PROTECTION OF TRADE SECRETS IN OUTER SPACE ACTIVITY: A STUDY IN FEDERAL PREEMPTION*

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TABLE OF CONTENTS

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INTRODUCTION

Over the past two decades, outer space law has moved from the realm of science fiction to the realm of legal necessity. Intriguing commercial prospects have prompted an increased number of governmental and private ventures into outer space and have created a demand for expertise to define the legal parameters of such ventures.[1] The result has been the emergence of a small but vigorous legal practice area[2] that combines a curious mix of international, administrative and business law.[3] This field of law is likely to grow and its mixture of disciplines is likely to become more diverse. As increasing numbers of humans work and live in outer space, increased attention must be paid to the rules governing their conduct and interactions.[4] Both practition-

[1] *See* Edward Cohen, *Launching a Legal Field*, 246 SCI. 132 (1989).

[2] *Id.*; Glenn H. Reynolds, *Space Law in the 1990s: An Agenda for Research*, 31 JURIMETRICS J. 1, 2-3 (1990).

[3] For an overview of this emerging area, see GLENN H. REYNOLDS & ROBERT P. MERGES, OUTER SPACE: PROBLEMS OF LAW AND POLICY (1989).

[4] *See generally* William J. Brennan, Jr., *Space Colonization and the Law*, 3 HARV. J.L. & TECH. 7 (1990) (discussing the need for rules in the face of expanding outer space activity).

ers and academic commentators are racing to define and resolve the legal questions that are beginning to arise on this "final frontier."[5]

Many of the most crucial, yet largely unaddressed, legal questions expected to arise in outer space law are those involving the interaction of federal and state regulation. The United States is a major player in the outer space arena; most American ventures to date, sponsored by the federal government, have occurred under the purview of federal law. The United States is a federation, however, and federal law has always existed against the backdrop of state law. Federal law has been called "interstitial,"[6] and even where a comprehensive federal regulatory scheme exists, state law is often expected to lend coherence to the area. In other instances, the operation of state law would conflict with federal interests, and state regulation is prohibited. Defining the proper relationship between state and federal law has never been a simple legal exercise, but it is likely to be important in the realm of space law, where federal regulation is sparse and increasing numbers of private actors are entering the field.

This Article examines one area in which state law is well developed and federal law is non-existent: trade secret protection. Because of the drive toward commercial use of outer space, trade secrecy is likely to be a matter of concern in the near future. In addition, a discussion of the application of trade secret law to outer space activity may serve as a pattern for discussing the application of other areas of state law.

Part I of the Article reviews the recent move toward commercialization of outer space and notes the need for trade secret protection to foster that trend. Because of the absence of any federal provisions for trade secret protection, the application of state trade secret law to outer space activity is explored as an alternative. This alternative may be hindered, however, by the preemptive effect of federal outer space patent legislation. Part II describes the legal background necessary to an analysis of federal

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[5] *See generally* Richard DalBello, *Jurisdiction, Intellectual Property, and Tort Law Aboard the Space Station, in* AMERICAN ENTERPRISE, THE LAW, AND THE COMMERCIAL USE OF SPACE, Vol. III, 41, 41-42 (1987) [hereinafter AMERICAN ENTERPRISE]; U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, SPACE STATIONS AND THE LAW: SELECTED LEGAL ISSUES—BACKGROUND PAPER 5 (1986) [hereinafter OTA BACKGROUND PAPER].

[6] *See, e.g.*, Shell Oil Co. v. Iowa Dep't of Revenue, 488 U.S. 19, 27 (1988); United States v. Little Lake Misere Land Co., 412 U.S. 580, 593 (1972); Richards v. United States, 369 U.S. 1, 7 (1962).

preemption, including an overview of the purposes of patent and trade secret law, the standards created by the United States Supreme Court to determine preemption and the manner in which these standards have been applied in matters of intellectual property protection. Part III then discusses the likely outcome when these standards are applied to commercial activity in outer space, and suggests that the outcome is likely to be fraught with contradictions and uncertainty. No simple legislative solution is likely to resolve this uncertainty; rather, federal courts will have to play an active role in shaping and creating the law governing American ventures in outer space.

I. COMMERCIAL ACTIVITY IN OUTER SPACE

Any discussion of the need for rules governing outer space activity must be rooted in the events giving rise to that need. Some general rules for outer space conduct are already in place, but this framework was erected many years ago, and may not be well suited to the present situation. The most drastic change in recent outer space activity has been the diversification of that activity. Rather than the traditional dominance of the United States and the Soviet Union, the field has seen the entry of new spacefaring nations, some decline in the influence of one superpower and the disappearance of the other. These changes reflect the rise of economic forces as a major factor in international activity; in space as on earth, commercialization and privatization are becoming the new order.

A. Commercialization and Privatization

Until recently, in the United States the federal government held a virtual monopoly over outer space activity. Over the last decade, however, the government has relinquished its hold on such activity and instead has encouraged private sector involvement in outer space.[7] This process of privatization began under the Reagan Administration with the announcement of a policy to foster increased outer space activity by attracting private investment.[8] The policy was implemented through a program of statu-

[7] *See* Steven H. Flajser, *Tax Law and Business Investments in Space, in* AMERICAN ENTERPRISE, *supra* note 5, at 91, 92-94; Dennis J. Helfman, *Patents in Space: Encouraging and Protecting Out-of-This-World Investments, in* AMERICAN ENTERPRISE, *supra* note 5, at 115, 116-17.

[8] *See* Ronald Reagan, Address Before a Joint Session of the Congress on the State of the Union (Jan. 25, 1984), *in* 1984 PUB. PAPERS 87, 90 [hereinafter State of the Union Address] (discussing private sector space incentives); Ronald Reagan,

tory and regulatory changes that altered or eliminated provisions that would discourage commercial space activities, enacted new provisions designed to encourage such ventures and privatized many government-dominated outer space activities.[9]

The Bush Administration renewed this policy with the promulgation of a national space policy that affirmed a commitment to permanent manned presence in space, including a low earth orbit space station and eventual construction of a lunar base.[10] The Bush Administration proposed to attain these goals by capturing the economic benefits of outer space activity through encouragement of private-sector investment in outer space activity.[11] Such investment was to be encouraged by transferring government space technology to the private sector and by making any unused capacity of government space facilities available to the private sector.[12] In addition, the Bush space policy was committed to increased governmental use of private-sector capacity and to joint ventures between government and private sectors.[13] Thus, government agencies were encouraged to act as "anchor tenants" to make commercial space ventures viable in the short term, but with a long-term view toward service of non-governmental customers.[14]

The Reagan and Bush administrations' space policies have already opened the way to establishing private investment in a variety of space-based services, including burgeoning markets in satellite communications, commercial space launch services and remote sensing services.[15] Such space-related activities are ex-

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Remarks at a White House Ceremony Marking the 15th Anniversary of the Apollo 11 Lunar Landing (July 20, 1984), *in* 1984 PUB. PAPERS at 1066-67 (same).

9 *See* Flajser, *supra* note 7.

10 *See* George Bush, Remarks on the 20th Anniversary of the Apollo 11 Moon Landing (July 20, 1989), *in* 1989 PUB. PAPERS 990, 991.

11 *See National Space Policy*, November 2, 1989 (copy on file with the author); *see also White House Fact Sheet on the National Space Policy* (Nov. 16, 1989), *in* 1989 PUB. PAPERS 1531.

12 *See* Remarks on the 20th Anniversary of the Apollo 11 Moon Landing, *supra* note 10; *National Space Policy*, *supra* note 11, at 6-9; *U.S. Commercial Space Policy Guidelines*, February 12, 1991 (copy on file with the author); *see also* Statement by Press Secretary Fitzwater on United States Commercial Space Policy Guidelines (February 12, 1991), 27 WEEKLY COMP. PRES. DOC. 167.

13 *See National Space Policy*, *supra* note 11, at 3; *National Space Council 1990 Report to the President* 25-26 (1990).

14 *See U.S. Commercial Space Policy Guidelines*, *supra* note 12, at 5.

15 *See* Helfman, *supra* note 7, at 116-23; NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, COMMERCIAL USE OF SPACE: A NEW ECONOMIC STRENGTH FOR AMERICA 8-18. Executive branch support of outer space commercialization is likely to continue under the newly-elected Clinton administration. Vice-President Albert

pected to generate $100-200 billion in annual revenues by the year 2000.[16] The most alluring promise of outer space commercialization, however, appears to lie in the area of materials processing, where the unique environment of earth orbit might be exploited to enhance scientific research and industrial processes.[17] The promise of a permanent human presence in space carries with it the possibility of permanent outer space research and manufacturing facilities. The economic benefit that may flow from such facilities has become increasingly apparent from recent experiments conducted in low earth orbit.

1. Microgravity research

Although the environment in outer space is sometimes casually described as "weightless," very slight gravitational forces are still measurable.[18] The effects of such microgravity are often negligible, however, and sensitive scientific processes that would be disrupted in Earth's strong gravitational field yield startling results in low orbit. For example, a microgravity environment has proven to greatly enhance biochemical studies of protein structure.[19] Large, regular crystals of a given protein are central to determining the structure of that protein in x-ray diffraction studies.[20] On Earth, strong gravitational effects tend to produce convection currents in the solution where crystals are grown; these currents disrupt the orderly growth of the crystals, producing flawed or very tiny crystals.[21] Recent experiments performed aboard the United States space shuttle have produced large, well-ordered protein crystals because of the absence of strong gravi-

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Gore, during his tenure in the Senate, sponsored a variety of initiatives related to outer space commercialization, including the Patents in Space Act; Gore has been designated to formulate the new administration's science and industrial policy. *See generally* Wil Lepowski, *Science-Technology Policy: Clinton Victory Will Mean Vast Changes*, CHEMICAL & ENGINEERING NEWS, Nov. 9, 1992, at 4.

16 *See* David Osborne, *Business in Space*, THE ATLANTIC MONTHLY, May 1985, *reprinted in Patents in Space: Hearing Before the Subcomm. on Courts, Civil Liberties, and the Administration of Justice of the House Comm. on the Judiciary*, 99th Cong., 1st Sess. 45, 51 (1985) [hereinafter *1985 Hearing*].

17 *See National Space Council 1990 Report to the President*, *supra* note 13, at 21; COMMERCIAL USE OF SPACE, *supra* note 15, at 14.

18 *See* Reynolds & Merges, *supra* note 3, at 13-14.

19 *See* Lawrence J. DeLucas, *Protein Crystal Growth in Microgravity*, 246 SCI. 651 (1989).

20 For an overview of x-ray diffraction studies of protein structure, see Dan L. Burk, *Application of United States Patent Law to Commercial Activity in Outer Space*, 6 SANTA CLARA COMP. & HIGH TECH. L.J. 295, 302-304 (1991).

21 *See* Robert Pool, *Zero Gravity Produces Weighty Improvements*, 246 SCI. 580 (1989).

tational interference.[22] The crystals produced in microgravity have proven valuable in x-ray diffraction studies of the proteins crystallized.[23]

Microgravity experiments are also becoming important in understanding the fundamental forces in many physical and biological processes. When the influence of strong gravity is removed, important physical influences that might have gone unnoticed on Earth are revealed. For example, experiments performed in microgravity are fostering new insight into the fluid dynamics of both experimental and living systems.[24] Electrophoretic separation of biological materials was thought to be limited by gravitational effects when performed on Earth.[25] The limitations on such separations, however, did not disappear when they were performed in space, indicating a need to rethink certain fundamental assumptions regarding the physics of the process.[26] By contrast, the growth of living cells appears to be profoundly affected by fluid dynamics generated by gravity; in comparison to normal cells, cells grown in microgravity have decreased biological activity and loosely packed cellular material.[27]

2. Orbital manufacturing

Outer space experimentation of the sort described above is already yielding new knowledge, and some of this basic research will likely be applied to change manufacturing processes on Earth.[28] Such experiments, however, may also pave the way for unique manufacturing processes carried out in outer space itself. Although the precise character of the improved materials that may be produced in outer space is still somewhat speculative, the

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22 *See* DeLucas, *supra* note 19; *see also Patents in Space: Hearing on H.R. 2946 Before the Subcomm. on Courts, Intellectual Property, and the Administration of Justice of the House Comm. on the Judiciary*, 101st Cong., 1st Sess. 30 (1989) [hereinafter *1989 Hearing*] (statement of Dr. Charles E. Bugg, Director, Center for Macromolecular Crystallography, University of Alabama at Birmingham).

23 *See* DeLucas, *supra* note 19.

24 *See* Richard Everett, *YCC Gets Spaced Out*, AM. CHEM. SOC. YOUNG CHEMISTS COMM. NEWSL., (American Chemical Society, Washington, D.C.) Spring 1991, at 7; Stu Borman, *Chemical Engineering: Ready for Space*, CHEMICAL & ENGINEERING NEWS, March 18, 1991, at 16; *Biochemist Studies Crystal Growth on Space Shuttle*, CHEMICAL & ENGINEERING NEWS, August 19, 1991, at 7.

25 *See* Everett, *supra* note 24.

26 *Id.*

27 *Id.*

28 *See* COMMERCIAL USE OF SPACE, *supra* note 15, at 4.

results of initial investigations are promising.[29]

For example, the same microgravity properties that allow enhanced formation of protein crystals are likely to allow improvements in the production of other types of crystals, such as silicon or gallium arsenide crystals for semiconductor manufacture.[30] In addition, manufacture of metal composites or alloys may be enhanced in space because a microgravity environment will allow better distribution of the materials forming the composite.[31] Materials of different densities, which would separate during processing in Earth's gravitational field, will remain suspended during melting and solidification in microgravity.[32] Finally, a microgravity environment offers the prospect of processing materials without a physical container; such processing would avoid problems of contamination and nucleation from contact with the container surface.[33]

Outer space manufacturing may also lend itself to culturing of human tissues and organs.[34] Culturing of animal cells in the laboratory is a mainstay technology of current biomedical research.[35] When cells are cultured under artificial conditions, however, they tend to form flattened layers unlike the three dimensional structures that are found in living organisms.[36] This effect is due in part to the press of gravity, which in nature is offset by the buoyancy of a fluid-filled womb.[37] Research is hampered by using cells that have grown in a form so unlike their natural condition, but recent work by National Aeronautics and Space Administration (NASA) researchers has led to the creation of a bioreactor mechanism that partially overcomes gravitational effects.[38] When used in a microgravity environment, the bi-

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29 *See* UNITED STATES DEPARTMENT OF COMMERCE, SPACE COMMERCE: AN INDUSTRY ASSESSMENT 97 (1988).

30 *See* SPACE COMMERCE, *supra* note 29, at 105; *see also* Borman, *supra* note 24.

31 *See* Everett, *supra* note 24; SPACE COMMERCE, *supra* note 29, at 100.

32 *See* SPACE COMMERCE, *supra* note 29, at 99.

33 *See id.*

34 *See* Tim Beardsley, *Shear Bliss*, SCI. AM., Feb. 1992, at 27.

35 *See generally* BRUCE ALBERTS ET AL., MOLECULAR BIOLOGY OF THE CELL 160-63 (2d ed. 1989) (discussing cell culture techniques).

36 *Id.*

37 *See* Kathy Sawyer, *Growing Spare Parts for People in Space*, WASHINGTON POST, November 18, 1991, at A3; Beardsley, *supra* note 34.

38 Sawyer, *supra* note 37, at A3. The NASA bioreactor is already in demand because it produces superior cell cultures even on Earth. *Id.* The bioreactor can only partially counter the effect of strong gravity on cell culturing, however. *Id.* The full benefit of this process will not be realized until the bioreactor is used in the setting for which it was designed: aboard the proposed space station *Freedom*. *Id. See also infra* notes 62-74 and accompanying text.

oreactor promises to allow scientists to reproduce the three dimensional structure of natural tissues, perhaps including the production of replacement organs formed in an outer space "womb."[39]

For the present, the products of microgravity processing are somewhat less exotic than human organs or novel alloys but still reflect the unique qualities of such manufacture. Microscopic polystyrene beads manufactured aboard the United States space shuttle are already available for sale.[40] Because of its origin in microgravity, each bead is a perfect sphere 10 microns in diameter; the beads are useful as references for counting red blood cells, measuring particulate air pollution or calibrating certain sensitive machines.[41]

3. Multinational ventures

The promise of commercial opportunities in outer space has sparked interest not only in the United States, but in other nations as well. Traditionally, outer space exploration has been dominated by the United States and the former Soviet Union; the massive space programs sponsored by these nations have been driven primarily by political and military factors, with some consideration for scientific interests.[42] The shift toward an emphasis on space exploration for commercial opportunities, however, has attracted the interest of new players, including Japan and a consortium of European nations, all eager to develop the unique economic opportunities available from outer space research and manufacturing.[43]

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39 "The bottom line is: I think it's possible to grow organs [for implant in humans] in space — theoretically. I don't want to sound like a way-out kook, and I know this is far in the future. But that is the ultimate utility of this kind of biotechnology." Sawyer, *supra* note 37, at A3 (quoting J. Milburn Jessup, Harvard Medical School).

40 SPACE COMMERCE, *supra* note 29, at 100.

41 *See* Osborne, *supra* note 16, at 45, 51.

42 The secondary status of scientific interests remains as true as ever. For example, it has become increasingly clear that the research value of the proposed space station will be less than that of many less expensive space research ventures, such as unmanned probes or experiment packages. *See* Eliot Marshall, *Starving Science to Feed Space Station*, 252 SCI. 1483 (1991); Eliot Marshall, *Slimmer Station Wins White House Approval*, 251 SCI. 1556 (1991). The current administration has emphasized, however, that the space station program will continue because of its political value, rather than its scientific value. *Id.* at 1556, 1557.

43 *See* COMMERCIAL USE OF SPACE, *supra* note 15, at 7, 16; SPACE COMMERCE, *supra* note 29, at 80; *see also* Eddie Scuderi, *Space and the Law of Intellectual Property*, 63 LAW INST. J. 492 (1989) (discussing legal questions arising from proposed launch facility in Australia).

a. *International programs*

The European Space Agency (ESA) constitutes one of the most ambitious and successful programs among the more recent entries into the space race. Bankrolled by a consortium of thirteen European nations, spearheaded by the major economic powers of Germany and France, ESA has already fostered an enormously profitable commercial launch industry that has captured fifty percent of the world commercial satellite launch market.[44] The European launch system, Ariane, was in fact the only commercial launcher available in the free world when the American space shuttle flights were canceled after the *Challenger* disaster.[45] Projects now underway for the ESA include development of a shuttle-like orbiter, called *Hermes*, and a space station research module, called *Columbus*.[46] Although portions of this ambitious space program have been delayed due to the massive cost of German reunification,[47] ESA is expected to continue as a leader in space activity.

Similarly, Japan, another major world economic power, has begun to turn its attention to activity in outer space.[48] By comparison to leading spacefaring nations, Japan's outer space budget is modest, due in part to the absence of any Japanese military budget that might assume a share of the cost of developing space technology.[49] Unlike American space policy, Japanese space policy has been fueled almost entirely by the possibility of commercial success, rather than by political goals of space leadership.[50] The Japanese have followed the same strategy for space technology that has been successful in other industrial enterprises: identify the world leader in technology, learn from that nation and then capitalize upon that knowledge to build a strong native industry.[51] Consequently, much of Japan's space program, through the present, has been "piggybacked" on that of the

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44 *See* Richard Sietmann & Peter Coles, *High Noon for Europe's Space Plans*, 54 SCI. 366, 366 (1991).

45 *See id.* at 366; Glenn H. Reynolds & Robert P. Merges, *Toward An Industrial Policy for Outer Space: Problems and Prospects of the Commercial Launch Industry*, 29 JURIMETRICS J. 7 (1988).

46 *See* Sietmann & Coles, *supra* note 44, at 366.

47 *Id.*; Steven Dickman, *Europe's Space Plans on Hold*, 254 SCI. 1289 (1991).

48 *See* John M. Logsdon, *U.S.-Japanese Space Relations at a Crossroads*, 255 SCI. 294 (1992).

49 *Id.*

50 *Id.* at 296.

51 *Id.* at 297.

United States.[52] The Japanese, however, are currently pushing to acquire space technology independence by developing their own launch systems.[53]

The multinational and collaborative features of these burgeoning space programs typify the growing trend in outer space projects, particularly where commercial results are expected. For example, the United States and ESA have recently collaborated on a series of missions involving the United States space shuttle and a laboratory module built by ESA.[54] This Spacelab module, designed to be carried in the Shuttle hold, enabled scientists from various nations to conduct pressurized and unpressurized microgravity experiments of the type described above.[55] Such collaborative projects allow the United States to spread the high cost of outer space research, while allowing its partner nation to benefit from the United States' leading space technology.

Such benefits have not been limited to partnerships with the United States. For example, an American company, Payload Systems, contracted to conduct protein crystallization experiments aboard the Soviet MIR space station.[56] The space program funded by the former Soviet Union accrued considerable proficiency in areas of space technology critical to outer space development, most notably in relation to orbital space stations.[57] In the final years of the Soviet nation, use of these facilities was increasingly offered to Western collaborators, particularly the French.[58] Joint space projects with the United States were also planned during meetings between Presidents Bush and Gorbachev.[59] The collapse of the Soviet Union, however, has probably suspended such collaborative projects for the foreseeable future. Recent events in the territories formerly controlled by the Soviet Union have left the control of Soviet launch facilities in doubt,[60] and the heirs to the Soviet space legacy now ap-

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52 *Id.*

53 *Id.* at 298.

54 *See International Crew Studies Microgravity in Space*, CHEMICAL & ENGINEERING NEWS, Jan. 27, 1992, at 5 (discussing recent Spacelab mission).

55 *See* SPACE COMMERCE, *supra* note 29, at 84-85, 102.

56 *See id.* at 87.

57 In contrast to the United States' relatively short missions, Soviet cosmonauts gained extensive experience in living and working in microgravity environments, spending up to 11 months at a time aboard the MIR space station. *See id.*

58 *Id.*

59 *See* Richard Seltzer, *U.S.-Soviet Space Research Expanded*, CHEMICAL & ENGINEERING NEWS, August 12, 1991, at 24.

60 The launch center at Baikonur is located in the breakaway republic of Kazakhstan. Dickman, *supra* note 47.

pear likely to auction off much of the space program's hardware, including the MIR station, to Western buyers to raise much needed hard currency.[61]

b. Space station *Freedom*

Perhaps the most prominent of the multinational ventures now under consideration is the proposed space station *Freedom*. This project was initiated as part of the Reagan Administration space initiative and included an invitation for other nations to participate.[62] Nine of the thirteen ESA nations, together with Japan and Canada, have joined in the project.[63] This international consortium will be reflected both in the personnel aboard the station and in the structure of the station itself.[64] Partner nations will provide an international crew of four persons that will occupy the completed station in four to six month rotations.[65] Additionally, different nations from the consortium will provide different components of the space station structure.[66]

As originally envisioned, the station was to consist of four interconnected habitable modules, together with a latticework truss structure extending from the module core and several free-flying space platforms.[67] Budgetary constraints in the United States and Europe have forced some reductions in the size and operations of this original plan, but the overall concept has remained the same.[68] The United States is to provide two of the habitable modules.[69] Access to the station will also be provided by the United States via the space shuttle.[70] A third module,

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61 *See Rockets for Sale*, 255 SCI. 1209 (1992).

62 *See State of the Union Address*, *supra* note 8.

63 *See* Mary B. McCord, Note, *Responding to the Space Station Agreement: The Extension of U.S. Law into Space*, 77 GEO. L.J. 1933, 1933-34 (1989); David C. Stewart, Note, *Resolution of Legal Issues Confronting the International Space Station Project: A Step Forward in the Development of Space Law*, 29 VA. J. INT'L L. 745, 746 (1989); R. Oosterlinck, *The Intergovernmental Agreement and Intellectual Property Rights*, 17 J. SPACE L. 23, 23-24 (1989).

64 *See* McCord, *supra* note 63, at 1938-39; Stewart, *supra* note 63, at 746-48; Oosterlinck, *supra* note 63, at 24-25.

65 *See* OTA BACKGROUND PAPER, *supra* note 5, at 3.

66 *Id.*

67 MARCIA B. SMITH, CONGRESSIONAL RESEARCH SERVICE ISSUE BRIEF: SPACE STATIONS 4 (October 6, 1989) [hereinafter CRS ISSUE BRIEF].

68 *See* Eliot Marshall, *Slimmer Station Wins White House Approval*, 251 SCI. 1556 (1991).

69 *See* CRS ISSUE BRIEF, *supra* note 67; OTA BACKGROUND PAPER, *supra* note 5, at 3.

70 *See* Eliot Marshall, *Space Station Science: Up in the Air*, 246 SCI. 1110, 1110-11 (1989).

called the *Columbus* module, is to be provided by ESA, as are two of the free-flying platforms to be associated with the station.[71] The final module, the Japanese Experimental Module, will be built by Japan and will provide both pressurized compartments and compartments exposed to outer space.[72] In addition, a fourth member of the multinational consortium, Canada, will provide a robotic arm to be deployed as part of the truss structure.[73] Although the station's multinational structure capitalizes on the benefits of each partner's technological expertise, it also forms the basis for a potentially tangled legal regime.[74]

B. The Legal Milieu

International law, derived from several different sources, primarily governs the interaction of spacefaring nations.[75] First, the activities of the many entities now operating in outer space are subject to the principles set out in a system of international treaties.[76] Second, customary international law may subject the spacecraft or the citizens of various nations to the laws of those particular nations. Third, individual nations may have entered into treaties or agreements among themselves that bind the signatories to a particular set of laws. Each of these bodies of law plays an important role in assessing the rules that govern outer space activity.

1. International treaties

The principal treaty governing the conduct of outer space operations, carrying the imposing title of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, is generally known simply as the Outer Space Treaty.[77] Three subsequent treaties clarify and implement various provisions of the Outer Space Treaty dealing with registration of space objects,[78] liability for damage caused by space objects[79]

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71 *See* CRS ISSUE BRIEF, *supra* note 67; OTA BACKGROUND PAPER, *supra* note 5, at 3.

72 *See* Logsdon, *supra* note 48, at 299.

73 *See* Marshall, *supra* note 70.

74 *See* OTA BACKGROUND PAPER, *supra* note 5, at 5.

75 *Id.* at 15.

76 *Id.*

77 October 10, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

78 Convention on Registration of Objects Launched into Outer Space, Septem-

and the rescue of astronauts.[80]

These treaties operate against a backdrop of customary international law that specifies the bases on which nations may assert jurisdiction over a given matter. In general, nations assert legal jurisdiction based on territoriality, i.e., over matters occurring within their borders.[81] Nations may also claim jurisdiction based on nationality, i.e., over their own citizens whether within the nation's borders or not.[82] Occasionally, nations may also seek jurisdiction over acts committed by anyone, anywhere, when those acts affect the nation's security or integrity, or are universally recognized as crimes.[83]

As a general rule, the treaties that govern outer space activity eschew territoriality and instead declare principles of openness and accessibility to space. The Outer Space Treaty mandates that the use of outer space be open to all nations, and that no nation may claim sovereignty over any portion of outer space.[84] The treaty also encourages international cooperation in assuring scientific freedom in outer space; to this end, nations are to report the nature, conduct and results of space explorations to the Secretary General of the United Nations who will in turn widely disseminate the information.[85]

Nationality, rather than territoriality, generally takes the lead in determining jurisdiction over outer space activity. This approach is primarily implemented through a system of international registry. The Outer Space Treaty, together with the Convention on Registry of Objects Launched Into Outer Space, declares that nations retain jurisdiction and control over space objects of their registry.[86] These treaties also specify that owner-

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ber 15, 1976, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

79 Convention on International Liability for Damage Caused by Space Objects, October 9, 1973, 24 U.S.T. 2389 [hereinafter Liability Convention].

80 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, December 3, 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119.

81 *See* OTA BACKGROUND PAPER, *supra* note 5, at 25-26 n.38 (citing S. Houston Lay & Howard J. Taubenfeld, THE LAW RELATING TO ACTIVITIES OF MAN IN SPACE (1970)); Glenn H. Reynolds, *Legislative Comment: The Patents in Space Act*, 3 HARV. J. L. & TECH. 13, 18 (1990); *1989 Hearing*, *supra* note 22, at 47-48 (statement of Glenn H. Reynolds, Associate Professor, College of Law, University of Tennessee).

82 For further discussion on this point, see *supra* note 81.

83 *Id.*

84 *See* Outer Space Treaty, *supra* note 77, at art. II.

85 *Id.* at art. I, XI.

86 *See id.* at art. VIII; Registration Convention, *supra* note 78, at art. II.

ship of objects does not change simply because they are launched into outer space.[87] Additionally, the Outer Space Treaty, together with the Convention on International Liability for Damage Caused by Space Objects, provides that nations are responsible for damage caused by their nationals or by space objects on their registry.[88]

These principles leave the jurisdictional character of outer space open to some dispute. Under one legal theory, outer space is classified as *res nullius*, freely appropriable for use by first comers.[89] A different school of thought, primarily espoused by developing nations that lack access to outer space, maintains that outer space is *res communis*, or the common heritage of mankind.[90] Under this theory, any use of outer space would require international community approval and must be for the benefit of all nations.[91] The United States has endorsed a position between these two extremes.[92] The former seems incompatible with the overall scheme of the applicable outer space treaties; like Antarctica or international waters, outer space cannot be permanently appropriated for the exclusive use of any nation.[93] The latter theory seems incompatible with private development of outer space opportunities because no incentive would exist to invest in activities if others who did not invest would reap the benefits.[94] Rather, the United States has adopted a position of freedom of space for use by all, under which no nation may permanently claim any portion of outer space, though a nation may engage in the use of outer space if it does so with respect for other nations.[95] Under this approach, entities that expend resources and

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87 *See* Outer Space Treaty, *supra* note 77, at art. VIII.

88 *Id.* at art. VII; Liability Convention, *supra* note 79.

89 *See* Fred Kosmo, Note, *The Commercialization of Space: A Regulatory Scheme that Promotes Commercial Ventures and International Responsibility*, 61 S. CAL. L. REV. 1055, 1073-74 (1988).

90 *Id.* at 1074.

91 *See id.* at 1073-74.

92 *See* Helfman, *supra* note 7, at 133.

93 *See* Helen Shin, Note, *"Oh I have slipped the surly bonds of earth": Multinational Space Stations and Choice of Law*, 78 CAL. L. REV. 1375, 1379-82 (1990). The analogy between outer space and the high seas is a familiar feature of outer space law and may be a useful approach if used with some caution. *See generally* Hamilton DeSaussure, *Astronauts and Seamen — A Legal Comparison*, 10 J. SPACE L. 165 (1982); Hamilton DeSaussure, *Maritime and Space Law: Comparisons and Contrasts*, 9 J. SPACE L. 933 (1981).

94 *See* Kosmo, *supra* note 89, at 1067.

95 *See* S. REP. No. 266, 101st Cong., 2d Sess. 5-6 (1990), *reprinted in* 1990 U.S.C.C.A.N. 4061, 4062; *see also* Kosmo, *supra* note 89, at 1074; Helfman, *supra* note 7, at 133.

take risks to develop outer space opportunities should reap the benefit of resulting profits and technical discoveries.[96]

2. The Intergovernmental Agreement

Where space station *Freedom* is concerned, an additional layer of legal standards will arise from the Intergovernmental Agreement (the IGA) signed by the participants.[97] In accordance with the Outer Space Treaty and other international agreements discussed above, the IGA designates jurisdiction almost exclusively by means of nationality principles.[98] The IGA provides that each participant nation shall retain jurisdiction and control over the space objects on its registry and that each participant nation shall have jurisdiction over its own nationals.[99] Some commentators have construed the first of these provisions as a concession to territoriality, according jurisdiction to each participant over the "territory" of its particular module.[100] This type of "territoriality" is primarily a legal metaphor, however.[101] With regard to ships on the high seas, the United States Supreme Court has observed that "[t]he jurisdiction which [this metaphor] is intended to describe arises out of the nationality of the ship, as established by her domicile, registry and use of the flag, and partakes more of the characteristics of personal than of territorial sovereignty."[102] Much the same may be said of spacecraft outside of Earth's atmosphere; because of the scheme of international treaties discussed above, no territorial sovereignty or jurisdiction exists in outer space, only registry and personal jurisdiction.[103]

The potential blend of jurisdiction by module and individual has been termed, with some justification, "probably unwise."[104] The scheme promises to generate a bewildering array of potential jurisdictional claims as nationals from any given participating

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96 *See* Kosmo, *supra* note 89, at 1067, 1085.

97 Agreement on Cooperation in the Detailed Design, Development, Operation, and Utilization of the Permanently Manned Civil Space Station, September 29, 1988 [hereinafter Intergovernmental Agreement] (on file at the National Aeronautics and Space Administration Headquarters Library, Washington, D.C.).

98 *See* McCord, *supra* note 63, at 1939.

99 *See* Intergovernmental Agreement, *supra* note 97, at art. 1.

100 *See* McCord, *supra* note 63, at 1940.

101 *See* Reynolds, *supra* note 81, at 21-24; Burk, *supra* note 20, at 319-26.

102 Cunard Steamship Co., Ltd. v. Mellon, 262 U.S. 100, 123 (1923).

103 *See* Bin Cheng, *The Commercial Development of Space: The Need for New Treaties*, 19 J. SPACE L. 17, 41 (1991).

104 Stewart, *supra* note 63, at 754.

country move from module to module, any of which may be on a different participant's registry.[105] The jurisdictional melange may prove particularly troublesome for determining ownership and control of industrial or scientific research results, as researchers of a given nationality are unlikely to confine their research activities to their nation's module, but rather will be using facilities in all the modules.[106]

Neither do the IGA's additional provisions on criminal law, tort liability and intellectual property rights appear to offer any certainty that would simplify possible disputes as to control over new discoveries. Indeed, many of the provisions appear to further complicate the matter. The tort provisions provide a cross-waiver of liability, but provide that the cross-waiver does not extend to intellectual property claims.[107] The intellectual property provisions of the agreement provide that activity occurring on board a given module will be deemed to have occurred in the territory of the nation on whose registry the module is carried.[108] For the *Columbus* module, any ESA member may consider the activity to have occurred in its territory, further complicating the station's jurisdictional patchwork.[109]

Although most commentators have discussed the IGA intellectual property provisions only as related to patents,[110] the agreement's definition of "intellectual property" is probably broad enough to include other types of protection, such as trade secrets. During the negotiation of the agreement, the definition of intellectual property found in Article 2 of the Convention Establishing the World Intellectual Property Organization (WIPO) was adopted.[111] That definition includes "protection against unfair competition, and all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields."[112] This IGA provision is likely to be especially important to contin-

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105 *See* DalBello, *supra* note 5, at 47-48; Charles B. Meyer, *Protecting Inventor Rights Aboard an International Space Station*, 70 J. PAT. & TRADEMARK OFF. SOC'Y 332, 343 (1988).

106 *See* Meyer, *supra* note 105.

107 *See* Intergovernmental Agreement, *supra* note 97, at art. 16, para. 3, subpara. d.

108 *See id.* at art. 21, para. 2.

109 *Id.*

110 *See, e.g.*, McCord, *supra* note 63, at 1951-53; Oosterlinck, *supra* note 63, at 26-27.

111 Convention Establishing the World Intellectual Property Organization, July 14, 1967, 21 U.S.T. 1749, 828 U.N.T.S. 3 [hereinafter WIPO Convention]; *see also* Stewart, *supra* note 63, at 756; Oosterlinck, *supra* note 63, at 25-26.

112 WIPO Convention, *supra* note 111, at art. 2 (viii).

ued private investment in space, but only if some definitional framework is provided for its implementation.

3. Patent protection

The uncertainty in the intellectual property provisions of the *Freedom* IGA may prove troublesome for space station participants hoping to profit from outer space commercialization. The mainstay of the commercialization movement is investment by private business entities, but these firms may be reluctant to invest in outer space ventures if the potential profits are uncertain.[113] Commercial space ventures are already known to be capital intensive and high risk, with an uncertain payback period.[114] Intellectual property rules, particularly the availability of patents, have been suggested as important tools to reassure outer space investors that their speculation carries a reasonable chance of making money.[115] The availability of intellectual property law for outer space has, however, posed a series of legal challenges.

a. *"Floating island" jurisdiction*

Although a comprehensive federal patent scheme exists in the United States, the application of these laws to outer space ventures has been a question of concern because of language in the patent statutes. Many provisions of the patent law provide that they are applicable to activities in the "United States" or in "this country."[116] The definitional section of the patent laws specifies that these terms refer to "the United States of America, its territories and possessions."[117] The Supreme Court had accordingly held that United States patent law generally lacks an extraterritorial effect.[118] Given the international character of outer space, which denies any territorial claim, these statutory

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113 *See* OTA BACKGROUND PAPER, *supra* note 5, at 5-6; Meyer, *supra* note 105, at 333, 345.

114 *See* SPACE COMMERCE, *supra* note 29, at 91, 92, 111.

115 *See, e.g., 1985 Hearing, supra* note 16, at 14-15 (statement of Donald S. Chisum, Professor, University of Washington Law School); *Statement on Signing the Bill Ensuring the Applicability of Patent Law to Activities in Outer Space*, 26 WEEKLY COMP. PRES. DOC. 1828 (Nov. 19, 1990).

116 *See, e.g.*, 35 U.S.C. §§ 102, 271(a) (1988); *see also 1985 Hearing, supra* note 16, at 16-19 (testimony of Donald S. Chisum, Professor, University of Washington Law School) (discussing 35 U.S.C. §§ 102, 271(a) as applied to outer space activity).

117 35 U.S.C. § 100(c) (1988).

118 *See* Deepsouth Packing Co., Inc. v. Laitram Corp., 406 U.S. 518, 531 (1972).

provisions have made extension of United States patent laws to outer space a doubtful legal proposition.

One proposed analysis of the question of outer space patents indicated that no problem existed at all, because United States spacecraft were in some sense equivalent to United States territory.[119] This view was based primarily on the holdings of certain older patent cases that considered American ships on the highs seas as "floating islands" of United States territory for purposes of the patent law.[120] According to these cases, "[patent] jurisdiction extends to the decks of American vessels on the high seas, as much as it does to all the territory of the country . . . ."[121] The same principle, it was argued, could be extended to American spacecraft.[122]

More recent patent cases, however, have indicated that the courts were uncomfortable with the notion of "floating island" jurisdiction.[123] As one court stated, "a decision founded on the fiction that for purposes of the Patent Laws, United States ships and planes wherever found are United States territory, would be founded on water."[124] In addition, this legal theory had been explicitly rejected in areas other than patent law. The United States Supreme Court in particular had stressed that the jurisdictional character of ships derives more from registry than from territoriality.[125] Consequently, although the application of the "floating island" theory to United States spacecraft might lead to the correct result, there was little surety that courts would in fact employ such a problematic doctrine.[126]

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119 *See* Harry M. Saragovitz, *The Law of Intellectual Property in Outer Space*, 17 IDEA 86 (1975) (suggesting this rationale for spacecraft).

120 *See* Gardiner v. Howe, 9 F. Cas. 1157 (C.C.D. Mass. 1865) (No. 5219); Marconi Wireless Tele. Co. of America v. United States, 53 U.S.P.Q. 246 (Ct. Cl. 1942) *vacated and remanded on other grounds*, 320 U.S. 1 (1943). *See also* Brown v. Duchesne, 60 U.S. (19 How.) 183 (1856) (holding that French patent law applied to a French ship in an American port).

121 *Gardiner*, 9 F. Cas. at 1158.

122 *See* Saragovitz, *supra* note 119.

123 *See* Ocean Science & Engineering, Inc. v. United States, 595 F.2d 572 (Ct. Cl. 1979); Decca Ltd. v. United States, 191 U.S.P.Q. 439 (Ct. Cl. 1976).

124 *Decca*, 191 U.S.P.Q. at 442; *accord* Ocean Science Engineering, 595 F.2d at 574 ("[T]he constitutional power of Congress to make our patent laws applicable to processes carried out on U.S. flag ships and planes at sea is not challenged; the question is whether Congress has done so . . . .").

125 *See* United States ex rel. Clausen v. Day, 279 U.S. 389 (1929); Cunard Steamship Co. v. Mellon, 262 U.S. 100 (1923); Scharrenberg v. Dollar Steamship Co., 245 U.S. 122 (1917).

126 *See* Reynolds, *supra* note 81, at 24-25.

b. *Statutory jurisdiction*

As an alternative to "floating island" theories, Congress was urged to clarify the patent law by explicitly stating that the law extends to activities aboard United States spacecraft.[127] Legislation to this effect was introduced under the title of the Patents in Space Act, as early as 1985.[128] Although the bill enjoyed widespread support from government, industry and the international community, Congress took until 1990 to enact the bill.[129]

The Patents in Space bill was reintroduced each year during the interim, and each version contained small but important textual changes.[130] Many of the revisions made in the language of the Act prior to its enactment were calculated to accommodate the legislation to the milieu of the space station *Freedom*.[131] In particular, the Act's language was altered to avoid offending the interests of the United States' international partners. For example, nations involved in the station project expressed concern that because of the United States' dominance in the project, language in the legislation extending United States patent law to space objects under the "jurisdiction or control" of the United States might affect modules on the registry of other nations.[132] In response to this concern, certain exclusionary language was incorporated into the Act's final form.[133] Such alterations were considered crucial to avoid offending the sovereignty of partner nations.[134]

4. Trade secret protection

Enactment of the Patents in Space Act has constituted a major step toward resolving questions of intellectual property protection for outer space activity. Even though the patent question has been clarified, there still remains a large gap in the range of

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127 *See, e.g., 1989 Hearing, supra* note 22, at 9 (testimony of Robert F. Kempf, Associate General Counsel, Intellectual Property, National Aeronautics and Space Administration); *id.* at 13 (testimony of Alan J. Kreczko, Deputy Legal Advisor, U.S. Department of State); *id.* at 16-17 (testimony of James E. Denny, Acting Assistant Commissioner for Patents, U.S. Department of Commerce).

128 *See* H.R. REP. No. 788, 99th Cong., 2d Sess. pt. I. (1988).

129 Pub. L. 101-580, 104 Stat. 2863 (1990) (codified at 35 U.S.C. § 105 (West Supp. 1991)) [hereinafter Patents in Space Act].

130 For an overly exhaustive history of the Patents in Space legislation, see Burk, *supra* note 20, at 335-38.

131 *See id.* at 338-39.

132 *Id.* at 345-49.

133 *Id.*

134 *Id.*

available intellectual property protection. Inventions and discoveries that are ineligible for patents are often protected through another form of intellectual property: trade secrets.[135] The question of trade secret protection for outer space activity has yet to be addressed by Congress, but the need for such protection is clear.

a. *Actual v. trade secrecy*

Much of the incentive for investment in outer space development stems from the possibility that microgravity experiments will yield knowledge that may be applied to produce commercially valuable products. The new manufacturing techniques developed in outer space may be applied on Earth, or eventually in orbital manufacturing facilities.[136] One commentator has pointed out that many valuable industrial processes are ineligible for patent protection and so are protected under the law of trade secrets; consequently, the availability of trade secret protection for outer space activity may be more important than the availability of patent protection.[137]

The necessity of trade secret protection for outer space activity becomes all the more striking when the impossibility of actual secrecy aboard the space station is considered.[138] One possible way for investors to reap the benefits of valuable, but unpatentable, outer space discoveries would be to keep the discoveries a secret. For such a scheme to work, absolute secrecy would be required; absolute secrecy, however, is most likely not feasible in the cramped quarters of the space station.[139] Far more likely is the prospect that all those working aboard the space station, as well as their consultants and colleagues on Earth, will be aware of any new data or techniques arising from research aboard the station.

A possible alternative to actual secrecy might be some private agreement.[140] Participants in outer space ventures might re-

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135 *See generally* RESTATEMENT OF TORTS § 757 (1959); Uniform Trade Secrets Act, 14 U.L.A. 373 (supp. 1991).

136 *See* SPACE COMMERCE, *supra* note 29, at 81-83; COMMERCIAL USE OF SPACE, *supra* note 15, at 14; *National Space Council 1990 Report to the President*, *supra* note 13, at 23.

137 *See* Glenn H. Reynolds, *Space Stations and the Law: Selected Issues — Background Paper*, 27 JURIMETRICS J. 431, 436 (1987) (book review).

138 *Id.*

139 *Id.*; Katherine Durant & Glen M.W. Trowbridge, Comment, *Commerce and Outer Space: A Legal Survey*, 37 MERCER L. REV. 1551, 1556, 1571 (1986).

140 *See* Burk, *supra* note 20, at 350-51; *see also* DalBello, *supra* note 5 (suggesting

sort to a contractual arrangement designed to preserve the secrecy of valuable discoveries or processes; this approach is used for mining platforms in international waters.[141] A contractual solution is of limited value, however, because it will only cover the situations that the parties anticipate.[142] In addition, a contractual solution cannot bind those who are not parties to it. The Outer Space Treaty provides that nations shall have the right to inspect space objects.[143] Some commentators have suggested that this provision could prove troublesome for outer space investors hoping to maintain confidentiality of their discoveries.[144] Additionally, such inspectors might not be covered under a private contractual arrangement.

Far preferable to actual secrecy or contractual agreements would be the existence of a body of law that could cover unanticipated situations and that would protect investors who could not maintain actual secrecy. Trade secrecy is a form of legal protection that only requires the inventor to take reasonable steps to maintain confidentiality; if that confidentiality is breached, the trade secret holder may have the right to damages.[145] Trade secrecy also exists as a well-developed area of law able to cover virtually any factual circumstance. Thus, the operation of trade secret law may be critical to protect unpatentable but valuable discoveries stemming from outer space research or similarly unpatentable manufacturing processes employed in outer space.

Trade secret law, however, is not federal law, but state law.[146] Ideally, Congress would take the necessary action to provide for trade secret protection aboard United States spacecraft.[147] It has been suggested that this protection might be achieved by enacting a version of the Uniform Trade Secrets Act as federal law, or by simply designating the trade secret law of

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with regard to jurisdiction that "[p]re-launch agreements will probably be sufficient while space station crews are very small").

141 *See 1989 Hearing*, *supra* note 22, at 79 (statement of Glenn H. Reynolds, Associate Professor, College of Law, University of Tennessee).

142 The transaction and search costs of the parties attempting to formulate a private solution may also be undesirable. *See* Burk, *supra* note 20, at 351.

143 Outer Space Treaty, *supra* note 77, at art. XII.

144 *See* Durant & Trowbridge, *supra* 139, at 1556; Roger K. Hoover, *Law and Security in Outer Space From the Viewpoint of Private Industry*, 11 J. SPACE L. 115, 122-23 (1983).

145 *See generally* RESTATEMENT OF TORTS § 757 (1959); Uniform Trade Secrets Act, 14 U.L.A. 373 (supp. 1991).

146 *See* Reynolds, *supra* note 137.

147 *Cf.* Cheng, *supra* note 103 (asserting that all states must take the necessary steps to extend national laws for private claims to outer space).

some state as controlling for outer space activity.[148] Unfortunately, considering Congress's procrastination in passing the relatively minor amendments needed to extend United States patent law to outer space activity, the prospects for congressional consideration of another form of intellectual property protection seem dim.

b. *State jurisdiction*

In the absence of any federal law addressing trade secrets in space, participants in outer space ventures might attempt to protect their discoveries under state trade secret law. The interaction of state and federal laws in outer space has received little attention, but legal mechanisms appear to exist for individual states to assert jurisdiction over outer space activity.

Under the principles of jurisdiction outlined by the Supreme Court, states may assert jurisdiction over out-of-state entities if those entities have had certain minimum contacts with the forum state, which has statutorily authorized the exercise of such jurisdiction.[149] In some instances, the defendant's presence in the forum state may be sufficient for jurisdiction to lie;[150] in other instances, a pattern of commercial or juridical conduct relating to the forum will invoke jurisdiction.[151] In addition to the defendant's activities relating to the forum state, the availability of an alternative forum and the inconvenience to the defendant of litigating far from his usual place of residence may also be considered in determining jurisdiction.[152] These principles may extend state jurisdiction not only to United States citizens and corporations, but also to foreign nationals and corporations.[153]

Certain states, such as Texas, have statutorily authorized the very broad exercise of their courts' extraterritorial jurisdiction.[154] Commentators on the developing law of outer space have suggested that the Texas "long arm" jurisdictional statute might permit Texas courts to exercise jurisdiction over persons committing acts in outer space, based upon such person's contact

148 *See* Reynolds, *supra* note 137.

149 *See* Helicopteros Nacionales de Columbia, S.A., v. Hall, 466 U.S. 408 (1984); International Shoe Co. v. Washington, 326 U.S. 310 (1945).

150 *See* Burnham v. Superior Court of California, 495 U.S. 604 (1990).

151 *See* Burger King Corp. v. Rudzewicz, 471 U.S. 462 (1985); World-Wide Volkswagen Corp. v. Woodson, 444 U.S. 286 (1980).

152 *See* Asahi Metal Indus. Co., Ltd., v. Superior Court of California, 480 U.S. 102 (1987).

153 *See* Perkins v. Benguet Consol. Mining Co., 342 U.S. 437 (1952).

154 *See, e.g.*, TEX. CIV. PRAC. & REM. CODE ANN. §§ 17.041-17.069 (West 1992)

with "mission control" at the Johnson Space Center in Houston.[155] Presumably, Florida or California would have even better claims to assert jurisdiction over persons or entities regularly using NASA launch facilities at Cape Canaveral or landing facilities at Edwards Air Force Base.[156] Numerous other states might have the requisite "minimum contacts" with foreign corporations involved in outer space research or manufacturing that also did business within the given state. Finally, it is very likely that under the doctrine of pendant jurisdiction, federal courts empowered to hear patent infringement cases arising in outer space could also hear related trade secret claims.[157]

Once a court concluded that it in fact had authority to hear a trade secret claim arising from outer space activity, a determination would be required as to which jurisdiction's substantive law should be applied. Some recent commentators have considered the problem of such choice of law decisions for outer space activity, but these analyses have assumed that a choice of law could be made between nations.[158]

Where the United States is concerned, however, no federal or monolithic body of trade secret law exists. Thus, choice of law determination would be greatly complicated by the need to choose between the trade secret laws of fifty peculiar jurisdictions. The reasoning used to make such a choice of law would closely track the approach that has been outlined for international choice of law and would conceptually resemble the reasoning applied to determine personal jurisdiction under the United States' federal scheme. Under the analysis set forth in the Restatement (Second) of Conflict of Laws, the court determines what jurisdiction has the most significant contacts with the parties, considering the interests of the relevant jurisdictions in the outcome of the case.[159] The law of that jurisdiction is then applied.

Consequently, in an outer space trade secret dispute, it is quite conceivable that jurisdiction could be exercised by a state court that would decide to apply the substantive law of the forum or another of the fifty states to resolve the case. Indeed, this rea-

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155 *See* OTA BACKGROUND PAPER, *supra* note 5, at 74.

156 *See id.* at 74-75 (suggesting that space station crew members, returning from space through the United States via the Space Shuttle, would be subject to service of process).

157 *See* United Mine Workers of America v. Gibbs, 383 U.S. 715 (1966).

158 *See* Shin, *supra* note 93.

159 *See* RESTATEMENT (SECOND) OF CONFLICT OF LAWS §§ 6, 145 (1971).

soning could well be applied to areas of law besides that of trade secrets, thus further complicating the already bewildering jurisdictional patchwork of the multinational station *Freedom*. At least in the area of trade secret law, however, the forum for a trade secret dispute would need to answer yet another question in addition to those of personal jurisdiction and choice of law. Congress has enacted a statute dealing with intellectual property protection in outer space, and before any state intellectual property protection may be applied, the question of federal preemption must be resolved.

II. FEDERAL PREEMPTION OF TRADE SECRETS

The applicability of state law to outer space activity will be defined not only by the constitutional constraints on state jurisdiction discussed above, but also by the constitutional constraints on the operation of substantive state law in the federal union. These constraints are defined in a body of United States Supreme Court cases that attempts to define both the general interaction of federal and state law and the implication of such interaction for intellectual property law. Such an analysis must begin, however, with some discussion of the purposes and effects of each form of intellectual property protection; once the role of each is understood, their interaction may be viewed through the lens of constitutional preemption analysis.

A. Patents and Trade Secrets

Although intellectual property protection was at one time regarded primarily as an equitable means to guard inventors' rights inherent in their creations, it is today almost universally viewed as a utilitarian legal construct for the protection of ideal or intellectual goods.[160] Knowledge or ideas associated with technological advances may be created as pure intellectual goods or embodied to some degree in a physical form, such as an invention.[161] Like physical goods, intellectual goods may have great industrial value, and generating such knowledge may entail significant production costs of time and effort.[162] Unlike physical

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160 *See* ROBERT P. BENKO, PROTECTING INTELLECTUAL PROPERTY RIGHTS 16 (1987).

161 *See* Richard P. Adelstein & Steven I. Peretz, *The Competition of Technologies in Markets for Ideas: Copyright and Fair Use in Evolutionary Perspective*, 5 INT'L REV. L. & ECON. 209, 217-19 (1985); Tom G. Palmer, *Intellectual Property: A Non-Posnerian Law and Economics Approach*, 12 HAMLINE L. REV. 261, 274-77 (1989).

162 BENKO, *supra* note 160, at 17.

goods, however, intellectual goods often do not encompass natural physical barriers that exclude potential consumers.[163] Ideas, after all, may be held by more than one person at a time.[164] In addition, the distribution costs for disseminating an intellectual good such as an idea are minimal or nonexistent.[165] Once such intellectual goods are disclosed, there are no real barriers to free appropriation of the good.[166]

In this way, intellectual goods appear to resemble public goods, such as national defense, that also may be held by more than one person at a time.[167] Because it is difficult to exclude persons from deriving the benefit of the good, a significant number of persons may consume the good without recompensing the good's originator.[168] This lack of recompense may create a disincentive to create the good and the market for the good may be undersupplied.[169] The potential for an undersupply of intellectual goods is not precisely the same problem as the potential undersupply of public goods: the potential for "free riding" is likely much greater for intellectual goods. In the case of intellectual goods, unlike that of public goods, a consumer benefits only from the first unit consumed, and not from any additional units.[170] Furthermore, although public goods can usually be obtained only from the initial source, each consumer of intellectual goods becomes a potential secondary source of supply.[171] These additional complications in intellectual good supply amplify the difficulty of identifying potential consumers and estimating the good's value. Consequently, legal barriers have been developed to accomplish what physical barriers are unavailable to do: allow the intellectual good supplier to recapture his investment by excluding "free riders."

1. Patents: the federal scheme

The federal patent system comprises the most prominent set of legal barriers designed to correct potential undersupply in the

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163 *See* Paul A. Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. OF ECON. & STATISTICS 387, 389 (1954) (discussing collective consumption goods).

164 *See id.*; MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION 14 (1965) (discussing collective goods).

165 *See* BENKO, *supra* note 160, at 17.

166 *Id.*

167 *Id.*; Palmer, *supra* note 161, at 274-75.

168 *See* BENKO, *supra* note 160, at 17.

169 *Id.*

170 *See* Adelstein & Peretz, *supra* note 161, at 218-19.

171 *Id.*

market for technologically valuable intellectual goods. Article I, Section 8, clause 8 of the United States Constitution grants Congress authority to "promote the progress of science and useful arts" by securing to inventors for a limited time the rights to their work.[172] Congress has chosen to exercise this power by implementing a system of patents that grants a seventeen year exclusive right to use a new process, machine, article of manufacture or composition of matter.[173]

Because patents grant the patent holder an exclusionary right to the patented invention, patents have been loosely termed "monopolies."[174] Patent lawyers have long protested this label, noting that patents do not meet the criteria of a legal monopoly. The patent only allows the holder to exclude others from making, using or selling the invention, and does not confer on the holder an affirmative right to make, use or sell.[175] In addition, there is some evidence that patents also do not entirely meet the definition of an economic monopoly.[176] Unlike the true monopolist, patent holders may well face a marketplace containing a variety of substitutes for their products, and be forced to price their products competitively.[177] Additionally, failure to price a patent-derived product competitively may deprive the patent holder of information necessary to identify the market's boundaries.[178] Although this information may be irrelevant to the true monopolist, its lack may prevent the patent holder from dominating the market when the patent expires, allowing other firms to quickly enter and erode the patent holder's preeminence.[179] "Patent," therefore, would not seem to be synonymous with either definition of monopoly.

Nonetheless, some patents probably do confer a virtual monopoly on their holders, and all patents represent some restraint on trade.[180] Consequently, patents are likely to generate the type of inefficiencies associated with monopolies: higher prices, re-

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172 U.S. CONST. art. I, § 8, cl. 8.

173 35 U.S.C. §§ 101, 154, 271(a) (1988).

174 *See* Edmund W. Kitch, *Patents: Monopolies or Property Rights?*, 8 RES. IN LAW & ECON. 31, 33 (1986).

175 *See* 1 ERNEST BAINBRIDGE LIPSCOMB III, LIPSCOMB'S WALKER ON PATENTS § 1:6 at 45 (3d ed. 1984).

176 *See* Kitch, *supra* note 174.

177 *Id.* at 32, 33.

178 *Id.* at 38-39.

179 *Id.*

180 *Id.* at 33; BENKO, *supra* note 160, at 19.

stricted supplies and inefficient allocation of resources.[181] Patents are, in fact, specifically designed to create such inefficiencies; otherwise, the good might not be produced at all. The societal costs generated by the patent system, however, must not be allowed to exceed the benefits of the intellectual goods it fosters. This balance of costs and benefits is struck in large measure by severely restricting the availability of patents. Patents are only available to inventions that meet narrowly defined standards of novelty, usefulness and non-obviousness.[182] Before a patent issues, the application must pass through an extensive administrative review designed to ensure that the invention in question meets these standards.[183] To qualify for the patent, the inventor must disclose in detail how the invention is made and used; then, at the end of the seventeen year period of exclusivity, this information passes into the public domain for all to use.[184]

In addition to protecting the actual invention, the patent also creates a zone of de facto protection against close substitutes. First, slight variations on the patented product will be unprotectable by patent because they will fail to meet the novelty and non-obviousness requirements. Second, courts have recognized that inventions using close substitutes for elements of a patent invention will infringe the patented claim if the substitute performs substantially the same function in substantially the same way.[185] These characteristics of the patent, when coupled with the attribute of exclusivity, give patent protection an extremely broad scope. Such broad protection may be appropriate where total control of an intellectual good is required as an incentive.[186] Consequently, it is arguable that patent protection is the appropriate vehicle for encouraging new technology because generating such inventions requires a substantial investment that may only be recovered by exclusive control of the invention produced.[187]

Although this brief sketch of patent economics suggests the manner in which patenting is supposed to function, there is little hard evidence as to whether patenting in fact works this way, or

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181 *Id.*

182 35 U.S.C. §§ 101-103, 112 (1988).

183 35 U.S.C. § 112 (1988).

184 *See* 35 U.S.C. §§ 112, 154, 271(a) (1988).

185 *See* 1 DONALD S. CHISUM, PATENTS § 18.04 (1992) (discussing the Doctrine of Equivalents).

186 BENKO, *supra* note 160, at 22.

187 *Id.*

whether it works at all. Several competing theories have been suggested to account for the beneficial effects of patenting.[188] The first theory suggests that patents encourage inventors to engage in inventive activity because of the potential rewards to be reaped from exclusive control of the result.[189] An alternative theory that "has been more popular with the courts than with [economist] commentators"[190] holds that patents are socially useful because they encourage disclosure of inventions that might otherwise have been kept secret.[191] Yet another set of theories suggests that, rather than facilitating invention or disclosure of inventions, patents offer an incentive for firms to make the investment in innovation, i.e., in developing an existing invention for practical purposes.[192] All of these explanations are open to question, and at least some economists have asserted that none of them are correct; rather, they say, patents actually generate more societal costs than benefits.[193] What does seem apparent, though, is that business investors perceive patents to be an important incentive to supporting new product research and development and often will not invest in high risk ventures—such as commercial outer space activity—unless the assurance of patent protection is available.[194]

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188 *See generally* Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1024-44 (1989) (reviewing major theories of patent rights).

189 *See* John S. McGee, *Patent Exploitation: Some Economic and Legal Problems*, 9 J. L. & ECON. 135 (1966); William F. Baxter, *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, 76 YALE L.J. 267, 268-70 (1966).

190 *See* Eisenberg, *supra* note 188, at 1028.

191 *See, e.g.*, Sinclair & Carroll Co., Inc. v. Interchemical Corp., 325 U.S. 327, 331 (1945); Universal Oil Prods. Co. v. Globe Oil & Ref. Co., 322 U.S. 471 (1944).

192 "An *invention* refers to the practical implementation of the inventor's idea. . . . An *innovation* is the 'debugged' and functional version of the invention: the version first offered for sale." Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CAL. L. REV. 803, 807 (1988). At least two major variants on this theory have been proposed. *See id.* at 838-46; Eisenberg, *supra* note 188, at 1036-44. The first suggests that monopoly conditions, such as those attending a patent right, are most conducive to commercial development of new inventions. *See* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY (3d ed. 1950); *see also* Vernon W. Ruttan, *Usher and Schumpeter on Invention, Innovation, and Technological Change*, 73 Q.J. ECON. 596 (1959); Carolyn Shaw Solo, *Innovation in the Capitalist Process: A Critique of Schumpeterian Theory*, 65 Q.J. ECON. 417 (1951). The second theory of innovation holds that patent rights mimic property rights, and so internalize the external costs associated with communal ownership. *See* Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & ECON. 265 (1977); *cf.* Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347 (1967).

193 *See* BENKO, *supra* note 160, at 19.

194 "[U]ncertainty over these [patent] issues is already having some impact on the willingness of investors to become involved in space manufacturing and related

2. Trade secrets: the state scheme

An alternative to intellectual property protection through patenting is protection through trade secrecy. Ideal goods that will not meet the patent requirements of novelty, non-obviousness and/or utility may be protected under state law as trade secrets.[195] Like patents, trade secrecy was initially perceived not as an economic incentive to invention, but as an equitable legal mechanism;[196] unlike patents, trade secret has remained close to its roots and is still conceived of as a regulation to promote ethical business practices.[197] Thus, causes of action for trade secret misappropriation arise from an assemblage of doctrines gathered from tort, contract, property and unfair competition law.[198]

Nonetheless, trade secrecy involves clear economic characteristics flowing from the rights that are recognized. A trade secret is a legal interest in business information or technical know-how, which may include anything besides tangible capital and labor necessary to start up a business.[199] As with other rights in ideal goods, a trade secret interest entitles the holder to possession and use of the protected information.[200] Trade secret interest, however, is limited to protecting one's right to the fruit of one's labor obtained by nefarious or unfair means.[201] The trade secret interest does not prevent competitors from obtaining the secret through legitimate means such as reverse engineering, accidental disclosure or independent development.[202]

Generally, to qualify for trade secret protection, an intellectual good must be used in the owner's business and must confer some economic or competitive advantage upon the owner be-

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ventures. Even if [outer space patent legislation] did nothing more than soothe fears of the business community and help to encourage investment in such ventures, it would be well worth the time and effort." *1989 Hearing*, *supra* note 22, at 25 (statement of Glenn H. Reynolds, Associate Professor, College of Law, University of Tennessee).

195 *See* RESTATEMENT OF TORTS § 757, cmt. b (1959).

196 *See supra* note 160 and accompanying text.

197 *See* Elizabeth Miller, Note, *Antitrust Restrictions on Trade Secret Licensing: A Legal Review and Economic Analysis*, 52 LAW & CONTEMP. PROBS. 183, 186 (1989).

198 *See* Richard H. Stern, *A Reexamination of Preemption of State Trade Secret Law After* Kewanee, 42 GEO. WASH. L. REV. 927, 937-38 (1974) (reviewing common law bases of trade secret law).

199 David R. MacDonald, *Know-How Licensing and the Antitrust Laws*, 62 MICH. L. REV. 351, 355 (1964).

200 *See* Miller, *supra* note 197, at 184.

201 *Id.* at 185.

202 *Id.* at 185-86; MELVIN F. JAGER, TRADE SECRET LAW § 11.01 at 11-2 (1988).

cause it is not generally known.[203] The latter requirement implies that the property right in the secret exists only so long as it remains a secret. This does not mean that absolute secrecy must be maintained, but the owner must take reasonable steps to shield the intellectual good from common use and knowledge.[204] In addition, the definition of a trade secret implies some minimum degree of novelty or originality, because information that is generally known in the trade cannot qualify as a secret.[205]

a. *Protected subject matter*

Trade secrecy's criterion of reasonable secrecy defines a particular boundary on the pool of inventions that may be protected in this manner. As a practical matter, this pool is likely to be distinct from that pool of inventions for which patents are sought. A portion of the trade secret invention pool will be comprised of inventions that are not patentable subject matter; these inventions may only be protected by trade secrecy.[206] Patentable inventions that are never patented will constitute another portion of the trade secret invention pool. For those inventions that are patentable subject matter, concurrent patent and trade secret protection is incompatible because the disclosure required by the patent destroys trade secrecy.[207] Patents will only be sought for items whose disclosure was inevitable, however, and the patent bargain will not prompt the disclosure of intellectual goods that can be kept secret indefinitely.[208] The Coca-Cola soft drink

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203 *See* RESTATEMENT OF TORTS § 757 cmt. b (1959); 1 ROGER M. MILGRIM, MILGRIM ON TRADE SECRETS §§ 2.02, 2.03 (1992).

204 *See id.*

205 *See supra* note 203.

206 Limited exceptions to this rule exist under specific provision of other federal intellectual property laws. For example, some unpatentable software inventions may be protected under federal copyright provisions. *See* 17 U.S.C. §§ 101, 102, 117 (1988). Certain unpatentable pharmaceutical inventions may be protected under the Orphan Drug Act. Pub. L. 97-414, 96 Stat. 2049 (codified as amended in scattered sections of U.S.C. tits. 15, 21, 43 and 45). In addition, protection for mask works falls under the Semiconductor Chip Protection Act. *See* 17 U.S.C. §§ 901-14 (1988).

207 *See* MILGRIM, *supra* note 203, at §§ 2.06, 8.02[2].

208 *See* FRITZ MACHLUP, THE POLITICAL ECONOMY OF MONOPOLY 281 (1952). Note that this assertion differs from the that of the Supreme Court in Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470 (1974), where Chief Justice Burger claimed that an inventor whose discovery was eligible for patent protection was unlikely to rely on trade secret protection. *Id.* at 490. This statement was based on the assumption that a patent would be more attractive because its protection is absolute, whereas trade secrecy may be annulled by reverse engineering or independent invention. *Id.* The relevant criterion is not the breadth of protection, however, but the max-

formula provides the classic example of such a situation: as a trade secret, it has remained proprietary for decades and not merely exclusive for seventeen years, the period of protection available when a formula has been disclosed in a patent.[209]

The trade secret invention pool will not, however, include patentable subject matter whose disclosure is inevitable. Trade secret protection is almost impossible to maintain for product inventions that, once on the market, may be acquired, examined, and duplicated, or reverse engineered.[210] Process inventions that are not themselves placed into the stream of commerce, however, may lend themselves to trade secret protection. This criterion of exclusion marks the dividing line between those inventions that will be patented and those that will be protected by trade secret. Trade secrets may be maintained as trade secrets only because they can be feasibly screened from public view.[211] Consequently, trade secrets are by definition private goods rather than public goods: were they public goods, trade secrets would have to be patented or pass into the public domain.[212]

b. *Licensing and profits*

The economics of trade secrecy also sharply differ from that of patenting in the return that a trade secret holder may receive for her invention. A patent is by definition a legal restraint on trade, and, through licensing, the patent holder may grant the right to practice the disclosed invention.[213] A trade secret, by contrast, is *not* a restraint on trade, and the trade secret licensor lacks the ability to impose such a restraint.[214] Unlike the patent holder, a trade secret licensor possesses no right to exclude, enjoying only limited protection against competitors who appropriate her intellectual property through a circumscribed class of

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imization of profits. The rational inventor will choose whichever form of protection will give him the greatest return on his investment. If an inventor believes that his discovery may be screened from the public indefinitely, he may well opt for perpetual income under trade secrecy rather than seventeen years' income under a patent. *See* Stern, *supra* note 198, at 946-47; K. David Crockett, *The Salvaged Dissents of* Bonito Boats v. Thunder Craft, 13 GEO. MASON U. L. REV. 27, 63 (1990).

209 *See* Palmer, *supra* note 161, at 293.

210 *See* Martin J. Adelman, *Property Rights Theory and Patent-Antitrust: The Role of Compulsory Licensing*, 52 N.Y.U. L. REV. 977, 982 (1977).

211 Michael I. Krauss, *Property, Monopoly, and Intellectual Rights*, 12 HAMLINE L. REV. 305, 312 (1989); *see also* Palmer, *supra* note 161, at 293.

212 *See* Krauss, *supra* note 211.

213 JAGER, *supra* note 202, § 11.01 at 11-3.

214 *Id.*; MILGRIM, *supra* note 203, § 6.05[2] at 6-274.

illegitimate actions.[215] Stated another way, trade secret rights, unlike patent rights, cannot be used as an offensive weapon against those who independently develop the intellectual good.[216] Whereas the patent holder can bargain for an exclusive right against the world, the trade secret licensor can bargain only for disclosure of the secret.[217] Consequently, the trade secret holder cannot offer a licensee any protection against third parties who may independently develop or reverse engineer the proffered non-tangible goods.[218]

In addition, because the trade secret holder has only disclosure to offer, the position she must take in exploiting her ideal good poses something of a paradox. The trade secret licensor bargains for disclosure, yet the potential licensee cannot assess the value of the secret until it is disclosed.[219] The secret may perhaps be disclosed under some obligation of confidence, but this mechanism imposes an additional cost on the potential licensee who accepts the constraint before he is able to evaluate the secret.[220] The cumbersome security measures that therefore surround any trade secret sales or licensing transaction entail costs that may significantly affect the price that the trade secret holder can demand for her invention.[221]

Transactional costs aside, the trade secret holder is severely constrained in the price that she may demand for disclosure. This constraint is inherent in the nature of the trade secret right, which does not preclude re-invention or reverse engineering.[222] Should the trade secret licensor set her price too high, the potential licensee may choose to independently develop the proffered item or expertise.[223] To avoid this outcome, the trade secret inventor may reduce her licensing fees to a level where the cost of independent reinvention is greater than the cost of purchasing a license.[224] This approach reduces the inventor's profit, effectively redistributing it to share the wealth of the new technol-

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215 *Id.*

216 *See* Miller, *supra* note 197, at 185.

217 *Id.*; MILGRIM, *supra* note 203, § 6.05[2] at 6-274; JAGER, *supra* note 202, § 11.01 at 11-3.

218 Miller, *supra* note 197, at 185; MILGRIM, *supra* note 203, § 6.05[2] at 6-274.

219 *See* Kitch, *supra* note 192, at 278; Eisenberg, *supra* note 188, at 1029-30

220 *See* Kitch, *supra* note 192, at 278.

221 *See id.* at 279; Adelman, *supra* note 210, at 982.

222 Adelman, *supra* note 210, at 981.

223 MILGRIM, *supra* note 203, § 6.05[2] at 6-276.

224 Adelman, *supra* note 210, at 981.

ogy.[225] Thus, trade secret protection entails a form of self-regulation that prevents the development of a substantial disparity between the cost of creating new technology and the value that can be privately appropriated from that technology.[226] Such self-regulation seems appropriate for a class of inventions that need not be novel, useful and non-obvious, already entail natural barriers to exclude free-riders, and are eligible for perpetual protection.

By contrast, neither of the price constraints discussed above appears in the patent system. The secrecy costs surrounding trade secret licensing are not found in similar patent transactions where the invention has already been disclosed.[227] It has been suggested that the true value of the patent system lies in allowing two parties to approach licensing negotiations with relative parity of information.[228] In addition, the patent system contains no intrinsic control on the rate of return, such as that found in trade secrecy.[229] The practical check created by the threat of reinvention is eliminated in the patent system by the statutory trade-off of disclosure for an absolute right of exclusion.[230] The prospect of patent "super profits" for a limited period may be justified to prompt creation or development in a limited class of significant or capital-intensive inventions.

B. Federal Preemption Analysis

The coexistence of two systems of intellectual property protection raises the prospect that they may come into conflict. In a federal system like that of the United States, such questions regarding the interaction of national and state power have often arisen. Professor Laurence Tribe suggests that such cases come in three flavors.[231] In the first, preemption of state legislation in an area delegated to Congress may raise "complex questions of statutory construction but raise no controversial issues of

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225 *Id.*

226 *Id.* at 981-82.

227 *See* Kitch, *supra* note 192, at 278; Adelman, *supra* note 210, at 982.

228 *See* Kitch, *supra* note 192, at 278; Eisenberg, *supra* note 188, at 1029-30.

229 *See* Adelman, *supra* note 210, at 984. Instead, the patent system introduces as control mechanisms an administrative review of novelty, utility and nonobviousness prior to issuing the patent and antitrust scrutiny after issuing the patent. *Id.* at 984, 986.

230 *Id.* at 984.

231 *See* LAURENCE H. TRIBE, AMERICAN CONSTITUTIONAL LAW § 6-25, at 479 (2d ed. 1988).

power."[232] In the second, issues of power may arise in instances where the action of a state intrudes upon a latent or constitutionally "dormant" power of the federal government.[233] In the third, issues of state and federal powers may be raised in "hybrid" cases involving not an exclusive federal power, but a pervasive scheme of federal regulation that "occupies" a given area of concern.[234] The reasoning in each of these types of cases directly impacts the analysis of whether state trade secret law may legitimately operate in outer space.

1. The commerce cases

Much of the character of the relationship between the United States' state and national governments has been defined by Supreme Court interpretation of the constitutional commerce power granted to Congress. Creation of a centralized authority to regulate commerce was in large part the justification for drafting a new federal constitution, aimed at curbing the parochial economic interests unrestrained under the former Articles of Confederation.[235] The power was not fashioned as an exclusive federal power; thus, control of commerce is ostensibly a concurrent prerogative of the state and federal governments. In order to achieve the purposes of the Commerce Clause, the Supreme Court has recognized that the provision entails both an affirmative federal power to regulate commerce and a negative limitation on the states' ability to pursue their own commercial agendas.

This balance between state and national interests in implementing the commerce power is inherent in the text of the seminal commerce case, *Gibbons v. Ogden*.[236] In *Gibbons*, a federally licensed steamboat operator challenged New York's state-granted monopoly on steamboat traffic.[237] The opinion by Chief Justice John Marshall recognized both the state's traditional "police power" to govern the health and safety of its citizens and the federal authority to regulate commerce as "intercourse" among the states.[238] This affirmative federal power has since been rec-

232 *Id.*
233 *Id.*
234 *Id.*
235 *See id.* § 6-3, at 404.
236 22 U.S. (9 Wheat.) 1 (1824).
237 *Id.* at 6.
238 *Id.* at 189, 208.

ognized to extend not only to traffic among the states,[239] but to any matter that might impact such traffic.[240]

Later cases also recognized certain negative implications of the commerce power, holding that "[w]hatever subjects of this power are in their nature national, or admit only of one uniform system, or plan of regulation, may justly be said to be of such a nature as to require exclusive legislation by Congress."[241] Where the courts find such a national interest, the need for such exclusive federal regulation abrogates any state enactment. At the same time, the Supreme Court has "recognized that there are matters of local concern . . . which, because of their local character and their number and diversity, may never be fully dealt with by Congress."[242] In general, matters recognized to be of legitimate local concern are those involving state overview of health and safety.[243] Even an exercise of a state's police powers in such an area, however, cannot be permitted to create an economic barrier to interstate commerce.[244]

Delineation of local from national matters, and determination of whether state treatment of local matters impermissibly encumbers interstate commerce, has been an ongoing saga in constitutional jurisprudence. After struggling with different standards for measuring the compatibility of state laws with national interests, the Court eventually settled on a formulation that assays the state law at issue for evenhanded regulation that does not discriminate between local and out-of-state interests.[245] This standard inquires whether the law's impact on interstate commerce is "incidental" to its purpose, whether the local purpose is legitimate and whether alternate means are available to achieve the purpose.[246] This mode of analysis has had an impact on delineation of state and federal superintendence not only as a matter of constitutional power, but also as a matter of legislative supremacy.[247]

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239 The Daniel Ball, 77 U.S. 557, 565 (1870).

240 Wickard v. Filburn, 317 U.S. 111, 125 (1942).

241 Cooley v. Bd. of Wardens of Port of Philadelphia, 53 U.S. (12 How.) 299, 319 (1851).

242 South Carolina State Highway Dep't v. Barnwell Bros., Inc., 303 U.S. 177, 185 (1938).

243 *See id.*; Southern Pacific Co. v. Arizona, 325 U.S. 761 (1945).

244 *See* Dean Milk Co. v. City of Madison, 340 U.S. 349, 356 (1951).

245 *See, e.g.*, South Carolina State Highway Dep't v. Barnwell Bros., 303 U.S. 177 (1938).

246 City of Philadelphia v. New Jersey, 437 U.S. 617, 624 (1978).

247 *See infra* notes 254-58 and accompanying text.

This formulation has also been the basis for analyzing questions of both domestic commerce regulation and foreign commerce. Analysis of foreign commerce questions, however, differs sharply in the weight accorded national interests. In *Japan Line, Ltd. v. County of Los Angeles*,[248] the Supreme Court determined that a challenged California property tax satisfied the dormant commerce test for evenhanded, legitimate local regulation.[249] But, where the tax was applied to containers owned by Japanese shipping companies, the tax was held to burden unduly commerce with foreign nations.[250] According to the Court, unilateral taxation of oceangoing trade by a particular state could invite international disputes and trade retaliation impacting the entire nation.[251] Thus, the "negative implications" of Congress's power to regulate foreign commerce required more stringent treatment of state law than the "negative implications" of the domestic commerce power.[252]

2. The supremacy cases

The opinion in *Gibbons v. Ogden* marked the beginning of a body of jurisprudence dealing with the exclusionary effect of the Commerce Clause as well as with the similar effects of the Supremacy Clause.[253] According to *Gibbons*, state statutes, "though enacted in the exercise of powers not controverted, must yield" to federal enactments because of the Supremacy Clause.[254] Although subsequent cases dealing with Supremacy Clause preemption purportedly confined their analyses to statutory interpretation, they are closely linked to the dormant commerce cases. Drawing on the legacy of *Gibbons*, the supremacy cases often employ much the same reasoning as that used in the dormant commerce cases, particularly where congressional silence, or the negative implications of federal statutes, is concerned.[255] In each instance, the Court is attempting to define the interaction of state and federal powers. The grounds for pre-

248 441 U.S. 434 (1979).
249 *Id.* at 444-45.
250 *Id.* at 450-51.
251 *Id.* at 449-50.
252 *Id.* at 446, 450.
253 *See* U.S. CONST. art. VI, cl. 2 ("This Constitution, and the Laws of the United States which shall be made in Pursuance thereof . . . shall be the supreme Law of the Land . . . .").
254 Gibbons v. Ogden, 22 U.S. (9 Wheat) 1, 211 (1824).
255 *See* Note, *Pre-emption as a Preferential Ground: A New Canon of Construction*, 12 STAN. L. REV. 208, 219 (1959) [hereinafter Stanford Note].

emption stated in these cases fall along a continuum: at one end, state statutes are declared clearly preempted; at the opposite end, they are declared clearly not preempted; and in the center, various mixtures of state and federal interests are balanced.[256] These declarations, in turn, may reflect something of the relationship between state and federal law in a given instance, from direct and unavoidable conflicts between state and federal law at one end of the spectrum, to distinct and isolated operation of state and federal law at the other end, with various degrees of potential interference falling somewhere in the middle.[257] The determination of potential conflict requires a subjective evaluation of public policy, and, in fact, the Supreme Court has enormous freedom to construe the federal statutes at issue broadly or narrowly in order to preserve some state statutes and eliminate others.[258]

a. *Express preemption*

In determining whether state regulation is displaced by federal regulation, the Court's inquiry has ostensibly focused on determining congressional intent: the legislature's actual will regarding the preemptive effect of a given federal statute. Thus, the Court has stated that when Congress offers some express statutory statement as to federal preemption, "the courts' task is an easy one."[259] Considerable confusion has arisen, however, because of the Court's ostensible focus on intent.[260] Even where an explicit statement of preemption is included in the federal statute, the problem of preemption is by no means settled. The scope of preemption under an explicit statement can be determined only by determining the powers conferred by the statute, and the powers conferred can be determined only by looking to the policy underlying the statute.[261]

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256 *See* Stern, *supra* note 198, at 930.

257 *See* Kenneth L. Hirsch, *Toward A New View of Federal Preemption*, 1972 U. ILL. L.F. 515, 519.

258 *See id.* at 534.

259 English v. General Elec. Co., 496 U.S. 72, 79 (1990).

260 *See* Stanford Note, *supra* note 255, at 209; Hirsch, *supra* note 257, at 534, 537-38.

261 *See* Stanford Note, *supra* note 255, at 211. *Cf.* 1 PHILLIP AREEDA & DONALD F. TURNER, ANTITRUST LAW 15 (1978) (discussing the court's role in shaping antitrust doctrines). Areeda and Turner have commented that:

> [J]udges sometimes talk as if Congress has already decided the question before them. This is usually a misconception. It is harmless when the judge would, in all events, have reached a sound conclusion. But the attribution can be mischievous when it is a substitute for

Thus, an explicit statement of preemptive intent served only as a starting place for analysis in *Rice v. Santa Fe Elevator Corp.*[262] In *Rice*, the Court was asked to determine whether the acts of the Illinois Commerce Commission regarding grain warehouses were preempted by the United States Warehouse Act.[263] The Court noted that the Warehouse Act provided that the Secretary of Agriculture had "exclusive" power, jurisdiction and authority with respect to licensing under the Act.[264] The Court also noted, however, that the exclusivity provision was not of itself determinative. The federal regulatory scheme left many areas of concern unaddressed, and the state scheme could have been found to harmoniously supplement the federal Act.[265] By looking further into the statute's legislative history and purposes, the *Rice* Court determined that Congress intended to place all the regulation in the area under one agency in order to achieve uniformity.[266] The state scheme, therefore, had to give way.

The *Rice* decision illustrates the policy analysis that courts must undertake even where a federal statute mandates preemption, but much the same problem exists where Congress includes language expressly declining to preempt state statutes.[267] Just as preemption language must be carefully analyzed to determine the scope of the intended effect, so must "saving clauses" be examined to assess their scope.[268] A savings clause cannot be assumed to prevent federal preemption of any and all impinging state laws. Congress cannot anticipate all the possible conflicts between a particular federal statute and a statute of one of the fifty states; indeed, the enactment of many potentially conflicting state statutes may yet occur in the future when Congress includes a savings clause in a newly minted federal statute.[269] Consequently, the Court's task in the face of language expressly stating

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> thought and analysis. The judge who really thinks that Congress has already decided the matter at issue is not likely to think very long or hard about the conclusion, for which he erroneously supposes that he is not responsible.

Id. at 15-16.

262 331 U.S. 218 (1947). *See also* Stanford Note, *supra* note 255, at 211 (discussing *Rice*); Hirsch, *supra* note 257, at 532-33 (same).

263 *Rice*, 331 U.S. at 221-24.

264 *Id.* at 224.

265 *Id.* at 231-32.

266 *Id.* at 236.

267 *See* Stanford Note, *supra* note 255, at 212.

268 *Id.* at 211-14; Hirsch, *supra* note 257, at 540.

269 *See* Hirsch, *supra* note 257, at 540, 543.

congressional intent may be no easier than when Congress has been silent.

b. *Field preemption*

Where Congress has not seen fit to provide an explicit indication of intent, the Supreme Court looks to the nature of the statutory scheme in an attempt to find evidence of congressional intent.[270] Here again, framing the inquiry in terms of intent tends to obscure the importance of the underlying policy inquiry, preventing the development of guidelines that could inform future decisions.[271] As in the cases where an explicit statement of intent purportedly makes the Court's task an easy one, the actual focus of the inquiry still tends toward an assessment of compatibility between the state and federal statutes.[272] This actual focus becomes apparent when the Court's tests for implied intent are carefully examined.

The Supreme Court will infer that Congress intended to preempt any operation of state law in a field that the Court finds Congress has intended to occupy exclusively.[273] The intent for such "field preemption" may, for example, be inferred if Congress has enacted a pervasive scheme of federal regulation that leaves no room for state regulation.[274] The Court's assumption under this test appears to be that a pervasive federal scheme suggests an intent to maintain exclusive federal control over the particular area.[275] Thus, in *City of Burbank v. Lockheed Air Terminal, Inc.*,[276] the pervasiveness of federal regulation over aviation was deemed an indication of congressional intent to preempt the field of aircraft noise regulation. A local ordinance limiting the hours of aircraft take-off was accordingly declared preempted because "the pervasive control vested in [federal agencies] under the [federal statute] seems to us to leave no room for local curfews or other local controls."[277] Commentators have suggested that this test for preemption makes some practical sense: where the federal scheme is less pervasive, elimination of state statutes

270 English v. General Elec. Co., 496 U.S. 72, 79 (1990).
271 *See* Hirsch, *supra* note 257, at 537-38.
272 *See* Stanford Note, *supra* note 255, at 208.
273 *English*, 496 U.S. at 79.
274 *Id.*; Rice v. Santa Fe Elevator Corp., 331 U.S. 218 (1947).
275 *See* TRIBE, *supra* note 231, § 6-27, at 497.
276 411 U.S. 624 (1973).
277 *Id.* at 638.

might create an undesirable "legal vacuum."[278] This negative form of the pervasiveness test, however, ignores the Court's willingness to create such a vacuum when the mood strikes it.[279] Creation of a legal vacuum may give the Court pause, but other considerations obviously enter into any decision to find preemption.

Some of these considerations involve the states' traditional place in the federal union. Field preemption, if invoked, eliminates all state regulation within the designated area, even if the state regulation supports or furthers the federal interest.[280] Perhaps because of this broad effect, the Court has in recent years shown some reluctance to declare field preemption unless congressional intent to preempt is "clear and manifest."[281] This criterion seems almost ludicrous in the midst of a legal exercise to infer legislative intent; the exercise would be unnecessary if the intent *were* clear and manifest. This particular juridical buzzword, however, appears to signal a sort of heightened scrutiny that the Court will apply to the relationship between federal and state powers, particularly where the field of federal regulation is one "traditionally occupied by the States."[282] Indeed, these phrases seem to be employed to communicate something of a presumption against preempting state law when the federal regulation appears to occupy a field "traditionally occupied by the States."[283]

One consequence of such deference to state interests is that it permits a glimpse into the mechanism behind a finding of preemption. This analytical step generally forces the Court to abandon its charade of determining congressional intent from a particular statutory scheme. Instead, the Court looks to the sub-

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278 *See* TRIBE, *supra* note 231, § 6-27, at 497.

279 For example, in Guss v. Utah Labor Relations Bd., 353 U.S. 1 (1957), the Court recognized that its finding of preemption created a "no-man's land" of cases that would escape both federal and state law. The Court excused this result, however, by maintaining that "Congress has expressed its judgment in favor of uniformity . . . [that] judgment must be respected whatever policy objections there may be to creation of a no-man's land." *Id.* at 10-11.

280 *See* Paul Wolfson, *Preemption and Federalism: The Missing Link*, 16 HASTINGS CONST. L.Q. 69, 72 (1988).

281 *See* Jones v. Rath Packing Co., 430 U.S. 519, 525 (1977) (quoting Rice v. Santa Fe Elevator Corp., 331 U.S. 218, 230 (1947)).

282 *Id.*

283 *See* Elaine M. Martin, Note, *The Burger Court and Preemption Doctrine: Federalism in the Balance*, 60 NOTRE DAME L. REV. 1233, 1254 (1985) (noting de facto presumption in favor of preserving state legislation); William W. Bratton, Jr., Note, *The Preemption Doctrine: Shifting Perspectives on Federalism and the Burger Court*, 75 COLUM. L. REV. 623, 628, 642 (1975) (same).

ject matter of the affected area to determine whether the field is one of traditional state interest.[284] This inquiry, ostensibly at the level of statutory construction, closely resembles a federalism analysis at the constitutional level under the Commerce Clause analysis.[285] The Court here engages in the same weighing of interests as it would when examining state laws to determine whether they favor local economic interests over the interstate market.[286] This similarity is perhaps not surprising; the areas most likely to have traditionally been occupied by the states are those identified in the commerce cases as involving the states' police powers.[287]

Thus, in *Florida Lime & Avocado Growers, Inc. v. Paul*,[288] the Court let stand a California regulation aimed at protecting consumers from the marketing of immature avocados.[289] According to the record cited by the Court, immature avocados are unpalatable, but visually indistinguishable from mature fruit.[290] In an opinion redolent of its commerce decisions, the Court placed the regulation squarely within the state's traditional police powers.[291] Consequently, although the federal Secretary of Agriculture had promulgated marketing orders that judged avocado maturity on criteria different from those of the California regulation, the *Florida Lime* Court found no conflict. The Court observed that "[t]he maturity of avocados seems to be an inherently unlikely candidate for exclusive federal regulation. Certainly it is not a subject by its very nature admitting only of national supervision. Nor is it a subject demanding exclusive federal regulation in order to achieve uniformity vital to national interests."[292] The Court found that avocado standards are "a matter of peculiarly local concern,"[293] well within the states' legitimate interest in protecting their citizens from " 'fraud and deception in the sale of food products' at retail markets within their borders."[294]

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284 *See* TRIBE, *supra* note 231, § 6-27, at 499.

285 *See id.*; JOHN E. NOWAK & RONALD D. ROTUNDA, CONSTITUTIONAL LAW § 9.3, at 313 (4th ed. 1991).

286 *See* Stanford Note, *supra* note 255, at 220.

287 *See* NOWAK & ROTUNDA, *supra* note 285; *cf. supra* notes 238-44 and accompanying text.

288 373 U.S. 132 (1963).

289 *Id.* at 137-38.

290 *Id.*

291 *See id.* at 144-45 (quoting Cloverleaf Butter Co. v. Patterson, 315 U.S. 148, 162 (1942)).

292 *Id.* at 143-44 (citations omitted).

293 *Id.* at 144.

294 *Id.* (quoting Plumley v. Massachusetts, 155 U.S. 461, 472 (1894)).

If the Supreme Court appears likely to uphold state regulation in areas traditionally deemed local, then the inverse of this principle also holds true: in an area traditionally deemed national, the Court may be more inclined to strike down state legislation.[295] Congressional intent to preempt may be inferred where the regulatory field is one in which federal interest is so dominant that actions by the states are presumed excluded.[296] Here again, the test for preemption cloaks more than a simple question of statutory construction. As was the case in *Gibbons*, many of the preemption cases involve issues that could be framed either as supremacy or as commerce questions because the federal statute at issue was enacted under the commerce power.[297] The Court has generally taken the approach of deciding these cases on supremacy grounds even though the controversy might otherwise have been resolved by an appeal to the commerce power.[298] The same is true where other constitutional powers are implicated, particularly if these are powers reserved to the federal government.[299] This tendency has led some commentators to suggest that preemption analysis at the statutory level may in fact implement constitutional principles external to the Supremacy Clause.[300]

For example, in *Hines v. Davidowitz*,[301] the Court invalidated a state statute requiring the registration of aliens. Hidden behind the preemption analysis in *Hines* was a principle of strong deference to Congress's constitutional powers to prescribe a uniform rule of naturalization and to conduct foreign relations.[302] Similarly, in *Pennsylvania v. Nelson*,[303] a state statute criminalizing Communist activity was held preempted by federal sedition statutes; again, the Court appeared to focus not on the federal statute's text, but on the national and perhaps international ramifications of Communist activity.[304] The Court's practice of

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295 *See* TRIBE, *supra* note 231, § 6-27, at 500.

296 Rice v. Santa Fe Elevator Corp., 331 U.S. 218, 230 (1947).

297 *See* TRIBE, *supra* note 231, § 6-29, at 508-11; Stanford Note, *supra* note 255, at 219-21.

298 *See* Stanford Note, *supra* note 255, at 219.

299 *Id.* at 218-19.

300 *See id.* at 218.

301 312 U.S. 52, 73-74 (1941).

302 *See* Stanford Note, *supra* note 255, at 218. *Cf.* Toll v. Moreno, 458 U.S. 1 (1982) (University of Maryland policy against admitting aliens preempted because of broad federal authority to establish rules of naturalization and regulate foreign affairs).

303 350 U.S. 497 (1956).

304 *See* Stanford Note, *supra* note 255, at 218-19.

deciding such constitutionally loaded cases by announcing an ostensibly statutory decision may implicitly parallel the Court's explicit practice of avoiding a decision on constitutional grounds where possible.[305] The latter practice has been said to lend flexibility and vitality to the constitutional analysis that the Court must reach and to avoid unnecessary constitutional rule making that might undermine the Court's prestige.[306] In addition, a preference for analysis at the statutory level facilitates congressional review and revision of the Court's holding; such revision would be far more difficult were the Court to enshrine its analysis at a constitutional level. [307] Similar benefits may flow from basing preemption analysis on statutory interpretation, rather than indulging in commerce-type scrutiny every time a constitutional power is implicated.[308]

c. *Weighing state interests*

Given that the Supreme Court likely weighs competing factors in field preemption in much the same way that it weighs factors under the dormant Commerce Clause, the necessity that the Court go through the motions of statutory interpretation still makes the outcome of any particular evaluation difficult to predict. Even with a presumption in favor of upholding the state regulation, field preemption analysis requires the Court to engage in an exceptionally subjective articulation of legislative intent.[309] One commentator has nicely summed up the "definitional difficulties" posed by this determination when undertaken within the framework of field preemption: First, what is the field, and second, what determines whether the field is occupied?[310] In practice these questions likely collapse into one another. Depending on how the Court gerrymanders the boundaries of the field, it may or may not be too crowded for state regulation to operate.

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305 *See, e.g.*, Cohens v. Virginia, 19 U.S. (6 Wheat.) 264, 441 (1821).

306 *See* PAUL A. FREUND, ON UNDERSTANDING THE SUPREME COURT 58-59 (1951); FELIX FRANKFURTER, LAW AND POLITICS 24-26 (1939).

307 *See* TRIBE, *supra* note 231, § 6-2, at 403-04.

308 *See* Stanford Note, *supra* note 255, at 224-25.

309 *See* Wolfson, *supra* note 280, at 73-74.

310 *Id.* at 72. *See also* Bratton, *supra* note 283, at 627 n.29 ("The field's extent frequently is the point of contention, but precise bounds usually must be derived by inference from purpose interpretation."). *Cf.* Hines v. Davidowitz, 312 U.S. 52, 78-79 (1941) (Stone, J., dissenting) ("Every Act of Congress occupies some field, but we must know the boundaries of that field before we can say that it has precluded a state from the exercise of any power reserved to it by the Constitution.").

Although the Court has offered no candid explanation as to the manner in which it charts the contours of a preemptive field, certain decisions allow some insight into the process. The field charting process is perhaps best observed in a trilogy of cases beginning with *Pacific Gas and Electric Co. v. State Energy Resources Conservation & Development Commission*,[311] where it was alleged that a set of California utility laws was preempted by federal regulations overseeing nuclear power generation. The California laws prevented the construction of nuclear power facilities until methods were assured for the storage and disposal of spent radioactive fuel; this regulatory scheme, it was claimed, intruded upon Congress's occupation of the field in the Atomic Energy Act.[312] The Court looked to the legislative history of the Atomic Energy Act to draw the boundaries of the preempted field, holding that although Congress had preempted the field of nuclear safety, other matters of utility regulation, which were the traditional purview of the states, were not preempted.[313] The *Pacific Gas* Court then held that the challenged California statutes did not fall within the preempted field of nuclear safety, but rather constituted traditional state regulation concerning the economics of nuclear power generation.[314] The Court concluded that "the statute lies outside the federally occupied field of nuclear safety regulation."[315]

This demarcation of the nuclear safety field was revisited in two subsequent cases, *Silkwood v. Kerr-McGee Corp.*[316] and *English v. General Electric Co.*[317] Both of these cases concerned tort claims, rather than legislative enactments, and both witnessed the Court defining the contours of the federal field so as to exclude a traditional state concern. *Silkwood* involved a tort suit against a nuclear power plant operator for negligently exposing an employee to radioactive contamination.[318] *English* involved a claim of intentional infliction of emotional distress by a nuclear plant employee who had been dismissed from her job for reporting safety violations.[319] The defendants in both cases claimed that *Pacific Gas*, in mapping out a field of nuclear safety upon which states could not

311 461 U.S. 190, 207-08 (1983).
312 *Id.* at 197-99, 204.
313 *Id.* at 206-12.
314 *Id.* at 213-24.
315 *Id.* at 191.
316 464 U.S. 238 (1984).
317 496 U.S. 72 (1990).
318 *Silkwood*, 464 U.S. at 243.
319 *English*, 496 U.S. at 77.

intrude, preempted any tort awards.[320]

In *Silkwood*, the award of punitive damages was specifically challenged because exemplary damages are designed to deter unsafe practices, and nuclear safety supposedly constituted a field completely occupied by federal safety regulations.[321] The Court rejected this contention, tracing the boundaries of the field in such a way that "the pre-empted field does not extend as far as [the defendant] would have it."[322] As in *Pacific Gas*, the Court looked to the legislative history of the Atomic Energy Act and found no indication that Congress intended to preclude the states from providing remedies for tortious injury.[323] The *Silkwood* Court also looked to a separate enactment that set a limit on state suits arising out of a nuclear accident as evidence that Congress had expected state tort law to continue to apply in this area. Thus, because "[p]unitive damages have long been a part of traditional state tort law"[324] and because no clear congressional intent to preempt could be found, the Court rejected the appellant's claim. Similar reasoning was employed in *English* to find that the suit was not preempted because such remedies have "*traditionally* . . . been available to those persons who . . . allege outrageous conduct at the hands of an employer,"[325] and the Atomic Energy Act showed no "clear and manifest" intent by Congress to preempt.[326]

The pattern that emerges from these cases is a redrawing of the federal field so as to avoid obliterating well established areas of state superintendence, while preserving some semblance of federal supremacy. The *Pacific Gas* line of cases typify what has been called "the extreme reluctance of the modern Court to find preemption."[327] Whereas the courts at one time effaced state statutes with some abandon, the presumption in favor of preserving state enactments has, in recent years, been adhered to with some vigor.[328] Because field preemption sweeps so broadly,

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320 *Silkwood*, 464 U.S. at 245, 249; *English*, 496 U.S. at 77-78.

321 *Silkwood*, 464 U.S. at 245-46.

322 *Id.* at 249.

323 *Id.* at 250-51.

324 *Id.* at 255.

325 *English*, 496 U.S. at 83.

326 *Id.*

327 *See* Ronald D. Rotunda, *Sheathing the Sword of Federal Preemption*, 5 CONST. COMM. 311, 317 (1988).

328 *Id.* at 312. *See generally* Martin, *supra* note 283 (tracing the shift away from federal centralization); Bratton, *supra* note 283 (same). *But see* Michael Maher, *Federal Preemption: New Barrier to Injured Victims*, TRIAL 61 (Nov. 1991) (observing that

however, the boundaries of the field must be drawn with some care, and sometimes redrawn, in order to preserve state regulation. The same goal may be better achieved by instead relying on a more precise preemptive tool: conflict analysis.

d. *Actual conflict*

Where the courts find no intent to preempt an entire field of action, state law will still be declared preempted to the extent that it is found to actually conflict with federal law. Such "conflict preemption" may be found where compliance with both regulatory schemes is physically impossible or where the state law "stands as an obstacle" to the federal statute's purposes and objectives.[329] The sweep of conflict preemption is potentially less comprehensive than that of field preemption. Whereas a declaration of field preemption invalidates all state laws within a given area, including even those that advance federal objectives, conflict preemption invalidates only those portions of state law declared to conflict with federal objectives.[330] Invoking conflict preemption therefore allows the Court to trim away offending state statutes without the elaborate exercise of shaping the borders of a preemptive field so as to avoid eliminating necessary state operations.

In theory, conflict preemption involves a closer inquiry into the purposes and operation of both the federal and state statutes in question. In determining field preemption the Court turns first to the federal statute to determine the field's contours, and only then to the state statute to ascertain whether it falls within those contours.[331] Conflict preemption requires an examination of the expected and likely results flowing from both the federal and state statutes in order to determine if those results will conflict.[332] Yet, in practice, the court engaging in conflict preemption will, as with field preemption, be required to look at the state statute's purposes and policies to determine the potential for actual conflict with the narrow objectives underlying the federal statute.[333] The state statute will then be invalidated if the stat-

despite the Court's reluctance to find preemption, such claims are multiplying in state tort suits).

329 Florida Lime & Avocado Growers, Inc. v. Paul, 373 U.S. 132, 142-43 (1963); Hines v. Davidowitz, 312 U.S. 52, 67 (1941).

330 *See* Hirsch, *supra* note 257, at 529.

331 *See id.*

332 *Id.*

333 *See* TRIBE, *supra* note 231, § 6-26, at 482-83.

ute's effect is to discourage the result that the federal statute is intended to encourage.[334]

This similarity suggests that the line between these two approaches is less than distinct, and the Supreme Court has in fact acknowledged that "[f]ield pre-emption may be understood as a species of conflict pre-emption: A state law that falls within a pre-empted field conflicts with Congress's intent (either express or plainly implied) to exclude state regulation."[335] Consequently, it should not be surprising to find that conflict analysis involves a familiar weighing of valid local interests against restrictive effects, and where local interests outweigh the restrictive effects, the state statute may be upheld.[336]

The collapse of field preemption into conflict preemption is nowhere more pronounced than in a subspecialty of conflict preemption involving the "delicate balance" test.[337] The delicate balance cases acknowledge that Congress has not ejected state laws from a particular field, no federal interests predominate the field, and the field is not one whose nature requires national uniformity.[338] These cases, however, go on to suggest that an elaborate scheme of federal law promulgated by Congress might nonetheless be upset by state intrusion. This approach bears a striking resemblance to the "pervasive scheme" cases; indeed, the two may easily become intermingled or confused.[339] In *City of Burbank v. Lockheed Air Terminal, Inc.*,[340] the Supreme Court first found that federal regulation in the disputed area was pervasive, but then suggested that these regulations had struck a "delicate balance" between efficiency and safety.[341] The latter consideration, as much as the former, appears to have informed the Court's finding of preemption.[342]

Such indeterminate results may be more than simple intermingling or confusion of two theories: They may be the inevitable result of the premises of the delicate balance approach. The assumption of the delicate balance cases appears to be that the fruits of the federal legislative process represent a careful set of

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334 *See id.*

335 English v. General Elec. Co., 496 U.S. 72, 79-80 n.5 (1990).

336 *See* Stanford Note, *supra* note 255, at 220-21.

337 *See* Wolfson, *supra* note 280, at 76-79.

338 *See id.*

339 *Id.* at 82.

340 411 U.S. 624 (1973). *See supra* notes 276-77 and accompanying text.

341 411 U.S. at 638.

342 *See* Wolfson, *supra* note 280, at 77 n.42.

compromises among competing interest groups and that what has been excluded as a result of long negotiation is surely as important as what has been permitted to become law.[343] This set of legislative compromises could be upset by states meddling in the outcome.[344] As one commentator has recently pointed out, however, the effect is the same whether the courts find that Congress has ousted state legislation from a particular field *or* find that states are not ousted, but may not enact any law in that area for fear of upsetting the balance struck by Congress.[345]

The consequence of the latter holding "is to reconvert 'delicate balance' preemption back into 'occupying the field' — that is, to mark out a minifield that Congress has preempted."[346] It has been suggested that this effect is precisely what occurred in the area of labor law, where the Court in *Lodge 76, Int'l Ass'n of Machinists & Aerospace Workers v. Wisconsin Employment Relations Comm'n*[347] held that Congress's balance among the competing interests of management and labor could not be intruded upon by the states.[348] Because virtually every state statute touching on employment might in some way affect this balance, however, the scope of such "*Machinists* preemption" was subsequently drastically reduced by the Court, which "instead carved out a small field for Congress to occupy."[349] Indeed, under an alternative view of the *Pacific Gas* line of cases, it might be argued that the Court beat a similar retreat, recognizing a particular balance between safety and economic regulation, but carving out successively smaller fields for Congress in *Silkwood* and *English*.[350]

C. *Preemption Under the Patent Cases*

The brief sketch of preemption outlined above suggests that decisions in this area are anything but a simple exercise in statutory construction. Rather, they involve complex policy choices impacting the relationship between the authority of the federal government and that of the state. As a general rule, cases implicating federal preemption could well have been decided on con-

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343 *See id.* at 77.
344 *See id.* at 77-78.
345 *See id.* at 82.
346 *Id.* at 82.
347 427 U.S. 132 (1976).
348 *Id.* at 154-55. *See also* Metropolitan Life Ins. Co. v. Massachusetts, 471 U.S. 724 (1985).
349 *See* Wolfson, *supra* note 280, at 82-83 (citing Fort Halifax Packing Co., Inc. v. Coyne, 482 U.S. 1, 19-23 (1987); Metropolitan Life Ins. Co., 471 U.S. at 754-58.
350 *See supra* notes 311-27 and accompanying text.

stitutional, rather than statutory, grounds,[351] and the constitutional questions potentially at issue are reflected in the policy choice to be made. This rule holds just as true for cases concerning federal patent law as for any other body of federal law. Consequently, preemption in the realm of intellectual property cannot be considered by simply examining the statutes at issue; the constitutional authority behind the federal patent scheme must be considered as well.

1. The constitutional argument

Questions regarding the preemptive power of Congress's patent authority are as old as the question of federal preemption itself. *Gibbons v. Ogden*, which gave rise to the dormant commerce and supremacy doctrines, was in fact a patent case. Prior to the drafting of the Constitution, the individual states often granted their own patents to inventors.[352] In 1798, New York issued a patent for a steam powered boat to Robert Livingston, and in 1803 extended the patent for a period of twenty years to Livingston and Robert Fulton.[353] In *Gibbons*, Livingston and Fulton licensed their exclusive right to the respondent Ogden, who had successfully sued in New York state courts to enjoin the appellant Gibbons from infringing the state patent grant.[354] On appeal, Gibbons argued not only that the New York patent impermissibly interfered with interstate commerce, but that the state patent grant was preempted by the federal patent power.[355] Chief Jus-

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351 *See* Stanford Note, *supra* note 255, at 208.

352 *See generally*, LIPSCOMB, *supra* note 175, § 1:7, at 52-53; Frank D. Prager, *A History of Intellectual Property from 1545 to 1787*, 26 J. PAT. OFF. SOC'Y 711 (1944); P.J. Federico, *State Patents*, 13 J. PAT. OFF. SOC'Y 166 (1931); P.J. Frederico, *Colonial Monopolies and Patents*, 11 J. PAT. OFF. SOC'Y 358 (1929).

353 *See* LIPSCOMB, *supra* note 175, § 1:7, at 50.

354 Gibbons v. Ogden, 22 U.S. (9 Wheat.) 1, 5-7 (1824). Livingston and Fulton had previously sued James Van Ingen, who was also infringing the state patent grant, and were similarly successful in New York state courts. Livingston & Fulton v. Van Ingen, 9 Johns. 506 (N.Y. 1812). The New York Court of Appeals reasoned that the patent right was not repugnant to the federal commerce power and so could not offend what the court perceived to be the much narrower federal patent power:

> That power only secures, for a limited time, to authors and inventors, the exclusive privilege to their writings and discoveries; and it is not granted, by exclusive words, to the United States, nor prohibited to the individual States, it is a concurrent power which may be exercised by the individual States, in a variety of cases, without any infringement of the congressional power.

Id. Cf. infra notes 375-82, and accompanying text.

355 *Gibbons*, 22 U.S. (9 Wheat.) at 32-33.

tice Marshall seized the opportunity to rule on the scope of the federal commerce power, but declined to reach the patent power issue.[356] Since *Gibbons*, the tantalizing prospect of a "dormant patent clause" has remained an unadjudicated possibility, but a possibility that informs a preemption analysis involving the Patent Clause.

a. *The Patent Clause*

The question of the Patent Clause's negative repercussions is best approached by first considering *Goldstein v. California*,[357] a case that concerned federal copyright rather than patents, but which nonetheless holds important implications for interpreting the scope of the Patent Clause. In addition to granting Congress the power to issue patents, Article I, section 8 also authorizes Congress to promote the useful arts by issuing copyrights to authors for their works. In *Goldstein*, a California state statute prohibiting unauthorized copying or "piracy" of sound recordings was challenged as constitutionally repugnant under the Copyright Clause.[358] Chief Justice Burger, writing for the majority, rejected this argument; the Chief Justice reasoned that the Constitution permits concurrent state and federal copyright powers, and state regulation was permissible because it would not inevitably clash with federal interests.[359]

The *Goldstein* Court failed to consider the possibility of a different type of constitutional analysis, where state regulation would be permissible only to the extent that it did not unduly burden federal interests.[360] This analysis had been applied previously in *Compco Corp. v. Day-Bright Lighting, Inc.*,[361] where the Supreme Court invalidated an Illinois unfair competition provision because for a state "[t]o forbid copying would interfere with the federal policy, found in Art. I, § 8, cl. 8 of the Constitution

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356 *Id.* at 186-240. The Chief Justice explained that "it is unnecessary to enter in an examination of that part of the [C]onstitution which empowers Congress to promote the progress of science and the useful arts." *Id.* at 221. *See also* Crockett, *supra* note 208, at 38 (discussing the *Gibbons* Court's failure to address the patent power).

357 412 U.S. 546 (1973). *See also* Howard B. Abrams & Robert H. Abrams, Goldstein v. California: *Sound, Fury, and Significance*, 1975 SUP. CT. REV. 147 (1975) (tracing the commerce analysis roots of the *Goldstein* preemption opinion); Edward Samuels, Comment, Goldstein v. California: *Breaking Up Federal Copyright Preemption*, 74 COLUM. L. REV. 960, 966-67 (1974) (same).

358 412 U.S. at 551.

359 *Id.* at 571.

360 *See* Bratton, *supra* note 283, at 640.

361 376 U.S. 234 (1964).

. . ., allowing free access to copy whatever the federal patent and copyright laws leave in the public domain."[362] Much as it did in *Florida Lime & Avocado Growers v. Paul*,[363] the Court in *Compco* acknowledged a state's police "power to impose liability upon those who . . . deceive the public by palming off their copies as the original."[364] The Court, went on to find, however, that the Illinois law impermissibly burdened the balance of power struck in the federal constitution.[365]

It has been argued that *Compco's* "dormant Patent Clause" holding, framed at the constitutional level, held the potential to sweep away all state regulation of ideal goods.[366] Under the parallel commerce clause doctrines, however, this result has not occurred: State statutes continue to operate where they effectuate important state interests and do not overly interfere with the purpose of the constitutional provision.[367] This continued operation is consonant with the post-*Compco* cases, which balance federal and state interests and uphold state provisions where they place no undue burden on the purposes of the Patent Clause.[368]

The Supreme Court has recently reaffirmed the legitimacy of this approach, albeit with some reservations, in *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*[369] The *Bonito Boats* Court invalidated a Florida statute that prohibited the copying of boat hulls by direct mold processes.[370] In a decision that drew heavily upon Commerce Clause jurisprudence, the Court noted that "[o]ur decisions since [*Sears, Roebuck & Co. v. Stiffel Co.*[371]] and *Compco* have made it clear that the Patent and Copyright Clauses do not, by

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362 *Id.* at 237. The Court reached the same result in a companion case decided the same day. *See* Sears, Roebuck & Co. v. Stiffel Co., 376 U.S. 132, 144 (1964).

363 373 U.S. 132, 144 (1962).

364 *Compco*, 376 U.S. at 238.

365 *Id.* at 237-39.

366 *See* S. Stephen Hilmy, Note, Bonito Boats' *Resurrection of the Preemption Controversy: The Patent Leverage Charade and the Lanham Act "End Around,"* 69 TEX. L. REV. 729, 736-37 (1991) (suggesting that the purpose of *Sears* and *Compco* was to sweep away state law of unfair competition). *See also* Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 154 (1989) (discussing the perceived sweep of *Sears* and *Compco*).

367 *Cf.* Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 154 (1989) ("That the extrapolation of such a broad pre-emptive principle from *Sears* [and *Compco*] is inappropriate is clear from the balance struck in *Sears* [and *Compco*] . . . .").

368 *See, e.g.*, Lear, Inc. v. Adkins, 395 U.S. 653 (1969); Aronson v. Quick Point Pencil Co., 440 U.S. 257 (1979).

369 489 U.S. 141 (1989).

370 *Id.* at 144, 168.

371 376 U.S. 225 (1964).

their own force or by negative implication, deprive the States of the power to adopt rules for the promotion of intellectual creation within their own jurisdictions."[372] The Court observed, however, that "[o]ne of the fundamental purposes behind the Patent and Copyright Clauses of the Constitution was to promote national uniformity in the realm of intellectual property. . . . This purpose is frustrated by the Florida scheme, which renders the status of the design and utilitarian 'ideas' embodied in the boat hulls it protects uncertain."[373] In particular, the *Bonito Boats* Court asserted that state laws such as the Florida direct molding statute burden federal constitutional interests in a manner analogous to that of state laws burdening interstate commerce: "Absent such a federal rule [of uniformity], each State could afford patent-like protection to particularly favored home industries, effectively insulating them from competition from outside the State."[374]

This analysis stands in stark contrast to that in *Goldstein*, where the Court asserted that "a copyright granted by a particular State has effect only within its boundaries. If one State grants such protection, the interests of States which do not are not prejudiced since their citizens remain free to copy within their borders those works which may be protected elsewhere."[375] In *Bonito Boats*, the Court clearly shifted away from assessing only the local interest in protecting ideal goods toward assessing both the benefits and burdens of such state protection.[376] The importation of dormant commerce rationales into Patent Clause jurisprudence emulates the pattern previously followed in non-patent supremacy cases, heralded by the appearance of concern over dividing the nation into isolated markets.[377]

b. *Patent Clause construction*

Commentary considering the possibility of a dormant Patent Clause analysis suggests that this approach is forestalled by the divergent natures of the Commerce and Patent Clauses. The Commerce Clause, it is argued, was designed to constitute a

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372 *Bonito Boats*, 489 U.S. at 165.
373 *Id.* at 162.
374 *Id.* at 163.
375 Goldstein v. California, 412 U.S. 546, 558 (1973).
376 *See* Crockett, *supra* note 208, at 75-76; Hilmy, *supra* note 366, at 743.
377 *See* Samuels, *supra* note 357, at 969 (noting that the regulation in *Goldstein* "could well be said to discriminate in favor of local economic interests" and "begs the interstate commerce argument").

broad grant of power allowing the federal government to regulate interstate transactions in the national interest; accordingly, the language of the Commerce Clause does not address the values, purposes or limits to be considered in exercising the commerce power.[378] The Patent and Copyright Clause, by contrast, is a narrow grant of power that stipulates values and constraints to be considered in exercising the power granted.[379] Thus, the doctrines used to limit state intrusion upon the broad commerce grant may be inappropriately employed when evaluating the narrow patent grant.

This argument finds some support in *Goldstein*, where the Court stated that Article I, section 8, clause 8 of the Constitution "describes both the objective which Congress may seek and the means to achieve it. The objective is to promote the progress of science and the arts. . . . To accomplish its purpose, Congress may grant to authors the exclusive right to the fruits of their respective works."[380] Further support in the patent context stems from the constitutional analysis in *Graham v. John Deere, Co. of Kansas City*,[381] in which the Court declared that the Patent Clause grants Congress the power to issue patents subject to the limitation that this power may be used only to promote progress in science and the arts.[382] Any other exercise of the patent power would presumably exceed Congress's constitutional authority.[383]

Although these decisions certainly prescribe the limits of the patent power, it is not obvious why they should preclude the functioning of a "dormant patent" analysis within the scope of those limits. Rather, the boundaries of any negative Patent Clause should mirror the narrow boundaries of the power granted.[384] For instance, the Patent Clause clearly does not ap-

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378 *See* Howard B. Abrams, *Copyright, Misappropriation, and Preemption: Constitutional and Statutory Limits of State Law Protection*, 1984 SUP. CT. REV. 509, 527-28 (1984).

379 *See id.*; Crockett, *supra* note 208, at 43-44. This characterization of the Patent Clause was essentially the holding of the New York Court of Appeals in Livingston & Fulton v. Van Ingen, 9 Johns. 506 (N.Y. 1812), which the United States Supreme Court declined to review in *Gibbons*. *See supra* note 354.

380 *Goldstein*, 412 U.S. at 555.

381 383 U.S. 1 (1966).

382 *Id.* at 5-6.

383 *See* Crockett, *supra* note 208, at 43-44.

384 One commentator has argued that the narrowness of the Copyright and Patent Clause may be compared to the foreign affairs power, and so offers a stronger case for federal exclusivity than does the Commerce Clause. "In contrast to the nebulous commerce power grant, the 'specific' character of the copyright power invites an analogy to the relatively circumscribed subject matter of foreign affairs." See Bratton, *supra* note 283, at 640 (footnotes omitted). Similarly, the specific char-

ply to service to patrons at lunch counters, as the Commerce Clause has been held to do.[385] Conversely, although a wide variety of state statutes, such as state tax provisions, may in some way burden the operation of the federal patent scheme, their operation should fall outside the limits of any negative implication that the Patent Clause may carry. Where the states legislate squarely within the patent power's boundaries, as defined by the limiting language of the Patent Clause, however, the burden placed by the state statute on the operation of the Patent Clause is appropriately considered at the constitutional level.

c. *Other powers*

The argument that the Patent Clause is too narrow to accommodate commerce-type analysis also ignores the extensive body of case law indicating that Congress may reach a constitutionally authorized goal by any number of constitutionally authorized routes.[386] One can imagine a number of goals arising under the commerce power that Congress might choose to promote by granting an exclusive right resembling a patent.[387] Indeed, patents need not necessarily be granted pursuant to only one constitutional power; they might well be issued both to pro-

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acter of the Patent and Copyright Clause has been suggested to carry greater inherent preemptive capability than the general grant of the Commerce Clause. *See* Samuels, *supra* note 357, at 966.

385 *See, e.g.*, Heart of Atlanta Motel, Inc. v. United States, 379 U.S. 241 (1964); Katzenbach v. McClung, 379 U.S. 294 (1964).

386 *See generally* David E. Engdahl, *Preemptive Capability of Federal Power*, 45 U. COLO. L. REV. 51, 58-68 (1973). Engdahl observed that:

> Congress may freely use its enumerated powers as means for the accomplishment of ends extraneous to any of its enumerated powers. The purpose, objective, or effect is no ground for constitutional objection, so long as the end is sought by means of exercising an enumerated power.
>
> Under this principle, the commerce power as well as other enumerated powers are commonly exercised for ends which are not enumerated by the Constitution but which are within the federal domain.

Id. at 66 (footnotes omitted).

387 Arguably, such an exercise of the commerce power is forbidden because it would render the Patent Clause superfluous. *Cf.* Crockett, *supra* note 208, at 43 n.88. It seems clear, however, that results that could be accomplished under one constitutional power may also be accomplished in the exercise of another constitutional power. Thus, regulation of racial discrimination at lunch counters under the commerce power apparently is not barred because it would render the civil rights amendments excessive. *See, e.g.*, Katzenbach v. McClung, 379 U.S. 294 (1964). Similarly, regulation of rental prices that could be accomplished under the commerce power may also be accomplished under the war power. *See, e.g.*, Woods v. Cloyd W. Miller Co., 333 U.S. 138 (1948).

mote science and to exercise some type of control over interstate commerce.[388] The Court suggested this possibility in *Goldstein*: "Where the need for free and unrestricted distribution of a writing is thought to be required by the national interest, the Copyright Clause and the Commerce Clause would allow Congress to eschew all protection."[389]

Neither must the grant of a patent be necessarily connected only to the Patent or Commerce Clauses. Although the Supreme Court has seldom looked beyond the Commerce Clause to find constitutional authorization for congressional action, in those cases where it has done so the scope of permissible action under other constitutional provisions has been interpreted as broadly as such action under the Commerce Clause. For example, the Property Clause[390] has been interpreted as granting to Congress authority broad enough to reach beyond the territorial limits of federal lands, even impacting upon private holdings.[391] One can imagine that Congress, wishing to improve air quality over national parks such as the Grand Canyon, might offer an exclusive right resembling a patent to the inventors of air pollution control devices. Similarly, Congress's war power has been held to allow economic intervention, such as rent control, long after hostilities have ceased.[392] Congress might well exercise this power to offer a patent-like incentive to persons who invent devices useful to the national defense.

In each of these examples, the incentive offered by Congress under the property or war powers is consonant with the Patent Clause; progress in science and the useful arts is likely to be pro-

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388 *Cf.* Author's League of America, Inc. v. Oman, 790 F.2d 220 (2d Cir. 1986) (upholding a portion of the Copyright Act under the Commerce Clause); Dowling v. United States, 473 U.S. 207 (1985) (holding that copyright power is independent and Congress may penalize copyright infringement whether or not it impacts interstate commerce); Samuels, *supra* note 357, at 966 (suggesting that preemptive capability of the Copyright Act must come from the commerce power rather than the Copyright Clause).

389 Goldstein v. California, 412 U.S. 546, 559 (1973). *See also* Samuels, *supra* note 357, at 966 (discussing possible bases for the Copyright Act in the Commerce Clause). *Cf.* H.R. Rep. 1476, 94th Cong., 2d Sess. 131 (1977), *reprinted in* 1976 U.S.C.C.A.N. 5659, 5746 ("There is no intention [in the Copyright Act] to deal with the question of whether Congress can or should offer the equivalent of copyright protection under some constitutional provision other than the patent-copyright clause of article 1, section 8.").

390 U.S. CONST. art. IV, § 3, cl. 2. The Property Clause states that: "Congress shall have the Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States . . . ." *Id.*

391 *See* Kleppe v. New Mexico, 426 U.S. 529, 538-39 (1976).

392 *See* Woods v. Cloyd W. Miller Co., 333 U.S. 138, 141-43 (1948).

moted together with Congress's other objective. This need not always be the case. Situations could well arise where the Patent Clause is not satisfied because Congress offered an exclusive right that did not promote progress or because Congress promoted progress by offering something other than an exclusive right. The Atomic Energy Act appears to contain elements of both such possibilities. Under the Act, inventions relating to military uses of fissile material are removed from patentable subject matter.[393] A system of prizes and awards is authorized for meritorious research in this area, however.[394] In addition, although patents may issue for inventions relating to civilian uses of fissile material, such patents are subject to a compulsory license administered by the Nuclear Regulatory Commission.[395]

It is generally conceded that Congress removed nuclear armaments from patentable subject matter because it judged that neither national security nor public health and safety would be well served by encouraging private innovation in that area.[396] Presumably, the congressional action taken pursuant to this judgment is legitimate action under the war power, domestic commerce power and even the foreign commerce power. The Atomic Energy Act's legislative history indicates that the compulsory licensing scheme for domestic patents was instituted to allow widespread access to peacetime nuclear technology, which would rapidly foster the growth of domestic nuclear power capability.[397] Again, the scheme is presumably a legitimate exercise of congressional discretion under the commerce power.

Note, however, that these exercises of congressional power are not necessarily consonant with the generally accepted purposes and constraints of the patent power. By removing nuclear weapons technology from patentable subject matter, Congress in some sense intended to discourage invention in that area. As a comparative matter, the "patents" provided for civilian nuclear technology would seem to do the same. Such patents are, in essence, no patents at all because the patent holder cannot recap-

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393 42 U.S.C. § 2181 (1988).

394 *Id.* at § 2181 (b).

395 *Id.* at § 2183.

396 S. Rep. No. 122, 79th Cong., 2d Sess. (1946), *reprinted in* 1946 U.S.C.C.A.N 1327, 1335. *See also* Rebecca Dresser, *Ethical and Legal Issues in Patenting New Animal Life*, 28 JURIMETRICS J. 399, 404 (1988) (discussing congressional purpose for Atomic Energy Act patent provision).

397 S. Rep. No. 1211, 79th Cong., 2d Sess. (1946), *reprinted in* 1946 U.S.C.C.A.N. 1327, 1328, 1335.

ture her development costs by excluding competitors from using her invention or bargaining for a license. Rather, she must settle for whatever royalty is set by a government agency. Thus, in allocating research and development resources, an inventor would be likely to shift her effort to some other technology where she could be sure of recapturing her costs.

Additionally, to the extent that the prospect of an award or prize may offer an incentive to invention in the area of nuclear weapons technology, it cannot achieve this result pursuant to the Patent Clause. The constitutional framers considered instituting a system of awards and prizes as incentives for invention, but rejected that proposal in favor of the present Patent Clause that authorizes only securing to inventors the exclusive right to their inventions.[398] Any power that Congress possesses to institute a system of prizes must derive from some other constitutional provision. Thus, in the area of military and civilian nuclear technology, incentives to invent are at least tempered by constitutional powers lying outside the Patent Clause, and in some instances appear to be wholly drawn from those other powers.

Similarly, Congress has created a system of market exclusivity to reward pharmaceutical manufacturers who invest capital in the development and production of drugs that would be beneficial to only a small patient population.[399] Without the incentive of market exclusivity, these "orphan" drugs would presumably never be available because sales of the product would not be sufficient to recapture the initial costs.[400] Thus, both the exclusivity provision for orphan drugs as well the rationale behind the market exclusivity appear indistinguishable from those in the patent system. Congressional authority to enact the orphan drug statutes, like the authority to enact a system of nuclear technology prizes, cannot arise from the Patent Clause, however. Market exclusivity is available for orphan drugs regardless of their obviousness, yet the Court has stated that nonobviousness is a constitutionally mandated requirement for patentability.[401] Con-

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398 The system of prizes and awards was advocated by James Madison and Alexander Hamilton, but the present, limited exclusivity system was adopted instead. Donald W. Banner, *An Unanticipated, Nonobvious, Enabling Portion of the Constitution: The Patent Provision — The Best Mode*, 69 J. PAT. OFF. SOC'Y 631, 637, 639 (1987).

399 21 U.S.C. § 360cc (1992).

400 *See* H.R. Rep. No. 153, 99th Cong., 1st Sess. 4-5 (1985), *reprinted in* 1985 U.S.C.C.A.N. 301, 303-05. *See generally* Patricia J. Kenney, *The Orphan Drug Act — Is it a Barrier to Innovation? Does it Create Unintended Windfalls?*, 43 FOOD DRUG COSM. L.J. 667 (1988).

401 *See* Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 5-6 (1966).

gress's authority over orphan drugs must come from some other source, such as the Commerce Clause, and such sources of authority are certainly susceptible to commerce-type analysis.[402]

2. The supremacy argument

Despite the potential for resolving questions regarding state intellectual property law at the constitutional level, the Court has consistently chosen to resolve such questions at the statutory level through supremacy analysis. Although this approach has the virtues of constitutional restraint alluded to above,[403] it has in no way simplified the analysis. The standards for supremacy analysis have never been entirely clear, particularly on the border between field preemption and conflict preemption. The Court has recently admitted that these categories are not "rigidly distinct,"[404] and often collapse into one another, complicating the determination of preemption.

Nowhere has this been more true than in the Supreme Court opinions dealing with state and federal intellectual property law. In other areas, the Court has at least attempted to maintain the fiction that these categories involve different standards; this is not so in its intellectual property cases. The arguments in these opinions swirl chaotically around one another, admitting of no easy resolution, and the early cases in this area appear to have developed largely independent of any reference to the parallel jurisprudence in other areas of preemption law.[405] More recently, attempts have been made to square these opinions with established tests for preemption, but such late reconciliation has obscured, rather than clarified, the Court's approach to conflicts with the federal patent system.[406]

a. *Occupying the field*

As a general rule, the Court has tended to avoid field preemption as a basis for its decisions on matters involving intellec-

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402 *But cf.* John J. Flynn, *The Orphan Drug Act: An Unconstitutional Exercise of the Patent Power*, 1992 UTAH L. REV. 389 (arguing that the Orphan Drug Act incentives are impermissible under either the patent or commerce power).

403 *See supra* notes 305-06 and accompanying text.

404 English v. General Elec. Co., 496 U.S. 72, 79 n.5 (1990).

405 *See* Paul Goldstein, *The Competitive Mandate: From* Sears *to* Lear, 59 CAL. L. REV. 873 (1971) (discussing the Supreme Court's failure to draw on preemption cases outside intellectual property area).

406 *See* Crockett, *supra* note 208, at 29, 74; Hilmy, *supra* note 366, at 729; Carol A. Rogala, Casenote, 67 U. DET. L. REV. 475, 484 (1990).

tual property. This, however, is not to say that the Court has been straightforward in its choice of analysis, or that its intellectual property cases are devoid of field preemption language. An implication of field preemption was found in *Sears, Roebuck, & Co. v. Stiffel Co.*,[407] where the Court invoked broad language forbidding state law that would "encroach" on the federal patent system where "uniform federal standards are carefully used to promote invention . . . ."[408] Such language, reminiscent of the field preemption cases, was initially believed to signal the end of all state intellectual property protection.[409] Yet the *Sears* Court cited not a single supremacy case and failed to explicitly apply the tests for field preemption.[410] Instead, the Court employed additional language reminiscent of the conflict preemption cases, and spoke of forbidding state protection that "clashes with the objectives of the federal patent laws."[411]

This mixture of talismanic language, pointing to both field and conflict preemption, left commentators and lower courts confused for some time.[412] Without overruling *Sears*, later opinions opted to analyze similar intellectual property questions in

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407 376 U.S. 225 (1964).

408 *Id.* at 230. *See also* Samuels, *supra* note 357, at 964 ("The *Sears-Compco* decisions had rested primarily on a presumption that congressional enactment of any statute concerning copyrights or patents manifested an intent to preempt the entire field; indeed, the decisions strongly implied that such absolute preemption might be constitutionally mandated.").

409 *See* Goldstein, *supra* note 405, at 874-75 nn.6, 7 (citing numerous court decisions and scholarly articles); *see also supra* note 366 and accompanying text.

410 Curiously, the Court instead cited Sola Elec. Co. v. Jefferson Elec. Co., 317 U.S. 173 (1942) for the proposition that "federal policy 'may not be set at naught, or its benefits denied' by the state law." *Sears*, 376 U.S. at 229 (quoting *Sola Elec.*, 317 U.S. at 176). *Sola Electric* dealt with the ouster of state estoppel laws by federal patent policy, but was not a commerce or preemption case. *Sola Elec.*, 317 U.S. at 176. Rather, the case focused on the displacement of state law by federal common law under the doctrine of Erie R.R. Co. v. Tompkins, 304 U.S. 64 (1938). *See Sola Elec.*, 317 U.S. at 176-77. *See also* United States v. Kimbell Foods, Inc., 440 U.S. 715 (1979); Miree v. DeKalb County, Georgia, 433 U.S. 25 (1977); United States v. Little Lake Misere Land Co., Inc., 412 U.S. 580 (1973); Clearfield Trust Co. v. United States, 318 U.S. 363 (1943). *Sola Electric* belongs to a family of cases quite distinct from the supremacy or commerce cases, although some striking parallels exist between the two groups. *See* Stern *supra* note 198, at 929 n.1; Wolfson, *supra* note 280, at 105-06 n.198. Only recently, however, has the Court begun to explore these parallels suggested in Justice Black's *Sears* citation. *See* Boyle v. United Technologies Corp., 487 U.S. 500, 505-06 (1988); *see also* Wolfson, *supra* note 280, at 105-06 n.198 (discussing *Boyle*).

411 *Sears*, 376 U.S. at 231.

412 *See* Goldstein, *supra* note 405, at 874-75 nn.6, 7 and sources cited therein (listing contradictory decisions and commentary subsequent to *Sears*).

terms of conflict preemption.[413] Recently, however, language drawn more directly from the field preemption cases resurfaced in the *Bonito Boats* decision. Overruling a Florida statute that prohibited copying of boat hulls by direct molding, the Court declared that the state law "enters a field of regulation which the patent laws have reserved to Congress."[414] The Court seemingly applied the test of "pervasiveness" to conclude that field preemption was implicated in its analysis: According to the *Bonito Boats* decision, the patent statutes constitute a " 'scheme of federal regulation . . . so pervasive as to make reasonable the inference that Congress left no room for the States to supplement it.' "[415]

Despite this manifest field preemption language, the *Bonito Boats* decision, like *Sears*, fails to squarely apply field preemption analysis. In addition to its field preemption language, *Bonito Boats* is rife with allusions to conflict preemption, and the Court is less than candid as to which flavor of preemption was actually invoked to strike down the Florida law.[416] This strange mixture of standards stems in part from an unsuccessful attempt to reconcile inconsistent previous opinions, including *Sears*.[417] Yet, any concession to the rhetoric of field preemption seems astonishing in light of the Court's established history of reliance upon conflict preemption in intellectual property cases.

b. *Stands as an obstacle*

First evident in *Goldstein*, the Supreme Court's reliance on conflict analysis as the preferred approach in intellectual property cases became firmly established in *Kewanee Oil Co. v. Bicron Corp.*[418] The *Kewanee* case involved a preemption challenge to an Ohio trade secret law under the Patent and Supremacy Clauses. Relying heavily on his previous analysis of local copyright interests in *Goldstein*, Chief Justice Burger, writing for the Court in *Kewanee*, rejected out of hand any notion of field preemption

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413 *See* Bonito Boats v. Thunder Craft Boats, Inc., 489 U.S. 141 (1989); Aronson v. Quick Point Pencil Co., 440 U.S. 257 (1979); Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470 (1974); Lear, Inc. v. Adkins, 395 U.S. 653 (1969).

414 *Bonito Boats*, 489 U.S. at 167.

415 *Id.* at 167 (quoting Rice v. Santa Fe Elevator Corp., 331 U.S. 218, 230 (1947)).

416 *See* Crockett, *supra* note 208, at 32-33, 74-76.

417 *See* Hilmy, *supra* note 366, at 729; David E. Shipley, *Refusing to Rock the Boat: The* Sears/Compco *Preemption Doctrine Applied to* Bonito Boats v. Thunder Craft, 25 WAKE FOREST L. REV. 385, 385-86 (1990).

418 416 U.S. 470 (1974).

where the Patent Clause was concerned.[419] As in *Goldstein*, a field preemption was rejected on the basis of the states' historic interest in fostering local intellectual diversity.[420] Because trade secret law was effectively a field "traditionally occupied by the States," the Court quickly declared that "[t]he only limitation on the States is that in regulating the area of patents and copyrights they do not *conflict* with the operation of the laws in this area passed by Congress . . . ."[421]

Having dismissed the question of field preemption, the Court then determined whether state trade secret law stood as an obstacle to the goals of federal patent law. As defined by the *Kewanee* Court, such goals were not likely to encounter interference from state trade secret law. The Court began by drawing a sharp line between patentable and non-patentable subject matter, indicating that Congress had indicated an intent to promote disclosure of patentable material by offering the patent incentive.[422] The Court reasoned that trade secret law does not conflict with patent law because the former provides a "weaker" form of protection than does patent law; no rational inventor would opt for trade secret protection if patent protection were available.[423] The Court therefore concluded that trade secret law is unlikely to divert patentable inventions from disclosure and eventual entry into the public domain.[424] In addition, the *Kewanee* opinion observed that, once ideas are in the public domain, trade secret law is unlikely to conflict with the Congressional goal of keeping those ideas there.[425] The *Kewanee* Court observed that this policy "is not incompatible with the existence of trade secret protection. By definition a trade secret has not been placed in the public domain."[426]

The standards articulated in *Kewanee* set the tone for subsequent patent preemption opinions. The Court's more recent preemption discussion in *Bonito Boats* purports to adopt the *Kewanee* analysis; yet *Bonito Boats* saw the test of *Kewanee* subtly altered to fit the "delicate balance" preemption line of cases.[427]

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419 *Id.* at 479.

420 *Id. See also* Abrams & Abrams, *supra* note 357, at 178-79 (discussing the *Kewanee* inquiry into national and local interests as an amplification of *Goldstein*).

421 *Kewanee*, 416 U.S. at 479 (emphasis added).

422 *Id.* at 480-81, 483.

423 *Id.* at 483, 490.

424 *Id. But see* sources cited *supra* note 208 and accompanying text.

425 *Kewanee*, 416 U.S. at 484.

426 *Id.*

427 *See supra* notes 337-50 and accompanying text.

The *Bonito Boats* Court declared that "[t]he federal patent system . . . embodies a carefully crafted bargain for encouraging the creation and disclosure of new, useful, and nonobvious advances in technology and design in return for the exclusive right to practice the invention for a period of years."[428] Poised in opposition to this bargain is an equally carefully crafted determination that "free exploitation of ideas will be the rule, to which the protection of a federal patent is the exception."[429] The states may not intrude upon this equilibrium: "[S]tate regulation of intellectual property must yield to the extent that it clashes with the balance struck by Congress in our patent laws. . . . Where it is clear how the patent laws strike that balance in a particular circumstance, that is not a judgment the States may second-guess."[430]

The Court has been able to grant the widest possible latitude to state law in the area of intellectual property because of the Court's repeated designation of intellectual property as an area where conflict analysis is to be employed; conflict analysis trims away only particular laws without excluding states from the area altogether.[431] This approach makes some sense in *Kewanee*, where the Court appeared determined to allow state law as wide latitude as possible.[432] The approach makes less sense in *Bonito Boats*, where it seemed that the Court was determined to eliminate the Florida plug molding statute. *Bonito Boats*, however, clearly marks a turning point in intellectual property jurisprudence. As discussed above, the opinion contains not only conflict preemption language, but also field preemption language. *Bonito Boats* may therefore constitute a transitional case, leaving the door open for ventures into field analysis.[433] In juxtaposing language from these two tests, the Court may have been hedging its bets, including both types of preemption in the opinion in order to multiply the number of tools available to it in future cases.[434] Where previously only conflict analysis was available to prune away selected state intellectual property enactments, field pre-

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428 *Bonito Boats*, 489 U.S. at 150-51.

429 *Id.* at 151.

430 *Id.* at 152.

431 *See supra* notes 329-34 and accompanying text.

432 It is not a coincidence that the opinions that accomplished this shift, *Goldstein* and *Kewanee*, were penned by the same author, Chief Justice Burger. The shift in intellectual property law reflects the Burger Court's overall movement away from federal dominance of preemption analysis. *See* Martin, *supra* note 283; Bratton, *supra* note 283.

433 *See* Crockett, *supra* note 208, at 76.

434 *Id.*

emption seems now available to fence off larger areas of federal superintendence.

3. Favored status

The Supreme Court's shifting of the focus of intellectual property preemption from field to conflict preemption may have provided state law with a much greater measure of latitude, but with conflict preemption, the Court may still be confronted with the prospect of preemption in cases where state law can be said to directly conflict with federal law. In many instances, the Court has indicated a reluctance to annul the offending statute and has employed its wide interpretive leeway to avoid a finding of conflict. Such interpretive maneuvering has been especially apparent in cases involving the relationship of state trade secret law to federal patent law; in these cases the Supreme Court seems to indicate that trade secrecy enjoys something of a favored status. Although other state intellectual property statutes have been sacrificed to federal interests, trade secret law remains inviolate, even where it seems that the laws struck down are no more objectionable than is trade secrecy. Although both *Kewanee* and *Bonito Boats* attempt to distinguish trade secrecy from the other, objectionable statutes, the opinions' reasoning in this regard is highly questionable.[435]

First, the assumption that trade secret law will not draw inventions out of the patent system is largely unsupported.[436] As discussed above, trade secret law may offer protection of unlimited duration to an invention, whether the invention is otherwise patentable or not.[437] The only criterion for determining whether to adopt trade secret rather than patent protection is the availability of natural barriers to exclude potential users. Thus, the availability of trade secret protection may well interfere with the patent system's disclosure interest.[438]

Second, the *Kewanee* opinion tends to play fast and loose with the term "public domain." According to *Kewanee*, "the [federal patent] policy that matter once in the public domain must remain in the public domain is not incompatible with the existence of trade secret protection. By definition a trade secret has not been

435 *See id.* (questioning the reasoning in *Bonito Boats*); Stern, *supra* note 198, at 945-47 (questioning the reasoning in *Kewanee*).

436 *See* Stern, *supra* note 198, at 945-47.

437 *See supra* notes 206-12 and accompanying text.

438 *See* Stern, *supra* note 198, at 958.

placed in the public domain."[439] Yet definitions are precisely what the Court ignores, equating the "public domain" for purposes of patent law with the "public domain" for purposes of trade secrecy. The meaning of this term, however, is quite different in each context. Nonpatentability is not the same as publicity, yet the Court confuses the two concepts.[440] An invention may lie in the "public domain" because it is unpatentable subject matter, but be withheld from the "public domain" because it is not public knowledge. Although these two types of "public domain" characteristics may overlap, the *Kewanee* Court's implication that they are synonymous is flawed.

Third, the *Kewanee* opinion has been criticized for failing to address strong national interests that might favor a uniform national system. *Kewanee* does not discuss national uniformity or "occupying the field."[441] In arguing for regional intellectual property interests, the Court ignored the consideration that neither the states nor the nation are isolated entities, and that in an international market, intellectual property protection may only be meaningful when it is at least national in scope.[442] The corollary to this principle was later acknowledged in *Bonito Boats*: Regional intellectual property laws effectively divide the nation into discrete markets, placing virtual burdens on interstate commerce.[443] In neither *Kewanee* nor *Bonito Boats* did the Court follow this insight to its natural conclusion and acknowledge the possible negative impact of state trade secrecy law on competition.[444]

Thus, the Court's analysis of potential conflicts with patent policy has been at best dubious. Its analysis of the benefits of

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439 Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 484 (1974). *See supra* notes 418-19 and accompanying text.

440 *See* Hilmy, *supra* note 366, at 746-47.

441 *See* Stern, *supra* note 198, at 952-53.

442 *Id. See also* Langdon Jorgensen & Mary McIntyre-Cecil, *The Evolution of the Preemption Doctrine and Its Effect on Common Law Remedies*, 19 IDAHO L. REV. 85, 93 (1983) (arguing that *Goldstein*'s regional interests analysis ignored the implications for national or international markets). An alternative argument might be made on the basis of the states' strong interest in promoting business ethics, a traditional function of trade secret law. This argument would closely parallel the Court's discussion of avocado regulations preventing a sort of consumer fraud in Florida Lime & Avocado Growers v. Paul, 373 U.S. 132, 144 (1963). Invoking deference to the state's police powers, however, would necessitate an exercise, similar to that in *Florida Lime*, of balancing local health and safety interests against those of national uniformity. This is precisely the type of balancing that the *Kewanee* Court seemed eager to avoid: although the maturity of avocados in *Florida Lime* may not be a matter of national concern, the promotion of economic protections in *Kewanee* may be.

443 Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 163 (1989).

444 *See* Stern, *supra* note 198, at 943-44.

trade secret protection, against which the potential conflict was balanced, stands on firmer ground. Much of the benefit analysis in *Kewanee* and *Bonito Boats* draws upon the economic character of trade secrets discussed in Part II above.[445] In *Kewanee*, the Court suggested that without trade secret protection, valuable resources might be wasted in security efforts to achieve actual secrecy.[446] Licensing would also be deterred, creating further resource misallocation as firms attempted to reproduce inventions that would be better licensed.[447] The Court concluded:

> Trade secret law and patent law have co-existed in this country for over one hundred years. Each has its particular role to play, and the operation of one does not take away from the need for the other. Trade secret law encourages the development and exploitation of those items of lesser or different invention than might be accorded protection under the patent laws, but which items still have an important part to play in the technological and scientific advancement of the Nation. Trade secret law promotes the sharing of knowledge, and the efficient operation of industry; it permits the individual inventor to reap the rewards of his labor by contracting with a company large enough to develop and exploit it. Congress, by its silence over these many years, has seen the wisdom of allowing the States to enforce trade secret protection. Until Congress takes affirmative action to the contrary, States should be free to grant protection to trade secrets.[448]

In *Bonito Boats*, the Court expanded upon the economic analysis of *Kewanee* to recognize an additional economic function for trade secrecy. The *Bonito Boats* Court suggested that trade secret protection might allow development of inventions to a patentable stage, thus feeding the patent system.[449] The patent system seems to provide for this function of trade secrecy. The Patent Act provides that information contained in patent applications is to remain confidential unless and until a patent issues.[450] The regulations governing the Patent and Trademark Office require that pending, unsuccessful, or abandoned applications be maintained in secrecy.[451] Even

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445 *See supra* notes 206-30 and accompanying text.

446 Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 486-87 (1974).

447 *Id.*

448 *Id.* at 493.

449 *Bonito Boats*, 489 U.S. at 166. *Accord* Paul Goldstein, Kewanee Oil Co. v. Bicron Corp.: *Notes on a Closing Circle*, 1974 SUP. CT. REV. 81, 92; Rochelle C. Dreyfuss, *Dethroning* Lear: *Licensee Estoppel and the Incentive to Innovate*, 72 VA. L. REV. 677, 689-90 (1986).

450 35 U.S.C. § 122 (1988).

451 37 C.F.R. § 14(a), (b) (1989).

published opinions of the Board of Patent Appeals and Interferences may be excised of trade secret information if one of the parties so requests.[452]

These characteristics of the patent system did not escape notice in *Bonito Boats*, where the Court claimed to find "affirmative indications from Congress that both the law of unfair competition and trade secret protection are consistent with the balance struck by the patent laws."[453] Given that preemption analysis is ostensibly a question of implied legislative intent, the *Kewanee* decision likely overlooked an additional ground from which it might have supported its result: Congress has *not* been silent "over these many years" regarding the role of trade secret law.[454] If the patent scheme is examined for hints of congressional intent, as has been done in other cases determining federal preemption, it might well be argued that the provisions discussed above assume and encourage the continued existence of state trade secret law. If other federal statutes are considered, Congress has often provided for the protection of trade secrecy of information given to federal agencies. Thus, as Justice Marshall observed in his special concurrence in *Kewanee*, "Congress has repeatedly demonstrated its full awareness of the existence of the trade secret system, without any indication of disapproval."[455] The question remains whether this tacit approval will hold true in the context of outer space activity.

III. Federal Preemption in Outer Space

The criteria for preemption analysis announced by the Supreme Court are less than certain guides even where mundane, terrestrial matters are at issue: "As with other constitu-

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452 *Id.* at § 14(d).

453 *Bonito Boats*, 489 U.S. at 166.

454 Crockett, *supra* note 208, at 36.

455 416 U.S. at 494 (Marshall, J., concurring). The case for tacit congressional approval of state trade secrecy is rather overwhelming; virtually every federal agency that is given investigatory power is required to preserve the confidentiality of trade secrets. *See, e.g.*, 5 U.S.C. § 552 (1988) (in agency record requests); 7 U.S.C. § 136(h) (1988) (environmental pesticide control); 7 U.S.C. § 2157 (1988) (Institutional Animal Committee); 11 U.S.C. § 107(b)(1) (1988) (in bankruptcy court); 15 U.S.C. § 1193 (1988) (for flammable fabrics); 15 U.S.C. § 1263 (1988) (for hazardous substances); 15 U.S.C. § 1401(e) (1988) (National Motor Safety Act); 15 U.S.C. § 2055(a)(2) (1992) (Consumer Products Safety Commission); 18 U.S.C. § 1905 (1988) (in criminal investigation); 21 U.S.C. § 331(j) (1988) (Food, Drug, and Cosmetic Act); 26 U.S.C. § 6110(c)(4) (1988) (Internal Revenue Service); 29 U.S.C. § 664 (1988) (Occupational Safety and Health Administration); 39 U.S.C. § 4102 (1988) (postal service); 42 U.S.C.A. §§ 7542(b), 7607(a), 7621(c) (1988) (air pollution control).

tional standards, these considerations cannot be applied mechanically in most cases to produce sensible decisions."[456] The prospect for these standards to produce a sensible result seems even less encouraging where their application is translated to low Earth orbit. This jurisprudential pessimism may well be the most important lesson of the preemption cases. The common thread running through all the cases is the absence of a simple, universal solution. As one commentator has stated, "no single legal or policy consideration can be used universally to distinguish cases of preemption from cases of non-preemption, for the result must depend upon the particular interests or policies at stake."[457] This precept is crucial to an informed analysis of state and federal interests in outer space. The unique nature of outer space commercialization, rather than any previously announced preemption test, is likely to determine the best result. This concept will hold true not only in the consideration of intellectual property law, but also in determining the mechanics of other emerging legal questions.

A. Intellectual Property

At the most rudimentary level, the answer to whether state trade secret law should operate in outer space could be a simple one. The Supreme Court has declared in *Kewanee* and *Bonito Boats* that a trade secret enjoys something of a favored status; it exists alongside the patent as a viable form of intellectual property protection. If the rule of *Kewanee* controls, then the inquiry need not proceed further and the gap in outer space trade secret law may be filled by the enactments of individual states. The circumstances attending any application of state law to outer space activity diverge so widely from those considered in *Kewanee*, however, that the rule of the case may no longer fit the facts. A new derivation of the rule is in order. The considerations articulated in *Kewanee* and *Bonito Boats* may still guide the analysis, but the outcome may be different in a new milieu.

1. Narrowing the field

Using the supremacy cases as a guide, the first step in reconsidering *Kewanee* for outer space might be to ask whether the field at issue encompasses all aspects of federal patent law, or a more limited subset of its applications. As the *Pacific Gas* line of cases

456 *See* Hirsch, *supra* note 257, at 549.
457 *See* Stern, *supra* note 198, at 941.

suggests, continued operation of state law in a particular field does not mean that there are no federal enclaves where state law may not intrude.[458] Or, from the *Machinists* perspective, a "mini-field" of federal supremacy may still have to be staked out within the larger field originally considered.[459] Even if state law may as a general matter continue to operate alongside federal patent law, it may be barred from intruding on the federal function in the international environs of outer space.

One consequence of narrowing the field in this manner is that the Court's requirement that Congressional intent to pre-empt be "clear and manifest" most likely becomes inapplicable.[460] Although it is the states that, in general, have been involved in the regulation of trade secrets, it may be difficult to claim that such regulation has ever been a traditional area of state interest for activities occurring beyond Earth's atmosphere. The states' interest in activities far beyond their borders is not unknown, as evidenced by some cases allowing prosecution or adjudication of activity aboard ships on the high seas.[461] States may also be concerned with protecting the investments of local businesses that engage in outer space research or controlling the ethics and conduct of corporations that do business within their borders.[462] This interest may be particularly pronounced for states such as Florida, Texas and California, where representatives of firms engaging in outer space research are likely to conduct some operations. As the situs of a corporation's activity becomes farther removed from a state's terrestrial borders, however, so too must the state's assertion of "local concern" become more and more attenuated.

Thus, the *Kewanee-Goldstein* rationale of local concern will carry far less force in the outer space context, and the focus of preemption analysis will shift to federal concerns. Working through the strange exercise of seeking implied congressional intent regarding preemptive purposes, a court might begin by assessing a possible preemptive intent in the Patents in Space Act.

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458 *See supra* notes 311-27 and accompanying text.

459 *See supra* notes 345-50 and accompanying text.

460 *See* Jones v. Rath Packing Co., 430 U.S. 519, 525 (1977)

461 *See, e.g.*, Thompson v. Teledyne Movible Offshore, Inc., 419 So. 2d 822 (La. 1982); North Pacific Steamship Co. v. Industrial Accident Comm'n of California, 163 P. 199 (1917).

462 "The maintenance of standards of commercial ethics and the encouragement of invention are the broadly stated policies behind trade secret law." Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 481 (1974).

The statute's legislative history would be a likely place to look for indications of such intent. But, not surprisingly, the Act's legislative history is almost entirely devoid of any discussion of the question. The committee reports accompanying the statute state pointedly and repeatedly that the purpose of the Act is to extend the ambit of United States patent law to activities aboard United States spacecraft.[463] The reports do not discuss how the new law is to interact with any other existing intellectual property provision, however.

The sole reference to state law in general, and trade secret law in particular, appears in the report of a hearing regarding an early version of the Patents in Space bill before the House Subcommittee on Courts, Intellectual Property, and the Administration of Justice. In response to a question from Representative Kastenmeier, Chair of the Subcommittee, as to the potential legal problems that might have to be resolved, the witness, law professor Glenn H. Reynolds, replied:

> Well, one of the problems we have is that we don't entirely know, but I can give you a few examples, maybe. One is the relationship of state laws to space activity. Many areas of law having to do with employer-employee relationships, or also things like trade secrets, are really state law.
>
> There is no rule for determining whether state law should apply to activities in space other than general conflict of law rules; if so, which state's law should apply? . . . I called up Roger Milgrim in New York, who is the author of a leading treatise on trade secrets and who knows much more about the subject than I do, and he confessed that he found it a rather puzzling problem as well . . . .[464]

Consequently, the history of the relevant federal legislation is unlikely to provide much assistance in assessing preemption. Where the statute's legislative history is devoid of hints as to congressional purposes, the Supreme Court has turned to other indicators, such as the pervasiveness of the federal scheme.[465] Where outer space activity is concerned, however, this procedure may not be helpful. Congress has legislated extensively on the general subject of patents generally, of course, and administrative regulations governing the minute details of patent application, examination and issue extend even farther.[466] The extensive scheme of federal regu-

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463 S. Rep. No. 266, 101st Cong., 2d Sess. 2, 6 (1990).

464 *1989 Hearing, supra* note 22, at 79.

465 *See, e.g.*, Cloverleaf Butter Co. v. Patterson, 315 U.S. 148 (1942).

466 *See supra* notes 450-55 and accompanying text.

lation seems unlikely to serve as an indicator of legislative intent for outer space patents: the question of a pervasive scheme was completely ignored by the *Kewanee* Court, which skated past field preemption to reach the test for conflict preemption.[467] When the potential field of preemption is limited to that of the Patents in Space Act, the extent of federal regulation comprises an even poorer guide. It cannot be said that Congress has so occupied the field of outer space intellectual property protection that no room remains for the operation of state law. Congress has barely visited the field at all. The lack of federal attention to this field may in fact militate toward allowing state trade secret law to function; previously observed, trade secret law tends to play an important complementary role in patent protection, and its preemption would leave "a substantial legal vacuum" where it normally operates.[468]

2. Standing as an obstacle

An alternative approach to outer space trade secrets, the one more traditionally applied to intellectual property, would be to consider the operation of state law through the lens of conflict preemption. Rather than denying the entire field of outer space commercial activity to state trade secret law and leaving a legal vacuum, the conflict preemption standard would permit state law to operate except where it actually conflicted with federal purposes.[469] Because, as the Supreme Court has acknowledged, these categories of preemption are not "rigidly distinct,"[470] the considerations discussed above in terms of field preemption are likely to suggest a similar result under conflict preemption. Although application of conflict preemption signals a closer scrutiny of a statute's purpose, it is not immediately clear that the result will be different than that under a tightly focused field preemption inquiry.

Thus, if it cannot be readily said that Congress has "occupied the field" of outer space intellectual property protection, neither can it be readily said that application of state trade secret law to outer space activity be said to "stand as an obstacle" to congressional intent. The committee reports accompanying the legislation are replete with statements of the purposes that Congress intended to accomplish by amending the patent statutes:

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467 *See supra* notes 419-21 and accompanying text.
468 *Cf.* TRIBE, *supra* note 231, § 6-27, at 497.
469 *See supra* notes 329-34 and accompanying text.
470 English v. General Elec. Co., 496 U.S. 72, 79 n.5 (1990).

> [The Patents in Space Act] should clearly demonstrate congressional intent with respect to the patent law as applied to activities in outer space. [The Act] is intended to extend the protection of U.S. patent law to applicable activities conducted in outer space. It is anticipated that the clarification of the intellectual property law will significantly encourage scientific discovery and innovation in outer space.[471]

Arguably, the operation of state trade secret law in outer space would frustrate neither the goal of extending United States patent law to outer space activity nor that of encouraging discovery and innovation in space. Under the *Kewanee* rationale, it could be argued that the availability of trade secret law is not likely to interfere with the operation of patent law aboard United States spacecraft. Indeed, because of the practical difficulty of maintaining any type of confidentiality aboard the space station, researchers would probably prefer the certainty of patent protection where it is available. As to the encouragement of discovery and innovation, we have seen that trade secrecy fulfills a different role than does patent law.[472] By filling this role, state trade secret law may well aid in fostering outer space research and innovation. If anything, a *lack* of state trade secrecy law seems more likely to inhibit research than will the presence of state trade secret law. Consequently, preemption of state law might serve here to frustrate the stated congressional goals, rather than to further them.

However much this discussion suggests that state law be allowed to operate, an analysis oriented to a different set of congressional goals could well lead to the opposite result. One stated goal of extending patent protection to outer space activity was to clarify intellectual property law so as to encourage private investment in outer space activity.[473] The legislative history of the Patents in Space Act reflects congressional concern that private investment might not occur if uncertainty of reward were further exacerbated by lack of intellectual property protection.[474] Uncertainty and a resultant reluctance to invest might stem from the absence of patent or trade secret protection. If state law is allowed to operate alongside federal law aboard the space station, uncertainty might just as

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471 S. Rep. No. 266, 101st Cong., 2d Sess. 6 (1990).

472 *See supra* notes 206-30 and accompanying text.

473 *See* S. Rep. No. 266, 101st Cong., 2d Sess. 2 (1990); *Statement on Signing the Bill Ensuring the Applicability of Patent Law to Activities in Outer Space*, 26 WEEKLY COMP. PRES. DOC. 1828 (Nov. 5, 1990).

474 *See 1985 Hearing*, *supra* note 16, at 1; H.R. No. 788, 99th Cong., 2d Sess. Pt. 1, 1-2 (1986); H.R. No. 51, 100th Cong., 1st Sess. pt. 1, at 1-2 (1986); S. Rep. No. 266, 101st Cong., 2d Sess. 6 (1990).

likely stem from the possibility of being subject to the requirements of fifty jurisdictions' differing trade secret rules. The potential for uncertainty suggests the need for a uniform rule regarding intellectual property. Arguably, Congress has provided the uniform rule through its outer space patent legislation, and unless and until Congress addresses protection for intellectual property that is not patentable, any other rule should be preempted.

The need for a single rule is even more compelling when the space station's multinational character is considered.[475] For any given project, nationals from various partner countries may work on proprietary research. Separate aspects of a particular project may be pursued in modules on the registry of different partner nations, or the project may be moved from module to module at various times.[476] Thus, under the IGA governing the space station, any given research project may become subject to the intellectual property laws of the United States, Japan and the thirteen members of the European Space Agency. The possibility that activity in the United States module might be subject to fifty different sets of trade secret laws adds to the potential for confusion and uncertainty.

Moreover, in this area, state law could tread dangerously near the powers exclusively within the federal purview. The Supreme Court has more than once invalidated state laws that burdened or impinged upon Congress's powers concerning foreign treaties or foreign commerce.[477] These powers are certainly implicated where commercial activity aboard a multinational space station is contemplated. To date, at each crucial juncture during the planning of the *Freedom*, the United States has had to proceed cautiously to avoid insulting or alienating one or another of its partners in the space station coalition.[478] Negotiations for major international agreements such as the *Freedom* IGA tend to be particularly tricky, and major issues are often left unresolved because the partners were unable to agree on a solution.[479] The jurisdictional patchwork of the IGA, in fact, represents a difficult compromise necessitated by the

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475 The same, of course, may be said for other multinational space projects, such as the Spacelab missions. *See supra* note 54 and accompanying text.

476 *See* Reynolds, *supra* note 137; Meyer, *supra* note 105, at 343.

477 *See* Japan Line, Ltd. v. County of Los Angeles, 441 U.S. 434 (1979); Hines v. Davidowitz, 312 U.S. 52 (1941).

478 For example, Congressional wrangling over the United States' budget for the space station has been a source of some irritation to other participants, requiring considerable diplomacy to smooth over. *See* Eliot Marshall, *Space Station Science: Up in the Air*, 246 SCI. 1110, 1111 (1989).

479 *See, e.g.*, McCord, *supra* note 63, at 1947 (discussing unresolved choice-of-law issues).

participating nations' reluctance to allow the law of any other nation to dominate the project.[480]

This aspect of the *Freedom* IGA is underscored by the concern, found throughout the legislative history of the Patents in Space Act, to avoid impinging upon other nations' sovereignty. The Supreme Court declared that United States patent law does not contain an extraterritorial effect, in part to avoid offending the sovereignty of other nations.[481] Although no nation holds sovereignty over outer space, many of the nations participating in the *Freedom* project exhibited concern over the potential sweep of the Patents in Space Act, prompting the introduction of limiting language into both the legislative history and the Act itself.[482] Introduction of a variety of state trade secret laws into this web of considerations could well upset the "delicate balance" worked out by Congress and federal agencies with the United States' international partners.[483] Thus, if Congress has drawn a balance, it might be considered a balance between fostering commercial development in outer space and respecting the interests and sovereignty of the United States' partners in the *Freedom* project, rather than a balance between the operation of federal and state intellectual property law.

B. Resolving the Dilemma

Thus far, the application of preemption analysis to outer space activity seems to present something of a conundrum where trade secret law is concerned: Application of state laws may frustrate congressional intent with regard to foreign relations, but failure to apply the laws may equally frustrate congressional intent to commercialize space. This problem is not unique to matters of intellectual property law. Other potential questions of outer space law have received little or no federal attention and could require an analysis similar to that detailed here.

1. Similar legal problems

Federal preemption is a potential issue in any area of outer space law where federal legislation is sparse and state law is readily available to fill the void. This dynamic is true, for example, in the area of outer space criminal law. Criminal acts aboard United

480 *See, e.g.*, Oosterlinck, *supra* note 63, at 28 (noting that dominance of U.S. patent law "is unacceptable to the other partners . . . .")

481 Deepsouth Packing Co., Inc. v. Laitram Corp., 406 U.S. 518, 531 (1972).

482 *See* Burk, *supra* note 20, at 345-49.

483 *See supra* notes 337-45 and accompanying text.

States spacecraft were initially covered by military-style regulations that relied heavily upon the authority of the spacecraft commander's authority to maintain discipline.[484] As more civilian astronauts became involved in outer space missions, however, regulations designed to govern the conduct of a few "highly trained and disciplined NASA astronauts carrying out closely supervised tasks" were deemed inadequate to cover all possible contingencies.[485] Congress therefore added spacecraft to the special maritime and territorial jurisdiction of the United States.[486] This provision subjects certain criminal acts, such as assault, rape, robbery, arson or embezzlement, to federal law if the acts occur aboard a United States spacecraft after the doors have been sealed for liftoff and before they are unsealed after landing.[487]

The federal criminal scheme is not comprehensive, however, and often relies upon state criminal law to fill in gaps.[488] In addition, concurrent jurisdiction of both federal and state statutes is both acceptable and common.[489] But where outer space activity is concerned, the applicability of state criminal law is less than certain. States may assert jurisdiction on the same bases as nations do, including territoriality, citizenship, universality and others.[490] In certain situations, both state and federal criminal law may cover activity aboard a spacecraft, such as before the doors are sealed prior to liftoff or when the doors are unsealed after landing.[491] Under principles of nationality or protection, a state might also assert jurisdiction over activity in outer space involving its citizens or impacting upon its interests.[492]

The preemptive effect of United States criminal law in outer space is as uncertain as the question of criminal jurisdiction in outer space. The United States Criminal Code contains an express savings clause providing that nothing in that title of the

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484 18 U.S.C. § 799 (1988); 14 C.F.R. § 1214 (1989).

485 *See* OTA BACKGROUND PAPER, *supra* note 5, at 43.

486 18 U.S.C.A. § 7(6) (West Supp. 1992).

487 *Id. See generally* Karen Robbins, Comment, *The Extension of United States Criminal Jurisdiction to Outer Space*, 23 SANTA CLARA L. REV. 627 (1983).

488 *See* 18 U.S.C. § 13 (1988) (applying state criminal law to federal enclaves). *See also* WAYNE R. LAFAVE & AUSTIN W. SCOTT, JR., CRIMINAL LAW § 2.8(a)(2) (2d ed. 1986) (discussing federal enclaves).

489 *See generally* LAFAVE & SCOTT, *supra* note 488, § 2.8(d), at 125-26 (discussing concurrent federal and state jurisdiction).

490 *Id.* at § 2.9 (discussing bases of state jurisdiction).

491 *See* Robbins, *supra* note 487, at 649-50.

492 *See* LAFAVE & SCOTT, *supra* note 488, § 2.9(c), at 135-36 (discussing state exercise of protective and citizenship jurisdiction).

United States Code shall impair the jurisdiction of the States.[493] This provision, however, has not been interpreted to mean that federal law cannot preempt state criminal law where national interests are at stake. For example, the state statute held to have been preempted in *Pennsylvania v. Nelson* was a criminal statute.[494]

Tort law comprises an additional area of uncertainty. The international Liability Convention provides that nations are responsible for claims brought by third parties; this principle is recognized by the IGA governing the space station.[495] The IGA also establishes a limited cross-waiver among the participating nations, but claims for personal injury or death and for willful misconduct are not covered.[496] Thus, a variety of tort issues remain unaddressed, and unlike intellectual property or criminal law, no federal legislation touching on these issues has ever been enacted. In a terrestrial setting, state tort law would apply, but commentators have asserted that application of state tort law to outer space activity would undermine federal interests.[497] The suggested alternative has been to extend the Federal Tort Claims Act to outer space;[498] but this extension, of course, would not resolve the question of state law applicability — it would only raise the same preemption questions seen in intellectual property and criminal law.

2. Possible solutions

Besides intellectual property, criminal law and tort law, numerous other examples of outer space law are likely to raise questions of federal preemption. Initially, the answer to the conundrum posed here might seem to be congressional action to fill in those substantive legal areas, such as trade secrecy, that seem devoid of rules for outer space activity. Legislative action may not be the best solution, however, and cannot be the whole solution. It is not realistic to expect Congress to attend to all the many areas of law that might apply to outer space activity. Congress is not likely to lend that much attention to a single area unless some crisis demands such a focus. Even were Congress to

493 *See* 18 U.S.C. § 3231 (1988).

494 *See supra* note 303 and accompanying text; *see also* LAFAVE & SCOTT, *supra* note 488, § 2.15(b), at 187 n.27.

495 *See generally* McCord, *supra* note 63, at 1955-57 (discussing IGA tort provisions); Stewart, *supra* note 63, at 759-62 (same).

496 *See generally* McCord, *supra* note 63, at 1955.

497 *Id.* at 1956.

498 *Id.*

devote the time necessary to enacting a comprehensive space code, it probably could not anticipate all the situations that may arise in such a developing area of human endeavor.[499] The question of how and whether to fill those gaps with available state law would remain. This result will be true whether Congress enacts a comprehensive outer space code or simply addresses a few selected areas: The preemption question would remain. In fact, new federal legislation is just as likely to generate preemption questions as to resolve them.

a. *Express language*

It might be argued that Congress could forestall these questions by explicitly indicating whether or not state law was to be permitted to operate in a given area of outer space law. But, as suggested above, such explicit statutory language is no more than one factor to be considered in preemption analysis.[500] This concept is aptly illustrated by the difficulty courts have encountered in determining the scope of express language in current federal intellectual property statutes. The federal patent statutes as presently constituted contain neither express preemption language nor a savings clause; consequently, questions regarding such enactments's scope have not yet arisen at the interface of patent and trade secret. Both types of problems have arisen, however, at the interface of trade secret and federal copyright law.

Under the federal copyright statutes, Congress expressly provided for preemption of state laws that confer protection "equivalent" to that of federal copyright, but explicitly saved state laws that confer protection "not equivalent" to that of federal copyright.[501] This language has left federal courts scrambling to determine what is or is not equivalent to copyright.[502] In general, the courts have applied an "extra element" test requiring the state cause of action to include some factor, not found in a cause of action for copyright infringement, that "qualitatively

499 *See* OTA BACKGROUND PAPER, *supra* note 5, at 57.

500 *See supra* notes 260-68 and accompanying text.

501 17 U.S.C. § 301 (a), (b) (1988).

502 *See generally* 1 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 1.01 [B] (1992); Paul Goldstein, *Preempted State Doctrines, Involuntary Transfers and Compulsory Licenses: Testing the Limits of Copyright*, 24 UCLA L. REV. 1107 (1977) (discussing history and ramifications of 17 U.S.C. § 301 preemption language).

distinguishes" the nature of the action from that of copyright.[503] For fraud, the additional element might be deception; for contract, the requirement of a promise; or for breach of trust, a fiduciary relationship.[504] Where trade secrecy is concerned, this approach has produced decidedly mixed results: In some cases the requirement of secrecy has been enough to avert preemption,[505] in others it has not.[506]

Thus, explicit statutory language in and of itself is unlikely to remove the uncertainty surrounding the potential operation of state law in outer space. This realization does not mean that congressional attention to outer space law is not needed and would not go some distance toward resolving the problem. The existence of federal statutes in a given area of outer space law would at least remove one of the major considerations favoring the operation of state law: the development of a "legal vacuum" that neither state nor federal law could touch. Additionally, explicit statutory language as to preemption would at least serve as an indicator or starting point for judicial analysis.

b. *Federal common law*

Ultimately, however, it is the courts that will consider each new question of outer space law and weigh whether state law is to be allowed to function.[507] Interpretation is, of course, the role of the courts, and takes place wherever a legislative enactment is applied.[508] This role, however, becomes particularly important in the type of situation examined here, i.e., where critical statutory gaps need to be filled. Beginning with whatever can be determined about legislative intent, courts extrapolate from the text of a statute, attempting to reach an optimal balance of social interests.

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503 *See, e.g.*, Mayer v. Josiah Wedgwood & Sons, Ltd., 601 F. Supp. 1523, 1535 (S.D.N.Y. 1985) (explaining the "extra element" test).

504 *See generally* NIMMER & NIMMER, *supra* note 502, § 1.01[B][1][b], at 1-17.

505 *See, e.g.*, M. Bryce & Assocs., Inc. v. Gladstone, 319 N.W.2d 907 (Wis. Ct. App. 1982).

506 *See, e.g.*, Avco Corp. v. Precision Air Parts, Inc., 210 U.S.P.Q. 894 (M.D. Ala. 1980) (federal copyright preempted trade secret claim because latter required no additional elements).

507 "[T]he inevitable incompleteness presented by all legislation means that interstitial federal lawmaking is a basic responsibility of the federal courts." United States v. Little Lake Misere Land Co., Inc., 412 U.S. 580, 593 (1973).

508 *Id. See also* Kamen v. Kemper Fin. Servs., Inc., 111 S. Ct. 1711, 1717 (1991) (federal courts bear responsibility for developing novel federal rules for incorporating state law into federal rules of decision).

In some instances, the material with which a court must work is quite sparse; for example, in the area of antitrust, a statute that is a few words long has been parlayed into a rich body of case law.[509] The corpus of federal preemption doctrine examined here has in fact been compared to antitrust law, where balancing is employed to resolve some questions and key indicators determine the outcome of others.[510] Of course, unlike antitrust law, preemption is generally a matter of constitutional interpretation, rather than statutory adjudication. Still, concern that the court performing this expanded interpretive function might be overstepping the bounds of its authority is generally unwarranted; "judicial intervention in this sphere [of preemption analysis] is . . . less problematic than in other constitutional realms" because of the possibility of corrective congressional revision.[511]

Consequently, even in the absence of express language regarding federal preemption, judicial review should serve adequately to determine whether in a given instance the application of state law to outer space activity is in the best interests of the nation. Curiously enough, federal courts are also well positioned to resolve the more serious deficiency of substantive law that generates the need for state law to be applied, i.e., the lack of a federal space code.[512] Although the Supreme Court has held that "[t]here is no federal general common law,"[513] federal courts clearly have power to create common law in specific areas where uniquely federal interests are at stake.[514] These uniquely federal interests include international relations such as those involved in outer space activity.[515] Thus, the same concerns that

509 "[T]he common law process of law making was both intended by the antitrust enactments and has occurred." AREEDA & TURNER, *supra* note 261, at 15. The operative portion of the Sherman Antitrust Act provides that "[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States or with foreign nations, is declared to be illegal . . . ." 15 U.S.C. § 1 (1988). The relevant portions of the Federal Trade Commission Act and Clayton Act are similarly brief. AREEDA & TURNER, *supra* note 261, at 14.

510 *See* Stern, *supra* note 198, at 930.

511 TRIBE, *supra* note 231, § 6-2, at 404.

512 *See* Elizabeth A. Pucciarelli, Note, *The Case for a Federal Common Law of Space*, 33 N.Y.L. SCH. L. REV. 509 (1988); Reynolds, *supra* note 81, at 27-28; Reynolds, *supra* note 2, at 11.

513 Erie R.R. Co. v. Tompkins, 304 U.S. 64, 78 (1938).

514 *See* Boyle v. United Technologies Corp., 487 U.S. 500, 511-12 (1988); Clearfield Trust Co. v. United States, 318 U.S. 363, 366-67 (1943).

515 *See, e.g.*, Banco Nacional de Cuba v. Sabbatino, 376 U.S. 398, 423-24 (1964) (applying federal common law to an international dispute because the issues were "uniquely federal in nature"). *See also* Pucciarelli, *supra* note 512, at 520-22 (dis-

favor barring state law from operating in outer space also sanction allowing federal courts to fill the resulting legal "vacuum."[516] A federal common law approach to outer space law also offers the advantage of flexibility in a rapidly changing and expanding area. Those practicing in the area of outer space law have suggested that the only thing worse than no substantive law for outer space would be a code enacted too quickly, before problems and legal standards that might be unique to the outer space environment become apparent.[517] Rather than turning its attention to a comprehensive — or even piecemeal — outer space code, Congress might do better to vest explicitly the federal courts with authority to hear matters of outer space law.[518]

CONCLUSION

The promise of commercial gain is already spurring increased private activity in outer space, and the trend is likely to continue. With this trend comes the need for clear rules to govern outer space activity, but at present few such rules exist. Trade secrecy constitutes but one of the areas unaddressed by

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cussing federal common law and international relations). Pucciarelli argues that the development of federal maritime law is an appropriate model for development of a federal common law of outer space. Maritime law is often raised as an analogy to outer space law. *Id.* at 526. Federal jurisdiction of maritime matters is expressly provided for in the Constitution, however; there is no similar provision for outer space jurisdiction. *See* Reynolds, *supra* note 81, at 27. The common thread between these two jurisdictional areas is international relations, an area of concern clearly dedicated to federal superintendence by the Constitution. *Id.* at 27-28. International relations, then, seems to be the proper federal concern to examine when suggesting an active role for federal courts in outer space.

516 *See supra* note 410.

517 *See* OTA BACKGROUND PAPER, *supra* note 5, at 55-56. The disadvantage to the common law approach, of course, is that "[c]ommon law doctrines, much like a pointillist painting, resolve themselves bit by bit into a discernible pattern over time." Dan L. Burk, *Copyrightability of Recombinant DNA Sequences*, 29 JURIMETRICS J. 469, 528 (1989) (discussing use of the common law to resolving disputes regarding new technologies). That rulemaking by this method is responsive rather than anticipatory may create some uncertainty for those embarking on commercial space ventures. *See* OTA BACKGROUND PAPER, *supra* note 5, at 56-57. Much of this inclusiveness likely could be alleviated, however, by resolving who has authority to make the rules—the federal courts. *See* Reynolds, *supra* note 81, at 27-29.

518 *See* Reynolds, *supra* note 81, at 28-29. As indicated here, the federal courts probably already have the authority to create such a federal common law of outer space, working from present statutes and the strong federal interests in the area. An explicit grant of authority, however, might solve several jurisdictional questions, particularly regarding venue. *Cf. id.* (discussing possible venue of outer space courts). In addition, a grant of exclusive jurisdiction would shunt outer space matters to the federal, rather than the state, courts. *Cf. supra* notes 149-59 and accompanying text.

current federal law on outer space. Although state law is available to address these areas, state law may contain features inimical to national interests. Such a dilemma suggests the need for federal action, but feasibility and allure of a comprehensive outer space code presently are questionable. Rather, it may be most appropriate to allow outer space law to advance as common law. Congress could best facilitate this progress by an explicit grant of jurisdiction to the federal courts.