying the application. 189 The Copyright Office, moreover, lacks expertise in semiconductor technology and cannot deliver a considered judgment on whether a chip design is original within the meaning of section 902(b)(2). 190 Thus, as the House Report observes, section 902(b) does not mandate an examination system for chips like that provided for patent applications. 191 Instead, the Copyright Office issues the registration certificate if the application appears to be in order and then, "[i]n the event of mask work infringement litigation, failure to satisfy the requirements of [section] 902(b) would be a defense." 192

In the rare case where the evidence is exactly balanced on both sides, or where the plaintiff rests on its certificate and the defendant offers no evidence, the certificate should be enough to support a finding that the registration is valid. 193 If nothing else, such a finding rests on the presumption of regularity and correctness of an agency's administrative action. 194 Moreover, on an application for a preliminary injunction or for similar relief, where the court does not have the opportunity to examine the issues as thoroughly as at trial, it would be proper to give some weight to the certificate. In these situations, giving the

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188. Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,918.
189. See id. The Copyright Office will possibly consider other facts of which it is aware. See HOUSE REPORT, supra note 8, at 25, 1984 U.S. CODE CONG. & AD. NEWS at 5774 ("If the application, identifying materials, and any other information supplied by the applicant or otherwise known to the examiner support the conclusion that the claim is facially in compliance with the statute and regulations, a certificate of registration issues.") (emphasis added).
190. See supra notes 152-169 and accompanying text.
191. HOUSE REPORT, supra note 8, at 19 n.38, 1984 U.S. CODE CONG. & AD. NEWS at 5768 n.38.
192. Id.
193. Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,918.
194. Id. Of course, it must also be recognized that the Copyright Office's action is presumed regular and correct under the circumstances in which it operates, which here include accepting the applicant's factual assertions at face value.
mask work registrant the benefit of the doubt furthers the statutory purpose of promoting security of investment in development of new chip technology and thereby encourages semiconductor innovation.  

For these reasons, in determining validity of mask work registrations, the courts should assign the burden of proof as follows: The court should find that the mask work is protected under the SCPA if the only evidence is the registration certificate, the validity of which will be assumed. The alleged infringer should prevail if it offers credible, probative evidence showing that the mask work registration was invalid in some way and the mask work owner offers no further evidence. If the mask work owner and the alleged infringer both adduce actual evidence, then the validity issue should be decided on the basis of the actual testimonial and documentary evidence before the court. The standard should be the ordinary civil standard of a preponderance of the evidence. Where the evidence is nearly in equipoise, and in preliminary injunction hearings, however, a court should give some weight to the registration certificate to further the statutory purpose of encouraging and promoting security of investment in semiconductor chip innovation.

II. REVERSE ENGINEERING

Reverse engineering is probably the most important defense in mask work infringement cases. Often, it will be the only possible defense, and certainly, some kind of reverse engineering argument is generally available. If the reverse engineering defense is established, the defendant is completely immunized from liability for infringement of mask work rights. As an affirmative defense, reverse engineering is part of the defendant's case at trial, unless, of course, the potential defendant becomes the plaintiff by bringing a declara-

195. Clearly, these were the predominant concerns of Congress in enacting the SCPA. See House Report, supra note 8, at 1-4, 1984 U.S. Code Cong. & Ad. News at 5750-53; Senate Report, supra note 8, at 4-6.
196. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.
197. See id. at S12,917-18.
198. See id.
tory judgment action against the mask work owner for a declaration of noninfringement.

A. INDUSTRY CONCEPT OF REVERSE ENGINEERING

What the semiconductor industry calls "reverse engineering" reflects the highly competitive customs of the industry and its traditional emphasis on competition in the form of continued technological improvement.201 Semiconductor chip manufacturers often make themselves "second sources" for products that another chip manufacturer has pioneered, with or without the pioneer's consent. However, the second firm does not simply duplicate the first chip without improving or reworking it. Typically, the second manufacturer may attempt to improve the signal/noise ratio and thermal stability, to decrease chip size, and to decrease the number of masks and wafer fabrication steps.

Extensive testimony before both houses explained the industry concept of reverse engineering, including the aspects important enough to recognize and preserve in the SCPA. Semiconductor industry representatives testified that it is an established industry practice to make photographs of one another's chips in order to analyze them and design similar chips. The new chips are then sold in competition against the earlier chips.202 Because the second chip has the same electrical and physical characteristics as the first chip, the two chips are fungible in the marketplace.203 This practice creates second sources of supply for chips and is considered fair competition because the industry considers this conduct on the right side of the line between chip piracy and legitimate reverse engineering.

The right side of the line is that where the second chip manufacturer's photography and reproduction of the mask work is for the purpose of study and analysis, rather than simply for appropriation of the first chip manufacturer's labor and expense in creating and laying out the first chip. In both situations, the two chips are "substantially similar" in the copyright law sense. In the case of reverse engineering, however, there

201. See id. at 2-3, 21-22, 1984 U.S. CODE CONG. & AD. NEWS at 5751-52, 5770-71; SENATE REPORT, supra note 8, at 4-6, 21.
203. This is known as "form, fit, and function compatibility." Id. at 21, 1984 U.S. CODE CONG. & AD. NEWS at 5771. For a discussion of form, fit, and function compatibility, see R. STERN, supra note 5, § 1.2[B].
has been "substantial analysis and study," defined as toil and expense by the second firm. In the case of chip piracy, the second chip is "the mere result of plagiarism accomplished without such study or analysis." The distinction between a semiconductor chip company that invests its own substantial labor and expenditures in developing the second chip, and a company that cuts corners and avoids the expense of independent chip layout work is critically important. One witness testifying before the Committee noted that a legitimate job of reverse engineering leaves "a very big paper trail" made up of computer simulations, time records, and other compilations. Another difference between piracy and reverse engineering is that the work recorded by the paper trail almost inevitably leads to a second semiconductor chip product layout that is not substantially identical to the first, unless the second comer's engineering efforts are completely ineffective.

The industry concept of reverse engineering is to some extent similar to the copyright law's concepts of "fair use" or of copying "idea" rather than "expression." But "fair use" and "idea/expression" are concepts that apply better to books and similar traditional subjects of copyright; they translate very imperfectly to semiconductor chips and other industrial property. When the Senate Report states, in explaining the difference between reverse engineering and chip piracy, that "the bill is directed at the appropriation of substantial parts of the drawings embodied in the masks and chips, when that is done to take free advantage of the first comer's great costs in developing the layout of the chip," it far more accurately captures the misappropriation-like flavor of the semiconductor industry's concept of reverse engineering than do the "fair use" or "idea-expression" analogies.

205. Id.
206. 1983 House Hearings, supra note 8, at 36 (statement of F. Thomas Dunlap, Jr., Corporate Counsel and Secretary, Intel Corp.).
208. Senate Report, supra note 8, at 21.
209. Cf. International News Serv. v. Associated Press, 248 U.S. 215, 236-37 (1918) (newsgathering corporation's expenditures of time, skill and effort in collecting certain news items gave it a property interest in those items, which could not lawfully be appropriated by another news agency).
210. Probably the most concise explanation of the SCPA's concept of reverse engineering is found in the House Report:
B. LEGISLATIVE BACKGROUND

As originally introduced, the Senate and House bills had no reverse engineering provisions.\textsuperscript{211} Congress perhaps over-confidently assured the industry that the "fair use" exemption found in the Copyright Act\textsuperscript{212} would fully protect the industry practice of reverse engineering.\textsuperscript{213} A number of witnesses expressed concern, however, that the courts would \textit{not} interpret the Act and the fair use doctrine in accordance with this assurance.\textsuperscript{214} At the same time, the publishers' association strongly protested that bringing reverse engineering under the fair use doctrine would lead to a general and undue expansion of the fair use doctrine and thus an erosion of the rights of book publishers and other owners of traditional copyrights.\textsuperscript{215} No one opposed continuing the semiconductor industry's established practice of reverse engineering; the only question was whether it was sufficient to rely on the legislative history or whether an express statutory guarantee of the reverse engineering privilege was necessary. The latter view prevailed, and express re-

verse engineering provisions soon appeared in the Senate and then the House bills. The provisions failed to satisfy everyone, however, and were rewritten repeatedly until the eve of passage of the SCPA.

The main purpose of the revisions was to make it explicit that legitimate reverse engineering could properly lead to manufacture and sale of some types of competitive chips. Some very late legislative history explaining these changes confirmed that section 906(a) permits a semiconductor chip product resulting from reverse engineering to be substantially similar to the pioneer mask work, but not to be substantially identical as, for example, a virtual photocopy would be. In the course of so providing, Congress further required that the product of reverse engineering itself must be "an original mask work" if it is to escape liability. This last addition is nowhere explained in the legislative history, and the final language of section 906(a)

216. See S. 1201, 98th Cong., 2d Sess. § 5, 130 Cong. Rec. S5838 (daily ed. May 16, 1984); Senate Report, supra note 8, at 21 ("To respond to these concerns, the version [of S. 1201] reported by the Subcommittee and the Committee includes an express provision [section 5] guaranteeing the right to use a chip or mask for reverse engineering purposes. This right is not termed a form of 'fair use,' but is simply described in S. 1201 without reference to 'fair use.'").


218. When S. 1201 and H.R. 5525 were merged into the SCPA, the two provisions were already so similar that neither can be said to have prevailed. See 130 Cong. Rec. E4432-33 (daily ed. Oct. 10, 1984) (Explanatory Memorandum of the Senate Amendment to H.R. 6163, Title III, as considered by the House of Representatives) [hereinafter cited as Kastenmeier Explanatory Memorandum]; Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917. As enacted, § 906(a) provides:

Notwithstanding the provisions of section 905 [concerning the exclusive rights of a mask work owner], it is not an infringement of the exclusive rights of the owner of a mask work for—

(1) a person to reproduce the mask work solely for the purpose of teaching, analyzing, or evaluating the concepts or techniques embodied in the mask work or the circuitry, logic flow, or organization of components used in the mask work; or

(2) a person who performs the analysis or evaluation described in paragraph (1) to incorporate the results of such conduct in an original mask work which is made to be distributed.


219. See Kastenmeier Explanatory Memorandum, supra note 218, at E4432-33; Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.

220. See Kastenmeier Explanatory Memorandum, supra note 218, at E4433; Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.

about "original mask work" appears in none of the earlier published versions of the bill.

The unofficial legislative history of section 906(a) sheds some light on this otherwise mysterious provision. An unofficial, revised draft of the chip bill that was circulated for comment and suggestion in July and August of 1984 provided a version of § 906(a)(2) that immunized from infringement liability the conduct of a person who reproduced the work "in a substantially similar, but not substantially identical, mask work embodied in a semiconductor chip product that the person distributes."

This provision reflected an effort by various industry representatives to clarify and emphasize the difference between reverse engineering a semiconductor chip product under the SCPA and fair use of a book under copyright law. The language "in a substantially similar, but not substantially identical, mask work" troubled many of those involved, however, because it seemed too complex for statutory language. A less complicated substitute was suggested: "in an original mask work prepared to be commercially exploited." The substitute was combined with the original language to produce the final version of section 906(a)(2) of the SCPA. The concept of permitting the second semiconductor chip product to be "substantially similar" but not "substantially identical" to the first semiconductor chip product was moved from the statute to the legislative history, and without any detailed explanation, the requirement of an "original mask work" came into the statute.

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224. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917 ("If the resulting semiconductor chip product is not substantially identical to the original, and its design involved significant toil and investment so that it is not a mere plagiarism, it does not infringe the original chip, even if the layout of the two chips is, in substantial part, similar.").
225. The Explanatory Memorandum of the Mathias-Leahy Amendment to S. 1201 says only this regarding the inclusion of the original mask work requirement: "The end product of the reverse engineering process is not an infringement, and itself qualifies for protection under the Act, if it is an original mask work, as contrasted with a substantial copy." Id. See also Kastenmeier Explanatory Memorandum, supra note 218, at E4433 (identical language).
C. REVERSE ENGINEERING UNDER THE SCPA

As enacted, section 906(a) of the SCPA permits competitors of a mask work owner to reproduce the mask work for reverse engineering purposes notwithstanding section 905(1)'s exclusive reproduction right. The first step of the reproduction is to photograph the layout of the original chip. An enlargement of the photograph may be used to prepare a composite drawing, so that both the photograph and the drawing are substantially similar to the mask work owner's work, and thus, but for section 906(a), mask work infringements. The same pictorial material may be digitized and stored in a tape, which is a further reproduction of the mask work. Nonetheless, this is permissible if part of legitimate reverse engineering.

The competitor then analyzes the foregoing material and the semiconductor chip itself. The competitor will ascertain the circuit schematic and the logic flow within the chip, determining the physical and electrical specifications of the chip. Eventually, the competitor will combine the results of these reverse engineering efforts with its own engineers' engineering efforts to yield a new, and possibly improved, version of the chip.\footnote{226}

The second chip may not be substantially similar to the original one. In that unlikely event, its manufacture would not violate the reproduction right under section 905(1),\footnote{227} and its sale would not violate the distribution right under section 905(2),\footnote{228} even if there were no reverse engineering privilege.\footnote{229} More likely, the second chip will be one "whose layout, in substantial part, is similar to the layout of the protected mask work . . . ."\footnote{230} The two semiconductor chip products and the two underlying mask works will be substantially similar. Were it not for section 906(a), manufacture of the chip would be a violation of the reproduction right and its sale a violation of the distribution right.\footnote{231} There will be no such liability, however, if the second chip is "the product of substantial study and analy-

\footnote{226. Such improvements may include shrinking the size of the silicon chip, using fewer fabrication steps, and improving stability.}
\footnote{227. See 17 U.S.C. § 905(1) (Supp. II 1984).}
\footnote{228. See id. § 905(2).}
\footnote{229. The photography would violate SCPA § 905(1), if performed within the United States, were it not for SCPA § 906(a)(1). See id. §§ 905(1), 906(a)(1).}
\footnote{230. HOUSE REPORT, supra note 8, at 22, 1984 U.S. CODE CONG. & AD. NEWS at 5771.}
\footnote{231. See 17 U.S.C. §§ 905(1)-(2), 906(a) (Supp. II 1984).}
sis,\textsuperscript{232} is \textit{not} substantially identical to the first,\textsuperscript{233} and embodies an original mask work.\textsuperscript{234}

A spectrum of similarity is relevant, therefore, for semiconductor chip products in reverse engineering situations. It runs as follows: total identity, substantial identity, substantial similarity, insubstantial similarity, no similarity.\textsuperscript{235} The first two parts of the spectrum are always actionable; that is, the plaintiff always prevails when the two chips are identical or substantially identical. The last two parts of the spectrum are never actionable in this context; that is, the defendant always prevails if the two chips are not even substantially similar. When the two chips are substantially similar, but not substantially identical, however, reverse engineering can be a valid defense; the plaintiff prevails unless the defendant proves reverse engineering, or some other defense.\textsuperscript{236}

There are three separate criteria that the defendant must satisfy to establish the reverse engineering defense. The first two are more or less objective, focusing on how much money, toil, effort, and study the defendant expended as evidenced by his documentary evidence and on whether the two semiconductor chip products are substantially identical. The third condition is more qualitative and subjective, asking whether the result of the defendant's investment, toil, effort, and study resulted in a work that is sufficiently different from the plaintiff's to be "an original mask work."

The word "original" is not defined in the SCPA. Moreover, the Act uses it three times—in sections 902(b)(1), 902(b)(2), and 906(a)(2)—each time in a slightly different context and


\textsuperscript{233} Mathias-Leahy Explanatory Memorandum, \textit{supra} note 17, at S12,917. The memorandum is quoted in relevant part \textit{supra} note 224.


\textsuperscript{235} The legislative history of SCPA § 906(a)(2) expressly recognizes these distinctions, explaining that the reverse engineering defense applies only in the case of a substantially similar, but "not substantially identical," mask work. See Mathias-Leahy Explanatory Memorandum, \textit{supra} note 17, at S12,917. It should be understood that in this context, the term "substantial similarity" is used to mean similarity without identity. In other contexts, "substantial similarity" is used in a sense including identity as well as similarity. Thus, for purposes of copyright law a photocopy of a document which is virtually identical to the original is "substantially similar" to the original document and therefore may be a copyright infringement. \textit{Id}.

\textsuperscript{236} See \textit{id}.
The House *sui generis* bill, H.R. 5525, defined "original" as independent creation by an author who did not copy the work from another source. The definition was deleted, without explanation, from the final bill. The deleted definition appears to correspond to the meaning of "original" as it is used in section 902(b)(1), although even there the word possibly implies some novelty or being first in time. In section 902(b)(2), protection is barred for semiconductor designs that are merely variations of staple designs, "combined in a way that, considered as a whole, is not original." In that context, "original" appears to have a connotation of novelty, over and above independent creation without copying. In section 906(a)(2), the reverse engineering privilege is limited to "an original mask work" that incorporates the results of analysis and evaluation of the earlier mask work. In that context, "original" clearly does not mean independent creation without copying, for the context of reverse engineering presupposes nonindep-

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237. See 17 U.S.C. §§ 902(b)(1), 902(b)(2), 906(a)(2) (Supp. II 1984). For the text of section 902(b), see supra note 149. Section 906(a) provides:

(a) Notwithstanding the provisions of section 905 [specifying the exclusive rights in mask works], it is not an infringement of the exclusive rights of the owner of a mask work for—

(1) a person to reproduce the mask work solely for the purpose of teaching, analyzing, or evaluating the concepts or techniques embodied in the mask work or the circuitry, logic flow, or organization of components used in the mask work; or

(2) a person who performs the analysis or evaluation described in paragraph (1) to incorporate the results of such conduct in an original mask work which is made to be distributed.

Id. § 906(a) (emphasis added).


239. The definition may have been omitted as surplusage, or as inconsistent with other parts of the SCPA.


242. The section of the Senate floor memorandum captioned "Originality," states that whether a new mask work is just an "insubstantial variation of prior work in the field" is to be determined with regard to the prior art existing in the field at the time of registration. Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917. Thus, the originality requirement appears to involve novelty over the prior art rather than just independent creation.

dent creation and some amount of copying, at least in the copyright sense of "copying." "Original mask work" must mean something else in section 906(a)(2). Undoubtedly, it means being different in some amount from the earlier work on which the reverse engineered work is based.

To be sure, "originality" in this sense is not necessarily the same as the "novelty" or "creativity" required by section 902(b)(2). The two concepts are different. Novelty under section 902(b)(2) entails a combination of the old in a way that, considered as a whole, is original. Section 906(a)(2) does not, by its terms, require a reverse engineered semiconductor chip product to meet the full novelty standards of section 902(b)(2), but it does require something more than failing to be substantially identical to or a mere copy of the earlier semiconductor chip product. Unfortunately, the required degree of novelty or creativity is left unclear by the mysterious legislative history of section 906(a)(2).244

Probably the best analogy is suggested by the Second Circuit's rule relating to copyrights of derivative works. In several cases involving products based on prior works, which were either in the public domain245 or created by a licensor of both parties,246 the Second Circuit held that such derivative works could support a new copyright only if the new work was different in some nontrivial respect from the work that came before.247 Section 906(a)(2) appears to impose the same rule on reverse engineered mask works, but in the context of avoiding infringement liability rather than that of gaining copyright protection. Thus, for a semiconductor chip product developed by

244. For a discussion of the legislative history of § 906(a)(2), see supra notes 211-225 and accompanying text.
246. See, e.g., Durham Indus., Inc. v. Tomy Corp., 630 F.2d 905 (2d Cir. 1980).
247. See id. at 909-11; L. Batlin & Son, Inc. v. Snyder, 536 F.2d 486, 491 (2d Cir.), cert. denied, 429 U.S. 857 (1976). Snyder involved the copyrightability of a toy bank based on 19th century banks. The derivative work was found to differ too trivially from the prior work to sustain a copyright. The court said that "there must be at least some substantial variation, not merely a trivial variation such as might occur in the translation to a different medium," such as from cast iron to plastic. Id. Durham involved the copyrightability of toys based on Walt Disney cartoon characters. Since both parties were Disney licensees, the toy-copyright owner was entitled to copyright protection only for its additions to the Disney works. The court held that the additions were too trivial and insubstantial to sustain a second copyright. Durham Indus., Inc. v. Tomy Corp., 630 F.2d 905, 911 (2d Cir. 1980).
reverse engineering to escape liability, it must, in effect, qualify as what the Second Circuit would consider to be a legitimate derivative work under copyright law. 248

This is an unusual infringement test for intellectual property law. Having any merit or qualifying for any kind of intellectual property protection is neither a necessary nor a sufficient condition to avoid infringement liability in patent or copyright law. An improvement patent is likely to infringe any "dominant" patent to which it is "subservient," and a derivative work copyright often cannot be exploited without infringing the work from which it is derived. Section 906(a)(2) takes the unusual step of making this particular kind of derivative work, a reverse engineered mask work, free of subservience to the earlier work. The later mask work is wholly immune from liability for infringement of mask work rights if it is the result of reverse engineering. It is doubtless the unusual nature of this rule that led to section 906(a)'s requirement that an otherwise infringing chip must have some merit before it is excused from liability for infringement. The requisite merit, however, is only a small quantum of originality—not necessarily even enough to satisfy section 902(b)(2).

D. APPLICATION OF THE REVERSE ENGINEERING DEFENSE

The legislative history of section 906(a) asserts that it will rarely be difficult to distinguish between piracy and legitimate reverse engineering, because most actual fact situations will tend to fall into one of these two polar categories rather than into the "gray area" between the poles. 249 The Senate Report summarizes testimony on this matter in terms of two factors. First, it is uneconomical for a pirate to copy only part of a chip and then spend its own money to design the rest; a strategy of wholesale appropriation is more sensible from the pirate's standpoint. 250 Second, because the parts of a chip tend to be highly integrated, copying a part of a chip and combining it with something else is likely to result in a product that does not function properly. 251 Accordingly, there will be few cases occupying the gray area between clear copying and clearly legiti-

248. This does not necessarily mean that the second mask work would qualify for registration under SCPA § 902(b), for that is not what § 906(a)(2) requires. See supra text accompanying note 244.
249. SENATE REPORT, supra note 8, at 22.
250. Id. at 21.
251. Id. at 22.
mate reverse engineering.\footnote{252}

Of course, clear cut fact situations are not litigated as frequently as close cases. Still, whatever uncertainty is left should be resolved, the Senate Report states, by use of proper documentary evidence at trial.\footnote{253} This documentary evidence is the "paper trail" that legitimate reverse engineering leaves behind, but piracy does not.\footnote{254} The House Report concurred with the Senate as to the "evidentiary importance of the 'paper trail' of legitimate reverse engineering that helps distinguish it from mere piracy."\footnote{255}

The "paper trail" is not the only evidence to be considered on reverse engineering. Testimonial evidence from expert wit-

\footnote{252. The Senate Report concludes: "Hence, cases will rarely arise that are in a gray zone between clear copying and clearly legitimate reverse engineering, since most actual fact situations in this field are either at one end or the other of the spectrum." \textit{Id.} Not all observers agree, however, that most actual fact situations will be at one extreme or the other. For example, one commentator has asserted that disagreements will occur over whether it is illegal chip piracy or legitimate reverse engineering to use the original "floor plan" of a chip and then to do one or more of the following: modify the layout within a block or subcircuit, substitute a different block or subcircuit, or reformat all subcircuits in accordance with a different process technology. \textit{See} Petraske, \textit{Comments on the Semiconductor Chip Protection Act of 1984}, 4 COMPUTER L. REP. 828, 830 (1985).

253. \textit{SENATE REPORT, supra} note 8, at 22.

254. The "paper trail" of reverse engineering was described by Leslie L. Vadasz, Senior Vice President, Intel Corp., in a letter made part of the record of the 1983 Senate Hearings on S. 1201, which the Senate adopted "as a guide to its intent:"

"Whenever there is a true case of reverse engineering, the second firm will have prepared a great deal of paper—logic and circuit diagrams, trial layouts, computer simulations of the chip, and the like; it will also have invested thousands of hours of work. All of these can be documented by reference to the firm's ordinary business records. A pirate has no such papers, for the pirate does none of this work. Therefore, whether there has been a true reverse engineering job or just a job of copying can be shown by looking at the defendant's records. The paper trail of a chip tells a discerning observer whether the chip is a copy or embodies the effort of reverse engineering. I would hope that a court deciding a lawsuit for copyright infringement under this Act would consider evidence of this type as it is extremely probative of whether the defendant's intent is to copy or to reverse engineer."

\textit{SENATE REPORT, supra} note 8, at 22 (quoting 1983 Senate Hearings, \textit{supra} note 214, at 146 (letter of Leslie L. Vadasz, Senior Vice President, Intel Corp.)) (footnote omitted). The same letter was also made part of the record of the 1983 House Hearings on H.R. 1028. See \textit{1983 House Hearings, supra} note 8, at 36-37 (letter of Leslie L. Vadasz, Senior Vice President, Intel Corp.).

255. \textit{HOUSE REPORT, supra} note 8, at 21 & n.42, 1984 U.S. CODE CONG. & AD. NEWS at 5770 & n.42.
nesses is also important.\textsuperscript{256} Such testimony would help explain the significance of the paper trail or that of its absence. Expert testimony would also cover the importance or lack of importance of the obvious or subtle changes that the defendant made in its version of the mask work.\textsuperscript{257}

E. \textbf{Burdens of Proof}

Since reverse engineering is an affirmative defense,\textsuperscript{258} the burden of proof is on the accused infringer. Unless the defendant persuades the fact finder that the defendant's competitive replication of the chip is immunized under the reverse engineering exemption, the plaintiff's prima facie case of infringement will stand unrebutted.\textsuperscript{259} No one item of documentary evidence is necessarily decisive, but in the aggregate, the evidence may paint a very persuasive picture.\textsuperscript{260}

In defending against a charge of piracy involving at least superficially similar products and where the circuitry did not compel any particular design choice, the defendant may try to

\begin{footnotes}
\item[256] See Senate Report, supra note 8, at 18.
\item[257] See id. (quoting 1983 Senate Hearings, supra note 214, at 145-46 (letter from Leslie L. Vadasz, Senior Vice President, Intel Corp.)).
\item[258] House Report, supra note 8, at 23, 1984 U.S. CODE CONG. & AD. NEWS at 5772.
\item[259] Some of the objective, documentary evidence that a fact finder might consider in a reverse engineering case includes the relative development costs of the two semiconductor chip products, the person-hour figures, and the elapsed time from start to finish. A great disparity would suggest misappropriation. Additionally, a fact finder might consider whether the defendant's records show substantial expenditures for analysis, testing, computer simulations of the functioning of the chip, and other indicia that the defendant independently exercised its judgment in determining the design it used; whether there are common mistakes, unnecessary elements, and arbitrary design choices; whether there is the same "fix" to correct a prior error; and whether the second chip contains substantial design enhancements.
\item[260] A well-publicized case of this sort occurred with the 8086 microprocessor. At a very late stage of the development of the product, its designers decided that they had to change several 1's in the microcode of the ROM to 0's. To remove these transistors entirely would have meant redoung several masks, with the attendant opportunity to make mistakes. Therefore, the decision was made simply to remove the interconnections that "wired" these 1's into the circuit, so that the "floating," unconnected transistors would, in effect, become 0's. This meant changing only one mask—that for making the holes in an upper insulating layer to permit aluminum to pass through them to make the interconnections. When another company then copied the 8086, it copied the several nonfunctional transistors along with the functional ones. See Morgan, High Tech: Leaving Home—Battling to Innovate and Emulate: Intel Versus Nippon Electric, Washington Post, May 2, 1983, at A1, col. 1, reprinted in 1983 House Hearings, supra note 8, at 375; 1983 Senate Hearings, supra note 214, at 164-65.
\end{footnotes}
convince the court that the market compels "form, fit, and function compatibility." Moreover, the defendant might argue that compatibility considerations require that the second chip include what seem to be flaws or arbitrary design choices in the original chip. For compatibility purposes "better is worse," because improvements may interfere with product fungibility, and a nonfungible second product may be unsalable.  

III. FAIR USE

It is not yet clear whether a defendant may maintain a "fair use" defense in SCPA cases. The reverse engineering defense started out as a species of fair use, but was given independent status to underscore its availability as a defense. It is possible, however, that inclusion of express language on reverse engineering was not intended to prevent any judicial development of a fair use defense.

The room for such evolution is limited, however, because the practice of reverse engineering in the semiconductor industry goes far beyond the ordinary concept of "fair use" in copyright cases. Business conduct that typically would be considered reverse engineering in the semiconductor chip industry would probably not qualify as fair use if copyright law were applied. The courts have developed and the 1976 Copyright Act codified a number of criteria for deciding whether a use of a copyrighted work is fair or unfair. Most

261. For a discussion of "better is worse" from a technological standpoint, see R. Stern, supra note 5, § 1.2[B].
262. See supra notes 199-261 and accompanying text.
263. See supra notes 212-217 and accompanying text.
264. Of course, the practice of reverse engineering in the semiconductor industry evolved during a period when copyright protection was unavailable to semiconductor chip products and before there was a chip protection statute, so that copyright law's "fair use" rule had little relevance to industry concerns and values.
265. See, e.g., Williams & Wilkins Co. v. United States, 487 F.2d 1345, 1352 (Ct. Cl. 1973), aff'd by an equally divided Court, 420 U.S. 376 (1975).
267. Section 107 lists four factors which must be considered in determining whether a use is a "fair use":
(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit 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.

Id.
of the factors tend to weigh heavily against reverse engineering as a fair use. The reverse engineering use is usually commercial, which, although not decisive, "tends to cut against a fair use defense," or may even raise a presumption that the taking is an unfair, rather than a fair, use. The amount taken from the first chip will often be quite substantial. Finally, the effect on the market for the original chip is likely to be adverse, since the defendant usually seeks to substitute its chip for the plaintiff's, competing directly with the plaintiff for the same customers. Accordingly, if SCPA defendants had to satisfy the Copyright Act's fair use standards when a chip had been reverse engineered, defendants would probably lose most cases.

Of course, defendants do not have to meet the Copyright Act's standard, because section 906(a) of the SCPA sets its own standard regarding fair use of a prior mask work in engineering a new mask work. The concept of reverse engineering under section 906(a) is not as limited as copyright law's fair use concept. For example, it does not prohibit commercial competition by the user, who is free to distribute a substantially similar semiconductor chip product.

It is unclear whether any separate doctrine of fair use exists under the SCPA, apart from section 906(a)'s express recognition of reverse engineering. For example, suppose that one company uses an identical reproduction of another company's mask work in comparative advertising. Such a use is probably a "fair use" or is otherwise privileged, despite the exclusive


269. See Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 449 (1984) (if a copy were made for "a commercial or profit-making purpose, such use would presumptively be unfair").

270. On occasion, however, even taking an entire work has been excused as fair use. See, e.g., Williams & Wilkins Co. v. United States, 487 F.2d 1345, 1353 (Ct. Cl. 1973) (limited photocopying by libraries of copyrighted medical journal articles held to be fair use), aff'd by an equally divided Court, 420 U.S. 376 (1975). In Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417 (1984), entire copyrighted works were videotaped, but the circumstances were such that the Court concluded that "the fact that the entire work is reproduced, see [17 U.S.C.] §107(3), does not have its ordinary effect of militating against a finding of fair use." Id. at 449-50.


272. Suppose, for example, a company's advertisement reads: "See how we shrink the die and accomplish the same function as XYZ, faster and using less silicon!"
reproduction right of section 905(1), the express allowance of reverse engineering reproduction in section 906(a), and the failure of that section to include comparative advertising. Other examples can perhaps be formulated, although the reverse engineering privilege of section 906(a) is so much broader than fair use that invocation of the latter doctrine would usually be futile.

The House Report asserts in a footnote that there is no fair use doctrine under the SCPA because the provisions of the Copyright Act do not apply to the SCPA. However, the fact that the recently codified fair use rule of the copyright law does not expressly extend to the subsequently enacted SCPA does not mean that judicial application of the fair use rule to semiconductor chip products is inappropriate. This is particularly so since fair use had its origins as a judicial rule. Counsel, faced with a fact situation that could be fair use but which does not fit under section 906(a), should therefore explore fair use arguments despite the footnote in the House Report. If an area de-

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274. Another possible example is suggested by an occurrence at the January 7, 1985, ceremony at the Copyright Office, in which the first mask work applications for registration were accepted and the congressional sponsors of the legislation were honored. Several members of Congress held up to press photographers acetate overlays of masks, and the photographers then photographed the scene. Theoretically, unless fair use or a similar doctrine applies, the press photographers violated the mask owner's reproduction right, and the members of Congress knowingly caused the unlawful reproductions. See 17 U.S.C. § 905(1), (3) (Supp. II 1984). Clearly, this kind of reproduction of a mask work was not the evil Congress sought to remedy when it passed the SCPA.

275. HOUSE REPORT, supra note 8, at 23 n.45, 1984 U.S. CODE CONG. & AD. NEWS at 5772 n.45 ("The provisions of [the Copyright Act] do not apply to this Chapter . . . , and thus there is no right of fair use under the Act.") (emphasis added). The word "thus" implies a logical connection that does not exist. See infra note 276 and accompanying text. It should be noted that the House Report discusses a version of section 906(a) different from that finally enacted by Congress. The comment about fair use may therefore be of limited significance. The Senate Report is silent on this issue. See SENATE REPORT, supra note 8.

276. See, e.g., Williams & Wilkins Co. v. United States, 487 F.2d 1345, 1350 (Ct. Cl. 1973), aff'd by an equally divided Court, 420 U.S. 376 (1975). Fair use is also a judicially created defense to claims of patent or trademark infringement. See cases cited infra note 277. One cannot therefore conclude with any certainty that the fair use doctrine does not apply to semiconductor chip products. If the argument were to be made at all, it would be that inclusio unius est exclusio alterius. That is, it could be argued that when Congress specifically provided for reverse engineering, and went no further, it intended SCPA § 906(a) to be a substitute for any other or more expansive fair use defense.
velops in which the question is of practical significance, the courts may well create a semiconductor chip product doctrine of fair use just as they created fair use doctrines in copyright, trademark, and patent law.277

IV. FIRST SALE AND EXHAUSTION OF RIGHTS

The “first sale” doctrine,278 or “exhaustion doctrine”279 as

277. As indicated in such decisions as Williams & Wilkins Co. v. United States, 487 F.2d 1345 (Ct. Cl. 1973), aff’d by an equally divided Court, 420 U.S. 376 (1975), fair use was a judicially created doctrine in copyright law long before it was codified in the 1976 Copyright Act. Id. at 1350.

In trademark law, use of another’s trademark in comparative advertising or to identify a product correctly is fair use or otherwise not a trademark infringement. See, e.g., Champion Spark Plug Co. v. Sanders, 331 U.S. 125, 129-30 (1947) (reconditioned “Champion” plugs may be so designated); Societe Comptoir de L’Industrie Cotonniere, Etablissements Boussac v. Alexander’s Dep’t Stores, Inc., 299 F.2d 33, 37 (2d Cir. 1962) (copy of “Dior” dress may be so designated); American-Marietta Co. v. Krigsman, 275 F.2d 287, 291 (2d Cir. 1960) (refills may be designated in terms of brand that they fit).

In patent law, noncommercial laboratory or “experimental” use of an invention is a form of fair use and is not patent infringement. See, e.g., Kaz Mfg. Co. v. Chesebrough-Ponds, Inc., 317 F.2d 679, 681 (2d Cir. 1963) (holding that use of invention in television commercial was not patent infringement, and collecting cases on other noninfringing uses of inventions); Poppenhusen v. Falke, 19 F. Cas. 1048, 1049 (C.C.S.D.N.Y. 1861) (No. 11,279) (law is “well settled, that an experiment with a patented article for the sole purpose of gratifying a philosophical taste, or curiosity, or for mere amusement, is not an infringement of the rights of the patentee”). In Roche Prods., Inc. v. Bolar Pharmaceutical Co., 733 F.2d 858 (Fed. Cir.), cert. denied, 105 S. Ct. 183 (1984), the court sought to limit this doctrine to wholly nonbusiness use and held that the experimental use of a patented drug product constituted patent infringement because the purpose of the experiment was to complete during the life of the patent the testing required to market the generic drug after the patent on the name brand drug expired. Id. at 863. Within a few months, Congress in effect reversed the holding in Roche Products by passing Pub. L. No. 98-417, § 202, 98 Stat. 1585, 1603 (1984) (codified at 35 U.S.C.A. § 271(e) (West Supp. 1985)) (amending 35 U.S.C. § 271 (1982)). See H.R. REP. No. 857, 98th Cong., 2d Sess. 27 (Part II), reprinted in 1984 U.S. CODE CONG. & AD. NEWS 2647, 2711 (“The provisions of section 202 have the net effect of reversing the holding of the court in Roche Products, Inc., . . . .”); see also id. at 45-46 (Part I), 1984 U.S. CODE CONG. & AD. NEWS at 2678-79 (“It is the Committee’s view that experimental activity does not have any adverse economic impact on the patent owner’s exclusivity during the life of a patent, but prevention of such activity would extend the patent owner’s commercial exclusivity beyond the patent expiration date.”).

278. The first sale doctrine is codified in section 109(a) of the Copyright Act, 17 U.S.C. § 109(a) (1982), and in section 906(b) of the SCPA, 17 U.S.C. § 906(b) (Supp. II 1984).

279. The term “exhaustion doctrine” is more often used in relation to industrial property rights such as patents and trademarks. In the United States, the doctrine has developed in the case law and has no statutory basis. For a discussion of the exhaustion doctrine in United States patent law, see Stern,
it is often called, provides that a product protected under intellectual property law passes outside the protection of that law after the intellectual property rights owner or its licensee sells the product to a customer. Accordingly, the owner of the intellectual property rights cannot bring an infringement action against direct or indirect customers with respect to the customers' further utilization or disposition of their purchases.\textsuperscript{280} Courts usually strike down attempts by sellers to exercise "remote control" over the resale or use of the goods, or to impose limitations or restrictions on further resale or use. At a minimum, the exhaustion doctrine makes infringement actions unavailable, on the theory that the first authorized sale of the goods "exhausts" the intellectual property monopoly or places the goods "outside the monopoly." Courts often go further, however, and refuse to enforce contracts, whether express or merely quasi-consensual, that purport to give the intellectual property rights owner some measure of remote control over the goods after their sale.\textsuperscript{281} Courts also tend to disregard the use of licenses, bailments, and other nonsale transaction formats by an intellectual property rights owner to avoid the exhaustion doctrine, at least when the transaction has most of the ordinary earmarks of a sale.\textsuperscript{282}

\textsuperscript{280} The first sale defense is equivalent to a license or estoppel defense. The defendant alleges that the plaintiff licensed the activity of which the plaintiff now complains, by providing the semiconductor chip product to the defendant or its source of supply or by authorizing manufacture of the product. License is an affirmative defense. \textsc{FED. R. CIV. P. 8(c)}. Similarly, in civil copyright litigation, first sale is an affirmative defense to be proved by the defendant. \textsc{See American Int'l Pictures, Inc. v. Foreman}, 576 F.2d 661, 663 n.1 (5th Cir. 1978) ("the burden of proving that a particular copy was lawfully made or acquired rests on defendant"). \textit{But see} United States v. Wells, 176 F. Supp. 630, 635 (S.D. Tex. 1959) (in criminal cases, the government must show that defendant's copies were not published by a lawful licensee of the copyright proprietor). The criminal cases are inapplicable in the civil context, however, because the predominant reason for placing this burden on the government, rather than on the defendant, is the principle that the government has the burden of proof on every essential element of the crime. \textsc{American Int'l Pictures}, 576 F.2d at 663 n.2. Similarly, because first sale is a defense or exemption from liability for infringing mask work rights, it is up to the defendant to plead and establish it. Moreover, the defendant in such cases is ordinarily in control of information regarding its source of supply.

\textsuperscript{281} \textit{See, e.g., Boston Store v. American Graphophone Co.}, 246 U.S. 8, 27 (1918).

\textsuperscript{282} \textit{See, e.g., United States v. Masonite Corp.}, 316 U.S. 265, 277-78 (1942);
A. LEGISLATIVE HISTORY OF THE FIRST SALE DOCTRINE

Section 906(b) of the SCPA carries over to mask works the "exhaustion of monopoly rights" and "first sale" doctrine of the Copyright Act and many years of prior case law. Some form of the first sale rule has appeared in every version of the bills that became the SCPA. Nonetheless, the Copyright Office and others expressed concern that the bill might in some way impair the first sale doctrine. Accordingly, a second provision was placed into an early version of the Senate bill to "make it clear that the intention of Congress [was] to continue and carry forward . . . the entire existing body of law concerning the exhaustion of copyright by the first authorized sale of the copyrighted product." The House's sui generis bill duplicated the relevant provisions of the Copyright Act in its own provision on first sale. This provision, section 906(b), imme-
diately followed the bill’s description of a mask work owner’s exclusive rights and placed a limitation on them. Section 906(b) of the House bill became section 906(b) of the SCPA.289

In combining the House and Senate bills, the language of section 906(b) of H.R. 5525 was modified to incorporate some of the greater generality of section 9 of the Senate bill,290 to include an express provision regarding importation, and to clarify the language. As enacted, section 906(b) of the SCPA allows customers to import, sell, and otherwise use or dispose of whatever semiconductor chip products they buy from the mask work owner or its licensee. The same right then passes down the distribution chain to subsequent customers. The right applies only to the particular units of the semiconductor chip product so purchased, and not to units acquired from infringers or to stolen units.291

B. EXHAUSTION OF DISTRIBUTION RIGHT BY FIRST SALE

The first authorized sale of a semiconductor chip product exhausts the distribution right as to that semiconductor chip product.292 Thus, if a mask work owner manufactures semiconductor chips and sells them, the purchaser becomes their owner and may resell the same chips anywhere in the United States, at any price. The purchaser may also export the same chips without liability under the SCPA. None of these acts would violate the exclusive distribution right of the seller. There is also no liability for infringement of mask work rights if the customer first incorporates the purchased chips into another produc-

289. SCPA § 906(b), as enacted, provides:

Notwithstanding the provisions of section 905(2) [creating exclusive importation and distribution rights], the owner of a particular semiconductor chip product made by the owner of the mask work, or by any person authorized by the owner of the mask work, may import, distribute, or otherwise dispose of or use, but not reproduce, that particular semiconductor chip product without the authority of the owner of the mask work.


292. See id.
uct, such as personal computers, and then resells the chips as part of the other product. Similarly, when a mask work owner's licensee makes the chips and sells them to a customer, the customer will not be liable.

1. Sales Contracts

A mask work owner's notice or an express contract in which a mask work owner attempted to limit a customer's disposition of the purchased chips would probably be ineffective because the courts would not enforce them. A court order for specific performance or an award of damages against a customer who disregarded the notice or contract would aid the seller in contravening the policy underlying the SCPA. Hence, a court would probably refuse either to order specific performance or to award damages in such cases.

A mask work owner might argue that sale of the semiconductor chip product exhausts only the right to bring an action for infringement of mask work rights and does not affect any other rights or claims, such as a claim based on the contract. This argument would probably not succeed, however, because there is no indication in the statute or its legislative history that by selling the chip, the mask work owner gives up only the power to bring an infringement action and can still otherwise exercise "remote control" over customers through a contract. The House Report simply states in sweeping terms that the owner of a mask work has no right to try to exercise such control over customers and that purchasers of semiconductor chips have the right to use and resell the chips freely. Without question, a resale price notice or contract would be ineffective.

2. Nonsale Transactions

Although the practice does not exist in the semiconductor industry, cases have arisen in other industries testing whether a

293. HOUSE REPORT, supra note 8, at 23, 1984 U.S. CODE CONG. & AD. NEWS at 5772.

294. For example, the following resale price notice would be ineffective: "This chip must not be resold for less than $1." Both the Senate and House Reports cited Bobbs-Merrill Co. v. Straus, 210 U.S. 339 (1908), on this point as an illustration of the exhaustion doctrine. See HOUSE REPORT, supra note 8, at 23, 1984 U.S. CODE CONG. & AD. NEWS at 5772; SENATE REPORT, supra note 8, at 26. Bobbs-Merrill involved a price restriction as to a copyrighted book, similar to the example given above. For a general discussion of this issue, see R. STERN, supra note 5, §§ 9.4, 9.5, 12.3.
seller may avoid the first sale rule or exhaustion doctrine by adopting a nonsale transactional format. Under such a format, the customer is not the "owner" of the product. The Supreme Court, in Bobbs-Merrill Co. v. Straus,295 held that a book publisher's purported "license" of books was ineffective to control their resale price.296 In patent cases, patentees have unsuccessfully sought to use "licenses" to control the resale price and the territories in which their customers use products and to use del credere agency and other devices to convert, or purport to convert, sales into bailments.297 On the other hand, mass marketers of computer software frequently seek to avoid the impact of section 109(a) of the Copyright Act by purporting not to sell the software or the diskette in which the software is encoded, purporting instead to license or bail the diskette or software.299 As yet, there is no precedent on the enforceability of these so-called "shrink-wrap licenses." Proprietors of other copyrighted works, such as motion pictures and music, have sought enactment of amendments to section 109 that would permit them to prevent or control rental of video tapes, audio tapes, and records. In the discussions of such bills before Congress, those involved assumed that the proprietors of these works could not exercise control over rental absent the enactment of the legislation sought.300 Thus, the weight of authority and general opinion indicates that use of putative nonsale formats for transactions will not defeat the exhaustion doctrine.

The language of section 906(b) and the legislative history indicate that avoidance or evasion devices, such as bailments, would be ineffective. A court would probably find that the customer is the "owner" of the semiconductor chip product whenever the transaction appears to transfer dominion and control over the semiconductor chip product. This is not to say that

295. 210 U.S. 339 (1908). Bobbs-Merrill was cited with approval in both the Senate and House Reports. See House Report, supra note 8, at 23, 1984 U.S. CODE CONG. & AD. NEWS at 5772; Senate Report, supra note 8, at 23.


courts would disregard a true consignment of semiconductor chip products, adopted for conventional business purposes, or the retention of a security interest in semiconductor chip products intended to insure payment. If, however, the principal purpose of an arrangement were to avoid section 906(b), it would undoubtedly be stigmatized as a "sham" and disregarded.\footnote{See United States v. Masonite Corp., 316 U.S. 265, 278 (1942).}

C. IMPORTATION RIGHT

A late amendment to section 906(b) of the SCPA added importation to the exhaustion doctrine of that section.\footnote{See 17 U.S.C. § 906(b) (Supp. II 1984).} A customer of the mask work owner, or of its licensee, may therefore import protected semiconductor chip products that the customer purchased. For example, if the mask work owner sells a number of chips to A in Japan, or to B in Chicago who resells to C in Taiwan, or to D in France who resells to E in Australia, then A, C, and E, and the customers of A, C, or E, may ship the same chips back into the United States, where they may be resold freely. The same result would occur if the mask work owner had not itself manufactured the chips in question, but had granted A, B, and D simple licenses to manufacture the chips.

Suppose, however, that the mask work owner grants A a license to manufacture chips for use and sale only in Japan, grants B a license to manufacture chips for domestic use and sale only, and grants D a license to manufacture chips for use and sale only within the European Economic Community. Suppose, further, that A, B, or D agree not to sell knowingly to persons who will ship the chips outside the assigned territory. Putting aside United States antitrust law and foreign restrictive practices laws, the question is whether these transactions bring about a different result under section 906(b). The analysis should focus on whether the licensee is a person "authorized by" the mask work owner to sell the chips.\footnote{SCP A § 906(b) provides:}

\begin{quote}
(b) Notwithstanding the provisions of section 905(2) [setting forth the importation and distribution rights], the owner of a particular semiconductor chip product made by the owner of the mask work, or by any person authorized by the owner of the mask work, may import, distribute, or otherwise dispose of or use, but not reproduce, that particular semiconductor chip product without the authority of the owner of the mask work.
\end{quote}

\textit{Id.} (emphasis added).
mean several things, for example, "authorized to any extent," "authorized specifically to sell for importation into the United States market," or "not expressly prohibited from selling for United States importation."

The precise meaning of "authorized by" is uncertain, but the thrust of section 906(b) and its legislative history seem to indicate that the importation will not be an infringement of mask work rights. Whether a contract or tort action, such as inducing breach or interfering with business relations, or even fraud, lies against A, B, C, D, E, or others is another question. To the extent that the answer to that question depends on the policy of section 906(b), the answer would appear to be negative. In contract cases, however, policies other than those of section 906(b) may dominate.304

D. USE LIMITATIONS AFTER SALE OR LICENSED MANUFACTURE

1. Copyright and Patent Precedents

The suggestion has occasionally been made that under the copyright laws, there is no general exhaustion doctrine, and that an authorized first sale of a copyright product exhausts only the distribution right. Under this theory, the customer may resell the copyrighted product intact, but may not modify the copyrighted product and then resell it, display it publicly, or cause its public performance.305 Thus, the owner of a video game machine may not modify the copyrighted computer code and audiovisual work of the video game and then allow patrons to play (publicly perform) the modified video game.306 Similarly, software licenses frequently provide that customers may not modify copyrighted computer programs or merge them with or into other computer programs and sell the resulting products.307 On the other hand, courts have allowed purchasers

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304. For example, that promises ought to be kept and that there is a duty to act in good faith, in both inducing and performing the contract. On the other hand, in Sola Elec. Co. v. Jefferson Elec. Co., 317 U.S. 173 (1942), the Supreme Court found the field of patent licensing so dominated by the sweep and interplay of federal policies that it said state contract law policies must give way to them. Id. at 176; accord Lear, Inc. v. Adkins, 395 U.S. 653, 673 (1969).


to disassemble packages containing copyrighted parts and resell the components, to rebind and combine copyrighted books with other material, and to convert copyrighted products into other products and resell them.

In patent law, and in patent-related antitrust law, a pervasive view of the exhaustion doctrine seems to prevail. Sale of the patented product carries with it an unqualified right of modification, use for any purpose, and resale in any form.

2. Legislative History of the Exhaustion Doctrine

The language of section 906(b) and the legislative history suggest that the sale of a semiconductor chip cuts off all power of the seller to exercise remote control over the use of the chip. Thus, section 906(b) expressly refers to other use and disposition of the chip, as well as to distribution. There is no suggestion in the legislative history that only the distribution right is exhausted when a mask work owner sells a semiconductor chip product. Indeed, the intimation is to the contrary. The Senate Report speaks in general terms of "exhaustion of copyright," not merely exhaustion of the distribution right. The House Report generally inveighs against any attempt to exercise "remote control" over the pricing or other business conduct of copy of computer program may make or authorize reproduction of another copy or adaptation if new copy is used solely as "essential step in the utilization of the computer program" or for archival purposes).

308. See Burke & Van Heusen, Inc. v. Arrow Drug, Inc., 233 F. Supp. 881, 884 (E.D. Pa. 1964) (knowledge by retailer of contract between copyright holder and original customer requiring that copyrighted product be sold only as part of promotional package did not bind retailer to observe terms of contract).


312. For the full text of SCPA § 906(b), see supra note 303.

313. See Senate Report, supra note 8, at 26. See also Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917 ("[I]t now is made clear that a customer is free to use a semiconductor chip product unit as he chooses, after becoming its owner by buying it from the mask work owner or its licensee.").
of customers and proclaims that “the exhaustion of any rights by the first authorized sale is a basic tenet of our intellectual property law.”314 The Report states that the Act gives purchasers “the right to use and resell [the chips] freely.”315 Finally, Congress refrained from giving mask work owners any exclusive “use” right.316 This suggests that the legislative intent is to establish a broad policy in favor of customer freedom to use purchased chips as customers see fit, a policy that would be contravened by any device extending “remote control” over the chip's use, including contractual restrictions. Therefore, any notice or contract limiting customers' use of purchased semiconductor chip products317 would probably be ineffective.318

In any event, the question is more theoretical than real. Practice at this time in the semiconductor industry is consistent with the broader view of section 906(b). It is not the custom in the industry to impose use, price, or other distribution restrictions on chip purchases. Although chips are not sold at this time for use only with specified types of machines, that could change in the future. At this time, however, section 906(b) imposes no real impediments on semiconductor chip manufacturers' business practices.

315. Id. (emphasis added).
317. E.g., “This chip may be used only in mainframe computers,” “This microprocessor may be used only in printed circuit boards containing XYZ RAM chips,” “This chip is not licensed for use in modems,” “This chip is licensed for distribution only via authorized jobbers, wholesalers, and retailers of XYZ Co.”
318. The issue is not completely free from doubt, however. The argument may be made that the policy behind SCPA § 906(b) is not so strong as to prevent the parties to a contract from bargaining for a limitation on the purchaser's power to use chips freely. It may be said that the policy only prevents SCPA infringement actions against those who disregard contracts limiting disposition or use of chips, and does not prevent state contract law actions. For example, it is clear that it is not patent or copyright infringement to disregard a territorial limitation on the distribution of the patented or copyrighted article, but geographically limited distributorships for patented and copyrighted goods appear to be permissible under present law. The language of the SCPA and its legislative history are cast in somewhat stronger terms than those of the patent and copyright laws; nevertheless, courts might simply regard that as a reason to interpret narrowly contracts bargaining away or limiting § 906(b) rights, rather than to refuse to enforce them at all. For a general discussion of this issue, see R. Stern, supra note 5, § 9.5.
3. Use Limitations in Licenses to Manufacture Equipment

There is a possible exception to the general proscription against devices that limit subsequent use of the chip, but it, too, may raise only theoretical questions. Sometimes, a semiconductor chip product manufacturer will license an equipment manufacturer to make a particular chip for "in-house use only." A chip used "in-house" is one included as part of the equipment sold by a licensee, as contrasted with a chip sold as such in the ordinary (so-called "merchant") semiconductor chip product market. In the latter market, the licensee's sales of the chip would compete with the licensor/chip manufacturer's sales.

Suppose the equipment manufacturer breached and sold the chips, as opposed to equipment containing the chips, on the regular market. That would raise the questions of whether the equipment manufacturer could be enjoined and whether the wholesalers or retailers who bought chips from the equipment manufacturer could be prevented from reselling them. Since the license would presumably not authorize sale of the chips on the regular market, at least arguably the chips so sold are unlicensed.

The counterargument is as follows: The equipment manufacturer was licensed ("authorized" in the words of section 906(b)) to make chips; all of the chips are fungible, and, at the time they are made, the equipment-bound chips are indistinguishable from those bound for the regular market. Further, the mask work owner has no right to control the distribution of the chips so made, and once the chips are made they pass outside the monopoly. This argument appears to be weak, because courts are likely to refuse to extend the exhaustion doctrine to the manufacture as well as sale of chips. In effect, the argument would so extend the exhaustion doctrine.

It would not be surprising, however, if a court enjoined only the equipment manufacturer but let the chip wholesalers

319. See generally United States v. General Elec. Co., 272 U.S. 476, 488 (1926) (where dealers were found to be sales agents, not purchasers, price fixing did not violate common law or antitrust law). In United States v. Ciba Geigy Corp., 508 F. Supp. 1118, 1147-51 (D.N.J. 1976), the court held that generally similar license restrictions as to a patented chemical were antitrust violations when imposed on purchasers but were lawful when imposed on manufacturing licensees. The restrictions at issue permitted only certain specified chemicals to be combined with the patented chemical. For a decision similarly upholding against an antitrust challenge an "in-house" restriction on chemicals produced by a patented process, see United States v. Studiengesellschaft Kohle, M.B.H., 426 F. Supp. 143, 149 (D.D.C. Cir. 1976).
and retailers alone. The theory would be that the mask work owner created the situation where the wholesalers and retailers innocently, or at least nonculpably, acquired an ordinary article of commerce. Once they acquired the chip, under ordinary principles, the wholesalers and retailers would be free to use it or dispose of it as they chose. Even a requirement by the mask work owner that the equipment manufacturer label the chips "not for sale" would probably be ineffectual against the equipment manufacturer's customers who disregarded the label. Nevertheless, this scenario will probably never occur in any real business setting. The reason is that the equipment manufacturer would probably recognize that no one would ever again license such a "treacherous" equipment manufacturer to make semiconductor chip products, and most equipment manufacturers would be too honorable to violate what both parties considered an agreement.

E. REPRODUCTION RIGHT NOT EXHAUSTED BY FIRST SALE

The first sale rule can apply only after an authorized first sale of a semiconductor chip product has occurred, and only to those rights that come into play after such a first sale. Distribution and importation of a semiconductor chip product are in that category of rights, but reproduction of a semiconductor chip product is not. Therefore, inducing or causing others to import or distribute chips legitimately purchased from the mask work owner is not a wrongful act and not a violation of

321. Technically, there is no agreement not to sell the chips as such. There is merely a limited or conditional license, for example, A licenses B to make semiconductor chip product C only on the condition that B place the semiconductor chip products into product D. A license on a condition is generally not considered to imply a promise by the licensee not to engage in unlicensed conduct, i.e., conduct beyond the scope of the license. The remedy for conduct beyond the scope of the license is an action for infringement, not one for breach of contract. See, e.g., Automatic Radio Mfg. Co. v. Hazeltine Research, Inc., 339 U.S. 827, 836 (1950) (limited license for home use production is "neither an express nor implied agreement to refrain from production for 'commercial' or any other use as part consideration for the license grant"). Nevertheless, most businesspersons would consider all of this a lawyer's quibble, because the intent of the parties was that the licensee would engage only in the licensed conduct. See Baxter, Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis, 76 YALE L.J. 267, 278-79 (1966) ("infringers no less than promise-breakers are pariahs in the business community").
Reproduction of a mask work is in a different category from importation and distribution. Reproduction of a mask work, by making a semiconductor chip product embodying the mask work or by photographing the layout and preparing a composite drawing, data base tape, or mask, is not the kind of customer "use" of a purchased semiconductor chip product that section 906(b)'s first sale doctrine authorizes. Such conduct is permissible if it qualifies as reverse engineering under section 906(a), but otherwise it is a violation of section 905(1)'s reproduction right. Ordinarily, reproduction of the mask work could not be justified as a necessary adjunct to the customer's getting the benefit from the sale of the semiconductor chip product. In any event, at a late stage of the legislative history, an amendment was added to section 906(b) changing the provision so that it would allow the customer of a semiconductor chip product to use, but not reproduce, the semiconductor chip product. Thus, a mask work owner's sale of a semiconductor chip product does not give the customer any right to reproduce the semiconductor chip product. By the same token, induc-
ing or knowingly causing a purchaser of a chip to reproduce it is a violation of section 905(3). 327

F. APPLICATION OF THE FIRST SALE DEFENSE

The first sale or exhaustion doctrine of section 906(b) is probably not a major defense in actual infringement of mask work rights cases. Ordinarily, a semiconductor manufacturer will not sue purchasers of its chips for infringement. A manufacturer accused of unlawful reproduction of the semiconductor chip product cannot assert the defense because only a purchaser of a semiconductor chip product can invoke the defense. 328 Finally, whenever the first sale defense is applicable, ordinarily the innocent infringement defense would apply as well.

V. INNOCENT INFRINGEMENT

A. LEGISLATIVE BACKGROUND

Innocent infringement provisions of one kind or another have been in all of the major bills leading up to the SCPA. As originally introduced, the Senate329 and House330 bills included a compulsory licensing provision and an innocent infringement provision to protect the positions of persons who bought semi-

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328. By its terms, SCPA § 906(b) applies only to an owner of a particular semiconductor chip unit that has been made by the mask work owner or a person authorized by the mask work owner. See id. § 906(b). One who reproduces the work could qualify only if authorized by the mask work owner to reproduce it, i.e., if the person were a licensee. In that case, however, the defendant would invoke the license defense, not the first sale defense.
conductor chips without knowing that the chips were infring-
ing. The use of the term "compulsory licensing" greatly
disturbed some persons. Therefore, to avoid controversy, all
references in the legislation to compulsory licensing were de-
leted and replaced by an expanded innocent infringement pro-
vision. The innocent infringement section was largely
equivalent in substantive effect to its predecessor, but a provi-
sion limiting damages to a reasonable royalty and eliminating
the possibility of an injunction was substituted for the provision
providing for a compulsory license at a reasonable royalty.

Both the Senate and House provisions exempted conduct
occurring before an innocent purchaser of semiconductor chips
learned that the purchased chips were infringing. Thus, the
purchaser's resale of such chips before notice of mask work
rights, for example, as part of electronic equipment, would not
create liability for infringement. The Senate and House bills
differed in a number of ways, however. The issues in dispute
included whether an innocent purchaser may continue to op-
erate on a royalty basis after it learns that the purchased chips
were infringing, whether a purchaser from an innocent in-
fringer enjoys the same status, and whether the innocent in-
fringer has manufacturing rights. These issues were eventually
resolved by informal conference.

332. See id. at 25-26.
News at 5772-73; Senate Report, supra note 8, at 10-11.
News at 5772-73; Senate Report, supra note 8, at 10-11.
335. S. 1201's innocent infringement provision differed from the House ver-
sion in three main respects: First, it allowed an innocent infringer to continue
to operate indefinitely on a reasonable royalty basis after innocence ended, if
the "equities" of the situation favored the innocent infringer. In contrast, H.R.
5525 dispensed with balancing the equities. The innocent purchaser was al-
lowed to sell off all semiconductor chip product inventory acquired before no-
tice of infringement on a reasonable royalty basis. After that, no special
privileges attached to the once-innocent infringer. Second, the Senate bill al-
lowed a good-faith purchaser from an innocent infringer the same privileged
status as an innocent infringer. Under H.R. 5525, however, all of the innocent
infringer's innocently acquired semiconductor chips (and products in which
they were incorporated) could be sold off to purchasers, who would also enjoy
all the privileges of an innocent infringer, whether or not the subsequent pur-
chasers were good-faith purchasers. Third, in some circumstances, S. 1201 en-
titled the innocent infringer to make the semiconductor chip or have it made,
on a reasonable royalty basis. Under H.R. 5525, no innocent infringer ever ac-
quired any right to make chips or have them made. Compare Senate Report,
B. INNOCENT INFRINGEMENT UNDER THE SCPA

Under section 901 an innocent infringer is a person who buys semiconductor chip products without actual notice of mask work rights and without reason to believe that the chip layout is protected under the SCPA.\textsuperscript{336} Section 907 provides that the innocent infringer is not liable for any acts done before it had notice that the mask work was protected.\textsuperscript{337} After the innocent infringer has notice, it enjoys reasonable royalty rights as to inventory purchased before notice.\textsuperscript{338} Any subsequent purchases of additional units of the semiconductor chip product, however, are fully subject to the SCPA.\textsuperscript{339} Customers who directly or indirectly purchase semiconductor chip products or equipment containing chip products from the innocent infringer have the same status as the innocent infringer.\textsuperscript{340}

Innocent infringement is an affirmative defense and must be proved by the alleged infringer.\textsuperscript{341} The principal issue in-

\textsuperscript{337} Id. § 907(a)(1).
\textsuperscript{338} Id. § 907(a)(2).
\textsuperscript{339} Id. § 907(d).
\textsuperscript{340} Id. § 907(c).
\textsuperscript{341} The legislative history is silent on this point. The prima facie notice provisions of SCPA § 909(a), id. § 909(a), and the fact that the defendant is in control of the evidence, however, would seem to require that the defendant adduce some evidence of innocent infringement. Since innocent infringement has all the appearance of an affirmative defense, the defendant undoubtedly would have the burden of persuasion as well. For a description of the prima facie notice provisions of SCPA § 909, see infra notes 344-349 and accompanying text.
volved is whether the defendant had actual notice, or at least should have known, that the chip layout was protected under the SCPA when the chip was purchased. This is a matter of establishing the defendant's good faith. A related question is the time at which the defendant's innocence may have ended. Finally, there is the problem of determining a reasonable royalty.

C. **NOTICE**

Usually the mask work owner will comply with the statutory notice provisions of section 909. The owner will thus be in a position to rely on section 909(a)'s rule that use of the notice is "prima facie evidence of notice of protection" under the SCPA. If the defendant stands mute, that will be the end of the issue. Of course, the defendant will not stand mute. The defendant will produce testimony of its officials to support its ignorance of the plaintiff's rights, arguing that the defendant simply bought the chips from a third party and that the circumstances gave the defendant no reason to believe that the chip was pirated. The defendant may also point out that the statutory notice was not placed on the pirated chips that it bought and assert that, had it known of the plaintiff's rights, it never would have encroached on them.

Section 909(a) does not make the affixation of the statutory

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342. The question of when the defendant was put on notice of the plaintiff's rights will ordinarily raise the same factual issue as whether the defendant had notice in the first place. See infra text accompanying notes 344-349.


344. Section 909 provides:

(a) The owner of a mask work provided protection under this chapter may affix notice to the mask work, and to masks and semiconductor chip products embodying the mask work, in such manner and location as to give reasonable notice of such protection. The Register of Copyrights shall prescribe by regulation, as examples, specific methods of affixation and positions of notice for purposes of this section, but these specifications shall not be considered exhaustive. The affixation of such notice is not a condition of protection under this chapter, but shall constitute prima facie evidence of notice of protection.

(b) The notice referred to in subsection (a) shall consist of—

(1) the words "mask force [sic]", the symbol [sic] *M*, or the symbol @ (the letter M in a circle); and

(2) the name of the owner or owners of the mask work or an abbreviation by which the name is recognized or is generally known.

Id. § 909 (footnotes omitted).

345. See id. § 909(a); see also id. § 901(a)(8) (defining notice of protection).
notice a constructive notice of mask work protection. Nor will affixation have much evidentiary significance, since a third party supplier's infringing chips will carry no mask work label advising of the plaintiff's rights, unless the third party is a counterfeiter or the equivalent. Therefore, the plaintiff's notice on its own chips tells the defendant nothing unless defendant is aware, or should otherwise be aware, that the same chip layouts are involved.

The legal standard for notice is what a reasonable person in the trade would have known. Thus, if the plaintiff's chip is widely hailed in the trade press as, for example, the first chip to contain analog and digital computer circuitry on the same chip, or the first 64-bit microprocessor, or the first 2-megabit EPROM, a prudent member of the trade might make some inquiry when a second source appears before purchasing from the second source. In the same vein, if the plaintiff had given the defendant actual notice of its mask work rights previously, for example, by mailing the defendant's general counsel a copy of the mask work registration certificate, the defendant would be hampered in arguing that it was reasonably unaware of the risk of mask work infringement.

D. DETERMINATION OF REASONABLE ROYALTY

The parties are free to determine by voluntary negotiation the rate of reasonable royalty. In the absence of such an agreement, a court may determine the reasonable royalty in an infringement action brought by the mask work owner against the innocent infringer, or in a declaratory judgment action by the purchaser against the mask work owner.

The legal standard for a reasonable royalty has been set down in numerous decisions under the patent laws. The rate is what a willing purchaser who was not forced to buy would pay

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346. In contrast, SCPA § 903(c)(1) makes recordation constructive notice. Id. § 903(c)(1).
347. See id. § 901(a)(8); SENATE REPORT, supra note 8, at 25.
348. See SENATE REPORT, supra note 8, at 25 (widespread publicity would constitute reasonable grounds for belief in protection).
349. See id. (expressly recognizing that actual notice may take the form of "a letter from the copyright owner to the infringer advising that a specific chip is copyrighted.").
350. See 17 U.S.C. § 907(b) (Supp. II 1984). Parties are not required by the SCPA to reach or to try to reach an agreement on reasonable royalty. See HOUSE REPORT, supra note 8, at 23, 1984 U.S. CODE CONG. & AD. NEWS at 5772.
as a license fee to a willing seller who was not forced to sell.\textsuperscript{352}

In the decisions applying this standard,\textsuperscript{353} courts have considered the following factors, among others: the cost savings to the defendant from the use of the patented technology compared with the cost to the defendant to develop alternative technology;\textsuperscript{354} the going rate of a similar license, granted by the plaintiff to others or in the same industry generally;\textsuperscript{355} and finally, the price that would allow both parties to make a profit on the transaction.\textsuperscript{356}

Ordinarily, both parties will have experts familiar with licensing, preferably in the semiconductor industry, testify on the issue of reasonable royalty. Specifically, witnesses would testify about the "going rate" for a similar license in the industry and the manner in which percentage or lump sum royalties are usually determined. They would then apply these general principles to the facts of the case to arrive at a rational number. It should be noted that the payment of a reasonable royalty covers all downstream purchasers of the semiconductor chip product or equipment containing it.\textsuperscript{357}

\section*{VI. FRAUDULENT PROCUREMENT AND INEQUITABLE CONDUCT BEFORE THE COPYRIGHT OFFICE}

Fraudulent procurement of a mask work registration, or other inequitable conduct before the Copyright Office, is an affirmative defense to a claim of infringement of mask work rights.\textsuperscript{358} A plaintiff who fraudulently procured a mask work

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\textsuperscript{353} See, e.g., cases cited id. at 333-36.

\textsuperscript{354} See id. at 333-34.

\textsuperscript{355} See id. at 334-35.


\textsuperscript{357} See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.

\textsuperscript{358} The two forms of misconduct have been distinguished in patent cases. Fraud invalidates the patent. Inequitable conduct or nonpurgeable misuse, however, usually make the patent unenforceable. See, e.g., Timely Prods. Corp. v. Arron, 523 F.2d 288, 297 (2d Cir. 1975); cf. American Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1364 & n.5 (Fed. Cir.) (declining to}
registration does not have "clean hands." Therefore, the court will be unwilling to assist the plaintiff in enforcing its tainted rights. Similar considerations apply to conduct that, while perhaps not sinking to the level of fraud, is sufficiently inequitable to deprive the plaintiff of recourse to the courts.

A. THE DOCTRINE OF FRAUDULENT PROCUREMENT AND INEQUITABLE CONDUCT

The doctrines of fraudulent procurement and inequitable conduct have developed primarily in patent cases and, to a lesser extent, in copyright cases. The defense requires a showing that the plaintiff made a misstatement to the agency on a matter of importance in the proceeding, knowing that the statement was incorrect and perhaps also knowing that it was important. A showing that the agency actually relied on the misstatement to its detriment, i.e., "but for" the misconduct, the agency would not have issued the patent or copyright, an element of common law fraud, is generally considered superfluous, at least insofar as defensive use of the doctrine is concerned.
B. MATERIAL MISSTATEMENTS

For this defense to apply, the mask work owner must have made an incorrect statement to the Copyright Office on a material matter on the application form or in some other connection with the registration proceeding. The misstatement must involve a matter that could affect the proceeding, such as one that would, or at least might, influence the Copyright Office to grant the registration. More specifically, the false statement must tend to induce a grant while the true statement would have tended to cause rejection. Thus, for a Brazilian national and domiciliary to falsely assert that its mask work was first commercially exploited in the United States is clearly material, since section 902(a) makes a Brazilian mask work first commercially exploited in Brazil ineligible for protection.

A more difficult question would arise if a United States citizen falsely stated that its mask work was first commercially exploited in the United States, when in fact it was first commercially exploited in Brazil. Arguably, the false statement is immaterial, since section 902(a)(1)(A) makes the fact of the applicant’s United States citizenship enough to render the mask work eligible for protection. On the other hand, the Copyright Office should not be made to act on false information. Hence, if the misstatement is intentional or inexcusable, the applicant should be penalized as a matter of equity and as a lesson to others not to make intentional false statements on potentially important matters. Treating such a misstatement as material is consistent with the prevailing view in the United States Court of Appeals for the Federal Circuit, which has held that falsity is material if it relates to a matter that could affect the outcome in some circumstances, even if not those of the case at bar.

Another difficult question regarding materiality could occur...
cur when a mistake is made “against” the interest of the applicant. Suppose the applicant files on June 1, 1987, and there is a question of whether first commercial exploitation occurred on July 1, 1986, or March 1, 1987. Either way, the application is still timely under the two year rule of section 908(a). The applicant resolves doubts “against” himself and puts the July 1986 date in the application, so that the term of protection ends in 1996 instead of 1997. It is later decided that March 1987 was the correct date. The misstatement probably is not material,369 unless the earlier date preceded damaging prior art that would have or might have invalidated the registration under section 902(b).370

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It is not enough that a statement be incorrect and material. An applicant must either know that a statement is incorrect or be sufficiently careless as to be culpable. The standard for liability appears to be failure to make proper inquiry, when a reasonable person would inquire. An alternative standard, however, borrowed from patent law, may be that the applicant must act in a grossly negligent manner or recklessly.371 There


369. Suppose, however, that the applicant puts the March 1987 date in the application and it is later decided that July 1986 was correct. Again, the difference is immaterial under SCPA § 908(a). See id. § 908(a). Such a misstatement also has no effect for purposes of establishing originality under SCPA § 902(b). See id. § 902(b). The duration of the rights might be affected, however, because the term of protection will end in 1997 instead of 1996. See id. § 904. Whether the applicant acted in good faith may be the determinative factor in such cases.


371. See Kansas Jack, Inc. v. Kuhn, 719 F.2d 1144, 1151-52 (Fed. Cir. 1983); Norton v. Curtiss, 433 F.2d 779, 795-96 (C.C.P.A. 1970). The distinction between negligence and gross negligence appears to have been blurred by the decision in J.P. Stevens & Co. v. Lex Tex Ltd., 747 F.2d 1553 (Fed. Cir. 1984), cert. denied, 106 S. Ct. 73 (1985), in which the court stated: “Gross negligence is present when the actor, judged as a reasonable person in his position, should have known of the materiality of a withheld reference.” Id. at 1560 (citations omitted).

The Ninth Circuit took a stricter view in one patent fraud case. In W.R. Grace & Co. v. Western United States Indus., Inc., 608 F.2d 1214 (9th Cir. 1979), cert. denied, 446 U.S. 953 (1980), a patent was held invalid for fraud because of an incorrect affidavit, which denied advertising of the product. In fact, the corporation had extensively advertised the product. The affiant said that he erred because he misunderstood his subordinates' reports. The court, nonetheless, imputed the subordinates' knowledge to the corporate employer, for whom the patent application was being prosecuted. Hence, the corporation was held to have knowingly filed a false affidavit and thus to have procured
is probably a sliding scale to determine when an applicant also must know that the statement is material and when it is enough that the applicant knows that it is false.\textsuperscript{372}

D. JURY QUESTION GUIDELINES

The Court of Appeals for the Federal Circuit, in \textit{American Hoist \& Derrick Co. v. Sowa \& Sons, Inc.},\textsuperscript{373} recently formulated guidelines for federal trial courts regarding which aspects of patent fraud cases are matters for the jury and which are matters for the district judge.\textsuperscript{374} Reserved for the jury, as questions of fact, are determinations of the importance of information withheld from the application and of the patentee's intent, whether resolved by evidence of deliberate scheming or by inference from gross negligence or recklessness. A legal conclusion, reserved for the district judge, is the decision whether information withheld from an agency would have been likely to

the patent by fraud. \textit{Id.} at 1218-19. The Patent and Trademark Office's rule, in contrast, imputes to the corporate applicant (the assignee of the inventor) only the knowledge of each "individual who is substantially involved in the preparation or prosecution of the application." \textit{37 C.F.R. \S\ 1.56(a) (1985).}

372. \textit{See} \textit{American Hoist \& Derrick Co. v. Sowa \& Sons, Inc.}, 725 F.2d 1350, 1363 (Fed. Cir.), \textit{cert. denied}, 105 S. Ct. 95 (1984); \textit{Digital Equip. Corp. v. Diamond}, 653 F.2d 701, 716 (1st Cir. 1981); \textit{see also Kayton, Lynch \& Stern, \textit{Fraud in Patent Procurement: Genuine and Sham Charges}, 43 Geo. Wash. L. Rev. 1, 132-35 (1974) (creating four categories of knowledge). With regard to a false, clearly material statement, as, for example, when the date of first commercial exploitation is 25 months before the application but is represented as being only 23 months, it is probably enough that the applicant knew that the statement was incorrect. Even clear proof that the applicant did not know what SCPA \textit{\S\ 908(a) provides would not excuse the intentional false statement. Even if the applicant made the statement carelessly, rather than intentionally, he should still be found culpable. Any reasonable person who read and understood the statute would know that the date of first commercial exploitation was an important material fact. Therefore, the appropriate standard of care as to this fact should be quite high. At the other extreme, considerable carelessness might be tolerated, for example, in ascertaining the correct ZIP code for the mask owner's street address.

In patent fraud cases, the current standard for assessing the applicant's knowledge of materiality is whether the applicant knew or should have known that the statement was important to the agency in making the decision whether to issue the patent. \textit{Kansas Jack, Inc. v. Kuhn}, 719 F.2d 1144, 1152 (Fed. Cir. 1983). It is probably easier to find a culpable state of mind on an important issue concerning the mask work that the applicant incorrectly represents to the Copyright Office than it is on a less important one. \textit{See Rohm \& Haas Co. v. Crystal Chem. Co.}, 722 F.2d 1556, 1571-72 (Fed. Cir. 1983), \textit{cert. denied}, 105 S. Ct. 172 (1984); \textit{Kansas Jack}, 719 F.2d at 1151-52.


374. \textit{Id.} at 1363-64.
have influenced the agency’s decision on issuing the patent.\textsuperscript{375} The district judge is also responsible for the “careful balancing of intent in light of materiality” to determine whether the patentee fraudulently procured the patent.\textsuperscript{376} Whether the guidelines set forth in \textit{American Hoist} would apply\textsuperscript{377} or be useful\textsuperscript{378} in a case under the SCPA is unclear.\textsuperscript{379}

\textsuperscript{375} Id. at 1363 n.4. In J.P. Stevens & Co. v. Lex Tex Ltd., 747 F.2d 1553 (Fed. Cir. 1984), \textit{cert. denied}, 106 S. Ct. 73 (1985), however, the court said that both intent and materiality “are factual issues subject to the clearly erroneous standard of review,” id. at 1562, which necessarily means that, in a case tried to a jury, they are both jury matters, see id. \textit{J.P. Stevens} was tried without a jury on the fraud issue. On appeal the issue was the appropriate standard of appellate review, which raises the same question. \textit{Id.}

\textsuperscript{376} \textit{American Hoist}, 725 F.2d at 1364. In \textit{J.P. Stevens}, the court amplified this point by stating that the court must determine, “as a matter of law,” how the balance should be struck once the minimum thresholds for materiality and culpable intent are each crossed. J.P. Stevens & Co. v. Lex Tex Ltd., 747 F.2d 1553, 1560 (Fed. Cir. 1984), \textit{cert. denied}, 106 S. Ct. 73 (1985). The court apparently meant that if the jury finds that a reasonable examiner would have thought that the misstated or withheld information was important in deciding whether to allow any aspect of the claimed subject matter, and if the misstatement or withholding was at least negligent, then the court should do the balancing. \textit{See id.} The argument may be urged that this division of authority effectively usurps the jury’s fact finding power.

\textsuperscript{377} Like patent appeals, SCPA appeals probably go to the United States Court of Appeals for the Federal Circuit. \textit{See} 28 U.S.C. §§ 1295(a)(1), 1338(a) (1982); \textit{see also} 17 U.S.C. § 912(d) (Supp. II 1984) (providing that the provisions of section 1338 of title 28 apply with respect to exclusive rights in mask works under the SCPA).

\textsuperscript{378} The first several guidelines may be helpful in a mask work case, but the last one may not. A jury may not be able to quantify intent or scienter sufficiently to permit the judge to factor its factual determination into the sliding scale process in which intent is balanced against materiality to determine whether fraudulent procurement had occurred.

The problem is analogous to that of deciding whether the defendant’s vehicle was going too fast, given the road conditions at the time of the accident. Perhaps, the decision cannot effectively be made if one person must decide what the road conditions were, while another person must decide what was the right speed for those conditions. In the case of intent to procure registration by fraud, the problem is even more difficult, because there is no numerical measure of intent analogous to miles per hour. It could therefore be said that the determination should be left entirely to the jury, after a suitable charge. This would also avoid the contention that the jury’s fact finding power was being usurped.

\textsuperscript{379} If the approaches taken in \textit{American Hoist} and J.P. Stevens & Co. v. Lex Tex Ltd., 747 F.2d 1553 (Fed. Cir. 1984), \textit{cert. denied}, 106 S. Ct. 73 (1985), prevail in cases involving alleged “inequitable conduct” in procuring mask work registrations, the procedure for determining liability could be illustrated by the following graph:
E. CONSEQUENCES OF A FRAUD RULING

In a case of misstatement of information that would invalidate the mask work registration, such as first commercial exploitation more than two years before the registration, the mask work is cast into the public domain irrespective of fraud. The court in such a case would almost certainly award attorney's fees under section 911(f).380

When the misstatement or failure to disclose information is sufficiently culpable, even though, absent fraud, the mask work would still be registrable, the court may hold that the mask work rights are unenforceable. In some cases of negligent misstatement, a court would probably allow the mask work owner to correct the registration, thereby reestablishing the validity

First, the jury decides whether clear and convincing evidence establishes that the defendant's conduct falls within the area defined by the broken lines, more specifically, whether the defendant's state of mind falls below the scienter or culpability threshold and whether the pertinence of the data is to the left of the materiality threshold. If the jury decides in the negative for either threshold, the mask work owner is exonerated of the inequitable conduct charge. If they find that both of the threshold tests are met, the matter becomes one for the court. In that case, the court, not the jury, determines as a matter of law the exact coordinates of the materiality and state of mind applicable to the mask work owner's conduct and whether they fall within the shaded area of the graph or within the unshaded area. If the coordinates are within the shaded area, the mask work owner is guilty of inequitable conduct. If the coordinates are in the white or clear area, the mask work owner is exonerated.

380. SCPA § 911(f) provides: "In any civil action arising under this chapter, the court in its discretion may allow the recovery of full costs, including reasonable attorneys' fees, to the prevailing party." 17 U.S.C. § 911(f) (Supp. II 1984). The question whether an award of attorneys' fees is appropriate in an infringement of mask work rights case under the SCPA is discussed in R. STERN, supra note 5, § 6.8.
and enforceability of the registration.\textsuperscript{381}

Finally, enforcement of a fraudulently procured mask work registration may serve as the basis of a claim for damages under unfair competition law or under state or federal antitrust laws.\textsuperscript{382} The theory of such an action is that the intellectual property owner, by bad faith litigation akin to malicious prosecution,\textsuperscript{383} excluded or attempted to exclude the alleged in-

\textsuperscript{381} The mask work owner could then enforce the mask work rights against all others, except where res judicata barred the action. In Rohm & Haas Co. v. Crystal Chem. Co., 722 F.2d 1556 (Fed. Cir. 1983), cert. denied, 105 S. Ct. 172 (1984), the court indicated that a patentee might "purge" the effects of fraud on the Patent and Trademark Office by bringing the correct facts to the attention of the Office. \textit{Id.} at 1572. The patentee's conduct in that case, however, was held to be not adequate to rehabilitate itself or the patent. \textit{Id.} at 1573.

Perhaps a defective assignment could be cured to restore registrability of a mask work. For example, consider the following hypothetical: Contractor \textit{A} in Iceland creates a mask work for Icelandic corporation \textit{B}, which then assigns its rights to its United States subsidiary \textit{C}. The mask work is then first commercially exploited in the United States and \textit{C} applies for registration. \textit{C}'s attorney somewhat carelessly states on the registration form that \textit{C} owns the mask work, that \textit{C} acquired all United States rights from the prior owner \textit{B}, and that \textit{B} created the mask work by its employees as part of their employment. In fact, \textit{A} owns the mask work. \textit{B} never did, and \textit{C} does not. \textit{B} never secured a written assignment from contractor \textit{A} as SCPA § 903(b) requires. \textit{See} 17 U.S.C. § 903(b) (Supp. II 1984). The registration is invalid. Under SCPA § 908(a), nonowner \textit{C} cannot register the mask work. \textit{See id.} § 908(a).

Suppose that all of this comes out in litigation against defendant \textit{D} only one year after first commercial exploitation began, and \textit{C} immediately takes the following steps: (1) \textit{A} assigns all its rights to \textit{B}, in writing; (2) \textit{B} assigns all its rights to \textit{C}, in writing; and (3) \textit{C} reapplies for registration, this time correctly stating the facts and advising the Copyright Office of the prior error. Does the earlier carelessness of \textit{C}'s attorney bar registration? Or may a registration now validly issue? If the court considered \textit{C}'s conduct not too culpable, it might well permit the rescue and rehabilitation of the mask work registration. But if defendant \textit{D} had secured an intervening judgment, \textit{C} would be faced with a res judicata bar as to that defendant.

The facts of the case may prevent rehabilitation, however. If first commercial exploitation had been in Iceland, rather than the United States, SCPA § 902(a)(1)(A) would prevent registration. If two years had passed between the first commercial exploitation and the discovery of the facts, SCPA § 908(a) could create the same problem. A further difficulty is that the Copyright Office takes the position that there is no authority for correcting mistakes in mask work registrations. \textit{See} R. Stern, \textit{supra} note 5, § 3.10.


\textsuperscript{383} \textit{See}, e.g., Otter Tail Power Co. v. United States, 410 U.S. 366, 379-80 (1973) (bad faith litigation over power to issue municipal bonds); California
fringer from competing in the sale of the product involved.\textsuperscript{384}

VII. ESTOPPEL

A defendant may successfully raise the affirmative defense\textsuperscript{385} of estoppel\textsuperscript{386} in an action for infringement of mask work rights if the defendant can prove that the plaintiff was re-


\textsuperscript{385} Such antitrust actions face a severe obstacle in most circuits: the antitrust claimant must show that the defendant controls a substantial share of the market for the product. See, e.g., Acme Precision Prod., Inc. v. American Alloys Corp., 484 F.2d 1237, 1244 (8th Cir. 1973) (patent-antitrust case). This consideration appears to be inapplicable in an unfair competition action. It also appears to be of less significance in antitrust actions based on bad faith assertion of infringement. See, e.g., Kobe, Inc. v. Dempsey Pump Co., 198 F.2d 416 (10th Cir.), cert. denied, 344 U.S. 837 (1952) (substantial share of market test not applied in patent-antitrust case involving bad faith assertion of infringement).

If the mask work owner claimed a very expansive scope for the registration, the argument of narrowness of mask work rights would lose its force. For example, if A sues B for infringement of A's mask work rights in a 1 Megabit DRAM under an interpretation of A's mask work rights that is so broad that it would cover any other 1 Megabit DRAM, the defendant might successfully argue that A is attempting to monopolize the whole 1 Megabit DRAM business, which may be a relevant product market. A's counterargument would presumably be that 4K, 16K, 64K and 256K DRAMs and static RAMs and also all PROMs, EPROMs, EEPROMs, and floppy disks are part of the relevant market.

Most semiconductor chip product layouts do not so uniquely dominate a product market that possession of exclusive rights over the layout confers monopoly power (or other substantial economic power) over the sale of the product, even under a broad definition. Most layouts represent only one way of accomplishing a particular purpose, although many others exist. If this were not so in a particular case, the doctrine that functionally dictated aspects of mask works are unprotected by the SCPA would govern. See supra notes 91-99 and accompanying text.

\textsuperscript{386} Estoppel is similar to, but not the same as, laches. Laches refers to a willful delay in bringing suit which prejudices the defendant, for example, by causing witnesses to become unavailable to the defendant. The gravamen of estoppel, on the other hand, is the defendant's action in detrimental reliance on plaintiff's misleading conduct. The same facts may give rise to both defenses.

It is sometimes said that laches merely deprives the plaintiff of the right to damages, see Menendez v. Holt, 128 U.S. 514, 524 (1888), while estoppel forecloses the plaintiff from all right to prospective or retrospective relief of any kind, see, e.g., Potter Instrument Co. v. Storage Tech. Corp., 641 F.2d 190, 192 (4th Cir.), cert. denied, 454 U.S. 832 (1981); Advanced Hydraulics, Inc. v. Otis Elevator Co., 525 F.2d 477, 479 (7th Cir.), cert. denied, 423 U.S. 869 (1975). For a discussion of laches in infringement of mask work rights cases, see R. STERN, supra note 5, § 7.4(B).
The defense of estoppel is recognized in copyright and patent infringement cases. It is reasonable to assume that the courts will follow the same principles in infringement of mask work rights cases. The elements of a case of copyright estoppel can be restated in terms of mask works. The first element is that the plaintiff mask work owner must have known of the

387. For example, a mask work owner who holds out the defendant's supplier as the owner's partner or licensee, or who knowingly fails to correct such a misimpression created by the supplier, might be estopped from claiming infringement. Estoppel might also apply in the following situation: the mask work owner accuses the defendant of infringing its mask work rights; the defendant denies infringement or validity, claiming that it has copied an earlier work in the public domain; the mask work owner then remains silent for a substantial period, while the defendant expands its production facilities. See Jensen v. Western Irrigation & Mfg., Inc., 650 F.2d 165, 169 (9th Cir. 1981) (patent case); Advanced Hydraulics, Inc. v. Otis Elevator Co., 525 F.2d 477, 481-82 (7th Cir.) (patent case), cert. denied, 423 U.S. 869 (1975); Continental Coatings Corp. v. Metco., Inc., 464 F.2d 1375, 1380 (7th Cir. 1972) (patent case). Estoppel is also an appropriate defense when a mask work owner has permitted widespread infringement of the semiconductor chip product for several years prior to the time that the defendant entered into the manufacture of that semiconductor chip product. See Faulkner v. Baldwin Piano & Organ Co., 189 U.S.P.Q. 695, 728-32 (N.D. Ill. 1976) (15-year silence in face of patent infringement by entire industry), aff'd on other grounds, 561 F.2d 677 (7th Cir. 1977), cert. denied, 435 U.S. 905 (1978). The following is another situation in which the defendant could argue estoppel: A gallium arsenide wafer fabricator (die supplier) and an equipment manufacturer collaborate on developing new designs for a high speed semiconductor chip product. Nothing is said of mask work rights for four years. The equipment manufacturer spends large sums to expand its capacity to develop products utilizing the new designs, including semiconductor chip product wafer fabrication facilities. Eventually, the equipment manufacturer begins to make a large part of its gallium arsenide semiconductor chip product requirements. The supplier then asserts mask work claims against the manufacturer. See Lukens Steel Co. v. American Locomotive Co., 197 F.2d 939, 940-41 (2d Cir. 1952). A final example is as follows: A mask work proprietor sells or licenses mask work rights to a semiconductor manufacturer. The mask work proprietor then acquires from a third party additional mask work rights in an earlier mask work, which dominate the mask work rights sold or licensed to the manufacturer. In other words, the mask work sold or licensed to the manufacturer contains part of the subsequently acquired but earlier mask work, so that the reproduction of the later work is an infringing reproduction of the earlier work. The original mask work proprietor then asserts these new rights against the manufacturer. See Minnesota Mining & Mfg. Co. v. E.I. DuPont de Nemours & Co., 448 F.2d 54, 57-58 (7th Cir. 1971); AMP, Inc. v. United States, 389 F.2d 448, 451-53 (Ct. Cl.) (implied license), cert. denied, 391 U.S. 964 (1968).

defendant's infringing conduct.\textsuperscript{389} Another element is that the plaintiff mask work owner must have acted in a way that gave the defendant infringer a reasonable basis for believing that the plaintiff did not intend to assert the mask work rights, if any, against the defendant.\textsuperscript{390} Further, it must be shown that the defendant did not actually believe that the plaintiff would assert mask work rights against it.\textsuperscript{391} Finally, the defendant must have relied on the plaintiff's conduct in a way that would make it unfair to let the plaintiff assert its rights because of the resulting detriment to the defendant.\textsuperscript{392} The elements of estoppel in patent infringement cases are similar.\textsuperscript{393}

\section*{VIII. MISUSE AND ANTITRUST}

Misuse of intellectual property rights has been recognized as a defense to an infringement action.\textsuperscript{394} The fact that the plaintiff has engaged in an antitrust violation involving the intellectual property rights is also a defense.\textsuperscript{395} The legislative history of the SCPA includes reference to one of the earliest precedents on misuse of a copyright,\textsuperscript{396} \textit{Bobbs-Merrill Co. v. Straus},\textsuperscript{397} in which the United States Supreme Court refused to enforce a license notice in a copyrighted book fixing a minimum resale price for the book.\textsuperscript{398}

\begin{footnote}
\textsuperscript{390} See \textit{id.}
\textsuperscript{391} See \textit{id.}
\textsuperscript{394} See, \textit{e.g.}, Morton Salt Co. v. G.S. Suppiger Co., 314 U.S. 488, 491-94 (1942).
\textsuperscript{395} See, \textit{e.g.}, Mercoid Corp. v. Mid-Continent Inv. Co., 320 U.S. 661, 665-671 (1944) (stating further that defendant may assert counterclaim against plaintiff's antitrust violation).
\textsuperscript{397} 210 U.S. 339 (1908).
\textsuperscript{398} \textit{Id.} at 350-51.
\end{footnote}
The doctrine of misuse is considered an equitable defense. Thus, in *Morton Salt Co. v. G.S. Suppiger Co.*, the Supreme Court considered whether an infringer could assert the defense that the patentee had misused its patent by requiring licensees of the patented machine to purchase unpatented supplies. The lower court rejected the defense, on the ground that the defendant had not shown that the patentee's tying of the patent license to the purchase of supplies lessened competition sufficiently to violate the antitrust laws. The Supreme Court said that the proper question was not whether the patentee had violated the antitrust laws, but rather "whether a court of equity will lend its aid to protect the patent monopoly" when the patentee is using the patent to impose a tie-in. Enjoining the infringer would assist the patentee in "thwarting the public policy underlying the grant of the patent." Accordingly, the Court dismissed the patentee's infringement complaint for want of equity. The Court noted that the "unclean hands" defense involved did not depend on whether the particular defendant had suffered from the misuse of the patent, because the purpose of the doctrine was to protect the public interest, as opposed to the interest of the particular defendant.

A. ANTITRUST VIOLATIONS

As *Morton Salt* expressly held, it is not necessary to prove an antitrust violation to sustain a misuse defense. Misuse, although an equitable civil doctrine, is like the criminal law

400. See id. at 490-94. The patent was on a machine for dispensing salt tablets in the process of canning foods. Morton infringed Suppiger's patent and sought to defend on the ground that Suppiger was using the patent to compel users of the machine to buy salt tablets from Suppiger. The effect was allegedly to supplant Morton in selling salt tablets to users of the machine. See id. at 491.
401. G.S. Suppiger Co. v. Morton Salt Co., 117 F.2d 968, 971-72 (7th Cir. 1941).
403. Id. at 493. The patentee was using the patent monopoly on the machine to restrain competition in the market for salt tablets, an unpatented article. This attempted monopoly of the unpatented article was against the public interest in the benefits of free and open competition in the market for that product.
404. Id. at 494. Other decisions make misuse a legal defense as well as an equitable one. Thus, a licensee may defend a suit for royalties due under a patent license by raising the patentee's misuse. See *MacGregor v. Westinghouse Elec. & Mfg. Co.*, 329 U.S. 402, 407 (1947).
405. See *Morton Salt*, 314 U.S. at 494.
concept of a lesser included offense. The misuse doctrine usually sweeps up conduct of the same general kind as might violate the antitrust laws, but which, in some way, falls short of being a full-blown antitrust violation.\textsuperscript{406} Recently, the Ninth Circuit found that a computer manufacturer violated the antitrust laws by tying the purchase of its computers to licenses of its copyrighted software.\textsuperscript{407} It seems inconceivable that the court would hold that the defendant violated the antitrust laws by refusing to allow the plaintiffs' potential customers to use the software unless they bought the defendant's, rather than the plaintiff's, computers, and yet at the same time would let the defendant maintain a copyright infringement action against the plaintiffs if they had infringed the copyright on the software as "self help" against the defendant's antitrust violation. Hence, whenever the challenged use of the intellectual property right, such as a mask work right, is proved to be an antitrust violation, it should automatically be a misuse as well.

B. COPYRIGHT MISUSE CASES

The misuse doctrine has also been applied in copyright and trademark\textsuperscript{408} cases, although not as frequently as in patent cases.\textsuperscript{409} In \textit{Broadcast Music, Inc. v. Columbia Broadcasting...
the Supreme Court apparently approved misuse as a defense in a claim of copyright infringement. The Second Circuit had held that certain copyright licenses were illegal per se because of their inherent harmful tendencies, regardless of their actual competitive effect under the antitrust laws. Therefore, the court concluded that the copyright proprietors had committed copyright misuse. The Supreme Court reversed on the ground that the license restrictions were not per se illegal, but were illegal only if they unreasonably restrained trade by causing adverse competitive effects in the marketplace. The Court remanded for a determination on that point. The Court appears to have ruled that the challenged practices could constitute copyright misuse and antitrust violations if, in fact, they unreasonably restrained trade.

Other practices which might also constitute grounds for a misuse defense include imposing restrictions on the use or disposition of a semiconductor chip product, contrary to SCPA § 906(b)'s first sale rule; licensing a cell library with restrictions on the price of the semiconductor chip products made under the license; agreeing with existing mask work licensees not to grant other persons subsequent licenses without the consent of the earlier licensees; and licensing a cell library with royalties running for 15 years. For a more extended discussion of antitrust considerations in the context of licensing mask works, see STERN, supra note 5, § 12.4.

411. See id. at 6 & n.3, 24-25.
413. See id. at 140, 141 n.29.
415. Id. at 24.
IX. LACK OF STANDING TO SUE

Lack of standing to bring an infringement suit is a defense in actions under the SCPA. Section 910(b)(1) permits the owner of the mask work or the exclusive licensee of all rights to sue. Because the statute contains only this limited grant of authority to sue, the plaintiff should allege its standing, and the defendant may simply deny standing.

In a noninfringement action, such as a declaratory adjudication of rights relating to a mask work, the defendant may assert that the plaintiff lacks a sufficient interest in the subject matter of the claim to entitle the plaintiff to bring the action. Such a challenge to subject matter jurisdiction is similar to a claim of no case or actual controversy between the parties. Similarly, a defendant might assert failure to state a claim for relief. Nonetheless, it would be prudent for a defendant also to raise lack of standing as an affirmative defense in its answer.

X. OTHER DEFENSES

Other defenses to a claim of infringement of mask work rights may overlap with those already discussed. It is often tactically advantageous, however, to restate a defense in as many legal formulas as applicable. One formulation may prove more effective than another before different tribunals or in situations where the fact pattern or evidence develops differently from what was expected.

F. Supp. 672, 686 (S.D.N.Y. 1979); Broadcast Music, Inc. v. Grant's Cabin, Inc., 204 U.S.P.Q. 633, 635 (E.D. Mo. 1979); see also 3 M. NIMMER, supra note 80, § 13.09[A] n.3 and cases cited therein. In view of the Supreme Court's decisions in Broadcast Music and United States v. Loew's, Inc., 371 U.S. 38 (1962), and the recent Second and Seventh Circuit rulings in Columbia Broadcast Sys. v. American Soc. of Composers, Authors and Publishers, 562 F.2d 130 (2nd Cir. 1977), and F.E.L. Publications, Ltd. v. Catholic Bishop of Chicago, 214 U.S.P.Q. 409 (7th Cir. 1982), these district court decisions have very limited precedential value. Moreover, some of them appear to turn on the point that the alleged misuse was extraneous to the controversy involved in the litigation, so that for the court to assist the plaintiff by enforcing the copyright against the defendant would not assist the plaintiff in carrying out the scheme said to be the misuse.

418. See FED. R. CIV. P. 12(b)(6).
419. Failure to join a necessary party may also be an appropriate argument, especially if someone other than the plaintiff may be the owner or exclusive licensee. See FED. R. CIV. P. 12(b)(7).
A. LICENSE

An alleged infringer of mask work rights may contend that its allegedly infringing conduct was authorized by the mask work owner. For example, in the case of a dispute over the interpretation of a license agreement containing a field-of-use or territorial limitation, the licensee may assert that its activity was within the scope of the license, while the mask work owner contends that the activity was outside the terms of the license and thus an infringement. Establishing that the defendant had a license is a complete defense to the charge of infringement of mask work rights.\textsuperscript{420} License is an affirmative defense which must be pleaded and proved by the defendant.\textsuperscript{421}

B. COMMERCE

Lack of effect on commerce by the alleged infringement is a defense, but not an affirmative defense. Rather, showing effect on commerce is part of the plaintiff's case, because section 910(a) defines infringement as conduct in or affecting commerce.\textsuperscript{422} Hence, if the plaintiff alleges effect on commerce in the complaint, the defendant should simply deny the allegation, leaving the plaintiff to prove it at trial. This defense will rarely be successful because commerce is nearly always affected by infringement. For example, shipment of infringing semiconductor chip products across a state line or interstate sales provide the requisite effect on commerce.\textsuperscript{423}

C. OTHER TYPES OF FAILURE TO STATE A CLAIM

The mask work owner who sues prematurely may fail to state a claim.\textsuperscript{424} For example, the defendant may have only begun preparation for the activities that the plaintiff alleges infringe its mask work rights. At that stage, it is uncertain whether the acts the defendant will commit, if ever committed at all, will be infringements.\textsuperscript{425} The plaintiff's complaint may


\textsuperscript{421} FED. R. Civ. P. 8(c).


\textsuperscript{423} See, e.g., Currin v. Wallace, 306 U.S. 1, 10 (1939); Dahnke-Walker Mill Co. v. Bondurant, 257 U.S. 282, 290-91 (1921).

\textsuperscript{424} See FED. R. Civ. P. 12(b)(6).

\textsuperscript{425} For a general discussion of prematurity and standing to bring actions for a declaration of rights as to mask works, see R. STERN, supra note 5, § 6.9.
also fail to state a claim if none of the defendant’s acts are within the territorial jurisdiction of the United States, or if those acts that do occur within the jurisdiction of the United States do not violate section 905.426

Defenses of this type go to defects in the plaintiff’s case, and the defendant is not required to plead them.427 However, the surprise value of reserving them until the last minute is limited, and by not pleading them affirmatively as defenses or counterclaims, the defendant loses the opportunity to shape the attitude of the court favorably as early as possible. Moreover, failure to assert a sound defense by way of a motion for summary judgment will needlessly increase the defendant’s legal expenses by sending the case to trial.

XI. PRIORITY BETWEEN CLAIMANTS

The question of priority between conflicting claims to the same or substantially similar mask works is not settled under the SCPA. The legislative history of the SCPA does not directly address the issue, although there are references to it in the Senate memorandum on the final bill.428

The question of priority can arise between rival first creators of a work when each seeks to assert rights in the work against the other. Priority conflicts may also arise between two alleged first creators in determining which creator is harmed by the infringement of some third party or which creator may properly license the third party. Hence, although a priority issue can be raised as a defense to a charge of infringement of mask work rights, priority may also be raised offensively. For this reason, it is treated here separately from other defenses.

The question of priority occurs frequently in patent law and trademark law, but it does not arise under copyright law. Under most patent law systems of the world, the first person to file a patent application disclosing and claiming an invention will have priority over anyone who later files an application on the same or a very similar invention. Under United States pat-

426. See 17 U.S.C. § 905 (Supp. II 1984) (specifying owner’s exclusive rights). If these rights are not violated, the mask work owner will not have a claim for relief. See also id. § 910(a) (limiting subject matter jurisdiction in infringement actions to conduct in or affecting commerce subject to congressional regulation).


428. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917.
ent law, however, the right to a patent belongs to the first person to complete the invention rather than the first person to file. 429 Under United States registration law, subject to some qualification, the right to a federal trademark registration and the rights that the trademark confers belongs to the person who first commercially exploits the trademark in commerce. 430 Under copyright law, each person who creates the same work independently is entitled to a separate copyright on that work. 431

Under the SCPA, the question of priority will probably not arise in the critical area of second sourcing. In a second sourcing case, the second source will base its work on the first mask work. Presumably, the first mask work will already be registered. Therefore, the second source will generally create a mask work that is not original, and consequently, its mask work will not be entitled to registration except where it departed from the first mask work. 432 The reverse engineering provisions of section 906(a) would probably govern whether the first source would have a claim against the second source for infringement of mask work rights. 433

Given the general premise of the SCPA that infringement of mask work rights occurs only if there is very close similarity between the two works, 434 the question of priority between two mask work proprietors will probably arise only in regard to cells or other small modules. Moreover, the question would arise only as to configurations that are not dictated by function, because mask work protection does not extend to functionally dictated topography. 435 Accordingly, the priority issue is not of

429. See 35 U.S.C. §§ 101-102 (1982). This assumes that a person who is first to complete the invention, but is the second or later person to file an application, did not "abandon" the invention or wait to file until a year or more had passed after a publication or first commercial exploitation of the invention. It also assumes that the fact situation is not so complex that a circularity of priorities, possible under United States law, by which A is prior to B, B is prior to C, and C is prior to A, has arisen. For further discussion of this issue, see Stern, Priority Paradoxes in Patent Law, 16 VAND. L. REV. 131 (1962).


431. For a discussion of this point, see supra notes 104-108 and accompanying text.

432. See 17 U.S.C. § 902(b)(1) (Supp. II 1984). Even if the second source could register before the first, the second mask work would not be original over the first.

433. See id. § 906(a). For a discussion of the reverse engineering provisions of the SCPA, see supra notes 199-261 and accompanying text.

434. See supra notes 79-101 and accompanying text.

435. See supra notes 91-99 and accompanying text.
It is conceivable, however, that the issue could arise, for example, in the case of a memory cell configuration that was arbitrary rather than functionally dictated. If two semiconductor chip product manufacturers independently created the same cell layout, or a substantially similar one, perhaps each could be an "original" creator for the purposes of section 902(b)(1). This would assume that "original" under section 902(b)(1) means "not plagiarized," as it does under copyright law, rather than "first in time." If each manufacturer completed its design before the other first commercially exploited the semiconductor chip product or published the layout, perhaps each manufacturer might also succeed in filing its application before the layout was "staple, familiar, or commonplace."

Because the Copyright Office has no facility for examining mask works for novelty or priority, the Copyright Office would probably be unaware of the similarity of the two mask works. Therefore, each manufacturer might end up with a registration certificate from the Copyright Office, which would be prima facie evidence of the registrant's compliance with the requirements of the SCPA. That, of course, would not be conclusive of entitlement to registration or of validity. If the doctrine of independent creation were carried over from copyright law to mask work law, priority would be immaterial and each manufacturer would be entitled to mask work protection on the mask work. If the doctrine of independent creation were not incorporated into the SCPA, relative priority of mask work rights would have to be decided by reference to what the courts consider pertinent dates. These could be the respective dates of creation of the mask work, fixation in a semiconductor chip product, first commercial exploitation of the mask work, registration, or some combination of dates. How the courts would choose among these dates is unclear. Perhaps, a court would consider registration of a mask work under section 908(a) constructive notice to subsequent applicants, as is recor-

436. See supra notes 150-151 and accompanying text.
437. SCPA § 902(b)(2) denies protection to designs that are staple, familiar, or commonplace, or that are variations of such designs. See 17 U.S.C. § 902(b)(2) (Supp. II 1984). These characteristics are to be measured as of the date of registration of the mask work. See Mathias-Leahy Explanatory Memorandum, supra note 17, at 512,917.
438. See supra notes 189-192 and accompanying text.
440. See supra notes 104-108 and accompanying text.
dation of a transfer or license under section 903(c)(1), so that only the first applicant could claim that its version of the mask work was "original" under section 902(b)(1) or was not "familiar" or "unoriginal" under section 902(b)(2). Because the argument for this approach is not strong, however, it remains uncertain how a court would resolve a priority dispute between two rival registrants. It is possible that the kind of fact situa-


442. The Senate memorandum on the final bill twice directs the courts to determine validity by looking to the state of the prior art on the date of registration. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917 (referring to the prior art "at the time of registration" and "on the date of registration"). SCPA § 908(e), 17 U.S.C. § 908(e) (Supp. II 1984), equates the date of registration with the date on which an application is filed in proper form. It may be appropriate to consider anything registered as a mask work in the Copyright Office to be prior art for the purposes of validity under SCPA § 902(b). See id. § 902(b). Moreover, the SCPA "requires registration within a reasonable time upon pain of forfeiture of rights under the Act," in order "to create greater certainty of rights, both for the public and the owners of mask works." HOUSE REPORT, supra note 8, at 24, 1984 U.S. CODE CONG. & AD. NEWS at 5773; cf. 17 U.S.C. § 908(a) (Supp. II 1984) (application for registration must be made within two years after the date on which the mask work is first commercially exploited). Hence, it may be said that Congress focused on the date of registration (i.e., application) as particularly important in determining mask work rights and sought to encourage early registration. Awarding priority of mask work rights to the first to register would be consistent with and would further that congressional policy. While this argument is reasonable, it is not so compelling that courts will necessarily adopt it.

443. Recordation of a transfer or license under SCPA § 903(c)(1) might assist a mask work owner in establishing that a subsequent registration was invalid on "originality" or "familiarity" grounds under SCPA § 902(b)(1)-(2). See 17 U.S.C. §§ 902(b)(1)-(2), 903(c)(1). Although SCPA § 908(a) does not by its express terms make registration constructive notice to all later applicants, SCPA § 903(c)(1) does expressly make recordation constructive notice of the facts concerning a transfer or license that are stated in a recorded transfer or license document. See id. §§ 903(c)(1), 908(a).

Thus, a recorded license identifying the licensed mask work with a composite drawing or overlays might give any potential subsequent applicant for registration constructive notice of the licensed mask work as a "fact concerning the license." See id. § 903(c)(1). Arguably, on the basis of that notice the mask work could no longer be "original" for a future applicant or could be deemed "staple, familiar, or commonplace" on the date of any subsequent application for registration of the same mask work or a variation of it. See Mathias-Leahy Explanatory Memorandum, supra note 17, at S12,917 (date of registration, not that of creation, significant for determining invalidity in light of prior art).

Accordingly, a first creator's prompt registration followed by recordation of a license might bar subsequent applicants from securing valid registrations on the same work. Alternatively, prompt registration followed by widespread publicity regarding the layout might make the mask work "staple, familiar, or
tion that would require courts to adjudicate priority is so rare that there may never be a decision on this point.

SUMMARY OF PART TWO

Persons accused of infringement of SCPA mask work rights are accorded defenses generally parallel to those under the patent and copyright laws, such as license, estoppel, and misuse, some of which are expressly recognized by the Federal Rules of Civil Procedure. Some of the defenses under the SCPA, invalidity, for example, have counterparts under the patent or copyright laws, but the SCPA defense has new ingredients.

Other defenses are not found in preexisting law and are peculiar to the SCPA. The SCPA defenses of reverse engineering and innocent infringement are in the latter category. They have no parallels in United States intellectual property law. They were created as part of the legislative compromise leading to enactment of the SCPA; conceeding them as limitations on the rights or remedies available to mask work owners was necessary to building the consensus that permitted passage of the new law. That Congress chose to include these defenses under the new statute illustrates that the SCPA is an industrial property law specifically directed to the economic needs of a new technology, rather than just a further development of artists' and authors' rights in their intellectual creations.

CONCLUSION

The elements of a cause of action for infringement of mask work rights, discussed in Part One of this Article, and the defenses to such a claim and the limitations on liability, discussed in Part Two of this Article, together illustrate the SCPA's peculiar blend of patent, copyright, and sui generis elements and illuminate the new law's policy parallels to and departures from preexisting intellectual property doctrines. The interests at stake under the SCPA are industrial property interests, which are generally more like those of the patent system than they are like those of the traditional subject matter of copyright, i.e., belles lettres, art, and music. In other words, the interests sought to be protected and advanced under the SCPA are primarily economic and material. A further interest, which

(commonplace" in the semiconductor industry before another applicant could file its application for registration. See supra note 348 and accompanying text.)
is largely a means to accomplishing material progress, is that of promoting and encouraging technological progress in the semiconductor electronics field. Investment in technology, the security of that investment, and business certainty therefore assume more importance under the SCPA than under copyright law.

At the same time, the personal and ideological values embedded in copyright doctrine assume relatively less importance under the SCPA. Copyright law reflects a concern for the personal interests and rights of individual creators in their creations; in the semiconductor chip field, by contrast, the context is one of team members producing a collective product owned by the employer of the team. Perhaps the SCPA can be similarly contrasted with the patent law, where the team concept and the economic values of the corporate investor have not yet fully supplanted the myth of the struggling garret or garage inventor.

The primacy of economic values under the SCPA tends to militate against there being, as elements of either party's case, matters that concern personal, noneconomic factors important in other areas of intellectual property law, such as leaving breathing room for the first amendment or for individual creativity, protecting the artistic integrity of a work against mutilation, and assuring due personal credit for authorship or inventorship. This emphasis on economic values greatly diminishes the relevance of the doctrine of independent creation in SCPA cases. It also accounts for the absence of the proper attribution of creation in the registration application as a significant issue in mask work infringement cases.

By the same token, in mask work cases there is a heightened concern for the economic interests of competitors and customers of the mask work owner, and for those of the general

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444. The doctrine of independent creation is discussed supra notes 104-131 and accompanying text.

public and other members of the electronics industry. The exhaustion doctrine\(^4\) and reverse engineering\(^5\) provisions of the SCPA reflect that concern, as do the innocent infringement provisions.\(^6\) The reverse engineering defense goes far beyond copyright's fair use defense and has no parallel in patent law. The innocent infringement defense is not paralleled in either copyright or patent law.

Another feature of the SCPA that illustrates its focus on economic interests is the unusual prominence given under the SCPA to those interests reflected in the unfair competition doctrine against the misappropriation of the quasi-property interest that is said to be created by an investment of toil and money in a design.\(^7\) Sections 902(b)\(^8\) and 906(a)\(^9\) of the SCPA reflect the application of this interest in the “investive step” to the mask work owner’s and the alleged infringer’s respective cases. That interest, although present, plays a far more subdued role in patent and copyright cases.

More generally, the entire contour of an infringement of mask work rights case reflects the economic setting of the technology involved. As compared with the subject matter of patents, mask works tend to have a substantially shorter economic life. This fact has lead to a ten-year term of protection under the SCPA,\(^10\) as contrasted with seventeen years for patents\(^11\) and approximately seventy-five years for copyrights.\(^12\) The

\(^{446}\) The exhaustion doctrine is codified in section 906(b) of the SCPA, 17 U.S.C. § 906(b) (Supp. II 1984). Section 906(b) is discussed supra notes 278-328 and accompanying text.

\(^{447}\) See 17 U.S.C. § 906(a) (Supp. II 1984). The reverse engineering provisions of the SCPA are discussed supra notes 199-261 and accompanying text.


\(^{450}\) 17 U.S.C. § 902(b) (Supp. II 1984) (providing that protection shall not be available under the SCPA for a mask work that is not “original”). The originality requirement of SCPA § 902(b) is discussed supra notes 144-174 and accompanying text.

\(^{451}\) 17 U.S.C. § 906(a) (Supp. II 1984) (reverse engineering). The originality requirement of SCPA § 906(a) is compared to the originality requirement of SCPA § 902(b) supra notes 237-248 and accompanying text.


\(^{454}\) See 17 U.S.C § 302 (1982).
same consideration led to postponement of the front end costs of the examination process for mask works until infringement litigation actually, if ever, results.455 Thus, issuance of a patent takes approximately three years and the expenditure of thousands of dollars,456 but the cost and complexity of patent infringement litigation is presumably lessened by the administrative screening that the patent received before issuance. In the case of infringement of mask work rights litigation, however, there has been no significant prior administrative screening and all major issues must be addressed for the first time in the district court. This different strategy reflects Congress’s decision that the interests to be served by the SCPA would be better advanced by faster and simpler establishment of praf ace mask work rights, even at the price of potentially more complex and expensive litigation. The elements of the plaintiff and defendant’s respective cases in an action for mask work infringement necessarily reflect that congressional decision.

In interpreting the requirements of the new statute in mask work infringement litigation, the courts may find some assistance in referring to patent and copyright infringement precedents. In many respects, however, the policies and interests at stake under the SCPA differ so significantly from those of the earlier bodies of intellectual property law that uncritical reliance on these precedents will lead to error. The courts will often be obliged, therefore, to define and give content to “a new body of law specifically applicable to semiconductor chip infringement,” by deciding which interpretation of the SCPA will be most consistent with the congressional purpose behind the Act.457

455. See supra note 20 and accompanying text.
456. The author’s personal estimate of corresponding data for mask works is at most a few months and a cost of several hundred dollars, assuming no need to seek judicial review for refusal to issue the registration, see 17 U.S.C. § 908(g) (Supp. II 1984) (authorizing mandamus action to compel registration).
457. See House Report, supra note 8, at 26, 1984 U.S. Code Cong. & Ad. News at 5775 (“While the Committee believes that the courts may usefully consider the copyright law precedents concerning substantial similarity, the Committee also intends that the courts should have sufficient flexibility to develop a new body of law specifically applicable to semiconductor chip infringement.”).