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Contents

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Notifications

WIPO Convention

I. Application to Aruba

The Government of the Netherlands has stated, in its note dated December 23, 1985, that the Convention Establishing the World Intellectual Property Organization (WIPO), signed at Stockholm on July 14, 1967, which had been made applicable to the Netherlands Antilles including the island of Aruba (see WIPO Notification No. 58 dated October 10, 1974*), applies as of January 1, 1986, as concerns the Kingdom of the Netherlands, to the Netherlands Antilles *and* Aruba.

WIPO Notification No. 136, of August 8, 1986.

II. Accession

LESOTHO

The Government of Lesotho deposited, on August 18, 1986, its instrument of accession to the WIPO Convention.

Lesotho will belong to Class C for the purpose of establishing its contribution towards the budget of the WIPO Conference.

The said Convention will enter into force, with respect to Lesotho, on November 18, 1986.

WIPO Notification No. 137, of August 18, 1986.

Paris Convention

Application to Aruba

The Government of the Netherlands has stated, in its note dated December 23, 1985, that the Paris Convention for the Protection of Industrial Property, which had been made applicable to the Netherlands Antilles including the island of Aruba (see Paris Notification No. 51 dated October 10, 1974**), applies as of January 1, 1986, as concerns the Kingdom of the Netherlands, to the Netherlands Antilles *and* Aruba.

Paris Notification No. 116, of August 8, 1986.

* *Industrial Property*, 1974, p. 403.

** *Ibid.*

Madrid Agreement (Marks)

Application of the Nice Act (1957) and the Stockholm Act (1967) to Aruba

The Government of the Netherlands has informed the Director General of WIPO, in its notification dated February 14, 1986, that the Nice Act of June 15, 1957 ("Nice Act (1957)"), and the Stockholm Act of July 14, 1967 ("Stockholm Act (1967)"), of the Madrid Agreement Concerning the International Registration of Marks of April 14, 1891, applies to Aruba.

Pursuant to the provisions of Article 11(7) of the Nice Act (1957), the said Act of the Madrid Agreement is applicable to Aruba as of September 8, 1986. In accordance with Article 14(7) of the Stockholm Act (1967), the said Act of the Madrid Agreement will be applicable to Aruba on November 8, 1986.

Madrid (Marks) Notification No. 37, of August 8, 1986.

Hague Agreement

I. Application of the Monaco Act (1961) to Aruba

The Government of the Netherlands has stated, in its note dated December 27, 1985, which was transmitted by the Federal Department of Foreign Affairs of Switzerland, that the Additional Act of Monaco of November 18, 1961 ("the Monaco Act (1961)") of the Hague Agreement Concerning the International Deposit of Industrial Designs, of November 6, 1925, which had been made applicable to the Netherlands Antilles, including the island of Aruba, applies, as of January 1, 1986, as concerns the Kingdom of the Netherlands, to the Netherlands Antilles *and* Aruba.

The Hague Notification No. 24, of August 8, 1986.

II. Application of the Stockholm Act (1967) to Aruba

The Government of the Netherlands has informed the Director General of WIPO, in its notification dated February 14, 1986, that the Complementary Act of Stockholm of July 14, 1967 ("Stockholm Act (1967)"), of the Hague Agreement applies to Aruba.

In accordance with the provisions of Article 9(2) of the Stockholm Act (1967), the said Act of the Hague Agreement will enter into force, with respect to Aruba, on November 8, 1986.

The Hague Notification No. 25, of August 8, 1986.

Nice Agreement

Application of the Geneva Act (1977) to Aruba

The Government of the Netherlands has informed the Director General of WIPO, in its notification dated February 14, 1986, that the Geneva Act of May 13, 1977 ("Geneva Act (1977)"), of the Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks, of June 15, 1957, applies to Aruba.

In accordance with Article 13 of the Geneva Act (1977) of the Nice Agreement, the said Act will be applicable to Aruba on November 8, 1986.

Nice Notification No. 64, of August 8, 1986.

Locarno Agreement

Application to Aruba

The Government of the Netherlands has informed the Director General of WIPO, in a notification dated August 4, 1986, that the Locarno Agreement Establishing an International Classification for Industrial Designs, signed at Locarno on October 8, 1968, applies to Aruba.

Pursuant to the provisions of Article 13, the said Agreement will enter into force, with respect to Aruba, on November 8, 1986.

Locarno Notification No. 21, of August 8, 1986.

Patent Cooperation Treaty (PCT)

Application to Aruba

The Government of the Netherlands has stated, in its note dated December 23, 1985, that the Patent Cooperation Treaty, which had been made applicable to the Netherlands Antilles including the island of Aruba (see PCT Notification No. 26 dated April 19, 1979***), applies as of January 1, 1986, as concerns the Kingdom of the Netherlands, to the Netherlands Antilles *and* Aruba.

PCT Notification No. 48, of August 8, 1986.

Strasbourg Agreement

Application to Aruba

The Government of the Netherlands has informed the Director General of WIPO, in its note dated December 23, 1985, that the Strasbourg Agreement Concerning the International Patent Classification which had been made applicable to the Netherlands Antilles including the island of Aruba (see Strasbourg Notification No. 14 dated September 17, 1974****), applies as of January 1, 1986, as concerns the Kingdom of the Netherlands, to the Netherlands Antilles *and* Aruba.

Strasbourg Notification No. 34, of August 8, 1986.

*** *Ibid.*, 1979, p. 123.

**** *Ibid.*, 1974, p. 404.

Plant Varieties

International Convention for the Protection of New Varieties of Plants

Application to Aruba

The Government of the Netherlands has informed the Secretary-General of the International Union for the Protection of New Varieties of Plants (UPOV), in its notification dated February 14, 1986, that the International Convention for the Protection of New Varieties of Plants of December 2, 1961, as revised at Geneva on November 10, 1972, and on October 23, 1978, applies to Aruba.

Pursuant to the provisions of Article 36(3)*(a)*, the said International Convention as revised in 1978 will be applicable to Aruba on November 8, 1986.

UPOV Notification No. 34, of August 8, 1986.

WIPO Meetings

WIPO Permanent Committee on Patent Information (PCPI)

I. Working Group on General Information

Ninth Session
(Geneva, April 14 to 18, 1986)

NOTE*

The Working Group on General Information (hereinafter referred to as "the Working Group") held its ninth session in Geneva from April 14 to 18, 1986.[1]

The following 18 members of the Working Group were represented at the session: Austria, Canada, Czechoslovakia, Denmark, Finland, France, German Democratic Republic, Germany (Federal Republic of), Japan, Netherlands, Norway, Soviet Union, Spain, Sweden, Switzerland, United Kingdom, United States of America, European Patent Office (EPO). The Commission of the European Communities (CEC), the International Patent Documentation Center (INPADOC) and the Patent Documentation Group (PDG) were represented by observers. The list of participants follows this Note.

The Working Group agreed upon the final draft of the revised Appendix II to WIPO Standard ST.16 (Code for Different Kinds of Patent Documents), which Appendix gives detailed information for each kind of patent document published by 40 patent offices. The Working Group also discussed what would be an appropriate code for patent documents that essentially contain only translations of the whole or part of patent documents already published under regional or international arrangements. It could, however, not come to a solution. The International Bureau was requested to prepare a discussion paper on the question and to circulate it to the members for comment.

The Working Group finalized a draft recommendation on the structuring of name indexes of patent documents.

The Working Group approved a draft recommendation concerning the form in which priority documents may be filed with patent offices, as well as the question of certifying the authenticity of such documents if filed on microfiche. The International Bureau will invite the patent offices of member States to state clearly their willingness to issue and to receive priority documents in microform.

The Working Group adopted a draft recommendation concerning coded character sets to be used in the exchange of machine-readable patent data and another draft recommendation concerning the filing of patent applications in optical character recognition (OCR) format.

The Working Group adopted draft amendments to WIPO Standard ST.3, now entitled "Recommended Standard Two-Letter Code for the Representation of Countries, and of Other Entities and International Organizations Issuing or Registering Industrial Property Titles."

LIST OF PARTICIPANTS**

I. Member States

Austria: H. Erber. **Canada:** C. McDermott. **Czechoslovakia:** M. Kopča; M. Fořtová. **Denmark:** I.-L. Frisenberg. **Finland:** R. Laukkarinen. **France:** M. Verderosa. **German Democratic Republic:** H. Konrad; K.P. Willig. **Germany (Federal Republic of):** E. Derday; H. Rothe. **Japan:** Y. Masuda. **Netherlands:** D. Dogger. **Norway:** P.E. Lillejordet. **Soviet Union:** B.S. Rozov. **Spain:** A. Gómez García. **Sweden:** L. Stolt. **Switzerland:** K. Grünig; K. Aeschlimann. **United Kingdom:** T. Saul. **United States of America:** J.R. Goudeau.

II. Member Organization

European Patent Office (EPO): C.J. Jonckheere.

III. Observer Organizations

Commission of the European Communities (CEC): H. Bank. **International Patent Documentation Center (INPADOC):** G. Quarda. **Patent Documentation Group (PDG):** P. Ochsenbein; S. Hahnemann.

IV. Officers

Chairman: T. Saul (United Kingdom). *Vice-Chairmen:* E. Derday (Federal Republic of Germany); B. Rozov (Soviet Union). *Secretary:* P. Higham (WIPO).

V. International Bureau of WIPO

L.E. Kostikov *(Deputy Director General)*; P. Higham *(Head, Patent Information Section, Patent Information and Classification Division)*; G. Negouliaev *(Senior Patent Information Officer, Patent Information Section)*; V. Tyč *(Assistant Patent Information Officer, Patent Information Section)*.

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* Prepared by the International Bureau.

[1] For a Note on the preceding session, see *Industrial Property*, 1985, p. 352.

** A list containing the titles and functions of the participants may be obtained from the International Bureau.

II. Working Group on Patent Information for Developing Countries

Seventh Session
(Geneva, June 4 to 6, 1986)

NOTE*

The Working Group on Patent Information for Developing Countries (hereinafter referred to as "the Working Group") of the WIPO Permanent Committee on Patent Information (PCPI) held its seventh session in Geneva from June 4 to 6, 1986.[1]

The following 19 members of the Working Group were represented at the session: Brazil, Canada, China, Cuba, Egypt, Finland, France, German Democratic Republic, Germany (Federal Republic of), Ghana, Japan, Philippines, Soviet Union, Spain, Sweden, Switzerland, United Kingdom, United States of America, and the European Patent Office (EPO). The International Federation for Documentation (FID) and the International Patent Documentation Center (INPADOC) were represented by observers. The list of participants follows this Note.

The Working Group discussed the present situation under the WIPO Program of Free-of-Charge Patent Information Services, and noted with approval that the contributions to this Program had been further broadened, enabling the International Bureau to satisfy the increasing demand from the side of users in developing countries.

The Working Group also noted analytical surveys prepared by the International Bureau on the replies received to the various questions put forward in the evaluation questionnaires distributed together with the search reports, and agreed that the routine distribution of the evaluation questionnaires presently in use should be discontinued. The International Bureau was requested to prepare a simplified evaluation sheet, a modified form for the submission of search requests, and a specific evaluation form. It was suggested that the specific evaluation form should be sent only when the search request indicated as purpose "to assist in overcoming difficulties in certain steps of a technology already implemented," or "to form a basis for developing research and development activities by identifying the solutions already known to a technological problem."

The Working Group revised the "Guidelines for the Organization of a Patent Information and Documentation Center, with Particular Regard to the Needs of and Conditions in Developing Countries" and asked the International Bureau to finalize the text.

The Working Group discussed the second draft of the "Glossary of Terms and Expressions Used in Patent Information and Documentation" and requested the International Bureau to invite further comments on the said draft and to prepare a draft on the basis of any comments received. The Working Group also requested the International Bureau to take the necessary steps to publish the Glossary also in French and Spanish.

The Working Group noted with approval the revised model curricula on "Training Courses on Patent Information (in general)" and on "Training Courses on International Patent Classification" prepared by the International Bureau.

The Working Group recommended that the task of updating the "List of Periodicals Obtainable Free of Charge or on Very Favorable Conditions by Developing Countries" be included in the PCPI Program for the 1986/1987 biennium.

LIST OF PARTICIPANTS**

I. Member States

Brazil: C. Rosemberg Treiguer. **Canada:** J.H.A. Gariépy. **China:** Xiao-Min Xu. **Cuba:** M. Jiménez Aday; A. Santos Rivera. **Egypt:** M. Hilal; W.Z. Kamil. **Finland:** J. Rainesalo. **France:** A. de Pastors. **German Democratic Republic:** K.P. Wittig. **Germany (Federal Republic of):** M. Voegtel. **Ghana:** A.M. Abdullah. **Japan:** Y. Masuda. **Philippines:** L.M. Duka. **Soviet Union:** L. Bandourina. **Spain:** D. Alcaraz Ruano. **Sweden:** K. Bergström. **Switzerland:** E. Caussignac. **United Kingdom:** G.K. Lindsey. **United States of America:** W.S. Lawson; T. Lomont.

II. Member Organization

European Patent Office (EPO): A.G. Wells.

III. Observer Organizations

International Federation for Documentation (FID): F.J. Leloux. International Patent Documentation Center (INPADOC): G. Quarda.

IV. Officers

Chairman: L.M. Duka (Philippines). *Vice-Chairmen:* J.H.A. Gariépy (Canada); L. Bandourina (Soviet Union). *Secretary:* R. Blumstengel (WIPO).

V. International Bureau of WIPO

L.E. Kostikov *(Deputy Director General)*; R. Blumstengel *(Head, Developing Countries Section (Patent Information))*; R. Andary *(Senior Program Officer, Developing Countries Section (Patent Information))*; N. Yoshikuni *(Program Officer, Developing Countries Section (Patent Information))*.

* Prepared by the International Bureau.

[1] For a note on the sixth session, see *Industrial Property*, 1985, p. 322.

** A list containing the titles and functions of the participants may be obtained from the International Bureau.

III. Working Group on Planning

Seventeenth Session
(Geneva, June 9 to 13, 1986)

NOTE*

The Working Group on Planning (hereinafter referred to as "the Planning Group") held its seventeenth session in Geneva from June 9 to 13, 1986.[1]

The following 15 members of the Planning Group were represented at the session: Australia, Austria, Brazil, Canada, Finland, France, Germany (Federal Republic of), Japan, Soviet Union, Spain, Sweden, Switzerland, United Kingdom, United States of America and the European Patent Office (EPO). The list of participants follows this note.

In respect of new requests and proposals for adding to the PCPI Program for the 1986-1987 biennium, the Planning Group noted a proposal submitted by the Hungarian Office, relating to the addition of periodicals concerning the rapidly expanding technical subject of biotechnology to the list of "minimum documentation" periodicals established under PCT Rule 34.1*(b)*(iii), and a study prepared by the African Regional Industrial Property Organization (ARIPO) concerning the availability of translations of international applications under the PCT, and agreed to request the International Bureau to put both matters before the PCT/CTC for consideration at its forthcoming ninth session. The Planning Group noted a request submitted by the United Kingdom Patent Office relating to the use of check digits with application and serial numbers and decided to recommend to the Permanent Committee that the task be added to the said Program.

In respect of newly received requests for revision of the IPC, the Planning Group noted, and agreed in general with, the conclusions reached, and recommendations made, by the IPC Committee of Experts in respect of the number of IPC revision projects selected each year and the process of selection, noting in particular that appointing the originator of a revision project as rapporteur for that project would lessen the burden of work in some offices. The Planning Group agreed to recommend to the Permanent Committee that any interested office should be given the opportunity to act as rapporteur for any project it had not originated. The Planning Group noted a letter submitted by the Japanese Patent Office which made proposals for modifying the criteria for selecting IPC revision requests for inclusion in the revision program and agreed that the question of selection of IPC revision projects should receive urgent attention.

The Planning Group discussed a draft questionnaire, prepared by the Australian Patent Office, relating to the use of patent statistics for technological assessment and forecasting, requested the International Bureau, in consultation with the Australian Patent Office, to revise and restructure the said questionnaire to take into account the comments received, and then to issue the said questionnaire.

The Planning Group noted a statement by the International Bureau concerning the preparation of inventories of English-language abstracts of Japanese and Soviet patent documents, heard several members of the Planning Group reaffirm the strong interest of their offices in receiving copies of the said inventories, and requested the International Bureau to issue a circular letter inviting offices to express their firm intention to purchase copies of the said inventories.

LIST OF PARTICIPANTS**

I. Members

Australia: H. Preston. **Austria:** F. Sohs. **Brazil:** C.R. Teiguer. **Canada:** G. Guzzo. **Finland:** J. Rainesalo. **France:** A. de Pastors. **Germany (Federal Republic of):** M. Voegtel; H.J. Fruehauf. **Japan:** Y. Masuda. **Soviet Union:** V. Kukolev; A. Korchagin. **Spain:** A. Gómez Garcia. **Sweden:** L.G. Björklund; K. Bergström. **Switzerland:** E. Caussignac. **United Kingdom:** G.K. Lindsey. **United States of America:** W.S. Lawson; T.F. Lomont.

II. Member Organization

European Patent Office (EPO): A. Vandecasteele; C. Jonckheere.

III. Officers

Chairman: H. Preston (Australia). *Vice-Chairmen:* G. Lindsey (United Kingdom); V. Kukolev (Soviet Union). *Secretary:* P. Higham (WIPO).

IV. International Bureau of WIPO

L.E. Koslikov *(Deputy Director General)*; B. Hansson *(Head, Patent Classification Section, Patent Information and Classification Division)*; P. Higham *(Head, Patent Information Section, Patent Information and Classification Division)*; G. Negouliaev *(Senior Patent Information Officer, Patent Information Section)*; V. Týč *(Assistant Patent Information Officer, Patent Information Section)*.

* Prepared by the International Bureau.

[1] For a Note on the sixteenth session, see *Industrial Property*, 1986, p. 30.

** A list containing the titles and functions of the participants may be obtained from the International Bureau.

IV. Working Group on Special Questions

Ninth Session
(Geneva, June 9 to 13, 1986)

NOTE*

The Working Group on Special Questions (hereinafter referred to as "the Working Group") held its ninth session in Geneva from June 9 to 13, 1986.[1]

The following 15 members of the Working Group were represented at the session: Australia, Austria, Brazil, Canada, Finland, France, Germany (Federal Republic of), Japan, Soviet Union, Spain, Sweden, Switzerland, United Kingdom, United States of America, and the European Patent Office (EPO). The International Federation for Documentation (FID) was represented by an observer. The list of participants follows this Note.

In respect of its study of the consistency in the application of the International Patent Classification (IPC), the Working Group agreed that time was not yet ripe for carrying out a study on the consistency in the application of the fourth edition of the IPC, since a sufficient number of documents had not yet been classified according to that edition, and expressed the view that, when adopting the program for the 1988-1989 biennium, the PCPI may wish to consider whether a further consistency study should be carried out, based on patent documents classified according to the fourth edition of the IPC and to be evaluated in the same way as the studies already completed.

The Working Group finalized the redraft of the text of the "Guidelines for the Organization of Search Files Based on the IPC" by agreeing upon wording which gives guidance for reducing the bulkiness of search files.

The Working Group, in its task of monitoring the use of microforms and other mass storage media for patent documents by offices, agreed that the task should be continued. Some conclusions could already be drawn from the information available which seemed to indicate that the use of microforms themselves was well established for the mass storage of patent documents but that the use of optical storage, e.g., video discs, CD ROMs, and of magnetic storage, was still regarded by offices as experimental.

The Working Group noted the progress made in updating the inventory of computerized search systems consisting exclusively, or almost exclusively, of references to patent documents. The Working Group agreed that the said inventory should be maintained as up to date as possible and welcomed a statement by the International Bureau that further information received before the end of August 1986 would be included in the final inventory containing details of 36 such systems to be published in the 1986 series of updating pages of the *WIPO Handbook on Patent Information and Documentation.*

The Working Group noted the numerous comments that had been received concerning experiences gained in the use of computerized systems useful for the purposes of search and examination. Some members of the Working Group expressed a reservation to this effect that it was still too early to come to any conclusion concerning an evaluation of the effectiveness of computerized search systems, but noted certain problems that had been encountered in the use already made of the systems.

The Working Group discussed the detailed proposal for an advanced IPC seminar to be held in October 1987, prepared by the International Bureau, and agreed on the time schedule for the preparation of the seminar, its title, structure and content.

Finally, the Working Group noted the draft of the handbook on telex interrogation of on-line patent data bases prepared by the International Bureau. It discussed certain difficulties that had arisen, in particular, the difficulties that occur when using telex machines that generate "carriage return" and/or "line feed" characters automatically. It agreed that a revised draft of the said handbook, to include as many examples as possible, should be prepared in good time before its next session.

LIST OF PARTICIPANTS**

I. Members

Australia: H. Preston. **Austria:** F. Sohs. **Brazil:** C.R. Treiguer. **Canada:** G. Guzzo. **Finland:** J. Rainesalo. **France:** A. de Pastors. **Germany (Federal Republic of):** M. Voegtel; H.J. Fruehauf. **Japan:** Y. Masuda. **Soviet Union:** V. Kukolev; A. Korchagin. **Spain:** A. Gómez García. **Sweden:** L.G. Björklund; K. Bergström. **Switzerland:** E. Caussignac. **United Kingdom:** G.K. Lindsey. **United States of America:** W.S. Lawson; T.F. Lomont.

II. Member Organization

European Patent Office (EPO): A. Vandecasteele; C. Jonckheere.

III. Observer Organization

International Federation for Documentation (FID): F. Schweikhardt.

* Prepared by the International Bureau.

[1] For a Note on the eighth session, see *Industrial Property*, 1986, p. 31.

** A list containing the titles and functions of the participants may be obtained from the International Bureau.

IV. Officers

Chairman: H. Preston (Australia). *Vice-Chairmen:* G. Lindsey (United Kingdom); V. Kukolev (Soviet Union). *Secretary:* P. Higham (WIPO).

V. International Bureau of WIPO

L.E. Kostikov *(Deputy Director General);* B. Hansson *(Head, Patent Classification Section, Patent Information and Classification Division);* P. Higham *(Head, Patent Information Section, Patent Information and Classification Division);* G. Negouliaev *(Senior Patent Information Officer, Patent Information Section);* V. Tŷč *(Assistant Patent Information Officer, Patent Information Section).*

General Studies

Protection of the Circuit Layout of Semiconductor Integrated Circuits in Japan

Z. KITAGAWA*

1. Introduction

1.1. *The Need for Protection of Layouts of Integrated Circuits*

Although it is merely a quarter of a century since the first integrated circuit was invented in the United States, the rapid development of microelectronic technology has enabled integrated circuits to become the "crude oil" of industry today. The production of integrated circuits has been increasing dramatically as a result of their introduction into various fields of industry. In 1978, worldwide production of integrated circuits was valued at 5.1 billion dollars, while in 1984 it was approximately 20 billion dollars. Thus the size of the industry has quadrupled in only six years.

It is now generally accepted that it is necessary to prevent the imitation of layouts of integrated circuits and establish basic rules, domestic as well as international, for transactions involving such layouts in order to secure their adequate protection and development. The creation of the layout of an integrated circuit is, as is well known, a time and cost-consuming process which can, however, be easily and quickly copied at a minimum of cost. Such misappropriation of an original layout, if it remains unregulated, causes serious damage to the original developer of the layout, and allowing such copying stands in the way of promoting the sound development of the integrated circuit industry and technology resulting therefrom.

1.2. *New Legislation in the United States and Japan*

The United States was the first country to enact a law for the purpose of protecting the original developer of the layout of an integrated circuit, reflecting concern based on the large share of worldwide production it held. The U.S. Congress passed the "Semiconductor Chip Protection Act of 1984" (hereinafter referred to as "the U.S. Act") in October 1984 and it was enacted into law on November 8 of the same year.[1]

In Japan, a subcommittee of the Industrial Structure Council[2] was organized in October 1984 in order to discuss how to protect the circuit layout of a semiconductor chip under Japanese law and, after several intensive meetings, published a report in January 1985 recommending that the Ministry of International Trade and Industry prepare a *sui generis* bill similar to the U.S. Act.[3] The Ministry immediately began the preparation of a bill named the "Act Concerning the Circuit Layout of a Semiconductor Integrated Circuit" (hereinafter referred to as "the Act").[4] The Cabinet approved the Bill in March and it passed the Diet on May 24, 1985. Promulgated on May 31, 1985, it came into effect on January 1, 1986. Thereafter, the Cabinet Order Concerning the Registration of Circuit Layout Rights, etc. (Cab. Order No. 326, 1985) and the Ministerial Ordinance Concerning the Registration of Circuit Layout Rights, etc. (Min. Ordinance No. 81, 1985) were issued. These mainly set forth precedural regulations concerning the registration of a circuit layout right and related rights.

2. Outline of the Japanese Act

The contents of the Act are basically similar to the U.S. Act, with three major differences: (1) protection is extended to all persons, regardless of nationality, whereas the U.S. law is based on the principle of "reciprocity"; (2) protection begins on the date of registration under the provisions of the Act, rather than on the date of first commercial exploitation; (3) infringement can result in criminal punishment.

* Director, Kyoto Comparative Law Center, University of Kyoto.

[1] For the text of the United States of America Semiconductor Chip Protection Act of 1984, see *Industrial Property Laws and Treaties*, UNITED STATES OF AMERICA — Text 1-001. The Act is composed of 14 Sections, which are set out as follows: 901: Definitions; 902: Subject Matter of Protection; 903: Ownership and Transfer; 904: Duration of Protection; 905: Exclusive Rights in Mask Works; 906: Limitation on Exclusive Rights: reverse engineering, first sale; 907: Limitation on Exclusive Rights: innocent infringement; 908: Registration of Claims of Protection; 909: Mask Work Notice; 910: Enforcement of Exclusive Rights; 911: Civil Actions; 912: Relation to Other Laws; 913: Transitional Provisions; 914: International Transitional Provisions.

[2] *Sangyo Kozo Shingikai*: the advisory council to the Ministry of International Trade and Industry.

[3] Report of the Subcommittee on Legal Problems Concerning Semiconductor Chips, "Aiming for the Healthy Development of the Semiconductor Integrated Circuit Industry."

[4] *Handotai Shuseki-Kairo No Kairo-Haichi Ni Kansuru Horitsu*. For the English text of the Act, see *Industrial Property Laws and Treaties*, JAPAN — Text 1-001.

Before entering into a detailed discussion of the Japanese Act, I will briefly point out some of its basic features.

The subject matter of protection is the *circuit layout*[5] of a semiconductor integrated circuit (the circuitry elements and lead wires connecting these elements), an equivalent term for "mask work" as used in the U.S. Act. Creators of original circuit layouts acquire, by registration, *exclusive rights,* called circuit layout rights.[6] Exclusivity covers manufacturing, transferring, leasing, exhibition and importation of any product incorporating the original layout.[7] The holder of the right can demand an injunction and compensatory damages for any infringement,[8] and infringements are also punishable by imprisonment or fine.[9] However, such rights are not, as is the case with patent rights, absolute. An independent creator (not an imitator) of an identical layout will also be granted full rights.[10] Furthermore, there are provisions concerning the doctrine of first sale,[11] reverse engineering[12] and innocent infringement,[13] similar to those under the U.S. Act.

The duration of protection is 10 years from the date of the layout's registration.[14] To protect the proprietor between the dates of commercial exploitation and registration, the Act requires those who copy the layout of another during such period to pay compensation equal to a reasonable royalty, even though such copying is not an infringement in the strictest sense.[15]

An application for registration must be made within two years of the first commercial exploitation of the circuit layout.[16] Unlike under the Patent Act, there is only a minimal examination process.[17] Since the Act does not provide for discretion on the part of examiners, it allows the Minister of International Trade and Industry (MITI) to designate a non-profit juridical person to perform registration.[18] The neutrality and impartiality of the designated registration organ is guaranteed by strict provisions in the Act.[19]

[5] *Kairo-haichi*: the Act, Section 2.1 and 2. See 4.1.1, below.

[6] *Kairo-haichi-riyo-ken*: the Act, Sections 10 and 11. See 4.1.2, below.

[7] The Act, Section 2.3.

[8] The Act, Sections 22 and 25. See 4.7.2, below.

[9] The Act, Sections 51 to 56.

[10] The Act, Section 12.1. See 4.2, below.

[11] The Act, Section 12.3. See 4.6.2, below.

[12] The Act, Section 12.2. See 4.6.2, below.

[13] The Act, Section 24. See 4.6.3, below.

[14] The Act, Section 10.2.

[15] The Act, Section 27. See 4.3.2, below.

[16] The Act, Section 6.

[17] The Act, Section 3.2. For the text of the Patent Act, see *Industrial Property Laws and Treaties*, JAPAN — Text 2-001.

[18] The Act, Section 28. The Industrial Property Cooperation Center (Kogyo Shoyuken Kyoryoku Center: IPCC) was designated as such juridical person. See below 4.5.2.

[19] The Act, Sections 29 to 46.

3. A *Sui Generis* Approach in Japan

3.1. *Copyright Approach Fails*

Soon after MITI's subcommittee started considering possible legislative means to protect the layout of semiconductor chips, the Cultural Affairs Agency *(Bunka-cho)*, which is the authority responsible for matters relating to the Copyright Act, also initiated a study committee under its Copyright Council. While the MITI subcommittee tended to follow the U.S. approach, the Copyright Council study committee tried to determine whether the existing Copyright Act could be extended to protect this new product of technology. The MITI subcommittee, however, took the position that this new type of product could adequately be protected only by way of creating a new right, although it did not deny the theoretical possibility of copyright protection. The study committee was, actually, somewhat inclined to favor copyright protection.

The parallel study going on at these two different and competing government agencies continued until the beginning of February 1985, ending up in the following manner: it was decided that MITI would prepare legislation concerning semiconductor chip protection, while the Cultural Affairs Agency would prepare computer program protection legislation, the latter also having been the subject of harsh debate between the two authorities over the preceding two years.[20]

3.2. Sui Generis *Approach Adopted*

The Japanese Act was ultimately enacted because of underlying considerations regarding inadequacies in the existing intellectual property legislation when dealing with the proper extent of protection that should be afforded the layout of an integrated circuit. The following is a brief summary of such considerations.[21]

3.2.1. *The Patent Act*[22]

The layout of a semiconductor integrated circuit is developed by designing a logic circuit and a transistor circuit. This enables circuitry functions to be fixed within a compact space. The process of developing a semiconductor integrated circuit involves overcoming and eliminating certain physical conditions and restrictions. A layout may, therefore, fall within the definition of invention, found in the Patent Act as a creation of technological ideas or concepts utilizing the laws of nature.[23]

[20] As to this debate, see, for example, Z. Kitagawa, "Legal Protection of Computer Software—Current Thinking in Japan," Proceedings of the International Seminar on Legal Protection of Computer Software, European Computing Services Association, 1984, pp. 42-51, and Z. Kitagawa, *"Allgemeiner Urheberschutz oder Sonderschutz für Computerprogramme in Japan? Ein Zwischenbericht,"* GRUR Int., 1985, pp. 173-6.

In order to extend its protection to computer programs, the Copyright Act was amended in 1985 (Law No. 62, 1985).

[21] This summary is based on the MITI Subcommittee Report but has been slightly modified by the author.

[22] *Tokkyo Ho* (Law No. 121, 1959).

[23] Patent Act, Section 2.

However, a patent may be granted in respect of a portion of the characteristics of a layout, but seldom of its entirety. The reason therefor is that since the development of a layout is largely based on empirical rules, the resulting layout rarely satisfies the requirements of "novelty" and "inventive step" which are provided for in Section 29 of the Patent Act.

3.2.2. *The Design Act*[24]

A design is defined under Section 2 of the Design Act as a "shape, pattern or color or a combination of these ... which produces an aesthetic impression on the sense of sight." However, the pattern of a layout is hard to perceive with the naked eye and, furthermore, is not intended to produce an aesthetic impression. Thus, it does not fall within this definition.

3.2.3. *The Unfair Competition Prevention Act*[25]

The Unfair Competition Prevention Act prohibits acts which lead to the confusion of one's business with that of a competitor or a confusion of products with those of a competitor, as enumerated in Article 10*bis*(3) of the Paris Convention for the Protection of Industrial Property. The only provision which might be applicable as a prohibition against imitating the layout of a semiconductor integrated circuit is Section 1, paragraph 1, item 1, which prohibits acts leading to the confusion of a product with that of another, by "using an identification identical or similar to the name, trade name,... or any other representation of a product of another as widely known in the territory."

However, the layout of a semiconductor integrated circuit is usually incorporated in machinery or in a device or kept in a package and not visible at the time of purchase. Therefore, a layout hardly falls within the requirements of being "widely known" and leading to "confusion of a product with that of another."

3.2.4. *The Copyright Act*[26]

The most significant issue here concerns the copyrightability of a layout. As already mentioned above, protection under copyright concepts was not the approach adopted in Japan. An inquiry into the reasons therefor deserves further attention.

(a) The development of the layout of a semiconductor integrated circuit can be divided into the design process, which includes the designing of the logic circuit, the transistor circuit and the layout, and the manufacturing process, in which masks are usually, though not always, produced and electronic circuits are imprinted on wafers by using the masks.

Various design-plans resulting from the design process involved in the making of a semiconductor integrated circuit may in many cases be interpreted as "figurative works of a scientific nature" as provided for in Section 10, paragraph 1, item 6, of the Copyright Act.

The nature of a mask is not always clear. Some contend that it is a reproduction of the original design-plan. However, others contend that because a mask is an article used for the development of a layout and is similar in nature to patterns used in making suits and dresses or molds used in producing castings, it is also possible to say that it is not a work or a reproduction of a work as meant in the Copyright Act.

According to the view that a mask is a reproduction of the original, copyrightable design-plan, as a matter of logic, it is possible to infer that the layout of a semiconductor integrated circuit is, in turn, a reproduction of the mask, and is therefore protectable under the Copyright Act. However, in developing the layout of a semiconductor integrated circuit, usually eight to 12 masks are used, and through the utilization of processing techniques such as oxidization, diffusion and etching, transistor elements connected by wires are produced on the wafers. Highly advanced technology and know-how, such as light exposure techniques using electron beams and ion beams, etching techniques using plasma ion beams, and coating production techniques using various kinds of furnaces and CVD (chemical vapor deposition) devices, is required. Therefore, it would seem to be a considerable leap in logic, legally speaking, to conclude that the layout of a semiconductor integrated circuit is a reproduction of the original design-plan or mask.

Furthermore, the layout of a semiconductor integrated circuit is an essential and inseparable component of the semiconductor integrated circuit, which is a useful article. Its purpose is to have the circuit efficiently perform specific functions, such as the storage of information or calculations. Therefore, it is not appropriate for the Copyright Act to extend its protection to such a useful article or its essential components.[27]

(b) If it were decided that the layout should be protected under the Copyright Act, the following issues might arise:

[24] *Isho Ho* (Law No. 125, 1959).

[25] *Fusei-Kyoso Boshi Ho* (Law No. 14, 1934).

[26] *Chosakuken Ho* (Law No. 48, 1970).

[27] In Japan this became a very delicate point in determining the legislative policy concerning protection of the layout of a semiconductor integrated circuit because the Copyright Act of Japan does not exclude useful articles *per se* from its protection. In this regard, it is different from the U.S. Act under which useful articles *per se* are usually not held to be copyrightable, see D. Schrader, "Statement Before the Subcommittee on Courts, Civil Liberties, and the Administration of Justice of the Committee on the Judiciary," House of Representatives, Hearings on H.R. 1028, Copyright Protection for Semiconductor Chips (August 3 and December 1, 1983), Serial No. 34(1984), p. 85. Furthermore, the copyright law in Japan does not make any particular distinction between normally copyrightable works and technical drawings as seems to be the case in the German Bundesgerichtshof (BGH. Urt. v. 29.3.1984, GRUR 1984, Heft 9, p. 659). The German law spells out a different and higher standard of creativity for technical drawings. The general extention of copyright protection to useful articles is acknowledged in the United Kingdom (see, for example, *British Leyland Motor Corporation v. Armstrong Patents Co. Ltd.*, Court of Appeal [1984] 3 CMLR 102). In Japan, however, it is not clear to what extent copyright protection is afforded to useful articles.

First, a copyrightable work must be of a literary, scientific, artistic or musical nature. Since the significance of the layout of a semiconductor integrated circuit is its function and value through use, it is not thought of as being a literary, scientific, artistic, or musical work.

Second, if the protection of the Copyright Act is extended to useful articles, it is feared that the scope of protection of the Copyright Act will become too broad and cover even the manufacture and distribution of other industrial products.

Third, since the Copyright Act is based upon the Universal Copyright Convention and the Berne Convention, it cannot establish provisions which contradict the provisions of those treaties. For example, if the Copyright Act established a provision that protected the holder's rights for 10 years, as does the U.S. Act, a contravention of those treaties would result.

4. Act Concerning the Circuit Layout of a Semiconductor Integrated Circuit (Law No. 43, 1985)

4.1. *Defintions and Subject Matter of Protection*

4.1.1. *Definitions*

Several basic terms are defined in Chapter 1 (General Provisions) of the Act: they are "semiconductor integrated circuit,"[28] "circuit layout,"[29] and "using."[30] The definition of a semiconductor integrated circuit is rather simple and unlike the U.S. Act (Section 901(a)(1)), avoids including therein the manufacturing process as a part of its definition. The term "circuit layout," which is the subject matter of a circuit layout right and is the focal point of the new right created by the Act, corresponds to the U.S. concept of mask work. The term "using" refers to two matters. The first one is the manufacture of semiconductor integrated circuits, and the second is the transfer, lease, exhibition, or importation of semiconductor integrated circuits and of goods incorporating such integrated circuits. Consequently, the manufacturer of goods incorporating a semiconductor integrated circuit who utilizes a circuit layout created by another does not engage in conduct which constitutes "using" under the Act.[31]

4.1.2. *Circuit Layout Right*

The creator of a circuit layout may upon application obtain a "registration for establishment"[32] of a circuit layout right. Such circuit layout right comes into existence upon obtaining the registration for establishment.[33] The holder of such a right has the sole right to use, for business purposes, the circuit layout for which a registration for establishment is obtained.[34]

4.2. *Originality and Identity*

Originality is required for a circuit layout to be protected under the Act.[35] Similar to the protection afforded copyrightable works, however, the scope of a circuit layout right does not extend to the use of a circuit layout created by another person.[36] That is, an independent creation of a circuit layout which is identical or similar to an already registered circuit layout is protected under the Act. If a circuit layout is not independently created, there arises a series of questions which can often be solved only through an interdisciplinary approach involving an understanding of both the relevant technology and law. Differing from simple piracy, the identity of two or several similar circuit layouts is difficult to analyze in cases where, for example, the same function is performed by entirely different electronic circuitry. In this regard, questions involving reverse engineering, which will be discussed later (see 4.6.2(A), below), are most critical.

4.3. *Use of Circuit Layouts*

4.3.1. *Use of a Registered Circuit Layout*

A circuit layout right is created upon a registration for establishment (see 4.1.2, above, and also 4.5, below). Registration results in the holder obtaining a right to the sole use, for business purposes, of the circuit layout concerned. The Act, furthermore, spells out two kinds of rights to use a circuit layout: a sole use right and an ordinary use right.[37] A sole use grantee has the exclusive right to use the circuit layout for business purposes

[28] The Act, Section 2.1: "a product having transistors or other circuitry elements which are inseparably forged on a semiconductor material or an insulating material or inside the semiconductor material, and designed to perform an electronic circuitry function."

[29] The Act, Section 2.2: "a layout of circuitry elements and lead wires connecting such elements in a semiconductor integrated circuit."

[30] The Act, Section 2, paragraph 3(1) the manufacture of semiconductor integrated circuits by utilizing the circuit layout; (2) the transfer, lease, exhibition for the purpose of transferring or leasing, or the import of semiconductor integrated circuits manufactured by utilizing the circuit layout (including goods incorporating such semiconductor integrated circuits)."

[31] This means that such "use" of a semiconductor integrated circuit is not an infringement of an already registered circuit layout right. If, however, goods thus manufactured are subsequently transferred, leased, or imported (see the Act, Section 2, paragraph 3) to a third person, those actions do, of course, constitute a violation of such circuit layout right.

[32] *Settei-toroku*: the Act, Section 3.1.

[33] The Act, Section 10.1.

[34] The Act, Section 11.

[35] This requirement is not expressly provided for in the Act. However, it may be inferred from the provisions concerning the creator of a circuit layout who may obtain a registration for establishment of a circuit layout right (Section 3.1) and the provisions concerning the protection of an independently created circuit layout (Section 12.1).

[36] See 4.1.2, above, and also, as to the scope of "use" under the Act, 4.1.1.

[37] Sole use right *(sen'yo riyo-ken)* and ordinary use right *(tsujo riyo-ken)*.

within the scope stipulated in the granting act.[38] An ordinary use grantee has the right to use the circuit layout in the same manner but does not exclusively enjoy such right.[39] Both types of use rights may be granted by the holder of a circuit layout right to a third party.[40] It is important to note that the holder of a circuit layout right may not use the circuit layout concerned to the extent that he has granted to another a sole use right based on his original, exclusive layout right.[41] In this sense, the Japanese concept of sole use right resembles the exclusive license concept contained in the U.S. Act,[42] but both are not of exactly identical content. Of particular significance as to the differences between those two concepts is the fact that the Japanese sole use right concept always excludes subsequent use by the holder of a circuit layout once such holder has granted a sole use right to another, while the U.S. exclusive license concept may, by agreement, allow such use even after it has been licensed to another.

Under the Japanese law, a sole use right is regarded as a kind of real right *(bukken)* which may be set up against third persons, while an ordinary use right is regarded as a kind of obligation-right *(saiken)* which, as a rule, may not be so set up. This is also reflected in the situation regarding infringement of rights. Namely, only the holder of a circuit layout right or a sole use grantee may enjoy the right to demand discontinuance or seek prevention of infringement.[43]

4.3.2. *Use of an Unregistered Circuit Layout*

Prior to a registration for establishment upon which a circuit layout right is created, the following two stages must be distinguished. Firstly, in the case where an applied-for circuit layout has been used by its creator or a person who has obtained a grant from the creator, anyone may use such circuit layout for two years or more prior to the date of application.[44] The time limitation of less than two years' use is thus the deadline for an application for registration, being at the same time a kind of allowance given to the creator, etc., to consider whether a given circuit layout deserves registration. Secondly, in cases where a circuit layout has been registered by its creator within the less than two-year period and that circuit layout has been used by a third person prior to such registration, the creator may demand of such a person the payment of compensation "equal to an amount of money which such person would normally have to pay for the use of such registered circuit layout."[45]

4.4. *Corporate Creator*

Usually, circuit layouts are created not by individuals but by corporations. In such cases, the question arises as to who is the creator of such a circuit layout. The Act provides that, with respect to a circuit layout created in the course of employment by a person engaged in the business of a juridical person or other employer, the creator of the circuit layout shall be deemed to be such juridical person or other employer.[46] In the case of an invention, the Patent Act provides that an invention which is made in the course of employment initially, as a matter of right, belongs to the employee who made the invention, and an employer, in order to apply for a patent right based on that invention, must obtain the right to apply therefor from the employee.[47] Differing from the treatment provided under the Patent Act for an invention made by an employee, the creation of a circuit layout by an employee is, under the Act, deemed to have been a creation of the employer.

The reasons why such direct proprietorship on the part of the corporation is acknowledged under the Act are as follows: first, the creation of a circuit layout is a process in which a series of working procedures are repeated according to rules of experience, resembling the manufacturing process utilized in factories; second, the creation of a circuit layout is almost always a joint undertaking of many corporate employees, carried out under previously determined conditions and in accordance with certain procedures; third, to create a circuit layout, significant financial resources are necessary and are usually assumed by the employer or by the corporation acting as employer.

The principle of such direct corporate creation, if thus understood, does not necessarily presuppose that the term "course of employment" need be interpreted in the same manner as the term "employment" in labor relations or contractual relations. That is, this term is to be interpreted in accordance with the sense of the Act and, consequently, in a much broader sense, so as to include certain legal relationships which do not come within the realm of labor relations or contractual relations. However, this principle is not mandatory; that is, if contracts, work regulations, or other agreements which are in effect at the time of creation of a circuit layout provide otherwise, direct corporate creation of the circuit layout will not be deemed to be the case as would otherwise occur under the Act.[48]

4.5. *Registration*

4.5.1. *Two Types of Registration*

(A) *Registration for Establishment.* In cases where an application for registration of establishment is filed,

[38] The Act, Section 16.2.

[39] The Act, Section 17.2.

[40] The Act, Sections 16.1 and 17.1.

[41] The Act, Section 11.

[42] The U.S. Act, 903 and 905.

[43] The Act, Section 22.1.

[44] The Act, Section 6.

[45] The Act, Section 27.

[46] The Act, Section 5.

[47] Patent Act, Section 35.

[48] The Act, Section 5.

the Minister of International Trade and Industry must carry out the registration for establishment. Such registration is effected by entering in the Circuit Layout Ledger the name or designation and the domicile or place of residence of the person obtaining the registration for establishment, the date of registration for establishment and other matters required by Ministry of International Trade and Industry ordinance. If a registration for establishment is made, the Minister must give public notice of the matters concerned therein.[49] A registration for establishment is a prerequisite for the creation of a circuit layout right.[50]

(B) *Registration of Transfer of a Circuit Layout Right, etc.* There are a variety of possible arrangements concerning a circuit layout right. Such a right can be transferred to another person, used as security in the form of a pledge or restricted in regard to its dispostion in a variety of ways by contract terms. A sole use right can be granted in regard to a circuit layout right, or an ordinary use right can also be granted in regard to such a circuit layout right. For all of those transactions, the Act provides for registration, without which the rights provided under the terms of the transaction may not be set up against third persons.[51] Even if such a transaction is not registered, its legal effect is not lost, but, rather, becomes more limited, so that it cannot be claimed against the whole world; in such case, the transaction is effective only among the contracting parties.

4.5.2. *Registration Procedures and Registration Organ*

(A) *Registration Procedures.* As to registration procedures, the Cabinet Order Concerning the Registration of Circuit Layout Rights, etc., and the Ministerial Ordinance Concerning the Registration of Circuit Layout Rights, etc. were promulgated on December 24, 1985, and both came into force on the enforcement date of the Act (January 1, 1986).[52] The Cabinet Order sets up provisions concerning the following matters: General Provisions, the Circuit Layout Ledger and the Closed Circuit Layout Ledger, Procedure for Registration Concerning Sole Use Rights and Ordinary Use Rights, Pledges, Deletion of Registration, Trusts and Performance of Registration Business by the Designated Registration Organ. The Ministerial Ordinance provides for the following matters: Method of Arrangement and of the Circuit Layout Ledger, etc., Procedure for Application, Procedure for Registration, which is further classified into the Procedure for Registration upon Application, Procedure for Application upon Request, and the Procedure for Ex-Officio Registration, and Miscellaneous Provisions.

(B) *Registration Organ.* Chapter 4 of the Act provides for the possibility of establishing a registration organ. Under the Act, the Minister of International Trade and Industry may have a person, designated by the Minister, perform the whole or a part of the registration procedure contemplated under the Act, and such person is to be designated in a Ministry of International Trade and Industry ordinance.[53] And the Industrial Property Corporation Center (IPCC) was so designated as such registration organ on December 16, 1985. The IPCC is an incorporated foundation, being a public interest juridical person under the Civil Code of Japan, and was previously incorporated on December 3, 1985, with the following two major objectives.

The IPCC is to engage in the research and development, in cooperation with the Patent Office, of a new patent information classification system which is to be set up to provide quick and accurate access to patent information, the IPCC thereby contributing to the promotion of a paperless patent examination. The Center is also to engage in, as part of its responsibilities and in accordance with the provisions of the Act, the registration of circuit layout rights and other rights pertaining thereto. It is empowered to perform all necessary business relating to the registration of circuit layout rights under the supervision of the Ministry of International Trade and Industry.

4.6. *Limitations on a Circuit Layout Right*

4.6.1. *In General*

Under the Act there are three types of possible limitations on a circuit layout right and its related rights. A circuit layout right can be restricted *contractually* by creating a sole use right or an ordinary use right. In the case of a sole use right, the holder of the circuit layout right concerned may not thereafter use the circuit layout.

In the following, the other two types of limitations will be discussed briefly. One is inherent in a circuit layout right and the other is based on the good faith principle or serves to protect or promote transactions concerning a circuit layout.

4.6.2. *Intrinsic Limitations*

The Act specifically regulates two kinds of limitations that can be characterized as intrinsic limitations. Those limitations concern cases of reverse engineering and the first sale doctrine.

(A) *Reverse Engineering.* Reverse engineering is one of the most difficult issues dealt with under the Act. The Act provides that the rights embodied in a circuit layout right shall not extend to or affect the manufacture, utilizing the information contained in the regis-

[49] The Act, Section 7. See, as to the dismissal of an application, the Act, Section 8, and as to the deletion of a registration for establishment, the Act, Section 9.

[50] The Act, Section 10.1. Between January 1 and May 12, 1986, 188 applications for registration for establishment have been filed and all of those have been registered.

[51] The set-up-against-requisite *(taiko yoken)*: the Act, Section 21.

[52] See 1.2. above.

[53] The Act, Section 28.

tered circuit layout, of a semiconductor integrated circuit which is made solely for the purpose of analyzing or evaluating a semiconductor integrated circuit.[54] This provision spells out an exception to the extent of protection provided to the holder of a registered circuit layout insofar as a reproduction of the circuit layout may be made for the sole purpose of analyzing or evaluating the semiconductor integrated circuit concerned. This limitation on a circuit layout right reflects reverse engineering practices which have been useful in facilitating technological innovation in the semiconductor chip industry. In this sense, this allowance for reverse engineering, which was first made in the U.S. Act and then adopted by the Japanese Act, may be regarded as an inherent limitation on the exclusive rights granted concerning semiconductor integrated circuit layouts.

A newly created circuit layout is, by all means, protected if independently created or if a new kind of circuit layout has been created. But the practices allowed in cases of reverse engineering do not justify the use of a circuit layout that is identical or substantially identical to a registered layout protected under the Act. Only for the purpose of educational or research activities is access to an existing circuit layout, protected under the Act, permitted. The question then arises, as discussed in the U.S. Act, whether a substantial similarity test for determining tbe permissibility of reverse engineering has also been adopted by the Japanese Act. This privileged treatment afforded to cases of reverse engineering is, in the author's view, not adopted by the Act of Japan.

(B) *First Sale Doctrine.* The next limitation which naturally arises is the so-called "first sale doctrine." If the holder of a circuit layout right, or a sole or ordinary use grantee, transfers a semiconductor integrated circuit to another person in the market, the rights granted by law in regard to the circuit layout may not extend to any furtber transfer, lease, etc., of such previously transferred semiconductor integrated circuit.[55] As in the Patent Law, circuit layout rights or their related rights are regarded as having been consumed upon their first sale in the market. It is natural to presume that the first sale doctrine contributes to the promotion of circulation of circuit layouts, and this doctrine may be viewed as a limitation on circuit layout rights that is inherent in the nature of the right.

4.6.3. *Protection of Good Faith Purchasers of a Circuit Layout Right*

First, in regard to the protection of good faith purchasers, the transfer or other transaction provided for under the Act by a person acting in good faith is not deemed an infringement of the circuit layout right or sole use right, even if the semiconductor integrated circuit concerned was manufactured by utilizing a circuit layout which imitated a registered circuit layout.[56] Second, after a person who acted in good faith becomes aware of the fact of imitation, the holder of the circuit layout right or the sole use grantee may demand of such person the payment of an amount of money which would normally have been received for the use of the registered circuit layout involved.[57] Third, and this is particularly interesting, if a person acting in good faith pays compensation to the holder of the circuit layout right or sole use grantee, as mentioned above, tbe semiconductor integrated circuit is thereupon deemed to have been transferred by the holder of the circuit layout right or sole use grantee to the good faith user.[58] Consequently, a good faith purchaser may be regarded to have thereby obtained a kind of constructive transfer of the circuit layout right involved.[59]

4.7. *Remedies*

4.7.1. *In General*

If a circuit layout right or a sole use right is infringed, an injunction and damages are the remedies provided for under the Act. The Act, furthermore, sets up special provisions concerning the scope of damages and also provides for a special type of infringement called indirect infringement.

4.7.2. *Right to Demand Discontinuance of an Infringement*

Usually, the violation of a real right, such as a property right, is subject to the proprietor's right to demand the discontinuance of such infringement. This ability to demand the discontinuance of an infringement readily contributes not only to stopping an already existing infringement but also to preventing possible future infringements. It is available to the holder of a circuit layout right or sole use grantee even if there is no fault on the part of the infringer. Furthermore, in addition to being able to demand the discontinuance of an infringement or to prevent threatened infringements, the holder of a circuit layout right or a sole use grantee may demand that the semiconductor integrated circuit with which the infringement was committed, and any other materials which were used in an infringement, be destroyed.[60]

4.7.3. *Right to Claim Compensation for Damages*

The holder of a circuit layout right or a sole use grantee may demand of the person who has intentionally or negligently infringed the holder's circuit layout right or the grantee's sole use right the payment of

[54] The Act, Section 12.2.

[55] The Act, Section 12.3.

[56] The Act, Section 24.1.

[57] The Act, Section 24.2.

[58] The Act, Section 24.3.

[59] The Copyright Act of Japan acknowledges a similar protection for the good faith acquirer of a computer program, but does not allow such person who thereby becomes aware of the fact of infringement to continue to use the computer program involved (Copyright Act, Section 113.1, No. 2).

[60] The Act, Section 22.1 and 2.

compensation for damages caused by such infringement. As to the type of damages which can be claimed, the Act sets forth two types. One type is compensation of an amount of money which would normally have been received for the use of the registered circuit layout.[61] This is the minimum amount of damages that will be awarded. It is possible, however, for the claimant to obtain an amount in excess of this minimum if the claimant can actually prove greater damages.[62]

The second type of damages available under the Act is the amount of profit obtained by the infringing party from a given infringement. Under the Act, the amount of such profit is presumed to be the amount of damage incurred by the holder of the circuit layout right or by the sole use grantee and thus such amount can be demanded from the infringing party as compensation.[63]

4.7.4. *Indirect Infringement*

Similar to patent infringement, if a transaction concerning materials that are to be used primarily for the imitation of a registered circuit layout is entered into, such transaction is deemed under the Act to be an infringement of the circuit layout right or sole use right concerned.[64] For such a transaction to be regarded as an infringement, it must be entered into for a business purpose. For example, if a magnetic tape or mask which incorporates a specific layout right is produced, transferred, leased, or imported for a business purpose, then that transaction would be deemed an infringement.

4.8. *Relation to Other Intellectual Property Rights*

With regard to a patent or utility model, the Act provides for the protection of patent rights, etc. Namely, if the use of a registered circuit layout also involves the use of another's patented invention or utility model, the holder of the circuit layout right or sole or ordinary use grantee may not use the registered circuit layout for business purposes.[65]

The relationship of the Act to the Copyright Act is not expressly set forth in the Act itself. It is evident, however, that the Act does not affect the protection already provided under the Copyright Act. For example, if a copyrightable work is stored in a memory chip, the work stored in the chip is protectable under the Copyright Act. The new Act, providing protection for layouts, does not cover such a work; however, as in the case of a ROM, there may be some instances where a clear-cut line is not easily drawn between a copyrightable work contained in a chip and a circuit layout contained in the same chip. Therefore, the interrelationship between those two intellectual property right categories needs further in-depth analysis.

4.9. *Transitional Measures*

The following matters are also regulated under the Act: co-ownership of a circuit layout right;[66] waiver of a circuit layout right;[67] forum of a non-resident;[68] and fees.[69] Of particular importance is Chapter 6, which deals with penal provisions.[70]

Some transitional measures are also provided for in the Supplementary Provisions of the Act. The first transitional measure is concerned with provisions for the two years' allowance for filing an application for a registration for establishment. Under the main provisions of the Act, when an application for such registration is filed within two years of the first utilization of a circuit layout, the protection provided for the circuit layout right extends to the period before the registration for establishment was effected. Under the Act,[71] when such an application for registration for establishment is filed within six months after the date of the coming into force of the Act, the creator of a circuit layout may also enjoy the protection of the Act retroactively to the date when the creator first utilized the circuit layout.

The second transitional measure is concerned with those circuit layouts that were in existence at the time of the coming into force of the Act and that were in the possession of a person who would not, under the Act, become the holder of the circuit layout right or sole use right upon complying with the procedures (e.g., registration for establishment) called for in the Act. Under the Act,[72] such circuit layouts may be used within two years after the coming into force of the Act. This exceptional measure was necessary because the owner of such a circuit layout would otherwise be suddenly prohibited from using it on the date of enforcement of the Act. Therefore, the Supplementary Provisions allow owners to dispose of such circuit layouts within two years of the date of enforcement of the Act.

The third transitional measure[73] is concerned with the payment of compensation under Section 27 of the Act. This transitional measure provides that if the use of a circuit layout is made before the enforcement of the Act, the payment of compensation under Section 27 of the Act is not necessary.

[61] The Act, Section 25.2.

[62] The Act, Section 25.3.

[63] The Act, Section 25.1.

[64] The Act, Section 23.

[65] The Act, Section 13.

[66] The Act, Section 14.

[67] The Act, Section 20.

[68] The Act, Section 47.

[69] The Act, Section 49.

[70] The Act, Sections 51 to 56.

[71] The Act, Supplementary Provisions, Section 2.

[72] The Act, Supplementary Provisions, Section 3.

[73] The Act, Supplementary Provisions, Section 4.

5. Concluding Remarks

Technological innovations are endless. It may happen that today's technology will become obsolete tomorrow. The situation is quite different in the legal field, however. Old statutes as well as old court cases continue to exist although the underlying technologies may have already gone out of use. Moreover, technological innovations are universal and international but the legal framework set forth regarding them is nationally delineated, even if an international treaty provides some broad framework for national laws.

In terms of reducing the number of areas where such contrasts between technology and law occur, the new U.S. and Japanese semiconductor chip laws have, in my view, opened a path for further *legal* innovations, in respect not only of semiconductor chips but also of software, data bases, and other computer-related innovations. However, it is quite difficult to anticipate the future development of such *legal* innovations due to the multilevel impact of new technologies on our society. In any event, the recent trend, initiated by the U.S. legislation and followed by the Japanese one, and further accelerated by WIPO's readiness to introduce a new international treaty on the protection of intellectual property in respect of integrated circuits,[74] must be characterized as a turning point in regard to such *legal* innovation.

The formative process of the Japanese semiconductor chip law, particularly in its relation to copyright protection, may well reflect only a small part of the legal transition common to such trends. This paper is, however, far from a detailed inquiry into the subject, which would involve a consideration of the various aspects of possible legal innovation. It is, rather, an attempt to introduce the contents of the Japanese law concerning circuit layouts of semiconductor integrated circuits, including comments on some special features of this Law.

[74] The Committee of Experts on Intellectual Property in Respect of Integrated Circuits has held two sessions, from November 26 to 29, 1985, and from June 23 to 27, 1986.

Patenting Seeds in the United States of America: What to Expect

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Intellectual property protection for seeds has been evolving rapidly in the U.S. From the 1790 origin of U.S. patent law as one of the first acts of the new Congress, it was nearly 150 years before protection was expressly extended to life forms. To be sure yeast strains were patented—by Dr. Pasteur among others—but in general the perceived inability to describe life forms fully, that is, to satisfy the disclosure requirement for a patent, was viewed as an insurmountable obstacle to patenting life forms. The disclosure (enablement) requirement, mandating that the patented object be described completely "as to enable any person skilled in the art...to make and use the same..." (35 U.S.C. Sec. 112[1]), is the exchange offered for the temporary monopoly rights granted by a patent. With disclosure, competitors can enter the market at the expiration of the patent period.

Congress with the passage of the Plant Patent Act of 1930 (subsequently incorporated into the Patent Act in 1952) swept away that limitation by modifying disclosure to be "as complete as is reasonably possible" (35 U.S.C. Sec. 161-162). This Act, however, admitted only asexually reproduced plants—cuttings, bulbs and spores, but not tubers. Seeds remained excluded, apparently in part because of concerns about describing a complex life form subject to natural heterozygosity (spontaneous mutation).[2]

A separate act, the Plant Variety Protection Act (PVPA) of 1970, was required for patent-like protection of open-pollinated seeds. No simple modification of existing patent law, this Act created a new administrative body, the Plant Variety Protection Office (PVPO) within the Department of Agriculture (USDA). The fact that the issuants of that Office are not properly called patents but rather "Certificates of Plant Variety Protection" is not the least of the distinctions between the laws. Despite the relatively weak protection granted through these Certificates (see below), considerable opposition to the Act remained right up through the 1980 amendment hearings. Indeed, passage was in doubt until a compromise called for additional hearings (which never materialized) and a major study by the USDA.[3] The amended Act extended protection to sexually reproduced seeds but expressly excluded F1 hybrids and bacteria.[4]

The Patent and Trademark Office (PTO) continued to deny patent protection to seeds covered by the PVPA despite the 1980 Supreme Court decision in *Chakrabarty,* which extended the scope of patentable inventions to "anything under the sun that is made by man."[5] The PTO position, stated simply, is based principally on an interpretation of Congressional intent. Congress, according to that view, would not have passed the PVPA if its members had intended seeds to be included under the general patent statutes. That interpretation was struck down, unexpectedly for many, on internal PTO appeal in *Ex parte Hibberd*[6] so that as of September 1985 it is permissible to patent any seed meeting legal requirements (see below).

At present it appears the decision will stand. The PTO could request reconsideration but that is generally done only to correct factual matters while *Ex parte Hibberd* was decided on an interpretation of intent, not on factual issues. Hence a reconsideration request is unlikely and no other persons have legal standing to appeal the decision unless it be within an infringement case challenging the basis for the patent. Considering *Chakrabarty* and the emphatic nature of *Ex parte Hibberd,* however, a reversal, while possible, would be surprising.

The decision of course has no direct effect on protection available under the PVPA. Several factors nonetheless make patents superior to Certificates of Plant Variety Protection from the perspective of the inventor. These are a somewhat greater scope of protection and lower nominal cost.[7] Hence it can be expected that most future applications will be made to the PTO rather than the PVPO. Applicants, though, *may not* protect a variety through both the PTO and PVPO as the granting of protection under one law would

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[1] For the text of 35 U.S.C. (the Patent Act), see *Industrial Property Laws and Treaties,* UNITED STATES OF AMERICA – Text 2-001.

[2] Straus, J., Industrial Property Protection of Biotechnical Inventions: Analysis of Certain Basic Issues (WIPO document BIG/281). Geneva: WIPO, July 1985, p. 61.

[3] Hearings, Subcommittee on Agricultural Research and General Legislation, U.S. Senate. *Plant Variety Protection Act.* Washington, D.C., June 17 and 18, 1980; Claffey, B.A., "Patenting Life Forms: Issues Surrounding the Plant Variety Protection Act." *Southern J. Agr. Econ.* 13 (1981): 29-37.

[4] According to the interpretation of Congressional intent by Neagley, C.H., D.D. Jeffrey and A.B. Diepenbrock (*Section 101 Plant Patents—Panacea or Pitfall?* In American Patent Law Association (Ed.), Selected Legal Papers, Vol. 1, no. 2, 1983, pp. A-11-12), hybrid seeds were excluded based on the Congressional understanding that protection could be maintained by holding the parental pure lines as trade secrets. That position not only weakens the protection available for an important class of seeds but also encourages the use of trade secrets which is contrary to the intent of a patent system.

[5] *Diamond v. Chakrabarty,* 447 U.S. 303 at 309, 206 U.S.P.Q. 193 at 197 (1980).

[6] Bd. Aps. 1985.

[7] Patent applications presently cost about $300 ($150 for smaller firms) and may encompass several varieties. Applications to the PVPO, limited to a single variety, have a $2,000 fee. The major cost of protection is for legal fees, however, so that the real cost distinction must be determined on a case-by-case basis. Patent applications seeking protection for something other than a simple variety extension are sure to be complex documents and hence costly to prepare.

establish prior art that prevents the extension of protection under the other (see the following section for patenting requirements).

With the expected shift of seed protection to patents, farmers, gardeners and plant breeders among others are clearly concerned about the implications of this major change in the law. This article examines the probable impacts of United States seed patents, including the effect that it can be anticipated to have on farmers and gardeners, domestically and internationally, as well as on breeders and other researchers. Consideration is given to seeds as the product of traditional plant breeding practices and seeds as the delivery mechanism for altered DNA sequences and other products of biotechnology.[8]

At this early date, nothing is certain about how patent law will be applied to open-pollinated seeds. A number of years must pass before the case law is firmly established. Nonetheless it is possible to draw on the interpretations and experiences with similar higher life forms patented previously as indicators of the probable extensions to seeds. That approach is applied here. Before proceeding, however, it is desirable to review briefly the major property rights differences among patents, plant patents and Certificates of Plant Variety Protection. That is done first, followed by an overview of the case law for comparable life forms, which incorporates the anticipated impacts of seed patents, especially on farmers. This analysis suggests some troubling implications for farmers, and for seed patent holders attempting to enforce their full patent rights, but important new incentives for the seed industry. Biotech firms may now have available a new *means* of protecting seed parts domestically but the *type* of protection offered is largely duplicative. The extent to which the courts recognize this new approach will not be known until some key infringement suits have arisen and been resolved in the courts.

Scope of Protection of Patents and Patent-Like Laws

Industrial, or utility, patents can be granted for virtually anything man made under the sun provided the object or process satisfies the conditions of novelty, utility and nonobviousness.[9] These terms are defined approximately as follows:

Novelty: the invention must not be previously known or exist in that form in nature (35 U.S.C. Sec. 102);

Utility: the invention must serve some specific purpose (as opposed to existing solely as an idea or concept) and generally must have an identifiable market (35 U.S.C. Sec. 101)[10]; and

Nonobviousness: the goods must be sufficiently different from previous discovery (prior art) so as not to be obvious at the time the invention was made to someone having ordinary skill in the art (35 U.S.C. Sec. 103).

Decisions on these criteria are made by the patent examiner who reviews the prior art as revealed by previous inventions, printed materials and other sources. The search is based on the specification included in the patent application, which consists of the *description* of the best mode of carrying out one embodiment of the invention plus one or more *claims*. A claim distinctly points out the subject matter that the inventor considers to be his invention.[11]

Typically, the inventor will claim more than the single embodiment of his invention. With bacteria, for example, Chakrabarty claimed for his invention two species within the genus *Pseudomonas* (Patent No. 4,259,444). In other cases one or several genera may be claimed, greatly expanding the scope of protection allowed by patents for inventions. The existence of novelty, utility and nonobviousness, as well as the allowable scope of the claims, are determined judgmentally by the patent examiners within the bounds established by the prior art.

Once issued, a patent may through legal processes be revoked or the scope of the claims reduced.[12] Following approval based on a thorough search of prior art, however, a valid patent carries a *presumption of validity* so that the burden of proof for overturning the patent rests with the plaintiff (35 U.S.C. Sec. 282). While this distinction may seem nebulous, it does provide greater protection for holders of patents for inventions than for some other forms of patent protection.

Plant patents as incorporated within the general patent laws have the same requirements for patentability except for the loosening of the description requirements to as complete as is reasonably possible (35 U.S.C. Sec. 161-162). However, the patent is granted for the entire plant so that only a single claim is required and permitted.[13] As a result, a plant patent is limited to a single embodiment, generally a particular variety. Moreover, there is no apparent systematic means of determining which differences from the prior art are obvious and which are not.[14] Hence, as a practical

[8] Calgene recently received a patent for a modified DNA chain which enhances the herbicide-resistance of plants such as tomatoes, tobacco, soybeans and cotton. *Business Week*, "Creating Supercrops that Can Shrug Off a Herbicide." September 2, 1985, p. 77.

[9] Certain national security limitations apply but are unlikely to be important in the case of seeds (35 U.S.C. Sec. 181).

[10] See also Straus, *op. cit.*, pp. 82-85.

[11] U.S. Department of Commerce, Patent and Trademark Office, *General Information Concerning Patents*, February 1983, p. 15.

[12] See, e.g., Bowman, W.S., *Patent and Antitrust Law: A Legal and Economic Appraisal*. Chicago: University of Chicago Press, 1975.

[13] U.S. Department of Commerce, *op. cit.*, p. 30.

[14] Neagley, C.H., D.D. Jeffrey, and A.B. Diepenbrock, *Section 101 Plant Patents—Panacea or Pitfall?* In American Patent Law Association (Ed.), Selected Legal Papers, Vol. 1, no. 2, 1983, pp. A-6-7. Novelty must also be determined judgmentally. For example, a variety of peach tree may be considered novel if it produces fruit that ripens two weeks earlier than existing varieties. However, one that claims a three-day ripening advantage may, at the discretion of the examiner, be rejected as a meaningless (non-novel) distinction considering all the environmental factors that affect the ripening date.

matter any discernable difference (e.g., the applicant variety is not a direct copy) among varieties constitutes nonobviousness and is sufficient for awarding a patent.[15] That is equivalent to saying plant patents are closer to a registration rather than an examination system. Under registration, the scope of protection is more limited and indeed the very validity of the patent may not be known until and unless there is a court decision.[16] Hence the property rights protection of plant patents is inferior to patents for inventions as a general matter.

The use of the term registration in reference to plant patents, however, perhaps understates the discretion applied by the PTO examiners. The patent examiners may request a substantiation of the claims—and in some cases have done so. That could include actually propagating the plant. Or the examiner can request further differentiation from a reference variety (the closest prior art) and, if unsatisfied, reject the application. These are powers not granted under a pure registration system so that a U.S. plant patent confers some presumption of validity but they are in general somewhat inferior in scope to patents for inventions.

The *Plant Variety Protection Act* is a distinct law (7 U.S.C. Secs. 2321 *et seq.*). That replaces the patent requirements of novelty, usefulness and nonobviousness with those of distinctiveness, uniformity and stability (7 U.S.C. Sec. 2401(a)). The latter two conditions refer to the need for breeding sufficient generations so that the variety reproduces itself true to type (homozygous). This serves both a market need and a requirement for a complete-as-is-reasonably-possible description. Once stability is established, the awarding decision is distinctiveness. Distinctiveness carries much the same interpretation as nonobviousness so that the comments regarding a registration system for plant patents are appropriate when discussing the PVPA.[17]

Other restrictions nonetheless apply to the PVPA that reduce the property value of Certificates compared to plant patents. These are the so-called "research exemption" and the "farmer exemption" (7 U.S.C. Secs. 2543 and 2544).[18] Under the former, a protected seed variety may be used by a competing company in a breeding program. For example, if a protected flower variety has red and white flowers, a competitor using purchased seed could select for a strain that produces only white flowers and receive a Certificate for that new variety. Indeed, the same procedure could be followed even if the variations selected for were not obvious (a slight color shade variant) nor necessarily useful (leaf curl clockwise rather than counterclockwise). This exemption for experimental use is more explicit than what is described in the Patent Act but the practical differences are limited (see below).

The farmer exemption, for its part, allows farmers to retain seed for planting and even for sale provided the variety name is not used. Farmer-saved seed is a common practice among major open-pollinated species including wheat, cotton and soybeans.[19]

As a result of the registration system and the specific exemptions, the property rights under the PVPA are quite inferior even to plant patents. Economic analyses of the impacts of the PVPA support that judgment. Butler and Marion found "...modest private and public benefits at modest public and private costs."[20] Indeed, it is sometimes suggested that the PVPA protects the *variety name* rather than the unique germ plasm itself.[21]

From this brief overview, it is apparent that patents for inventions may allow far greater property rights protection than Certificates of Plant Variety Protection. Hence the patenting of seeds can have significant impacts, both beneficial and deleterious. Much, however, depends on the specific application of the law to seeds in terms of the scope of protection and the exemptions permitted for research and farmer-saved seed. The case law for closely related products is reviewed next for insights into the likely applications to seeds.

Anticipating PTO Interpretations

The case law for plant patents and hybrid seeds makes it possible to anticipate applications to open-pollinated seeds. This section reviews that history in six areas: scope of protection, disclosure requirements, research exemption, farmer-saved seeds, enforcement, and international harmonization of laws. To be considered are both seeds developed through traditional plant breeding practices and seeds used as delivery mechanisms for manipulated DNA structures and similar products of bioengineering.

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[15] Schmid, A.A., "Biotechnology, Plant Variety Protection, and Changing Property Institutions in Agriculture." *Northcentral J. Agr. Econ.* 7 (1985), p. 131.

[16] Williams, S.B., Jr. "Protection of Plant Varieties and Parts as Intellectual Property." *Science*, 225 (1984), p. 19; Pombo, F., *Patent Law and Practice of the Major European Countries*. J. Gevers (Ed.). Lausanne: Seminar Services, S.A., Vol. 2, 1976, pp. E9, E21.

[17] Williams, *op. cit.*, p. 19; Schmid, *op. cit.*, pp. 131-133.

[18] A third or "compulsory licensing" stipulation allows the Secretary of Agriculture to permit others to produce a protected variety if in his judgment it is in the public interest. However, that is little different from the power of the Government to authorize others to use another's invention for the benefit of the Government (Williams, *op. cit.*, p. 21).

[19] See Lesser, W.H. and R.T. Masson, *An Economic Analysis of the Plant Variety Protection Act*. Washington, D.C.: American Seed Trade Assoc., 1985, pp. 71-72.

[20] Butler, L.J. and B.W. Marion. *Impacts of Patent Protection in the U.S. Seed Industry and Public Plant Breeding*. Univ. Wisconsin, N.C. 117 Monograph 16, 1983, p. viii. See also Lesser and Masson, *op. cit.*

[21] This distinction is particularly important when the certificated seed is sold as a class of certified seed (see footnote 36). Under the Federal Seed Act (7 CFR Sec. 201.36b(c)), a brand name can only be used in conjunction with the kind or variety names, e.g., Oxbrand Golden Cross sweet corn. Under these restrictions, the PVPA provides an alternative means of identifying a variety with a unique name.

Scope of Protection: When patenting a seed the inventor is protecting the entire plant, as with a plant patent.[22] Within a single application, however, all related varieties[23] may be claimed provided that they can be disclosed (e.g., they exist). That is, if a virus-resistant strain of soybeans is developed, the breeder within a single application would likely claim varieties adapted to different soil and/or climatic conditions (see discussion below under "Disclosure"). This option can reduce the cost of preparing and filing applications compared to using a separate application for each variety. Alternatively, the novel characteristic of a seed may be an engineered DNA sequence that increases, say, herbicide resistance. In a single application, the breeder could potentially claim a range of plant species (tobacco, tomatoes, etc.) each of which exhibits the trait expressed by the engineered DNA sequence. Anyone subsequently transferring that sequence to other species or varieties would be infringing. By thus claiming, the applicant can substantially extend protection for that characteristic beyond existing varieties. Both plant patents and Certificates of Plant Variety Protection, which do not admit claims, prevent extending protection in that way.[24] Of course a patent on the DNA sequence itself would allow the same extension of protection for a trait or characteristic associated with a part of the seed so that the major distinction is in the form of acquiring protection rather than in the existence of legal protection *per se.*

At the same time, with a patent for invention the applicant is presumably protected from subsequent independent discovery. That is, there is no need to demonstrate derivation as has typically been required for plant patents.[25] By simplifying enforcement of patent rights, the scope of protection is enhanced.

The degree of non-obviousness required for patenting similar seed varieties is not clear at this time. This matter gave the courts considerable difficulty when applied to the Plant Patent Act[26] and the distinctions will be no easier with patents for inventions. The *Matsui* case, however, implied that some range of equivalents is provided for in plant patents and that interpretation will likely carry over to patents for inventions. The range required may perhaps be best understood as the "minimum distance" test proposed by the Union for the Protection of New Varieties of Plants (UPOV).[27] To meet that standard, there must be at least one "important" (read distinguishing, not commercially significant) distinction from existing varieties.[28] Thus some "distance" from existing varieties will likely be required, as befits the higher patentability standards under Section 101, but the degree of difference mandated cannot be known with certainty at this time.[29]

Disclosure: Complete disclosure of hybrid seeds (and for that matter most life forms granted patents for inventions[30]) now requires a deposit. In fact, under current PTO practices the applicant must file a declaration allowing unrestricted access to deposits following the issuance of the patent.[31] Moreover, Rule 11 of the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure, to which the United States of America is party, allows universal access to deposited samples following publication of the patent. Thus there are strong reasons to believe that seed deposits with unrestricted access will be required for patented seeds.[32]

With the exception of the judgmentally-applied novelty and non-obviousness requirements, the expected deposit mandate suggests strongly that variety claims shall not be permitted to exceed the deposited materials. That is, while multiple varieties may be protected with a single application, a deposit will be required for each variety claimed.[33]

Research Exemptions: Research *on* a patented product is generally considered a fair use under the implicd use agreement granted with the sale of a patented product.[34] If it were not so, improvements of

[22] See Williams, *op. cit.*

[23] At this point it is unclear what constitutes the distinction between a single invention or several inventions and hence what varieties can legitimately be claimed in a single application (Neagley, Jeffrey and Diepenbrock, *op. cit.*, p. A-29).

[24] Seay, N. "Proprietary Protection of Plants and Varieties in the U.S." In *The World Biotech Report 1985*, Vol 2. U.S.A. New York: Online International. 1985. pp. 45-56.

[25] Neagley, Jeffrey and Diepenbrock, *op. cit.*, p. A-31.

[26] See *Yoder Brothers, Inc. v. California-Florida Plant Corp.*, 537 F.2d 1347, 1348 n. 34, 193 U.S.P.Q. 264, 291 n. 34 (5th Cir. 1976); *Pan-American Plant Co. v. Matsui*, 433 F. Supp. 693, 694 n. 2, 198 U.S.P.Q. 462, 463 n. 2 (N.D. Cal. 1977).

[27] UPOV, "Industrial Property and Plant Breeders's Rights," (document Symp/1984/4). In *Industrial Patents and Plant Breeders' Rights—Their Proper Fields and Possibilities for Their Demarcation.* Records of a Symposium. Geneva. October 17, 1984.

[28] Neagley, Jeffrey and Diepenbrock, *op. cit.*, pp. A-22-24.

[29] See also footnote 14.

[30] Straus, *op. cit.*, pp. 85-89.

[31] Hoefer, M.A., "U.S. Biotechnology Considerations—A Corporate View." In *The World Biotech Report 1985*, Vol. 2, U.S.A. New York: Online International, 1985. pp. 22-24.

[32] At some point advances in molecular biology may permit a written description that is fully enabling, i.e., sufficient so that one skilled in the art can make and use the invention. Nonetheless a deposit might still be required to fulfill the "best method" obligation of the enablement requirement: the applicant must reveal the best mode of replicating the discovery, which may require that the actual germ plasm be available (Neagley, Jeffrey and Diepenbrock, *op. cit.*, p. A-28).

[33] See Seay, *op. cit.*, pp. 39-50.

[34] Goldstein distinguishes between experimentation *on* a potential product and experimentation *with* it (Goldstein, J., "Legal and Administrative Developments in Depository Practice—U.S. and Abroad." In *The World Biotech Report 1985*, Vol. 2. U.S.A. New York: Online International, 1985, p. 15). The former—which includes plant breeders—is generally permitted, while the latter is not. However, if the research is done strictly in the pursuit of knowledge (e.g., is non-commercial), it may in the latter case be exempted under a narrow exemption which has evolved from the case law (Williams, *op. cit.*, p. 21).

patented products would be largely foreclosed, something which most certainly has not happened. Thus at this level of generalization there is little practical difference between the Patent Act and the PVPA regarding research access and no major impact is anticipated.

Nor is there any major distinction between the laws if a component of a seed—say a DNA segment—is patented. In either case a competitor utilizing that part in another variety requires a use license. However, should protection over a component of a patented seed be extended through a claim (see discussion under "Scope of Protection," above), then a license will also be required to use that component in another variety. Overall then, research *use* of patented seed is not expected to be curtailed but the requirement for licensing may be expanded depending on how claims for patented seed varieties are specified.

Farmer-Saved Seeds: The commercial purpose of a seed is to produce food, a flower, or related products, and it is for that purpose that the purchaser of seed receives an implied use license. Open-pollinated seeds also reproduce themselves (approximately) so they may be replanted in successive generations. Reproduction for replanting ("making" seed), however, is not the purpose for which seeds are sold so that planting home-produced patented seeds would be an infringement. A direct parallel can be drawn from plant patents. An orchard operator propagating an entire orchard from cuttings taken from a patented fruit tree would be infringing on the rights of the patent.[35] The prohibition of the use of home-produced patented seeds by farmers and gardeners is a major difference between patented seeds and seeds protected under the PVPA.

Enforcement: The enforcement of property rights—the bringing of an infringement suit—requires both detecting the infringer and proving that the allegedly infringing act occurred. Under the PVPA, simple infringement—the selling of a protected variety by variety name—has been relatively easy to detect by scanning classified ads, etc. Generally, according to seed company officials, a letter to the violator corrects the problem.[36] Note that since it is not illegal to sell the certificated variety but only to sell it by *variety name*, much of what constitutes infringement of patents does not apply to the PVPA.[37]

For seed *patents*, consider first the problems of detecting and proving unauthorized use of home-produced seeds. Excluding garden seeds that are used in such low concentrations as to make detection all but impossible, the use of home-produced seeds by farmers is of major economic importance. Based on data from the mid-1970s, soybean, wheat and cotton seeds are purchased on average every other year.[38] (Production and seed handling characteristics of other major crops mean seeds are generally purchased annually.) The prohibition of using farm-produced seeds would approximately double the seed bill for these crops for a total cost in 1975 of $400 million.[39] That translates to about $508 million at 1984 seed prices.[40] With seeds constituting 2.5 percent of production costs seed patents could at 1984 prices lead to at most a 0.8 percent overall increase in those costs (USDA, Table 591).[41] While the average cost impact is not major, it would be large for farmers producing soybeans, wheat and cotton.

But without competition from home-grown seeds, breeders could raise prices substantially, increasing the seed bill further. This simple analysis ignores volume economies associated with increased seed production and distribution as well as the value of seed purchased annually. Additionally, the universal patenting of seeds and enforcement of rights is highly unlikely. Nonetheless, the figures indicate in degrees of magnitude the potential importance of how the farmer-saved seed issue is treated for patented seeds.

Two approaches seem most likely. First, Congress recognizing the problematic nature of enforcement could pass special legislation declaring the use of home-grown seed not to be an infringement. As a precedent, the Home Recording Act of 1983 (S.31) exempting individuals from copyright infringement liability for home video recording (VCR) of copyrighted programs can be cited.[42] Faced with a virtually unenforceable and widely unpopular law Congress changed it. The farmer-saved seed section of the PVPA can be seen as a response to similar public pressure that could carry over to patented seeds. Congress may further prefer to legitimatize an unenforceable action to the toleration of widespread and persistent violations. Thus a legislative remedy is possible.

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[35] See Williams, *op. cit.*, pp. 19-20, for a discussion of the issues involved with the illegal propagation of potential plants overseas and reimportation of parts of those plants, especially flower blooms.

[36] When applying for a Certificate of Plant Variety Protection, an option of selling only as a class of certified seed may be selected. By choosing the certified seed option, the breeder retains greater control following release as the seed stocks must be replenished at stipulated intervals. That gives the breeder periodic access to the certified seed system as a quasi enforcement agency. Not all applicants select this option, however, suggesting that the enforcement issue is perhaps not an overriding concern (see Lesser and Masson, *op. cit.*, pp. 58-59).

[37] The issue of contesting the validity of a granted Certificate of Plant Variety Protection is not discussed here (see Hearings, *op. cit.*).

[38] The purchase of new seed periodically is necessitated by the contamination and genetic drift of older varieties, by the ongoing need to breed for virus resistance and other forms of pestilence, and by the yield improvements available from new varieties. Hybrids must of course be purchased annually.

[39] Compiled from Leibenluft, R.F., *Competition in Farm Inputs: An Examination of Four Industries*. Federal Trade Commission, Office Policy Planning. February 1981, pp. 104-107.

[40] U.S. Department of Agriculture, Agricultural Statistics, 1984, Tables 372 and 374.

[41] *Id.* at Table 591.

[42] See, e.g., Diedring, M.C., "VCR Home Recording and Title 17: Does Congress Have the Answer to *Sony Corp. of American v. Universal City Studios, Inc.*," *Syracuse Law Review* 35 (1984), pp. 821-824.

Short of Congressional action, patent holders are likely to act selectively, choosing larger farmers for efficiency and demonstrative purposes. Alternatively cooperatives that frequently process (dry, remove foreign matter and treat with fungicides) seeds for farmers could become the focus of enforcement. Certainly larger farmer-propagators, those farmers who raise seed for sale to neighbors as a cash crop, as well as seed companies, would be prevented from handling patented seeds without a license. With the widespread dealer network (many dealers are actually neighbor-farmers) supplying data, the identification of likely infringers seems a plausible task.[43]

Proving infringement requires samples of seed (or tbe plants grown from them) and, wbile costly and time-consuming, could probably be tested with minimal complications. In the future, advances in describing living matter may do away with the need to propagate tbe plant material for testing. Thus, unless Congress acts otherwise, large farms (and the cooperatives serving them) that propagate and plant patented seeds are in jeopardy of infringement suits. Smaller firms can be considered tacitly exempt so long as seed is not sold openly.

In general, infringement enforcement, while problematic, appears not totally impractical at least against large-scale violators. The more distinct a variety is, especially if distinction is based on a novel sub-part like a gene, the easier will be enforcement as a general matter. That is appropriate as tbe novelty likely reflects greater research and development expenditures. Most uncertain is the possibility of specific legislation exempting the practice of seed saving from enforcement.

Seed patents through the claiming process do provide a means of protection against infringement overseas and subsequent exportation to the U.S. That protection becomes effective if a part of the plant—say the grain, fruit, or bloom it provides—is claimed in the application. Importation of those parts if they are made, used or sold without authority can be prevented under Section 1337(b) of the General Tariff Acts. Williams argues that the same Section can be applied to parts of patented plants[44] but his interpretation is apparently not widely accepted as federal legislation now pending (S.1535) enhances the prohibition against the importation of parts of patented plants. The Tariff Act restriction does extend to seeds protected under the PVPA as the PVPA defines one form of infringement as the dispensing of a novel variety "in a form which can be propagated" (7 U.S.C. Sec. 2541(6)). As many of the commercial products of plants propagated from seeds do indeed carry the ability to regenerate, infringement would seem to be indicated. Hence, while seed patents allow for some prohibition of imports based on infringing uses, the extent of protection is little changed from that presently available under the PVPA.

Harmonization of International Laws: Worldwide intellectual property protection for seeds is coordinated by the International Union for the Protection of New Varieties of Plants (UPOV), of which the United States is a member State. Article 2(1) of the UPOV Convention prohibits double protection for seeds as with both patents and PVPA-type legislation.[45] *Ex parte Hibberd* places the U.S. in violation of that Article. However, a violation existed previously as with the availability of double production for grasses which are both sexually and asexually propagatable. That conflict was resolved in 1978 by a special Act of the Convention (Article 37), which essentially excused the United States for double protection that existed prior to the establishment of UPOV on October 31, 1979.[46] Since the U.S. Patent Act existed much prior to 1978—*Ex parte Hibberd* changed only the interpretation of the law, not the law itself—then the exemption would seem to apply as well to the broader range of double protection now allowed.[47] As a result no conflict with international law is foreseen.

But while there is no apparent conflict internationally, it is highly unlikely that many other nations will follow the U.S. lead and offer the patenting option for seeds. Indeed most European countries prohibit patents for inventions for products like seeds that are produced through "essentially biological processes".[48] This means that seeds patented in the United States must be protected by other means abroad, mostly likely under the UPOV Convention. That situation is similar to what has been required previously for plants granted plant patents in the United States and other forms of protection elsewhere. While perhaps not ideal, this dual protection approach is nonetheless workable for the products of traditional breeding. Limitations arise if U.S. patents are used (via claims) to protect a seed part, such as an altered DNA sequence. UPOV-type protection does not extend to seed parts so that some other form of foreign protection, probably a patent for invention for the part, will be required.

Summary and Conclusions

The legal interpretation in September 1985 allowing patents for inventions to be granted for open-pollinated

[43] See Forbes, "A Sustained Harvest." October 15, 1979, pp. 120-122, for a brief description of the seed distribution system.

[44] Williams, *op. cit.*, p. 20.

[45] See Straus, *op. cit.*, pp. 64-67.

[46] See UPOV, *op. cit.*, p. 76.

[47] The Board of Patent Appeals writing in *Ex parte Hibberd* further noted that U.S. member status in UPOV is by means of an unratified Executive Agreement that does not constitute a binding treaty on the nation (Bd. Aps. 1985 at p. 10).

[48] Straus, *op. cit.*, pp. 77-79; see, e.g., the European Patent Convention, Article 53(b) ("European patents shall not be granted in respect of...essentially biological processes for the production of plants....").

seeds in the United States appears to establish law for the foreseeable future. With the subsequent availability of two forms of protection for these seeds—patents for inventions and Certificates of Plant Variety Protection—patents are likely to dominate in the future due to the lower application fees and slightly enhanced scope of protection.

Despite the apparent suddenness and, in the view of many, radicalness of this decision, open-pollinated seeds do indeed fit well within established patent laws and prior interpretations of that law. One measure of the fit is the degree to which interpretations can be anticipated based on past decisions for related products. That evaluation, presented here, indicates that no fundamental impact on seed producers and users can be anticipated from the act of patenting seeds. Seed patents are expected to extend the scope of patent protection to a limited degree and hence to provide some additional incentives to invest in plant breeding and related activities. These assessments are of course conjectural as a case history must be generated over a period of years before more definitive conclusions can be made.

More specific conclusions regarding seed patents are as follows:

(1) The scope of protection will expand to prohibit near-exact copies. Very broad patents will not be allowed, however, at least as long as seed deposits are required as part of the conditions for patentability.

(2) Patents provide an alternative means of protecting seed parts such as engineered genes. But as that potential existed previously in the form of patents for the genes themselves, the difference is more one of approach than substance.

(3) Research access to patented seeds, including access by commercial breeders, will not be more limited than under the Plant Variety Protection Act. Of course if a seed part is protected specifically, a license is required to transfer legally that part to another variety.

(4) With patented seeds, the common farmer practice of using home-produced seeds will be an infringement. This factor and the related enforcement issues appear as the major unanswerable questions surrounding seed patents. Particularly difficult to anticipate is how Congress might respond to farmer pressure and to the selective enforcement that would necessarily follow any effort to prevent the planting of farm-produced seeds. At the outside and assuming all seeds are patented, a complete prohibition of farmer-saved seeds would cost $500 million annually. That level of cost is, however, highly unlikely. The practical impact of a prohibition against using farmer-saved seeds is likely to be substantially smaller, especially if accelerated advances in seed breeding, stimulated by the greater property rights protection allowed by patents, make it economically attractive to buy seeds at shorter intervals. Farmers, though, must overcome a psychological resistance to having the uses of their crop dictated by the legal system.

In addition to what is *likely* to happen with seed patents, it is possible to project with some assurance what *will not* transpire. In particular, "cosmetic breeding," the development of varieties with trivial differences, is likely to be a contentious issue as it was during debates over the PVPA.[49] Anticipated impacts are divergent. The lower cost of securing legal protection encourages such practices while the more stringent patenting requirements (meaning greater difference from prior art), at least compared to the PVPA, limits the breeders' ability to patent minor variations.

Yet even if trivial variations were patentable, farmers would have no incentive to adapt unless there were discernable performance differences.[50] Many states report the relative performance ranking of major food and fiber crops as an aid to farmers in variety selection.[51] With that impartial information it would be difficult for a firm to develop, even through advertising, the impression of performance differences that could not be observed in the field. Moreover, the use of advertising need not depend on patent protection. A trademarked variety name or Certificate of Plant Variety Protection would provide sufficient commercial protection for an investment in advertising. Thus, overall, the patenting of seeds is not expected to have any notable impact on the development of trivial varieties.

A second and more fundamental issue is the one of impact on access to germ plasm. Access to germ plasm in patented varieties under the mandatory deposit/open access requirements is excellent, superior in fact to that available under the PVPA where deposits are closed. However, much germ plasm exists in private or quasi-private (university) collections or uncollected in the wild, particulary in developing countries. Patents could affect breeders's access to that germ plasm, according to one widely held view,[52] by raising the commercial value of that material so that it will not be shared freely. Such indirect effects of patents exceed the scope of this paper, but as counterarguments it is important to recognize that a higher private value on germ plasm will stimulate collection and preservation of those materials with possible subsequent sale. Moreover, even in the absence of patent protection, several countries have become reluctant to release germ plasm for their major export crops like rubber, cocoa and vanilla. Overall, patents are seemingly a minor component in what is becoming a major international discussion of the preservation of and access to germ plasm.[53]

[49] See Hearings, *op. cit.*

[50] Schmid, *op. cit.*, p. 132.

[51] See Lesser and Masson, *op. cit.*, pp. 72-80.

[52] See, e.g., Hilts, P.J., "Battles Sprout Over World Seed Supplies," *Washington Post*, November 4, 1985, p. 3, for a more popular expression of those concerns.

[53] For further information on these topics, see Allen, C.E. and C.J. Arntzen, *Research Briefings 1985*, Washington, D.C.: National Academy Press, 1985; U.S. Agency for International Development,

Much of the preceding analysis has focused on the possible private and social costs of patenting seeds. Benefits both public and private tend to be minimized because they will come as a delayed response to the enhanced incentives to invest in plant breeding and related activities. The magnitude of the investment cannot be forecast with any accuracy, but one may project with a high level of confidence that the industry will respond by expanding breeding efforts much as was done following passage of the PVPA.[54] This point should not be minimized as it constitutes the benefits from the change in patent law. At the same time the seemingly moderate public and private costs of seed patents are contingent in part on the continuance of a relatively competitive seed industry.[55] That industry is, however, continuing a period of transition due largely to anticipated opportunities in biotechnology and the entry by merger into the business of large pharmaceutical and chemical companies in particular. With the evolving nature of private seed breeding, the role of public breeding, which occurs largely at state agricultural experiment stations, could become an increasingly important counterbalance. Yet those breeding programs too can use patents, as they have Certificates of Plant Variety Protection,[56] as a means of generating research funding during a period of declining real public funding. Thus while patents are traditionally associated with private sector incentives, they do provide opportunities for the public sector as well which, in turn, can generate indirect social benefits by helping to sustain the competitive nature of the sector.

U.S. Strategy on the Conservation of Biological Diversity. Washington, D.C., 1985; Food and Agriculture Organization, International Board for Plant Genetic Resources, *Collection of Crop Germplasm: The First Ten Years (1974-1984)*, Rome, 1985; and Hawkes, J.G., *The Diversity of Crop Plants;* Cambridge, Mass.: Harvard University Press, 1983.

[54] Butler, L.J. and B.W. Marion, *Impacts of Patent Protection in the U.S. Seed Industry and Public Plant Breeding*, Univ. Wisconsin, N.C. 117 Monograph 16, 1983, sec. 3.2.

[55] See Leibenluft, *op. cit.*, Butler and Marion, *op. cit.*

[56] About 10 percent of PVPA certificates awarded for 1971-1983 were granted to experiment stations and other public agencies (Evenson, R.E., "Intellectual Property Rights and Agribusiness Research and Development: Implications for the Public Agricultural Research System," *Amer. J. Agr. Econ.* 65 (1983).

Calendar of Meetings

WIPO Meetings

(Not all WIPO meetings are listed. Dates are subject to possible change.)

1986

October 13 to 17 (Geneva) — Permanent Committee on Patent Information (PCPI): Working Group on General Information
November 11 to 14 (Geneva) — Committee of Experts on the International Registration of Marks
November 24 to December 5 (Geneva) — Permanent Committee on Patent Information (PCPI): Working Group on Search Information
December 8 to 12 (Geneva) — Permanent Committee on Patent Information (PCPI): Working Groups on Special Questions and on Planning

UPOV Meetings

1986

November 18 and 19 (Geneva) — Administrative and Legal Committee
November 20 and 21 (Geneva) — Technical Committee
December 1 (Paris) — Consultative Committee
December 2 and 3 (Paris) — Council

Other Meetings Concerned with Industrial Property

1986

October 22 to 24 (Mainz) — Pharmaceutical Trade Marks Group: 33rd Conference
December 1 to 5 (Munich) — European Patent Organisation: Administrative Council