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Post-Myriad Genetics Copyright of Synthetic Biology and Living Media

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Post-Myriad Genetics Copyright of Synthetic Biology and Living Media

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Abstract

This Article addresses copyright as a viable form of intellectual property protection for living, organic creations of science and art. The United States Supreme Court's decision in *Association for Molecular Pathology v. Myriad Genetics, Inc.*¹ narrowed patent-eligible protection over living components of humans or other organisms. Synthetic biologists are expected to look with renewed focus on copyright law for the intellectual property protection of biological creations. The contribution of this Article is to reveal that the same issues are raised with regard to the copyrightability of the works of synthetic biology as are raised by pictorial, graphic, and sculptural arts that use and produce living media as their works. The current contours of copyrightability present four identical questions that are particularly relevant to and difficult to answer in the context of science and art that purports to create works of living media:

- Is living media copyrightable subject matter?
- What is authorship (or who is an author) of living media?
- What does it mean to create a fixed and tangible work of living media?
- What constitutes an original creation of living media under the originality doctrines of merger and scenes a faire?

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1. *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013) (holding isolated DNA sequences not patentable).

This Article will provide an analytical framework for rethinking the contours of copyright so as to answer these questions by comparing contemporary scientific methods of creation with artistic methods in order to determine the copyright narratives and metaphors of subject matter, authorship, creation, and originality that best address the concerns underlying these four questions and allow copyright protection over the works.

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I. Introduction: Copyright and Living Creations

“In other studies you go as far as others have gone before you, and there is nothing more to know; but in a scientific pursuit there is continual food for discovery and wonder.”

— MARY SHELLEY, *FRANKENSTEIN* 37 (Colburn & Bentley 1831)

"Life! Do you hear me? Give my creation ... life!"

— Mel Brooks & Gene Wilder, *Young Frankenstein* (20th Century Fox 1974)

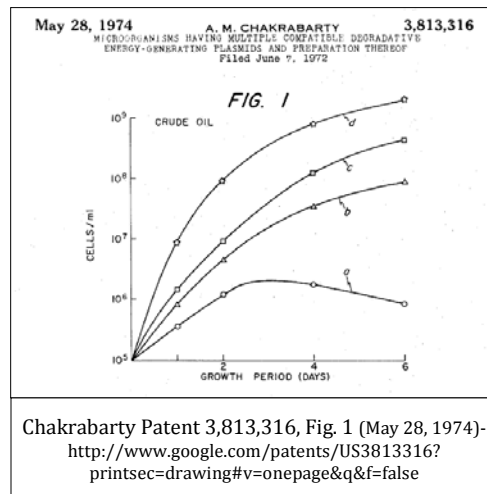


DNA Strands

http://commons.wikimedia.org/wiki/File:DNA_strands.gif

Contemporary scientific and artistic methods of creation threaten the comfortable conceptions and contours of copyright law, particularly the basic conception of what is copyrightable subject matter, and what it means to be an author of an original creation fixed in a tangible media. In synthetic biology, biological engineering, and DNA sequencing, contemporary scientists are using new technologies and methods of creation, and attempt to obtain intellectual property rights in new products and creations that were not producible or even conceivable a decade or, in some cases, even a year or two ago. At the same time, contemporary artists and designers are producing living, breathing, growing media as their pictorial, graphic, and sculptural works. Judges and practitioners must struggle with issues of what is copyrightable subject matter, what does authorship and fixation mean, and what should be the standard of originality in these new works of biology, genetics, and living art.

Patent law has had a head start on this intellectual property challenge. In *Chakrabarty*,² the Supreme Court endorsed the patent claims of a biological engineer who asserted a claim over an artificially created organism—a human-engineered bacterium that is useful and innovative in the clean-up of petroleum (crude oil) spills—and accepted the patent eligibility of a human-designed and human-engineered living organism.



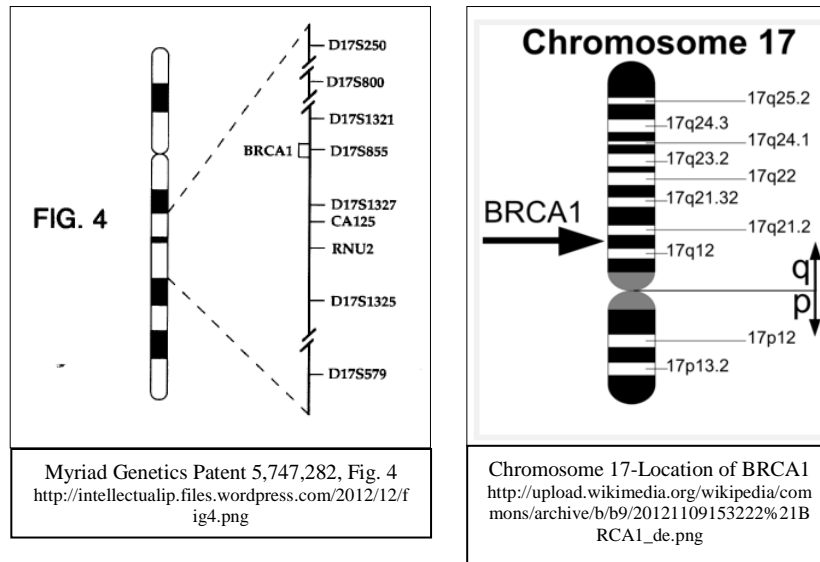
Two years after *Chakrabarty*, the United States Patent and Trademark Office (USPTO) granted the first human DNA-related patents.³ Over the next thirty years, the USPTO and the courts enforced the rule of patent-eligibility for isolated DNA molecules, recognizing that the human isolation of a molecule so as to produce novel and useful applications represents a patentable advancement over what existed in nature.⁴ The USPTO has granted over 40,000 patents drawn to human genetic material, almost 3,000 of which are specifically directed to isolated DNA molecules.⁵

2. *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

3. See Eric J. Rogers, *Can You Patent Genes? Yes and No*, 93 J. PAT. & TRADEMARK OFF. SOC'Y 19, 19 & n.3 (2010); Brief for Respondents, *Myriad Genetics*, No. 12-398, 2013 WL 860315 at *2-3 (Mar. 7, 2013).

4. See *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1206 (Fed. Cir. 1991); Brief for Respondents, *Myriad Genetics*, 2013 WL 860315 at *2.

5. See Rogers, *supra* note 5, at 19, 40; Brief for Respondents, *Myriad Genetics*, 2013 WL 860315 at *2. In the mid-1990s, when DNA-related claims had been issuing for over a decade and upheld by the Federal Circuit, the USPTO evaluated its approach so as to ensure its compliance with § 101, and “to ensure that examination was of sufficiently high quality.” The USPTO concluded that “any ‘non-naturally occurring manufacture or composition of



But events have overtaken patent law's position with respect to the intellectual property protection of living creations. *Myriad Genetics* held that components of living organisms, such as isolated DNA strands taken from human genes, are not patent eligible.⁶ The Supreme Court has narrowed the portal to intellectual property patent protection over the products of synthetic biology. Synthetic biology faces a critical juncture in its effort to find intellectual property protection for its creations, and biologists' attention will likely turn to copyright law for the intellectual property protection of biological creations.

matter' ” is patent-eligible under § 101. USPTO Utility Examination Guidelines, 60 Fed. Reg. 36,263 (July 14, 1995). The distinction was reinforced in 2001 to provide that “[a] patent on a gene covers the isolated and purified gene but does not cover the gene as it occurs in nature.” USPTO Utility Examination Guidelines, 66 Fed. Reg. 1092 (Jan. 5, 2001); see also Brief for Respondents, *Myriad Genetics*, 2013 WL 860315 at *2-3.

6. The Court held that isolated DNA strands or isolated components of organisms are not patent eligible. *Myriad Genetics*, 133 S. Ct. at 2118-19. The Court's rationale turned on the finding that Myriad's claims pertained to DNA sequences that were held to be “naturally occurring,” “products of nature.” *Id.* (comparing natural DNA sequence claims to artificially created, non-naturally-occurring cDNA sequence claims).

Copyright is a potential alternative for intellectual property protection of living creations.⁷ But copyright protection may be hindered by precedents that have limited the copyrightability of living works.⁸ Professors Andrew Torrance and Christopher Holman⁹ have been advancing the conversation regarding copyright, synthetic biology, and DNA sequencing.¹⁰ Professor Roberta Kwall¹¹ and several other scholars have confronted the copyright issues of living media as the subject matter of artistic works.¹² While each of these scholars has admirably wrestled with some of the questions of copyrightability, originality, and authorship that I will raise in this work, their scholarship fails to note the overlap of four identical questions that are particularly relevant to and difficult to answer in the context of science and conceptual art that uses and produces living media as its works:

7. As of this writing in August 2013, there is no evidence that a copyright claim over a synthetical biological creation ever has been litigated.

8. See *infra* text accompanying notes 59-65.

9. Torrance is Professor of Law, Docking Faculty Scholar, University of Kansas School of Law. Holman is Professor of Law, University of Missouri-Kansas City School of Law.

10. See, e.g., Andrew W. Torrance, *DNA Copyright*, 46 VAL. U. L. REV. 1 (2011) [hereinafter Torrance, *DNA*] (copyrighting DNA sequences); Andrew W. Torrance, *Synthesizing Law for Synthetic Biology*, 11 MINN. J.L. SCI. & TECH. 629 (2010) [hereinafter Torrance, *Synthesizing*] (discussing intellectual property protections, including copyright, for synthetic biological works); Christopher M. Holman, *Copyright for Engineered DNA: An Idea Whose Time Has Come?*, 113 W. VA. L. REV. 699 (2011). It is fair to say the conversation started with a work by Cornell law professor Irving Kayton. See Irving Kayton, *Copyright in Living Generically Engineered Works*, 50 GEO. WASH. L. REV. 191 (1982) see also Tani Chen, *Can a Biological Sequence Be Copyrighted?*, 19 INTELL. PROP. & TECH. L.J. 1 (2007); Joseph N. Michelotti, *Genes as Intellectual Property*, 11 MICH. ST. U. J. MED. & L. 71 (2007).

11. Raymond P. Niro Professor of Intellectual Property Law, Co-Director, DePaul University College of Law Center for Jewish Law & Judaic Studies; Founding Director, DePaul College of Law Center for Intellectual Property Law and Information Technology.

12. See Roberta R. Kwall, *The Lessons of Living Gardens and Jewish Process Theology for Authorship and Moral Rights*, 14 VAND. J. ENT. & TECH. L. 889 (2012); see also Charles Cronin, *Dead on the Vine: Living and Conceptual Art and VARA*, 12 VAND. J. ENT. & TECH. L. 209, 227 (2010); John Nivala, *The Landscape Art of Daniel Urban Kiley*, 29 WM. & MARY ENVTL. L. & POL'Y REV. 267 (2005); Morgan M. Stoddard, Comment, *Mother Nature as Muse: Copyright Protection for Works of Art and Photographs Inspired by, Based on, or Depicting Nature*, 86 N.C. L. REV. 572 (2008). Professor Kwall also has written on narrative theory and its potential impact on the questions of authorship and creation, which parallels the angle I have taken on the topics of this Article. See Roberta Rosenthal Kwall, "Author-Stories:" *Narrative's Implications for Moral Rights and Copyright's Joint Authorship Doctrine*, 75 S. CAL. L. REV. 1, 25-27 (2001).

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In one sense, questions such as these are not entirely new and contemporary; copyright law always has had to deal with new technologies that have challenged conventional thinking on authorship, creation, and originality, in areas such as photography,¹³ chromolithography,¹⁴ motion pictures,¹⁵ and computer programs.¹⁶ Eventually, each art and science communicated a narrative containing one or more metaphors of the process or the product of creation that allowed the expansion of the contours of copyright to encompass the new technology and art form. Photography came to be understood not as a science or craft that literally captured reality, but one that depicted an author's conception and composition of reality expressed in photographic media. Cameras came to be understood as tools that do not operate on their own to take pictures, but require an author to frame, compose, and create the image, fulfilling the copyright requirements of mental conception and artistic creation.¹⁷

13. *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53 (1884). Although photographs were mentioned as a form expressive work in the 1870 Revisions to the Copyright Act, Act of Congress of July 8, 1870, Rev. St. § 4952, *Sarony* is the first Supreme Court case to recognize that photographs are proper subjects of copyright protection.

14. *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 251-52 (1903).

15. *Edison v. Lubin*, 122 F. 240, 242-43 (3rd Cir. 1903); *Kalem Co. v. Harper Bros.*, 222 U.S. 55, 61 (1911).

16. An early copyright question regarding a "program" arose in *White-Smith Music Pub. Co. v. Apollo Co.*, 209 U.S. 1 (1908), which held that player-piano rolls were not "copies" of musical compositions and thus could not infringe the compositions. *Id.* at 16-18. Later, in the early 1960s, actual computer programs were accepted as "books" or "literature," even in a non-human-readable form, such as magnetic tape, as long as a human-readable format (source code, as opposed to object code) also was deposited with the Register of Copyrights. See Copyright Office Circular No. 61, 1964 version. Later cases, including *Lotus Development Corp. v. Borland International, Inc.*, 49 F.3d 807 (1st Cir. 1995), *aff'd*, 516 U.S. 233 (1996); *Apple Computer, Inc. v. Microsoft Corp.*, 35 F.3d 1435 (9th Cir. 1994); *Gates Rubber Co. v. Bando Chemical Industries, Ltd.*, 9 F.3d 823 (10th Cir. 1993); *Computer Associates International, Inc. v. Altai, Inc.*, 982 F.2d 693, 701-14 (2d Cir. 1992), filled in important details in the conception of originality and copyrightability of computer programs.

17. *Bleistein*, 188 U.S. at 251-52.

Chromolithography came to be understood as a new, efficient, speedy, and cost-effective method of production of two-dimensional color images—the same images as might appear in paintings or drawings—that require an author to design and create the images, again fulfilling the copyright requirements of mental conception and artistic creation.¹⁸ Motion pictures drew on the accepted “technology” and artistry of pantomimes and photographs,¹⁹ and computer programs were analogized to literature with an expressive, communicative purpose,²⁰ before being codified as a separate area of copyrightable subject matter.²¹

Copyright is flexible enough to handle contemporary technologies that produce living organisms or organic components, but contemporary judges, practitioners, and scholars must reframe and, in some instances, reimagine the proper contours of copyrightability in order to bring living works under copyright protection.²² This Article does not propose a change in the copyright code or in the substance of the current interpretative rules and doctrines promulgated under the code to answer these questions. Copyright law does not suffer from a lack of meaningful rules on copyrightability, authorship, creation, and originality. Instead, this Article will provide a framework for rethinking the contours of copyright by comparing scientific methods of creation with artistic methods in order to determine the

18. *Sarony*, 111 U.S. at 59-60; *Mannion v. Coors Brewing Co.*, 377 F. Supp. 2d 444, 452-54 (S.D.N.Y. 2005).

19. *Edison*, 122 F. at 242-43; *Kalem*, 222 U.S. at 61. The Townsend Amendment to the 1909 Copyright Act created a class of copyrightable subject matter for dramatic motion pictures and a class for newsreels and similar non-dramatized material. Act of Aug. 24, 1912, Pub. L. No. 62-303, 62d Cong., 2d Sess., 37 Stat. 488. Prior to the amendment, motion picture producers submitted printouts of the cells of their films on long strips of paper as their deposit of the “photographic prints” of their creation. See *Motion Pictures in the Library of Congress*, LIBRARY OF CONGRESS – RES. & REFERENCE SERVS., <http://www.loc.gov/rr/mopic/mpcoll.html> (Nov. 30, 2012).

20. See generally Sapna Kumar & Arti Rai, *Synthetic Biology: The Intellectual Property Puzzle*, 85 TEX. L. REV. 1745, 1749-50 (2007).

21. 17 U.S.C. § 101. House Report 94 on the 1976 Act specifically discussed computer programs as being copyrightable subject matter under the Act. H.R. REP. NO. 94-1476, at 54 (1976). Later, the Computer Software Copyright Act of 1980 rewrote 17 U.S.C. § 117 to clarify the types of rights and possible infringements of software protected under the Copyright Act.

22. In her 2012 *Harvard Law Review* article, Professor Rebecca Tushnet examined the problem of uninformed and disingenuous judicial determinations regarding visual images in copyright law. Rebecca Tushnet, *Worth a Thousand Words: The Images of Copyright*, 125 HARV. L. REV. 683 (2012). This Article extends this conversation and analysis to the specific questions of subject matter, authorship, creation, and originality.

narratives and metaphors of subject matter, authorship, fixation, and originality that best address the concerns underlying the four questions posed above of authorship, fixation, originality, and copyrightability. The framework grounds the answer to each question with the proper narrative and metaphor that will allow the works to navigate the restrictions and limitations of the copyrightability requirement and the originality doctrines of merger, scenes a faire, functionality, and the idea-expression distinction. The Article also will discuss the metaphors and narratives that are prone to failure and that might deny copyright protection to living works of contemporary art and science. Describing the proper conception of the nature and scope of a copyright over artistic creations will aid judges and practitioners in reaching an appropriate conception of the nature and scope of contemporary scientific creations, allowing a proper, desirable scope of protection for each scientific and artistic work.²³

II. Living Media as Copyrightable Subject Matter in Art and Synthetic Biology

Copyrightability is a complicated topic when applied to the creations of living media. This Article separates the requirement of copyrightable subject matter from the related concepts of originality, authorship, and fixation. This section focuses on the narrative and metaphors that will allow the subject matter of synthetic biology and other arts and sciences producing works of living media to receive copyright protection.

Copyrightable subject matter is limited. The limitations on protectable subject matter come from:

- the nature of copyright, which will be compared to patent law,
- copyright law's requirements of expressive subject matter, and
- copyright's idea-expression distinction.

The proper narrative of subject matter is required to navigate the limitations imposed by the law.

23. A note on methodology: I have included multiple diagrams and illustrations throughout this article as an intentional reminder and demonstration that the creations of synthetic biology can be demonstrated and established through visual and other media. These works have protectable expressive characteristics as graphical-pictorial-sculptural works in the same way that computer programs have been accepted to have protectable literary characteristics in both the source code and object code.

The Copyright Code, section 102, states:

(a) Copyright protection subsists, in accordance with this title, in original works of authorship fixed in any *tangible medium of expression*, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. Works of authorship include the following categories: (1) literary works; (2) musical works, including any accompanying words; (3) dramatic works, including any accompanying music; (4) pantomimes and choreographic works; (5) pictorial, graphic, and sculptural works; (6) motion pictures and other audiovisual works; (7) sound recordings; and (8) architectural works.

(b) In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.²⁴

Section 102 is the statutory source for copyright's requirements of expressive subject matter, the idea-expression distinction, and the doctrines of functionality, merger, and scenes a faire.²⁵ At first blush, copyright cannot protect a procedure, process, system, method of operation. Copyright does not protect inventions when characterized as concepts, principles, or discoveries.²⁶ Copyright cannot protect formulas and recipes, including chemical formulas, that list components and ingredients and layout the process to perform the task.²⁷

The approved categories of section 102 are expressive works in the form of literary works; musical works; dramatic works; pantomimes and choreographic works; pictorial, graphic, and sculptural works; motion pictures and other audiovisual works; sound recordings; and architectural works. There is room for debate whether the listed categories limit the subject matter of copyright to any particular class or nature of works. Congress itself declared the list to be illustrative and not limiting.²⁸ But an

24. 17 U.S.C. § 102(a) (2012) (emphasis added).

25. *Gates Rubber Co. v. Bando Chem. Indus., Ltd.*, 9 F.3d 823, 836 (10th Cir. 1993); *Computer Assocs. Int'l v. Altai, Inc.*, 982 F.2d 693, 703-06 (2d Cir. 1992).

26. *See* 17 U.S.C. § 102(b).

27. *Id.*; *see also Gates Rubber*, 9 F.3d at 836; *Publ'ns Int'l, Ltd. v. Meredith Corp.*, 88 F.3d 473, 481-82 (7th Cir. 1996).

28. H.R. REP. NO. 94-1476, at 53 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659, 5666.

inclusive, illustrative listing in statutory interpretation invites the application of the *ejusdem generis* maxim: that the listed words suggest that items of the same general kind and nature (i.e., the same genus) as the listed words are acceptable and others are not, and this is to be the guidance for the evaluation of appropriate subject matter.²⁹ Thus, the narrative of subject matter must tell a story of an expressive product of creation.³⁰

Copyright's and patent law's subjects are not mutually exclusive, but they protect their subjects of creation differently and reward different products of intellectual creation, satisfying different expectations of protectability. In contrast to copyright, patent law protection has nothing to do with expression and everything to do with ideas. In general, a patent can protect ideas, processes, and procedures that are useful, novel, not anticipated, and invented by the author. A copyright cannot protect ideas, processes, or procedures of any nature or form, regardless of how unprecedented, inventive, useful, or novel they may be.

The Patent Code, section 101,³¹ "Inventions patentable," states:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

To drive home the point, the Patent Code, section 100,³² "Definitions," states:

When used in this title unless the context otherwise indicates –

(a) The term "invention" means invention or discovery.

(b) The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.

29. See, e.g., *Todamerica Musica v. Radio Corp. of Am.*, 171 F.2d 369 (2d Cir. 1949) (applying *ejusdem generis* maxim to sections 2 and 4 of the 1909 Copyright Act defining the specific subjects of copyright).

30. See *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 350 (1991) (copyright law limited to original expressive works, and "limits severely the scope of protection in fact-based works"); *Harper & Row Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 547 (1985) ("The copyright is limited to those aspects of the work—termed 'expression'—that display the stamp of the author's originality.").

31. 35 U.S.C. § 101 (2012).

32. 35 U.S.C. § 100.

Thus, patent law welcomes and protects all processes, discoveries, machines, items of manufacture, or compositions of matter.³³

Under 17 U.S.C. § 102's limitations, copyright cannot protect the actual synthetic biological discovery of a gene-splicing procedure or prevent others from using the procedure itself.³⁴ It should follow that copyright cannot protect an actual, existing sequence of DNA that a biologist has isolated and discovered that it has significant function in the creation of a certain protein that can be exploited to create a biological component *if* the biologist's narrative is evaluated as a process or procedure or discovery.³⁵ Copyright may cover the creation of a purified form of a DNA sequence that does not exist in nature; the Supreme Court has made that distinction for patent law and granted patent protection over forms of isolated, purified DNA sequences—cDNA—that are not naturally occurring products of nature.³⁶ Copyright also might protect living media if it can be found to fall within one of the protected categories—literature; pictorial, graphic, or sculptural works;³⁷ computer programs,³⁸ or compilations.

33. *Id.* §§ 100, 101.

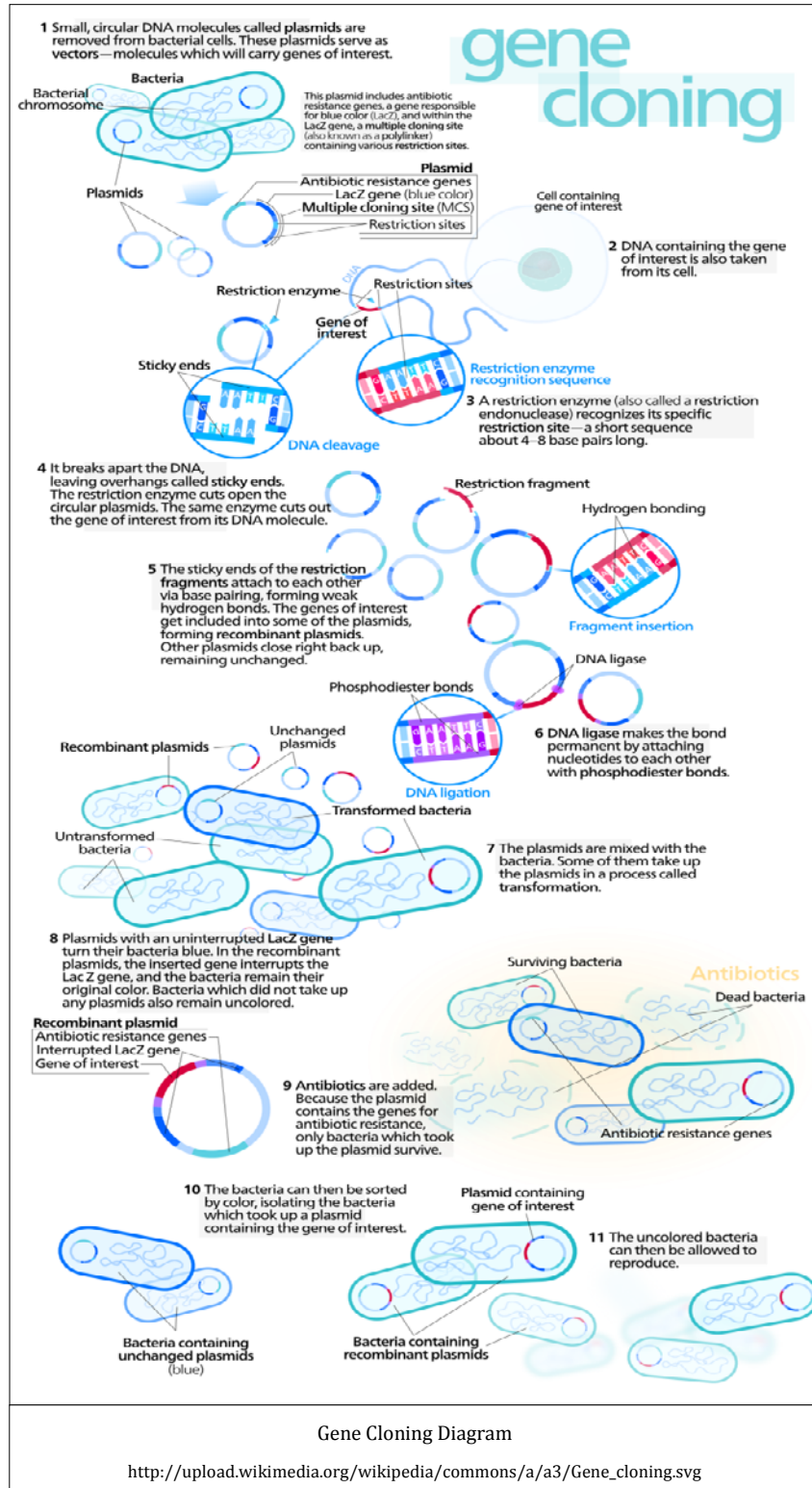
34. An analogous example would be to a recipe, which is unprotectable in copyright as a formula, process, or procedure when examined as a list of ingredients and instructions for the preparation of a dish, while recipes might be copyrightable in compilation with protectable literary expression or creative, artistic layout and presentation. *Compare* Publ'ns Intl., Ltd. v. Meredith Corp., 88 F.3d 473, 474, 480-81 (7th Cir. 1996) (recipes without literary adornment are not copyrightable), *and* *Lambing v. Godiva Chocolatier*, 142 F.3d 434 (Table), 1998 WL 58050 (6th Cir. 1998) (same), *and* *Continental Micro, Inc. v. HPC, Inc.*, No. 95 C 3829, 1997 WL 309028 at **1-2 (N.D. Ill. Jun. 4, 1997) (same), *and* *Harrell v. St. John*, 792 F. Supp. 2d 933, 943 (S.D. Miss. 2011), *and* 37 C.F.R. § 202.1 (lists of ingredients not copyrightable), *with* *Barbour v. Head*, 178 F. Supp. 2d 758, 761-64 (S.D. Tex. 2001) (cowboy-themed cookbook combined creative, expressive elements with recipes in copyrightable compilation).

35. See sources cited *supra* note 34. *Myriad Genetics* denied patent-eligibility to isolated sequences of DNA that are naturally occurring. 133 S. Ct. at 2117-19.

36. *Myriad Genetics*, 133 S. Ct. at 2119.

37. 17 U.S.C. § 102(a).

38. Computer programs are recognized as a specific category of copyrightable subject matter under 17 U.S.C. §§ 101, 117. The legislative history of the 1976 Act also recognized programs as copyrightable under the category of "literature." See H.R. REP. NO. 94-1476, at 54 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659, 5667 ("‘literary works’ . . . includes . . . computer programs"); *id.* at 51, *reprinted in* 1976 U.S.C.C.A.N. at 5664 ("computer programs . . . were . . . copyrightable from the outset"); *id.* at 116, *reprinted in* 1976 U.S.C.C.A.N. at 5731 (1976 Act recognizes "copyright-ability of computer programs").



With a little narrative reasoning,³⁹ that just might be possible.

A. *The Narrative of Synthetic Biological Subject Matter*

The story of synthetic biology involves some very exciting subject matter. Practitioners and proponents alike describe the creation of new DNA sequences leading to new genes, and to the production of polypeptides and proteins leading to new organic components, life forms, or entirely new organisms. There is nothing lacking in the potential subjects of study and creation; only the collective imagination of synthetic biologists seems able to limit the potential. Detractors warn of the downside—super germs and viruses, cloning, designer babies—and raise many other potentially troublesome legal and ethical questions involving the manipulation of life forms. Nevertheless, the question raised and answered here is: “Are the products of synthetic biology copyrightable?”

The copyrightable subject matter issue in synthetic biology is affected by questions of content, as well as by the limits on protection of ideas, discoveries, and inventions. Even with the question of content, there are two parts to the issue—first, what is nature of the creation that a synthetic biologist would seek to protect, and second, can you protect actual living creations under copyright law.

1. *The Nature of the Synthetic Biological Creation as Subject Matter*

Regarding the nature of the creation that a synthetic biologist would seek to protect, the subject matter issue would seem to present a low prospect of success for the biologist author because compared to patent law, which welcomes and protects all processes, discoveries, machines, items of manufacture, or compositions of matter,⁴⁰ copyright protects only

39. Narrative reasoning, or storytelling, is a form of rhetoric and advocacy, and not simply a campfire pastime. See, e.g., ANTHONY G. AMSTERDAM & JEROME BRUNER, MINDING THE LAW 113-14 (2000); MICHAEL D. MURRAY & CHRISTY H. DESANCTIS, ADVANCED LEGAL WRITING AND ORAL ADVOCACY ch. 3 (2013); Daniel A. Farber & Suzanna Sherry, *Telling Stories Out of School: An Essay on Legal Narratives*, 45 STAN. L. REV. 807 (1993); Brian J. Foley & Ruth Anne Robbins, *Fiction 101: A Primer for Lawyers on How to Use Fiction Writing Techniques to Write Persuasive Facts Sections*, 32 RUTGERS L.J. 459 (2001); Michael D. Murray, *Explanatory Synthesis and Rule Synthesis: A Comparative Civil Law and Common Law Analysis*, 83-84 BAHÇEŞEHİR ÜNİVERSİTESİ HUKUK FAKÜLTESİ-KAZANCI HUKUK DERGİSİ 139 (2011); Michael D. Murray, *Rule Synthesis and Explanatory Synthesis*, 8 LEGAL COMM. & RHETORIC: J. ALWD 217 (2011); DAVID RAY PAPKE, NARRATIVE AND THE LEGAL DISCOURSE: A READER IN STORYTELLING AND THE LAW (1991).

40. 35 U.S.C. §§ 100, 101.

expressive works in the form of literary works; musical works; dramatic works; pantomimes and choreographic works; pictorial, graphic, and sculptural works; motion pictures and other audiovisual works; sound recordings; architectural works; computer programs; and compilations of protectable or unprotectable content.

Of the several authors writing about copyrightability of natural and artificially produced gene sequences and synthetic biological components and organisms, the majority have concluded that the DNA sequences, components, and organisms are copyrightable.⁴¹ These authors have suggested various metaphors to support the assertion that DNA sequences, biological components, and newly-generated organisms are works—of authorship—created by the synthetic biologist: that the work are writings written by the biologist,⁴² that they are compilations,⁴³ or that they are programs designed to carry out a biological function.⁴⁴ As discussed below, not all of these metaphors can produce satisfactory copyright protection over biological works.

The conception of the biologist is greater than most of these analogies. A deconstruction of the narrative of creation in synthetic biology includes:

- **The discovery itself:** The creation of knowledge through study, research, and experimentation to discover the attributes of DNA sequences and the proteins that might be produced through manipulation of the coding of the sequences, which in greater and greater combinations might produce organic components or actual organisms;
- **The invention of the method and process of production:** The creation of a method or process of production of meaningful DNA sequences that are coded and engineered for the production of proteins, organic components, and organisms;

41. See sources cited *supra* note 10.

42. *E.g.*, Torrance, *DNA*, *supra* note 10, at 4-6; Torrance, *Synthesizing*, *supra* note 10, at 632-35; Holman, *supra* note 10, at 702-04; Kayton, *supra* note 10, at 194-96.

43. *E.g.*, Kayton, *supra* note 10, at 201-03. *But see* Michelotti, *supra* note 10, at 86-87 (expressing pessimism about compilation copyrights); Kumar & Rai, *supra* note 20, at 1748, 1760-62 (discussing large-scale gene syntheses), 1764 (doubts concerning copyrightability of compilations).

44. *E.g.*, Torrance, *DNA*, *supra* note 10, at 23-24, 30-34; Holman, *supra* note 10, at 709-16; Kayton, *supra* note 10, at 198.

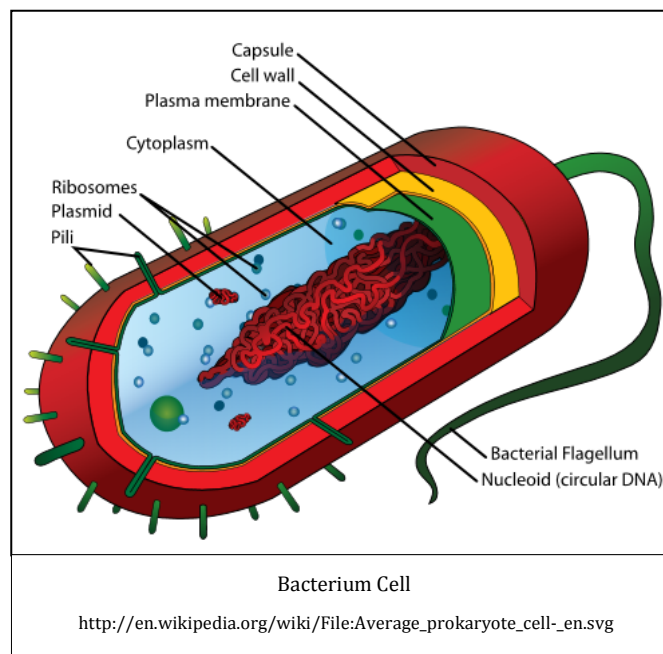
- **The writing, rendering, or recording of the steps of production:** The creation of a recorded (written, taped, coded) description of the steps of the production of meaningful DNA sequences that are coded and engineered for the production of proteins, organic components, and organisms, and a record, description, or depiction of the sequences, proteins, components, or organisms themselves;
- **The creation itself:** The actual sequences, proteins, components, and organisms themselves—in their physical, material form—that are created by the biologist.

Ideally, biologist authors would receive protection for each of these four items as the fruits of their intellectual conceptions, rendering, and creations. In reality, only varying levels of protection may be afforded to each under copyright law, affording a limited number of rights, and satisfying different expectations short of the grant of a thick copyright over each instance of conception and creation. The narrative of the subject matter of the works might be altered to reflect what may actually be protected under copyright law:

- **Writing, rendering, or recording of the discovery itself:** The literary, visual, or audio-visual writing or recording of the actual knowledge created through study, research, and experimentation to discover the attributes of DNA sequences, the proteins they might code, and in greater and greater combinations, the dynamic, replicative, perennial components of actual organisms⁴⁵ that the biologist might produce through manipulation of the sequences and proteins. The writings and recordings may be protected from unauthorized copying and, with some limitations, also protected from unauthorized translation, adaptation, and conversion into other writings, renderings, or recordings as derivative works of the initial write-up;

45. My thanks are given to Osman Mirza, my consultant on synthetic biology, for supplying the proper descriptors here.

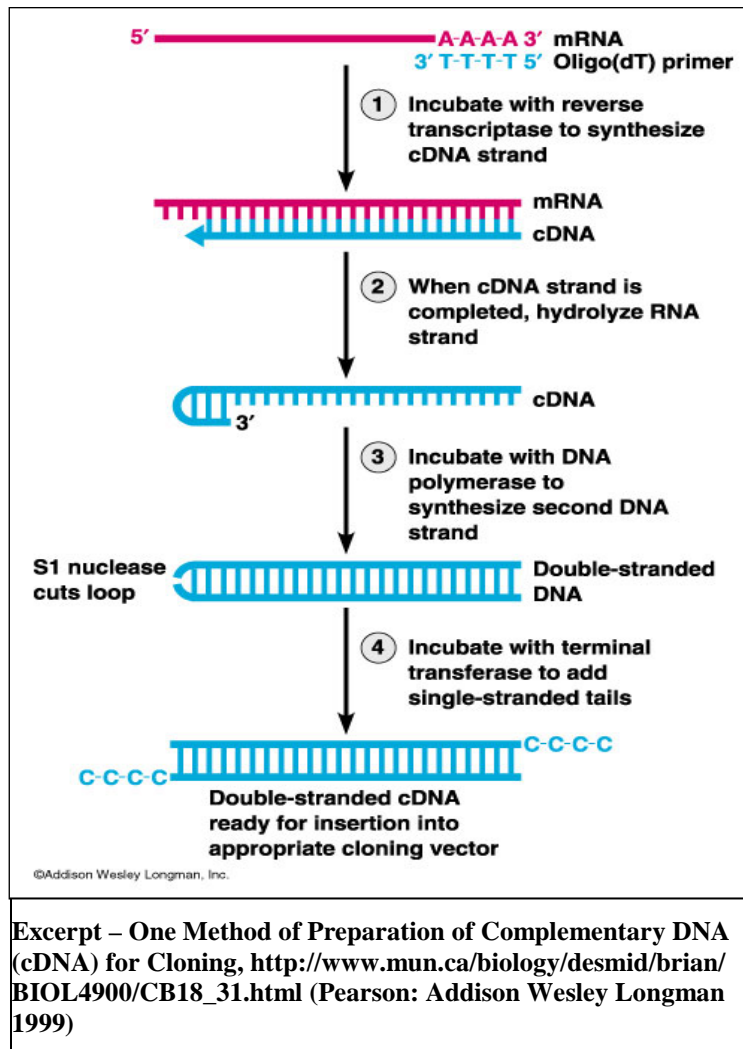
- **Writing, rendering, or recording of the processes and procedures of production:** The creation of a recorded (written, taped, coded) description of the steps of the production of meaningful sequences, proteins, organic components, and organisms, which are protected from unauthorized copying and, to a limited extent, also protected from unauthorized translation, adaptation, and conversion into other writings, renderings, or recordings as derivative works of the initial recorded description;
- **Writing, rendering, or recording of the creations:** The creation of a recorded (written, taped, coded) description, rendering, or depiction of the sequences, proteins, organic components, or organisms themselves. The goal of this record of the products of creation would be to prevent the copying or translation, adaptation, and conversion of the actual recorded description, rendering, or depiction of the creations into other



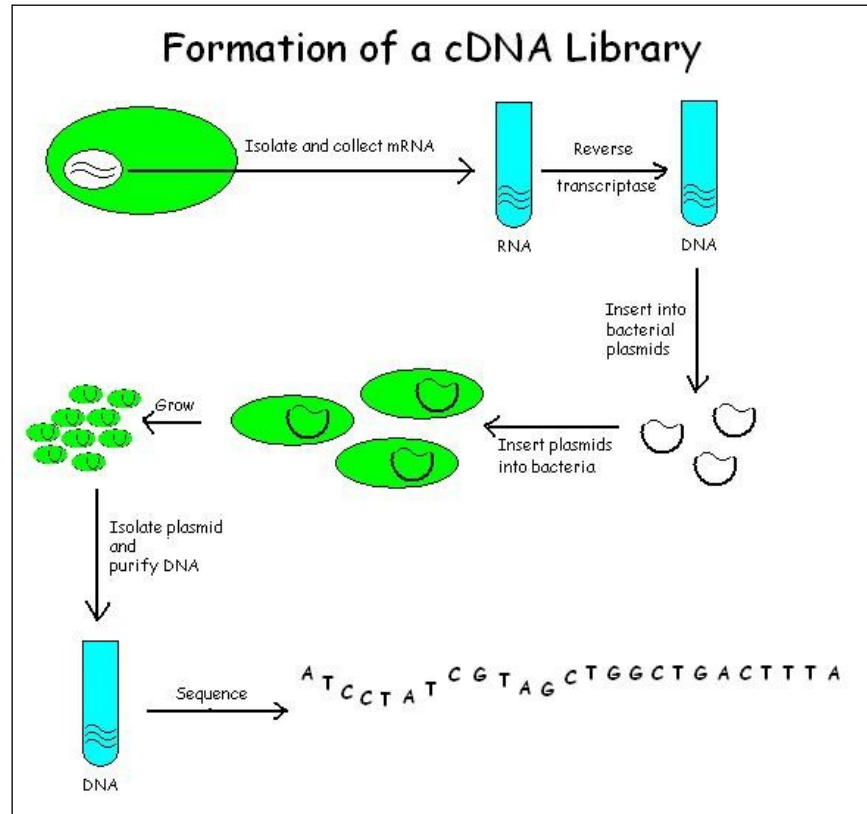
- writings, renderings, or depictions. At best, this step would also prevent the creation of actual, living, 3-dimensional derivative works from these 2-dimensional or audio visual records and descriptions. Ultimate success would be the right to control the recreation and further use of the sequences, proteins, organic components, or organisms themselves as derivative works of the original recorded description, rendering, or depiction of the sequences, proteins, organic components, or living organisms;
- **Protection of the creations themselves:** This final step would seek copyright protection over the biological creations themselves in the form of the physical products—the artificially created sequences, proteins, organic components, or organisms. The actual creations would be protected from physical copying, i.e., by culturing or cell-division, and ultimately this step would afford the biologist the right to control the recreation and further use of the artificially produced sequences, proteins, components, or organisms themselves as derivative works of the original sequences, proteins, organic components, or living organisms created by the biologist.

The reconstituted narrative of creation attempts to achieve copyright protection over the living biological creations themselves and over three types of recordings and descriptions of the creations. The goal is to achieve copy-protection for the original creations and for derivative works, including derivative works produced from the record, depiction, and description of the creations.⁴⁶

46. The copyright derivative works right extends to the creation of physical works from written plans and designs, such as the creation of 3-dimensional objects based on a copyrighted 2-dimensional plan. *See* 1 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 8.01[B] (2008) [hereinafter NIMMER ON COPYRIGHT]; *see also* Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc., 528 F.3d 1258, 1267 (10th Cir. 2008); Entm't Research Group, Inc. v. Genesis Creative Group, Inc., 122 F.3d 1211, 1221-24 (9th Cir. 1997); Durham Indus., Inc. v. Tomy Corp., 630 F.2d 905, 910 (2d Cir. 1980); JCW Invs., Inc. v. Novelty, Inc., 289 F. Supp. 2d 1023, 1033-36 (N.D. Ill. 2003).



The reconstituted narrative places most of the creations of synthetic biology into categories of expressive media—literature, audio and visual recordings, or graphical and pictorial works. What is lost is the protection of the conceptions of discovery and invention. What is preserved is the protection of the author's *record* of the conceptions of discovery and invention, at least in the literal terms and contents of the record and a limited number of abstractions from these literal terms and contents in the form of derivative works. The copying and derivative works protections ought to slow down competitors who would prefer a quick path to duplicate, recreate,

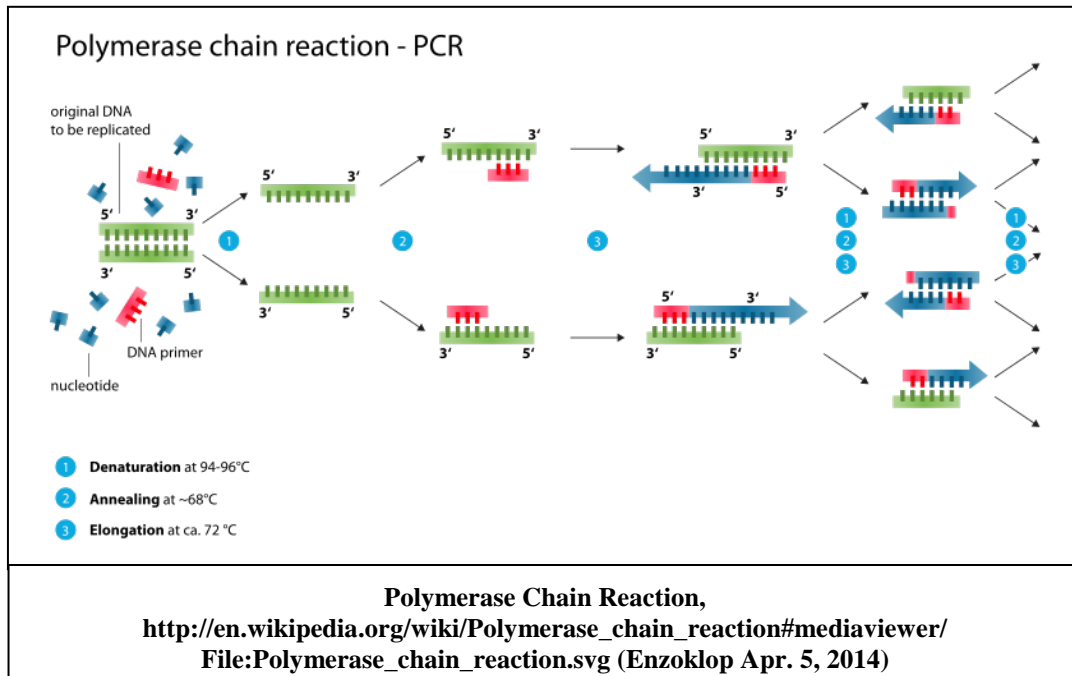


Formation of a cDNA Library, http://upload.wikimedia.org/wikipedia/commons/e/e6/Formation_of_a_cDNA_Library.jpg

and profit from the actual discoveries and inventions rather than taking the time and expending the effort to study the art and science of creation from written and recorded media, learning from it, and applying the ideas, processes, and procedures step by step, one experiment at a time, so as to produce the same or similar products on their own.

a) Using Literary, Graphical, Pictorial, Audio, or Audio-Visual Works to Protect the Biological Creation

The use of expressive media to depict and record the discovery and invention of a work of synthetic biology might sound mundane, but this affords the author with the surest protection over the record and description of the creation. The power of the record and depiction is in the derivative works right owned by the creator of the expressive work. The prohibition



not to copy the original expression will extend to the creation of derivative works created from the writings, depictions, or recordings the biologist has created.⁴⁷ The record and depiction will prevent not only copying of the expressive works but also derivative works of a real life, 3-Dimensional nature.

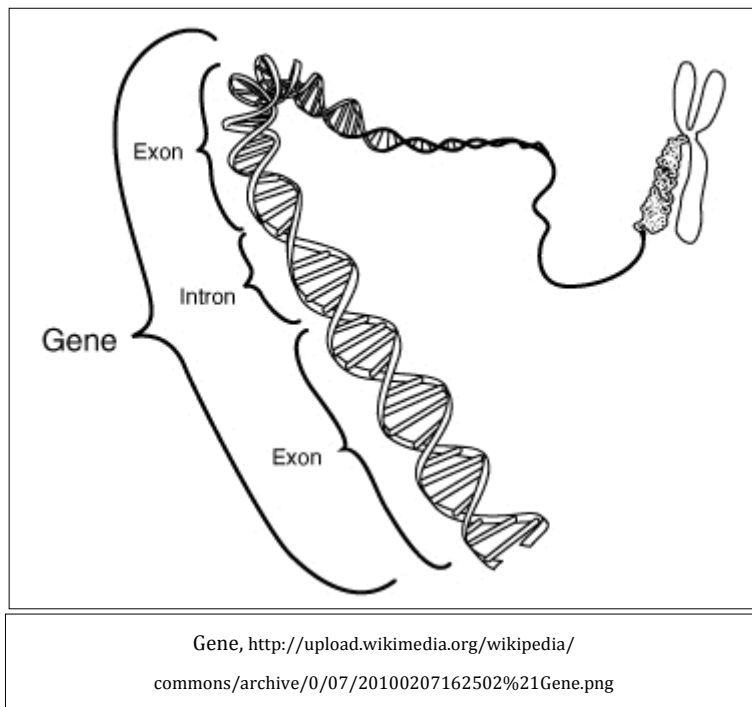
There is value in multiplying the expressions—the records of discovery or invention—in order to multiply the scope of potential derivative works that be controlled by the copyright owner. It would be worthwhile to write up, draw up, and make a film or animation of the actual sequence or component you have generated.⁴⁸ Random, independent creation is

47. See *Winfield Collection, Ltd. v. Gemmy Indus., Corp.*, 147 Fed. Appx. 547, 551-52 (6th Cir. 2005). See also *King Features Syndicate v. Fleischer*, 299 F. 533 (2d Cir. 1924); *Geisel v. Poynter Prods. Inc.*, 295 F. Supp. 331 (S.D.N.Y. 1968); *Fleischer Studios, Inc. v. Ralph A. Freundlich, Inc.*, 5 F. Supp. 808 (S.D.N.Y. 1934).

48. Two authors, Stephen Wilson and Willem Stemmer, have discussed encoding the record of the discovery or invention of DNA sequences into an encrypted MP3 audio file to take advantage of the Digital Millennium Copyright Act. Stephen R. Wilson, *Copyright Protection For DNA Sequences: Can the Biotech Industry Harmonize Science with Song?*, 44 JURIMETRICS J. 409 (2004); Willem P.C. Stemmer, *How to Publish DNA Sequences with Copyright Protection*, 20 NATURE BIOTECHNOLOGY 217, 217 (2002). Presumably, the record

permitted under copyright as only “copying” is precluded, but the replication of the exact creation described and depicted in the copyrighted work is not permitted. Multiplying the expressions of the creation will make it more difficult to explain away every expression, diagram, or description produced by the original biologist when a competitor asserts a claim of independent creation.

There is a limitation on the rights sought here in the form of the idea-expression distinction and its doctrines of merger, scenes a faire, and functionality. It is true that the ideas behind the creation are open to be used by all competitors, and any actual processes and procedures described may



would be protected by decryption software that would limit the access to an audience that was licensed to listen to the discovery. However, after listening to the recording and making notes, the audience of the work can proceed as if they received a written or unencrypted report—i.e., the ideas and facts of the discovery would still be available to the audience under 17 U.S.C. § 102. The only violation would come if the recipient broke the decryption in order to copy the record. Following up on the ideas, processes, or procedures does not require duplication of the original media.

be tried and exploited by others. Ideas, processes, and procedures may be protected by trade secret or patent law, but not copyright. (These limitations will be discussed in Section V *infra*).

A writing and recording of the attributes of a *preexisting* sequence of DNA identified by the biologist would have the lowest potential to deter a competitive use of the information in the writing. Preexisting sequences identified and described by the biologist can be “re-found” and used by others. Nevertheless, the protections on copying and creating derivative works may slow down the retransmission of information regarding the creation.

b) Using the Metaphor of a Compilation to Protect the Actual Biological Creation

The protection of actual biological works may be attempted under the category of compilation. This is described as a *metaphor* of compilation because the true biological task is not the combination of separate expressive parts to make a collective whole with greater expressive potential, as in the case of a collage,⁴⁹ or doll’s face,⁵⁰ or computer graphics interface.⁵¹ Instead, the biologist seeks to create a unitary whole creation, whether it be a DNA sequence, a protein, a biological component, or a complete organism.

The copyright code anticipates that creative, original combinations of copyrightable or non-copyrightable elements may be protected. Section 101 of the Code reads in part: “A ‘compilation’ is a work formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship. . . .”⁵² While this definition requires no analogy or abstraction—existing, recombined, or manipulated sequences, proteins, and components may be selected and arranged to produce an original work designed and created by the biologist author—the results may be less than desirable. Compilations are protected *as compilations*. To claim a copyright on the basis of a compilation might suggest that the component parts of the compilation are not themselves

49. NIMMER ON COPYRIGHT, *supra* note 45, § 3.02; *Jarvis v. K2 Inc.*, 486 F.3d 526, 531-32 (9th Cir.2007); *Harris v. Simon & Schuster, Inc.*, 646 F. Supp. 2d 622, 628-29 (S.D.N.Y. 2009).

50. *E.g., Mattel, Inc. v. Goldberger Doll Mfg. Co.*, 365 F.3d 133 (2d Cir. 2004).

51. *Eng’g Dynamics, Inc. v. Structural Software, Inc.*, 26 F.3d 1335, 1346 (5th Cir. 1994); *Apple Computer, Inc. v. Microsoft Corp.*, 35 F.3d 1435, 1446-47 (9th Cir. 1994).

52. 17 U.S.C. § 101.

protected or in fact are not copyrightable; otherwise, why seek protection for the creation only as a compilation. And the non-copyrighted or non-copyrightable component parts of a compilation generally may be used freely by others—the only identified original creation of the author is the complete combination, and only that exact combination is protected.⁵³ Thus, it would seem to be true that a compilation of organic parts could be reverse-engineered and that a second, skilled biologist might recreate the effect of the work in a slightly altered but nonetheless original combination without violating the copyright of the first biologist.

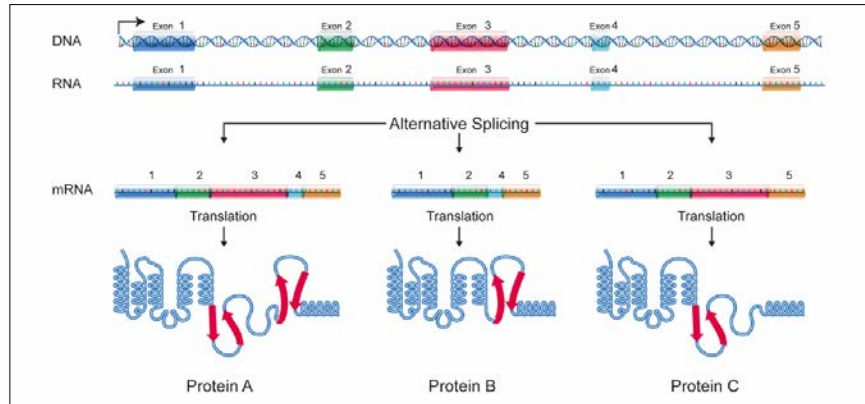
If the argument may be made that the desired biological effect may only be achieved by the single combination of organic components created by the original author, this argument would invite the application of the merger doctrine (discussed at greater length in Section V, *infra*) and would preclude copyright protection over the single means to achieve the result.

Lastly, the component parts are themselves organic substances—components of living creatures—meaning that a claim to a compilation copyright is claim to own a monopoly over a component of a living creature, even a human being. This argument (discussed at greater length in Section II(B), *infra*) might find a difficult reception with many judges and other legal audiences. Therefore, there are significant downsides and limitations to the compilation narrative.

c) Using the Metaphor of a Computer Program to Protect the Actual Biological Creation

The protection of actual creations—new sequences of DNA, biological components, and new organisms created through the manipulation of sequences, polypeptides, and proteins—is the most important and desirable protection to be obtained in copyright. The simplest narrative is that the biologist created a new, original—something—fixed in a tangible medium. If it were possible in copyright law to fill in the blank with DNA sequence, protein, organic component, or organism, our discussion would be finished here. But copyright requires a certain something—an expressive something. Section 102 of the code, quoted above, requires “original works of author-

53. In *Mattel v. Goldberger Dolls*, Mattel was able to claim a copyright in the total combined concept and appearance of Barbie’s face, even though, in isolation, each feature of Barbie’s face—large, widely-spaced eyes, accentuated eyebrows and lashes, pert nose, and bow-shaped lips—were standard features in doll faces of all kinds, and thus individually unprotectable. Only the total compilation that said, “Barbie’s face,” to a viewer was protected.



Gene Splicing

http://upload.wikimedia.org/wikipedia/commons/0/0a/DNA_alternative_splicing.gif

ship fixed in any something—an expressive something. Section 102 of the code, quoted above, requires “original works of authorship fixed in any tangible medium of expression.” Further, the expressive works must be analogous to the categories of works listed as illustration. And finally, the protectable attributes of the work must be expressive, not functional.⁵⁴

Several authors have suggested that a creation of synthetic biology is analogous to a computer program, one of the categories provided for in 17 U.S.C. § 102.⁵⁵ Sequences of DNA, biological components, and new organisms are programmed by the biologist through the manipulation of sequences, polypeptides, and proteins to produce the effects and results conceived of by the biologist, just as an existing computer language is manipulated by the computer programmer to produce the effects and results conceived of by the programmer.

Comparing the question of the copyrightability of DNA sequences and artificially-produced proteins, organic components, and organisms to the copyrightability of computer programs is the narrative with the greatest potential for success. The computer program analogy is especially apt because DNA sequences already are commonly analogized by synthetic biologists as programs that order the production of proteins and

54. Various: 17 USC 101, 102(a), (b); *Blake v. Selden*, *Mazer v. Stein*, *Esquire Lamp*, etc.

55. See sources cited *supra* note 10.

subsequently of biological organisms.⁵⁶ Thus, the practitioners of the art believe in this metaphor and can support it if push comes to shove in a copyright dispute.

(1) Computer Programs—Two Levels of Metaphor

Computer programs became protected under copyright law as a form of writing and literature by virtue of a two-part metaphor. The first layer of the metaphor is that a *program* written in source code or expressed in object code is in fact a *writing*, a medium of expression akin to literature. The second layer is that that the writing is written for the purpose of *communicating* something to an *audience*. There are in fact two audiences for the writing: the computer (reading the object code), and trained computer programmers (reading the source code).

Computer programs are written in a language—a system of symbols that are assigned to represent the operation of combinations of on-off signals (1's and 0's, a binary radix) controlling the flow of electric current in a computer device (e.g., a chip or processor). There is no metaphor at the first level because a computer language is a “language,” an assigned system of symbols to represent some other thing or operation in the traditional methodology common to all languages. Thus the metaphor begins with writing:

Writing: The first layer of metaphor is that of a computer programmer who “writes” or “composes” a work of literature—a program—making use of the existing computer language. The program is what is offered for copyright.

Communicative Work: The metaphor at the second level of “writing” fits the program under the category of “literature,” a writing with a communicative, expressive objective. This was not an enormous hurdle to leap because the program itself is expressive—it is written in symbols that can be recognized and interpreted by those familiar with the language and communicated to audiences who are not familiar with the language.

Computer programs are not altogether different from traditional literature that operates at two levels of metaphor—a language, such as English, that

56. Or as Crick, of the DNA pioneer duo, Watson and Crick, once pointed out: “DNA makes RNA, RNA makes protein, and proteins make us.” Torrance, *DNA*, *supra* note 10, at 13 (quoting EVELYN FOX KELLER, *THE CENTURY OF THE GENE* 54 (2000)).

consists of letters and words that represent something else, and an author who writes or composes a work of authorship using the existing language to produce a result—the communication of thoughts and feelings to those who can read and understand the existing language, and who might further interpret and communicate it to others who do not know the existing language. What is different about computer language is the environment in which the language and the program operate—computers—and the “audience” for the program—again, computer processors—as opposed to traditional literature, which can operate in any environment where actual humans can read or listen to the creation of the author. Of course, computer programs gained a special boost when Congress amended the copyright code to make it plain that computer programs are copyrightable, removing the necessity to analogize computer programs to traditional literature.⁵⁷

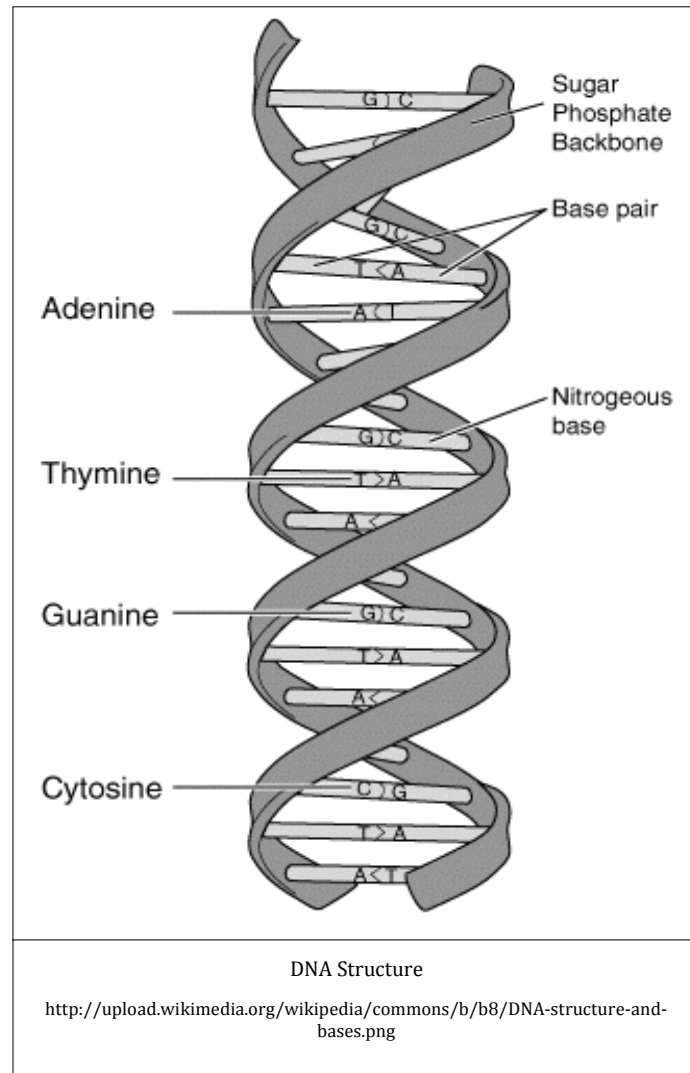
(2) *Biological Creations—Three Levels of Metaphor*

A biological creation is even more complicated than a computer program and has an additional layer of metaphor: first, DNA must be analogized to a language; second, sequencing or splicing and manipulating DNA, and further manipulating polypeptides to produce proteins and biological components, must be analogized to writing in a language; and third, the end product must be analogized to a work of expression that communicates something. To illustrate this further and more specifically, in synthetic biology, the layers of metaphoric analogy may be broken down as follows:

Language – that DNA is a “language” of four symbols (A, T, G, C) representing actual chemical nucleotides, adenine, thymine, guanine, and cytosine that in combination are the basis of all DNA and, by extension, all polypeptides, proteins, biological components, and organisms;

Writing – that a biologist who identifies a sequence of DNA, or acts to produce a new sequence of DNA or to produce something more complex building on new sequences of DNA, actually “writes” or “composes” a work (see the discussion of “communicative work” below) of expression and communication using a language in a manner that is analogous to the writing of a computer program or even the writing of actual, traditional literature;

57. 17 U.S.C. §§ 101, 117.



Communicative Work – that the resulting DNA sequence, protein, component, or organism, identified or composed by the biologist is an expressive, communicative “work of authorship,” a creation of the mind, analogous to a computer program or work of literature.

There are difficulties in each analogy. First, it must be accepted that the chemical formula representing a compound known as one of the four nucleotides is represented symbolically not just by the compound name (e.g., adenine) but also by the first letter, “A,” of the compound. And second, that this assignment has expressive qualities meeting our understanding of the term, language. It is noteworthy that the audience for the “A-T-G-C” language is the biologists and other humans studying the actual processes of nature, which is different from the “audience” of the chemical compounds themselves, which are other compounds, polypeptides, and proteins at the level of organic chemistry.

The metaphor of writing, or authorship, is troublesome because the biologist is dealing not simply with a language with which the biologist writes and composes to produce a communicative result, but instead, with actual organic chemical compounds, components, and organisms that are manipulated to produce additional sequences of compounds, components, and living things. Taken by itself, the writing metaphor might be analyzed as a double metaphor—that the language of the writing is a symbolic representation of biological subjects, and the biologist’s working with the biological subjects is in some ways analogous to writing up something that can be expressed in the language and understood by others trained in the language—and each half of the double metaphor relies on the audience’s understanding and acceptance of the other.

The expressive, communicative nature of the results of the writing also works on two levels because the biologist programs the biological components to communicate the designed biological results on an organic level, and the work itself also can be read by other biologists who will understand its use of the biological language.

The metaphor of a work or creation relies on the acceptance of the first two layers of metaphors. Then, the third layer follows directly, because the end product of the biologist’s working with the biological subjects is a new biological subject that can be expressed using the symbols and terms of the language, and can produce results—communicative, expressive results to biologists trained in the language that stand in for the actual real life biological results—new sequences, organic components, and organisms—produced by the biologist.

If successfully communicated and accepted, the complete formula means that the products of synthetic biology—the new sequences, components, and organisms produced by the biologist—are themselves protected under copyright. They may not be duplicated or replicated or adapted into new products of synthetic biology. The argument is difficult both to

communicate and to achieve the proper understanding and acceptance by the audience, but it has a tremendous upside in achieving exactly what the biologist author wishes to achieve.

The strengths of the computer program analogy, however, also suggest its weaknesses. As with compilations, if the argument is made that the desired biological effect may only be achieved within the language of DNA sequences by the combination of organic components created by the original author, this argument would invite the application of the merger doctrine (discussed at greater length in Section V, *infra*), and would preclude copyright protection over the single means to achieve the result. And once more, the program designed and written by the biologist, however analogized or abstracted, still represents actual organic substances—components of living creatures—meaning that a claim to a program copyright is claim to own a monopoly over a component of a living creature, even a human being. As discussed in Section II(B), *infra*, this argument, might find a difficult reception with many judges and other legal audiences.

Each of the levels of metaphor might fail—the biological work might not be regarded as a written work of language that is expressive—thus making the entire exercise potentially subject to failure when a claim or defense is attempted to be communicated to a court or to other legal practitioners. In other words, the fact that the audience of the argument must recognize and accept the analogies drawn from three levels of metaphors is a long row to hoe for the biologist and her lawyer. Nevertheless, this formula offers the best chance of protecting actual works of synthetic biology because the path has been cleared for the acceptance of each level of the metaphor by the precedent of computer programs. Biological creations are a logical extension of this metaphor, and by this extension, the entire creation of the biologist may be protected.

d) Failure Narratives: Using Metaphors of a Recipe or Chemical Formula

A good lawyer and advocate will hope for the best and prepare for the worst. As complicated as the above discussion in Section II(A)(1)(c) might sound, the computer program metaphor is the preferred metaphor for DNA sequencing and especially for artificially-produced DNA sequences, proteins, organic components, and organisms. If the counterargument gains traction that the proper analogy for works relating to synthetic biology is of a recipe or chemical formula, then copyright law most likely will not provide adequate protection for synthetic biologist authors.

A true recipe or chemical formula is a description of a process and the ingredients needed for the process to produce a certain result. As such, the recipe or formula is nearly entirely unprotectable under Section 102 of the copyright code and its associated doctrines of functionality and merger. The wording, layout, and formatting of a recipe or chemical formula may be protected under copyright, but not the formula itself, nor the ingredients described in the formula. A competitor might argue that the narrative of creation of synthetic biology is that the biologist made a discovery (unprotectable event in copyright law) of the DNA components (preexisting material, not created by the biologist) and their properties (preexisting material, not created by the biologist) as a recipe or chemical formula to follow to produce a functional result.

Many if not all of the ingredients of a typical recipe or formula were not created by the author, and anyone can take preexisting ingredients and follow the same recipe or formula to produce the product. The same might be said of certain “ingredients” of a creation of synthetic biology. This observation alone is not so damning because it suggests a possible counterargument—that if the components were in fact created by the biologist author, then they may not be freely used by subsequent biologists. However, how any one component used in the larger recipe came to be created may itself face the characterization of a recipe or formula, and so on, all the way down, until only preexisting biochemical elements with functional properties were discovered to be useful when manipulated to produce a component that became an ingredient used in combination with other preexisting or created components (ingredients) for brewing up a certain biochemical result. It is unfortunate that the recipe or chemical formula narrative is so simple to state; its simplicity and elegance is one of its greatest strengths.

The strongest counterargument to the assertion that synthetic biology is akin to a recipe or formula is the narrative of the work as a computer program. A computer program is not just a description of a process, it is itself a creation, written by the biologist as a whole work with an expressive function and purpose. True, a program, recipe, or formula each can be followed to produce a result, but that is where the comparison ends. Even an original creative compilation (Section II(A)(2) *supra*) is a complete whole, valuable in its expressive attributes because of the original and creative way it is compiled. A computer formula is well beyond that. It is a complete, composed work analogous to a work of literature. A recipe is to a novel what a simple chemical formula is to a creation of synthetic biology.

B. The Narrative of Living Artistic Works

The above discussion leads to the second topic of this section on copyrightable subject matter: what is the proper narrative of living *artistic* works that preserves the greatest copyrightable content of the works.

The success or failure of a narrative of synthetic biology will turn in part on the author's ability to defuse or overcome copyright law's reservations concerning living media. This is the first overlapping issue with artistic creations using living subject matter, namely: Can an artist or scientist copyright a living, growing, organic, living thing?

Patent law has answered this question, "yes," if the organism was created by the author.⁵⁸ This should give hope to biological or artistic designers. After all, if United States patent law is amenable to a twenty-year complete monopoly on the creation, duplication, growing, or exploitation of a living organism, why shouldn't copyright law be amenable to a more limited, but longer term monopoly solely on duplication through exact replication or derivative works?

Synthetic biological creations have yet to be the subject of a copyright infringement litigation, so it would be prudent to look to an analogous area for input and interpretation of this copyrightable subject matter issue. The counterargument is found in artistic expression cases, most notably, *Kelley v. Chicago Park District*.⁵⁹

Kelley tells the tale of Chapman Kelley, an artist of landscapes (as opposed to a landscaper or floral designer⁶⁰) who created a large pictorial display of living wildflowers in Grant Park in downtown Chicago, titled "Wildflower Works." The U.S. District Court for the Northern District of Illinois and the U.S. Court of Appeals for the Seventh Circuit both had a terrifically difficult time getting their judicial heads around the case—or at least it would appear so from the approach to the artistic work taken by both courts in the case. The opinions are two more confirmations of what Justice Holmes said 110 years ago: "It would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges of the worth of pictorial illustrations..."⁶¹

58. *Diamond v. Chakrabarty*, 447 U.S. 303, 313-18 (1980), and *Myriad Genetics*, 133 S. Ct. at 2118-19, both held that living, breathing organisms created by a scientist could be the subject of a patent.

59. *Kelley v. Chicago Park Dist.*, 635 F.3d 290 (7th Cir. 2011).

60. See John Nivala, *The Landscape Art of Daniel Urban Kiley*, 29 WM. & MARY ENVTL. L. & POL'Y REV. 267, 268 (2005).

61. *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 251-52 (1903).



Kelley's Plan for Wildflower Works

<http://www.rarin.org/index.php/File:KelleyChicagoAerial.JPG>



Wildflower Works Installation, <http://clancco.com/wp/wp-content/uploads/2011/02/CWFW1992.jpg>

The non-precedential trial court opinion found that the work was a painting or sculpture, and further found that it was a “work of visual art” under 17 U.S.C. § 101, and qualified as a “pictorial, graphic, and sculptural [work]” under 17 U.S.C. § 102(a); nevertheless, the work was held not to be copyrightable because it was held to be not original, although it was not

copied from any other work.⁶² The more relevant and detrimental opinion is that of the Seventh Circuit, which reversed the trial court in most respects, and found that the Wildflowers Works installation was original, but that it could not be copyrightable because of the nature of the living media, wildflowers, which were held to be not fixed in a tangible media, and not authored by Kelley.⁶³

Note that, although the court's determination is persuasive authority against a broad recognition of the copyrightability of works made from preexisting living media, it is not a refutation of living media as subjects of copyright. It is a refutation of preexisting growing, moving, living objects as being copyrightable because they are not fixed in a tangible medium and not authored by the artist or other purported "creator" of the works other than God or Mother Nature.

The authorship equation used by the Seventh Circuit is that Kelley's work is made up of plants; Kelley didn't create the plants (God did), so he is not the author of the plants. The plants make up the garden; Kelley is responsible for the garden being there, but he did not create the plants in the garden, so see the first answer here. On fixation, the Seventh Circuit notes that plants sway in the breeze, they move, they grow, they wither, they die; therefore, they are not fixed.⁶⁴ The authors of the narratives of living subject matter must be cognizant of this viewpoint.

There appear to be few cases on the issue of copyrightability of living subject matter—*Kelley* appears to be a loner, and *Kelley* cites no other cases on this point.⁶⁵ My research has failed to produce other cases directly on

62. *Kelley v. Chicago Park Dist.*, No. 04 C 07715, 2008 WL 4449886 at *5, 6 (N.D. Ill. Sep. 29, 2008).

63. *Kelley*, 635 F.3d at 303 ("The real impediment to copyright here is not that Wildflower Works fails the test for originality (understood as 'not copied' and 'possessing some creativity') but that a living garden lacks the kind of authorship and stable fixation normally required to support copyright . . .").

64. *Id.* at 304-05.

65. Analogous cases such as *Cockburn v. SWS Industries, Inc.*, No. C10-1566RSL, 2011 WL 2295145 (W.D. Wash. Jun. 8, 2011), *Dimitrakopoulos v. Flowers by Demetrios*, 79 Civ. 6961 (RLC), 1983 WL 1135 (S.D.N.Y. July 7, 1983), and *Florabelle Flowers, Inc. v. Joseph Markovits, Inc.*, 296 F. Supp. 304 (S.D.N.Y. 1968), are somewhat useful in predicting the analysis of living media. The cases involved the creation of artificial flowers. The courts did not balk at copyright protection for these creations, they simply limited the copyright and the protectable elements according to the scenes a faire and merger doctrines. See also *Corwin v. Walt Disney Co.*, 475 F.3d 1239, 1251 (11th Cir. 2007); *Satava v. Lowry*, 323 F.3d 805, 810-11 (9th Cir. 2003); *Durham Indus., Inc. v. Tomy Corp.*, 630 F.2d 905, 909 (2d Cir. 1980); *Novelty Textile Mills, Inc. v. Joan Fabrics Corp.*, 558 F.2d 1090,

point. It is noteworthy that *Kelley* does not preclude living media, it simply divides the issue into two questions: (1) are living works fixed, and (2) are living works authored? I will follow this path in my analysis, too.

III. Fixation Narratives of Living Media

Regarding fixation, the statutory standard is “fixed in *any tangible medium of expression*, now known or later developed, *from which they can be perceived*, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.”⁶⁶ Section 101 elaborates on this requirement, stating: “A work is “fixed” in a tangible medium of expression when its embodiment . . . is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration.”⁶⁷ “Author” or “authored” are not separately defined, but “created” is: “A work is ‘created’ when it is fixed in a copy or phonorecord for the first time; where a work is prepared over a period of time, the portion of it that has been fixed at any particular time constitutes the work as of that time, and where the work has been prepared in different versions, each version constitutes a separate work.”⁶⁸

Fixation is not dependent on media. To assure that copyright law remained media neutral, Congress defined fixation of works to include “any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.”⁶⁹

The legislative history of the fixation provision states:

This broad language is intended to avoid the artificial and largely unjustifiable distinctions, derived from cases such as [*White-Smith*] . . . under which statutory copyrightability in certain cases has been made to depend upon the form or medium in which the

1093 n.3 (2d Cir. 1977); *Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp.*, 562 F.2d 1157, 1163 n.5 (9th Cir. 1977).

66. 17 U.S.C. § 102(a) (emphasis added).

67. *Id.* § 101 (definition of “fixed”). “Copies” are “material objects, other than phonorecords, in which a work is fixed by any method now known or later developed, and from which the work can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. The term “copies” includes the material object, other than a phonorecord, in which the work is first fixed.” *Id.* (definition of “copies”).

68. *Id.* (definition of “created”).

69. *Id.* § 102(a); Deborah Tussey, *Technology Matters: The Courts, Media Neutrality, and New Technologies*, 12 J. INTELL. PROP. L. 427, 429 (2005).

work is fixed. Under the bill it makes no difference what the form, manner, or medium of fixation may be—whether it is in words, numbers, notes, sounds, pictures, or any other graphic or symbolic indicia, whether embodied in a physical object in written, printed, photographic, sculptural, punched, magnetic, or any other stable form, and whether it is capable of perception directly or by means of any machine or device “now known or later developed.”⁷⁰

This leads to the language of 17 U.S.C. § 101, quoted here more completely:

A work is “fixed” in a tangible medium of expression when its embodiment in a copy . . . is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration. A work consisting of sounds, images, or both, that are being transmitted, is “fixed” for purposes of this title if a fixation of the work is being made simultaneously with its transmission⁷¹

Fixation is supposed to be a simple, open-ended, painfully easy to satisfy concept. The need to perceive the creation is all that matters, and you can even use machines to do the perception. If the creation is oral or fleeting or otherwise transitory in nature, you can record it with a longer-lasting media such as a visual, audio, or audio-visual recording that depicts or records the creation.

Wildflower works should have met each of the fixation criteria. It could be seen, felt, smelt, and even tasted if you wanted to try any of these experiences. It existed in drawings, photographs, and other depictions and descriptions. Its nature was known well enough to copy it or avoid copying it. The nature of the creation was no mystery to anyone.

IV. Authorship and the Narrative of Creation of Works in Living Media

A. Authorship of Works of Living Media Beyond God or Mother Nature

The creation issue is similarly easy to resolve. With living artistic subject matter, there is no pressing need for a metaphor or analogy to the creation of copyrightable subject matter—the works are expressive works in the

70. H.R. REP. NO. 94-1476, at 5665 (1976).

71. 17 U.S.C. § 101.

form of pictorial or sculpture media. Pictorial and sculptural works are category 5 of copyrightable subject matter under 17 U.S.C. § 102(a).

The *Kelley* courts' interpretation of authorship is that:

- art installations containing living media (e.g., wildflowers) cannot be a painting or sculpture because they are flowers and plants, and the artist did not create the flowers and plants;
- art installations containing living media cannot be a painting or sculpture because they move, they change, they grow, or they wither and die;
- art installations are not paintings or flowers because they are a garden.

First, the criticism that a work cannot be a painting because it consists of living items mistakes media for creation of expression. Every painting is made of something—its media. At some level of immediacy, the media is traceable to a natural organic or chemical substance that was formed or grown in or on the earth. The canvas is traced to cotton duck or linen, which is traced to the cotton plant, which grew out of the earth. The stretcher bars are made of wood which grew up as a tree. The paint medium might be a naturally occurring substance such as charcoal or raw umber, or a slightly more complicated composition of lapis lazuli and linseed oil making ultramarine, or a chemical composition of matter constituting Prussian blue or one of the many synthetic hues that have become the normal media in artistic production. Sculpted media is similarly situated, substituting only a natural or manipulated media of clay, stone, metal, or a casting media that is plastic (i.e., malleable, able to be molded or shaped). An expression using existing media is copyrightable regardless of the form of media used; copyright law intentionally is media-neutral.⁷²

Second, the fact that creations of living media *might* move, or change, or grow, or wither and die and decompose again is not indicative of the element of authorship or of fixation. Consider that any work using wildflowers or some other living, organic media could be frozen in time by encasing it in Lucite or actually keeping it frozen at a sufficiently low temperature to keep it from decaying. Does that make the expression of the work different—regarding as we must that it is the expression of the work

72. Compare the definition of a “work of visual art” in 17 U.S.C. § 101, which was defined in a completely different, media-dependent manner so as to carefully delineate works subject to moral rights protection from works that will not be protected.

that causes us to think of copyright protection at all. Even absent that treatment, the comparison of the movability of one form of work versus another simply is a matter of degree: all painting surfaces are susceptible to expansion and contraction from humidity levels and temperature; they just move at so small a rate that we would hardly trouble to measure it. Sculptures of stone may be less moveable from temperature than metal, but again, the movement in each case is hardly noticeable. The movement by wind and air current works a great effect on wildflowers and plants in the great outdoors, less so indoors, but not much less than the workings of air currents on paper mobiles and other delicate sculptures. All materials degrade over time, although with some care there are media that seem “permanent.” All that this reflects is our comfort level with a semblance of permanence corresponding to our time of observation in the presence of the work. A highly fugitive dye placed in direct sunlight will give up its color faster than a wildflower. Neither is permanent, and the relative speed of alternation is easily observable but hardly seems remarkable when one is considering the potential of a work to express original creative attributes protectable in copyright.

Last, the fact that some artistic installations might resemble something else—a garden—is not a question concerning copyrightability, it is one of aesthetics and philosophy. If the issue was, is this “art,” we might ponder for a time whether an expressive composition of living matter was sufficiently artistic to meet our standards when it was created by a self-proclaimed gardener as opposed to a self-proclaimed or externally certified artist. We tend not to credit the work of first-time amateurs as high art, although on occasion the results are very intricate and beautiful. Nevertheless, the issue here is copyrightability, and the artistic merit of the work or the creator never has been a requirement for copyrightability.

And what makes living media expressive? Color, shape, forms, textures—all of which are possessed by wildflowers and living media as well and often to a greater degree than other media, such as paint in tubes, blank canvas, or a mound of sculpting clay. The same attributes of color, shape, forms, and textures that provide the difference in the expression perceived from a blank white canvas compared to that of a highly detailed landscape are provided by a palate of wildflowers combined and arranged on dark earth.

V. Originality Narrative of Creations of Living Media

All of the above discussion of analogies and narratives leads to the first genuine, inescapable flaw that may affect the desirability of protecting the

work of synthetic biology through copyright: the work of authorship claimed through the triple metaphor of synthetic biology described above is a work that manipulates real life organic compounds and sequences of compounds in order to produce dynamic, replicative, perennial components of living organisms. This fact is exactly the point of seeking copyright protection in the first place—biologists want to protect their living, growing, multiplying works from unauthorized duplication. The true value to the scientist and the world is not the expressive, communicative potential of the work. It is the fact that it is a living thing or a component of a living thing that performs a role to change aspects of other living things that matters to the scientist. This statement represents the awesome potential of synthetic biology.⁷³ But living subject matter is a troublesome subject for copyright's originality requirements.⁷⁴

A. Originality and Living Media: the Story of First Creations

The creation of original expression is the essential requirement for a copyrightable work.⁷⁵ “The *sine qua non* of copyright is originality.”⁷⁶ Originality is the very “premise of copyright law.”⁷⁷

The definition of original is “not copied,”⁷⁸ rather than something that is entirely new, fresh, novel, and excessively creative.⁷⁹ “Originality does not signify novelty; a work may be original even though it closely resembles other works so long as the similarity is fortuitous, not the result of copying.”⁸⁰

73. *E.g.*, Torrance, *Synthesizing*, *supra* note 10, at 632-39; Torrance, *DNA*, *supra* note 10, at 22-26; Andrew Torrance, *Patenting Human Evolution*, 56 U. KAN. L. REV. 1075, 1084-91 (2008); Holman, *supra* note 10, at 701-03.

74. Not so for patent law. *Diamond v. Chakrabarty*, 447 U.S. 303 (1980), held that living, breathing organisms could be the subject of a patent.

75. *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 347 (1991); *Stewart v. Abend*, 495 U.S. 207, 247-48 (1990) (Stevens, J., dissenting); *see also Goldstein v. California*, 412 U.S. 546, 561-62 (1973).

76. *Feist*, 499 U.S. at 345.

77. *Id.* at 347 (quoting *Miller v. Universal City Studios, Inc.*, 650 F.2d 1365, 1368 (5th Cir. 1981)).

78. *Id.* at 346-47; *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 58 (1884); *The Trade-Mark Cases*, 100 U.S. 82, 94 (1879).

79. *Feist*, 499 U.S. at 345; *Mazer v. Stein*, 347 U.S. 201, 218 (1954) (“[C]opyright protects originality rather than novelty or invention . . .”). In contrast, patent protection requires an invention that is novel and nonobvious. 35 U.S.C. §§ 101-103 (2006).

80. *Feist*, 499 U.S. at 345.

The narrative of originality for synthetic biology is simple: the synthetic biologist demonstrates that the work was her own conception and execution, not copied. Thus, the “not copied” requirement of originality presumably will be easy to meet, unless a biologist has copied someone else’s biological creation. A biologist who creates a new work according to the narratives of creation and subject matter discussed above, without copying another’s work, will have an original work. But the scope of the copyright over this original creation is likely to be reduced by the idea-expression doctrine under 17 U.S.C. § 102 and its two sub-doctrines of merger and scenes a faire.

In the subject matter section, the goal was to discover the best narrative for the creations of synthetic biology so as to preserve the largest possible scope of the copyright. The problem of copyrightability discussed in Section II(A) *supra* concerns whether the sum and substance of the intellectual products of synthetic biology are discoveries or inventions of uncopyrightable ideas, processes, procedures that manipulate preexisting materials possessing natural, chemical characteristics, none of which was authored by the biologist, so as to produce functional results. This blunt assertion is not fatal to the claim of copyright over synthetic biological works, but it does point to the need to securely fix the story of original creation by the biologist author in a stable media so as to preserve a proper scope of protection over the biologist’s works.

Although no copyright claim is known to have been litigated concerning synthetic biology, a prediction can be made that there are many ideas behind the creation that cannot be brought within the copyright. As in patent law, the operation of nature cannot be claimed by any human author, nor can the raw material used by the biologist to make the creation. To the extent that the creation uses a formula (process, or procedure) in the act of creation, this formula will not be protected by copyright. If the formula was the whole point of the biological activity, the copyright obtained over the product of the formula may be unsatisfactory. This, of course, is a significant difference between patent law and copyright law—the former protects ideas and inventions including formulas, processes, and procedures; the latter protects no ideas, and no formulas, processes, or procedures.

Living artistic works are likely to fare better in the balance of ideas vs. expression. One can imagine that an artist might develop a highly inventive process of creation of living media, and would face similar problems under copyright’s idea-expression distinction as a biologist would. The inventive artist might one day find the need to investigate patenting an artistic

technique or process of creation. But in general, the development of innovative techniques and processes is not the creative endeavor that matters the most to an artist. It is the expression that makes the artist, and the original expressive qualities of the work are the most likely to survive the application of the idea-expression doctrine.

B. The Scope of the Author's Copyright After the Application of the Merger and Scenes a Faire Doctrines

Ideas are not monopolized in copyright law. Others may learn from the ideas reflected in synthetic biological works, and may use that knowledge to pursue a myriad of original projects that do not duplicate the works of the first biologist. This is one of the main reasons why copyright might be a sufficient mode of protection for some synthetic biologists whose achievements are an original creation with highly expressive, non-functional characteristics—the kind of work that copyright can protect from duplication and give a fair scope of protection for derivative works. On the other hand, some biological creations will be largely defined by the practical functions of the creation. These functional aspects will not be protected by copyright, and if the functioning appears to follow the form of the work, the merger doctrine will limit the scope of copyright protection for the original and any derivative works. Patent law may be a more desirable vehicle of protection than copyright for these functional works

Discussion of originality in copyright law begins with one axiomatic proposition: there can be no valid copyright in facts.⁸¹ “[N]o author may copyright his ideas⁸² or the facts he narrates.”⁸³ The key to understanding the merger doctrine and scenes a faire doctrine lies in understanding why facts are not copyrightable.

81. *Id.* at 344. The *Feist* case and the originality requirements defined therein are discussed in Tyler T. Ochoa, *1984 and Beyond: Two Decades of Copyright Law*, 20 SANTA CLARA COMPUTER & HIGH TECH. L.J. 167, 169-70 (2003); Daniel Gervais, *Feist Goes Global: A Comparative Analysis of the Notion of Originality In Copyright Law*, 49 J. COPYRIGHT SOC. 949 (2002); Jane C. Ginsburg, Wendy J. Gordon, Arthur R. Miller & William F. Patry, *The Constitutionality of Copyright Term Extension: How Long Is Too Long?*, 18 CARDOZO ARTS & ENT. L.J. 651, 660-63 (2000); Jane C. Ginsburg, *No "Sweat"? Copyright and Other Protection of Works of Information After Feist v. Rural Telephone*, 92 COLUM. L. REV. 338, 367-87 (1992).

82. 17 U.S.C. § 102(b).

83. *Feist*, 499 U.S. at 345; *Harper & Row, Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 556 (1985).

No one may claim originality as to the reporting and publication of facts.⁸⁴ Facts, meaning data and information about the world, do not owe their origin to an act of authorship.⁸⁵ The first person to find and report a particular fact has not created the fact; he or she has merely discovered its existence.⁸⁶ Facts are not original to an author who writes about the facts. All facts—scientific, historical, biographical, and news of the day—belong to the public domain and are available to every person.⁸⁷

Nevertheless, while others may copy the underlying facts and ideas from a publication, they may not copy the exact words or arrangement used to present them.⁸⁸ For example, the facts of a president's life are subject to copying and republication but not his exact words and phrases regarding public figures and public events written in an autobiography.⁸⁹ The artist's or scientist's creative expression and embodiment of the idea is protected.⁹⁰ Copyright assures authors the right to control their original expression, but encourages others to borrow the underlying ideas and themes used by the original author and create their own original expression.⁹¹ This principle, known as the idea-expression dichotomy, applies to all works of authorship.⁹²

The definition of an "idea" in a literary work often is the most difficult aspect of the idea-expression dichotomy.⁹³ Judge Learned Hand characterized the difficulty in *Nichols v. Universal Pictures Corp.*⁹⁴ as arising from the fact that an idea as opposed to the expression of the idea in literature can be manipulated by viewing the interest protected by copyright

84. *Feist*, 499 U.S. at 347; 1 PAUL GOLDSTEIN, GOLDSTEIN ON COPYRIGHT § 2.2.1.4 (2005) [hereinafter GOLDSTEIN ON COPYRIGHT]; NIMMER ON COPYRIGHT, *supra* note 45, § 2.11[A].

85. *Feist*, 499 U.S. at 347; GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.2.1.4.

86. *Feist*, 499 U.S. at 347; GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.2.1.4.

87. *Feist*, 499 U.S. at 347; *Miller v. Universal City Studios, Inc.*, 650 F.2d 1365, 1369 (5th Cir. 1981); GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.2.1.4.

88. *Feist*, 499 U.S. at 348.

89. *Harper & Row, Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 556-57, 563 (1985).

90. *Id.*; *Feist*, 499 U.S. at 348-49.

91. *Feist*, 499 U.S. at 349-50; *Harper & Row*, 471 U.S. at 556-57.

92. *See Feist*, 499 U.S. at 350; *Harper & Row*, 471 U.S. at 556-57. *See generally* GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.

93. *See* GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.1.1; NIMMER ON COPYRIGHT, *supra* note 45, § 1.10[B][2].

94. 45 F.2d 119 (2d Cir. 1930).

at differing levels of abstraction.⁹⁵ If protection is limited to the words as they appear on the page—a strictly literal application of the term “expression”—the protection for original “Writings” envisioned by the Constitution⁹⁶ would be considerably thin.⁹⁷ A new author could imitate the plot, character types, exposition, conflict, resolution, and all other original elements of a novel so long as she changed the wording.⁹⁸ But if protection extends to the full range of derivative works that might be expressed by the author arising from the author’s fleshing out of an “idea” in literature, then an author could claim property rights to an entire genre.⁹⁹ Edgar Allan Poe or Wilkie Collins could have captured the mystery genre with the publication of a single mystery story; the innovators of the first reality television show, *Survivor*, might have deprived the public of *The Amazing Race*, *Fear Factor*, *Big Brother*, or even *Temptation Island*.¹⁰⁰

The difficulty is not present in visual works or living media. There are a myriad of possible ways to express ideas visually;¹⁰¹ similarly, there are a myriad of possible creations of synthetic biology. A new author need only refrain from copying one. A perfect example of the idea-expression dichotomy in visual works is the case of photography. Photography takes as its subject the concrete objects (the facts) of the world around us, and yet for over a hundred and twenty years the Supreme Court has recognized that works of photography are sufficiently creative and original as to obtain the protection of copyright.¹⁰² This is true for staged and posed subjects of

95. *Id.* at 121; *see also* *Nash v. CBS, Inc.*, 899 F.2d 1537, 1540 (7th Cir. 1990) (discussing *Nichols*).

96. U.S. CONST. art. I, § 8, cl. 8.

97. NIMMER ON COPYRIGHT, *supra* note 45, § 1.10[B][2]; *see* GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.1.2

98. *See Nichols*, 45 F.2d at 121.

99. NIMMER ON COPYRIGHT, *supra* note 45, §§ 1.10[B][2], [C][2]; *see also* GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.2.

100. *Nash*, 899 F.2d at 1540; *Southco, Inc. v. Kanebridge Corp.*, 390 F.3d 276, 291 (3d Cir. 2004) (Roth, J. dissenting).

101. *See* *Mattel, Inc. v. Goldberger Doll Mfg. Co.*, 365 F.3d 133, 135 (2d Cir. 2004) (innumerable ways of depicting doll faces); *Southco*, 390 F.3d at 292 (Roth, J. dissenting) (*Southco*'s numbering rules and the resulting numbers are one of many possible expressions of the idea of using a code to convey product specifications); *Atari Games Corp. v. Oman*, 979 F.2d 242, 245 (D.C. Cir. 1992) (*Atari II*) (Ginsburg, J.), *appeal after remand from* 888 F.2d 878 (D.C. Cir. 1989) (*Atari I*) (Ginsburg, J.) (innumerable ways of depicting breakout game features).

102. *See* *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 60 (1884); *Leigh v. Warner Bros.*, 212 F.3d 1210, 1215 (11th Cir. 2000). Yet, there are dissenting voices regarding the recognition of photography as a creative, original, copyrightable media. *See*

photographs as well as for advertising and for more natural or random snapshots.¹⁰³ What the author of a photograph work brings to the creativity and originality equation is an artist's sense of composition, angle, exposure, F-stop and aperture settings, background, and lighting, and creation of certain elements of the scene.¹⁰⁴ In *Mannion v. Coors Brewing Co.*,¹⁰⁵ the Southern District of New York categorized this originality into three specific areas: rendition (angle, light, shade, exposure, filter effects, developing techniques, or composition) of the photograph, the timing of the photograph (how it fortuitously or consciously captures the moment when the expression associated with the subject matter is the most poignant), or the creation of the subject matter of the photograph (as when the photographer stages or creates original subject matter for photographing).¹⁰⁶ However, nothing in these original elements prevents another author from photographing, painting, writing about, or otherwise using the same subject matter (the facts) in their own original expression as long as they do not copy the first author's expression.¹⁰⁷

Copyright protection is subject to an important limitation: "the mere fact that a work is copyrighted does not mean that every element of the work may be protected."¹⁰⁸ The requirement of originality means that copyright protection extends only to those components of a work that are original to the author.¹⁰⁹

The merger doctrine is a variation or application of the idea-expression dichotomy.¹¹⁰ When the idea and the expression of the idea are inseparable, then the expression will not be copyrightable because it would necessarily give the author a monopoly on the expression of the underlying idea.¹¹¹ In

generally Christine Haight Farley, *The Lingering Effects of Copyright's Response to the Invention of Photography*, 65 U. PITT. L. REV. 385, 446-51 (2004).

103. *Sarony.*, 111 U.S. at 60; *Leigh*, 212 F.3d at 1215; *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 251 (1903); *Kelly v. Arriba Soft Corp.*, 336 F.3d 811, 820 (9th Cir. 2003); *Los Angeles News Serv. v. Tullo*, 973 F.2d 791, 794 (9th Cir. 1992).

104. *Bleistein*, 188 U.S. at 250; *Ets-Hokin v. Skyy Spirits, Inc.*, 225 F.3d 1068, 1077 (9th Cir. 2000); *Los Angeles News Serv.*, 973 F.2d at 794 (quoting *United States v. Hamilton*, 583 F.2d 448, 452 (9th Cir. 1978)).

105. 377 F. Supp. 2d 444 (S.D.N.Y. 2005).

106. *Id.* at 452-53.

107. *See id.* at 454; *Ets-Hokin*, 225 F.3d at 1082; *Mason v. Montgomery Data, Inc.*, 967 F.2d 135, 138 (5th Cir. 1992).

108. *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 348 (1991).

109. *Id.*

110. *See generally* Michael D. Murray, *Copyright, Originality, and the End of the Scènes à Faire and Merger Doctrines for Visual Works*, 58 BAYLOR L. REV. 779, 799-848 (2006).

111. *See Educational Testing Services v. Katzman*, 793 F.2d 533, 539 (3d Cir. 1986).

other words, if there is only one way to express or depict an idea then no one may claim a copyright in that single manner of expression or depiction because that would evict everyone else from the right to express or depict that idea.¹¹²

The merger doctrine is traced to Learned Hand's opinion in *Nichols v. Universal Pictures Corp.*,¹¹³ and the opinion links the principles underlying the merger doctrine to those underlying the scenes a faire doctrine, although neither doctrine is named in the opinion. The *Nichols* case involved two literary works (a stage play and a screenplay) alleged to be substantially similar. There was no allegation that actual scenes or actual text was copied from the first work into the second, but Judge Hand observed that, "It is of course essential to any protection of literary property, whether at common-law or under the statute, that the right cannot be limited literally to the text, else a plagiarist would escape by immaterial variations."¹¹⁴ The first work involved a Jewish widower whose son secretly married an Irish Catholic girl whose widower father was as against the union as the Jewish father was.¹¹⁵ Eventually, the two fathers reconcile in order to rejoin the company of their respective children and grandchildren.¹¹⁶ The second work involved a Jewish family who lived in a state of animosity with their neighbors, an Irish Catholic family.¹¹⁷ The only family members not engaged in the quarrel from the fathers to the mothers (who are present and accounted for) to young children and family pets were the daughter of the Jewish family and the son of the Irish family, who, as you may have guessed, secretly marry.¹¹⁸ Further conflict is introduced in that the Jewish father inherits a sizeable sum of money, but later learns that the proper legatee is the Irish father, and in turning over the money, he prompts an unlikely friendship and partnership between the two fathers.¹¹⁹

Judge Hand noted that,

[w]hen the plagiarist does not take out a block in suit, but an abstract of the whole, decision is more troublesome. Upon any work, and especially upon a play, a great number of patterns of increasing generality will fit equally well, as more and more of

112. See GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.2.

113. 45 F.2d 119 (2d Cir.1930).

114. *Id.* at 121.

115. *Id.* at 119.

116. *Id.* at 119-20.

117. *Id.* at 120.

118. *Id.*

119. *Id.* at 121.

the incident is left out. The last may perhaps be no more than the most general statement of what the play is about, and at times might consist only of its title; but there is a point in this series of abstractions where they are no longer protected, since otherwise the playwright could prevent the use of his “ideas,” to which, apart from their expression, his property is never extended. [citation omitted] Nobody has ever been able to fix that boundary, and nobody ever can.¹²⁰

The opinion declared that stealing lines or scenes or stealing specific characters from a work may be actionable if it is a substantial taking,¹²¹ but the comparison of the similarity of two plots and storylines requires examination of the lowest level of abstraction it takes to find the two works to be the same; if the works are only similar at a high level of abstraction, it will be less likely that their similarity will constitute actionable infringement. For example, the two works at issue in *Nichols* may be abstracted as follows (starting with a high level of abstraction and working downward):

- two works about two men with children;
- two works about two men whose children marry;
- two works about two men whose children marry causing the men grief and anger;
- two works about two men whose children marry in secret causing the men grief and anger;
- two works about two men from different religions whose children marry in secret causing the men grief and anger because of their religious differences;
- two works about two men from different religions whose children marry in secret causing the men grief and anger because of their religious differences but who reconcile in the end;
- two works about a Jewish man and an Irish Catholic man whose children marry in secret causing them grief and anger because of their religious differences but who reconcile in the end;

and so on.

120. *Id.*

121. *Id.*

If the level of abstraction at which the works share the most similarities mainly involves the level of ideas (*e.g.*, the idea of pig-headed men who cannot get along because of religious differences; the idea of men who overcome petty religious differences in favor of stronger values), or generalities (*e.g.*, problems of marriages of two people from different religions; the situation of marriages that cause animosity in families but later produce a kind of coexistence), or repeats plot devices and stock themes common to many works (*e.g.*, star-crossed lovers; feuding families brought together by a marriage of defectors; fathers who compromise because of love of children or grandchildren), then the works are similar at a level where the first author cannot claim protection. The abstraction of two literary works for comparison of the plot and storyline must not result in a pattern of similarity that has eliminated so many disparate details of the works that the remaining similarities are simply plot ideas, stock themes, or common character types interacting in predictable ways.¹²² This is the level of abstraction where Judge Hand found the two works in *Nichols*, and he rejected the claim for infringement.¹²³

The process of abstraction and comparison described in *Nichols* works well in literary works where individual authors, all using a common language (English), may discuss a common theme or plot device or character-type or flesh out a familiar scene or stock image. In such instances, all literary works will share commonalities if they share a common idea but not elements that are original to one author. The idea and the expression of the idea will merge in a literary sense as the idea itself captures the several words and phrases necessary to communicate the idea in writing. Judge Hand recognized that it is prudent to declare such plot ideas, character-types, familiar scenes, and stock images as part of the public domain, available to all authors who wish to embody the idea or scene in their own work.¹²⁴ Thus, his decision is the grandfather of both the merger doctrine and the scenes a faire doctrine.

In the last two decades, the merger doctrine has seen the most increase in its application in cases concerning computer programs. Thus, synthetic biologists should be especially mindful of merger because the source of greatest protection for works is likely to be through the metaphor of a computer program. As noted above, computer programs are both literary

122. *Id.* at 120-21.

123. *Id.* at 121-22.

124. *See id.* at 121-22.

(the source code and object code)¹²⁵ and functional;¹²⁶ sometimes they produce visual results, too. The argument was raised and accepted in many computer code copyright cases that within a given programming language, certain results (the ideas) cannot be achieved without using certain expression (source code).¹²⁷ Thus, a merger of idea and expression was found and sequences of source code were declared to be uncopyrightable to avoid giving an early programmer a monopoly over a number of results in the context of the use of a certain programming language.¹²⁸

The merger doctrine is inapplicable when the same idea can be expressed in a plurality of different manners.¹²⁹ In these situations each author's creative original expression of the idea is deserving of copyright protection.¹³⁰

A perfect example of how courts misinterpret the merger doctrine in connection with visual works is the Ninth Circuit case of *Herbert Rosenthal Jewelry Corp. v. Kalpakian*.¹³¹ In *Kalpakian*, the court determined that there was only one way for the idea of a jeweled pin in the shape of a bee to effectively be depicted.¹³² As a result, the court ruled that defendant could copy plaintiff's depiction of a jeweled bee pin because plaintiff's depiction was the only possible effective depiction, and plaintiff cannot claim a copyright monopoly in the only available method of depicting an idea.¹³³ The idea and the depiction are one, and no one can copyright an idea. Although this is a venerated opinion, cited and accepted for decades,¹³⁴ the opinion simply is wrong. The fallacy of the opinion is that there is only one effective way to depict a jeweled bee pin. Nothing limits the creative potential of the designer of a jeweled bee pin other than the simple notion

125. NIMMER ON COPYRIGHT, *supra* note 45, § 2.04[C]; see Computer Software Copyright Act of 1980, Pub. L. 96-517, 94 Stat. 3015 (codified at 17 U.S.C. §§ 101, 101-117) (definition of "computer program").

126. NIMMER ON COPYRIGHT, *supra* note 45, § 2.18[J].

127. *Id.* §§ 2.04[C], 2.18[B], 2.18[J]; see Mark Lemley, *Convergence in the Law of Software Copyright*, 10 HIGH TECH. L.J. 1, 11, 14, 16, 31 (1995).

128. An outcome that should be precluded by *Baker v. Selden*, 101 U.S. 99, 103-04 (1879). See generally NIMMER ON COPYRIGHT, *supra* note 45, §§ 2.04[C], 2.18[B].

129. *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1253 (3d Cir. 1983); GOLDSTEIN ON COPYRIGHT, *supra* note 83, §§ 2.3.2- 2.3.2.1.

130. *Id.*; *Dymow v. Bolton*, 11 F.2d 690, 691 (2d Cir. 1926) (when a myriad of variations of a scene are possible, a myriad of protectable copyrights can exist).

131. 446 F.2d 738 (9th Cir. 1971).

132. *Id.* at 742.

133. *Id.*

134. *E.g.*, GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.2 & nn. 27-30.

that the end product should resemble a bee.¹³⁵ The amount of gold or other metal used and exposed in the design, the size and shape and number of the gems or semi-precious stones used, the color, tone, shade, clarity, and brilliance of the gems or stones used, whether the gems or stones will have few or many or no facets are simply the beginning of the creative opportunities available to a designer of a jeweled bee pin.¹³⁶ The plaintiff monopolizes nothing by coming out with one possible design when there are so many other available designs. In the light of these creative opportunities, there is no need to allow the defendant to copy plaintiff's single and original design.

The scenes a faire doctrine complements the merger doctrine when it is applied to literary works. The scenes a faire doctrine provides that when discussing a certain topic, story-line, or genre, there are certain themes, scenes, incidents, character types, or settings which as a practical matter must be used to properly treat the topic.¹³⁷ A literary discussion of a salmon run will inevitably describe how they swim for hundreds of miles, fly up over waterfalls, some are snatched in mid-air by hungry grizzly bears, and the rest strive to return to the pools where they were spawned. Motion pictures following the boy-meets-girl, boy-gets-girl, boy-loses-girl, boy-gets-girl-back storyline inevitably will employ character types of thoughtless boys and petulant girls and contain similar scenes of miscommunication, anger, and reconciliation in their conflict development and conflict resolution. A discussion of the Three Stooges' or Chris Farley's movies will inevitably contain references to "slap-stick," "prat falls," "physical comedy," and "self-effacing humor." The works discussing these scenes and themes will use similar language even at a fairly low level of abstraction because the very idea that is being expressed requires authors

135. If the only similarity between the two works was that they both resembled a bee, then the plaintiff's claim of infringement properly failed. The similarity would have been limited to the shared concept or idea of the two works, and the idea itself is not copyrightable. If the holding of *Kalpakian* were limited to this proposition, the case would be correct. But the opinion goes much farther by declaring that plaintiff produced the only possible design and depiction of a jeweled bee, *see* 446 F.2d at 742, inviting every subsequent jeweler to copy plaintiff's bee design without limitation.

136. The record unfortunately indicates that plaintiff's counsel was tongue-tied when it came to explaining the different design opportunities available to the defendant. *See id.* at 740.

137. *E.g.*, *Atari v. N. Am. Philips Consumer Elecs. Corp.*, 676 F.2d 607, 616 (7th Cir. 1982) (superseded by statute on other grounds as recognized in *Scandia Down Corp. v. Euroquilt, Inc.*, 772 F.2d 1423, 1429 (7th Cir. 1985), *See* GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.2.2.

to use certain terminology and phrasing.¹³⁸ An author using these terms and phrases is not being original and cannot impose a monopoly on the terms and phrases associated with the scene or theme.¹³⁹

When applied in the context of literary or utilitarian works, the scenes a faire doctrine means that copyright protection is denied to common elements of work that are essential to the presentation of the subject matter of the work.¹⁴⁰ The rationale for the rule is that elements dictated by subject matter itself necessarily lack originality.¹⁴¹ Another way of looking at it is that stock images and themes that are covered under the scenes a faire doctrine are in the public domain and thus free to be used by all.¹⁴² In a true scenes a faire situation, the plaintiff author is as likely to have drawn her material from the public domain as the plagiarist is, and it is even more likely that the alleged plagiarist need not have copied plaintiff author's work at all but instead could have drawn the material from the public domain.

The scenes a faire doctrine has no proper application in the case of visual works of living media and a very limited application in biological works. To the extent that the *idea* of certain images or biological creations are in the public domain, they are free for use whether characterized as scenes a faire or simply themes and ideas. In the visual work context, all themes and ideas, mundane ideas and clever ideas, stock images and innovative images, scenes that must be done and those that are more optional, all are proper subjects for works as long as the author does not copy the expression of another copyrighted visual work. In other words, there is no single visual expression of stock theme or commonplace idea that must be *copied* in order for the "scene" to be "done" properly. That is why many courts have

138. See GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.2.2.

139. *Id.*

140. *Dun & Bradstreet Software Servs, Inc. v. Grace Consulting, Inc.*, 307 F.3d 197, 214-15 (3d Cir. 2002); *Mitel, Inc. v. Iqtel, Inc.*, 124 F.3d 1366, 1375 (10th Cir. 1997). See generally Leslie A. Kurtz, *Copyright: The Scenes a Faire Doctrine*, 41 FLA. L. REV. 79, 90-96 (1989); GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.2.2.

141. *Dun & Bradstreet Software Servs, Inc.*, 307 F.3d at 214-15; *Mitel, Inc.*, 124 F.3d at 1375.

142. See, e.g., *Incredible Techns, Inc. v. Virtual Techns, Inc.*, 400 F.3d 1007, 1011-12 (7th Cir. 2005); *Swirsky v. Carey*, 376 F.3d 841, 850 (9th Cir. 2004); *Murray Hill Publ'ns, Inc. v. Twentieth Century Fox Film Corp.*, 361 F.3d 312, 319 (6th Cir. 2004); *Tufenkian Import/Export Ventures, Inc. v. Einstein Moomjy, Inc.*, 338 F.3d 127, 132 (2d Cir. 2003); *Computer Mgt. Assistance Co. v. Robert F. DeCastro, Inc.*, 220 F.3d 396, 401 (5th Cir. 2000).

recognized that scenes a faire is a doctrine that applies to literary or dramatic works.¹⁴³ It does not fit with visual works.

Synthetic biological works are similar. A copyrighted synthetic organic creation does not preclude another biologist from working to recreate the idea and function of the creation; but recreation does not mean copying. Neither merger nor scenes a faire require the stripping of every expressive aspect of a biological creation because the end product also has a function. Computer programs are the perfect analogy here: certain elements of display and function are stripped because there is only one way to achieve the result using the existing (non-proprietary) computer language.¹⁴⁴ But the program as a whole survives and is protected.

The idea of a soup can as the subject of a painting is in the public domain, but Andy Warhol's embodiment of that idea in the form of a Warhol painting of a Campbell's soup can is not in the public domain.¹⁴⁵ No artist wishing to embody the idea of a soup can in their work needs to copy Warhol's embodiment of that idea. They are free to paint all the soup cans they want (in a copyright sense, without regard to the limitations of other areas of the law, such as trademark and unfair competition and false designation of origin laws) as long as they do not copy Warhol's embodiment of the idea. Jeff Koons can paint or sculpt a work embodying the idea of two people holding a string of puppies in their lap; he just cannot copy Art Rogers's embodiment of that idea in the form of an Art Rogers photograph.¹⁴⁶

Real world, living breathing subjects are only difficult because we have limited (or no) experience with creations such as these. Aside from computer programs, the closest analogy might be the treatment of photography. Photography makes expressions out of real world, living, breathing subjects. The difficulties in applying the idea-expression dichotomy in photography in light of the lurking presence of the merger and scenes a faire doctrines is revealed by comparing two cases from the federal trial court of the Southern District of New York, *Mannion v. Coors Brewing*

143. *Southco, Inc. v. Kanebridge Corp.*, 390 F.3d 276, 287 (3d Cir. 2004) (Becker, J. concurring); *Lexmark Intern., Inc. v. Static Control Components, Inc.*, 387 F.3d 522, 535 (6th Cir. 2004); *Murray Hill Publications*, 361 F.3d at 319-20; *Cavalier v. Random House, Inc.*, 297 F.3d 815, 823 (9th Cir. 2002); *Country Kids 'N City Slicks, Inc. v. Sheen*, 77 F.3d 1280, 1286 & n.7 (10th Cir. 1996); see GOLDSTEIN ON COPYRIGHT, *supra* note 83, § 2.3.2.2.

144. *Apple Computer, Inc. v. Microsoft Corp.*, 35 F.3d 1435 (9th Cir. 1994).

145. Assuming no lapse in the registration, renewal, and protection for works created prior to 1977, the copyright should last at least until seventy years after Warhol's death.

146. See *Rogers v. Koons*, 960 F.2d 301, 307 (2d Cir. 1992).

*Co.*¹⁴⁷ and *Kaplan v. Stock Market Photo Agency*.¹⁴⁸ In *Mannion*, the court considered a photograph of basketball star Kevin Garnett who was depicted wearing a considerable assortment of men's jewelry.¹⁴⁹ A similar photograph appeared as part of a Coor's billboard advertisement; the allegedly plagiarized photograph zeroed in on the hands and mid-section of the model.¹⁵⁰ Similarities were noted in the heavily veined hands of the model in both photographs, the same white athletic attire, and the same number and type and assortment and placement of the items of jewelry worn by the model, although the composition of the allegedly infringing work is a mirror image of the original.¹⁵¹ Coors and its ad agency defended the allegations by asserting that plaintiff's photograph was not protectable: it was a rendition of an unprotectable idea—a heavily bejeweled African-American man—and any alleged similarities between the two works were attributable to the fact that both photographers had chosen to depict the same subject matter. Subject matter from the real world are facts, and the idea of depicting such subject matter in a photograph is an idea, and ideas and facts are not copyrightable.

The *Mannion* court rejected these assertions in their entirety. The court noted that photographs are readily copyrightable, and the creative, original elements are found in the photographer's rendition of the photograph, the timing of the photograph, or the creation of the subject matter of the photograph.¹⁵² The court noted the originality of plaintiff's creation and the rendition of the subject matter and the substantial similarity between defendants' depiction and plaintiff's,¹⁵³ and denied defendants' summary judgment motion.

In this way, a biologist is not creating a completely utilitarian work but a rendition of the idea of a work with utilitarian functionality. The creation is a work of the mind, satisfying the creativity aspect of copyright, and original, because it is not copied. The idea of the function and utility

147. 377 F. Supp. 2d 444 (S.D.N.Y. 2005).

148. 133 F. Supp. 2d 317 (S.D.N.Y. 2001).

149. The court referred to it as "bling bling." 377 F. Supp. 2d at 447.

150. *Id.* at 448.

151. *See id.* and Images 1 and 2 attached to the opinion.

152. *Id.* at 452-53.

153. *Id.* at 456 ("The 'idea' (if one wants to call it that) [of the photograph] postulated by the defendants does not even come close to accounting for all the similarities between the two works, which extend at least to angle, pose, background, composition, and lighting. It is possible to imagine any number of depictions of a black man wearing a white T-shirt and 'bling bling' that look nothing like either of the photographs at issue here.").

remains open for the next biologist to pursue and create a rendition of her own.

In *Kaplan*, the court declared that the second of two photographs depicting a person in businessman's attire staring down at their feet dangling over the edge of a tall building as if contemplating a leap from the edge (i.e., a photograph of a potential executive jumper taken from the jumper's perspective) could not be held to infringe the first because the general similarity between the two works was attributed to the two photographers' choices to depict the same subject matter, and any direct similarities between the actual photographs was necessitated by the common scene and subject matter of the photographs.¹⁵⁴ If that were the extent of the discussion, the case would gel nicely with *Mannion*; but the court goes on to state that "it would be impossible to depict the photograph's subject matter without portraying [the subject] in [the] pose" selected by the original photographer.¹⁵⁵ Then, the court incongruously identifies several aspects of the two photographers' rendition or staging of the photograph that were freely open to artistic creativity: the point of view of the photograph (bird's eye, over the shoulder, frontal, below from a far angle, below from a direct upward angle, or from the jumper's point of view), the cropping of the photograph (close up, medium, wide angle), the angle of the jumper's perspective (e.g., whether it took in a snippet of pin-striped pants legs or a knee to shoe length of pin-striped pants legs), the shading of the street below in the one photograph and the inclusion of a second building closely abutting the opposite side of the street in the other photograph.¹⁵⁶ With respect to the point of view, the court even admits: "There may be, as [plaintiff] Kaplan suggests, many other angles from which to depict this scene . . ."¹⁵⁷ Nevertheless, the court believed that each artistic decision of the original photographer was dictated by the merger of the subject matter with the depiction and any specific elements of the depiction not merged with the idea of the subject matter were scenes a faire of the scene depicted.¹⁵⁸

Kaplan is a cautionary tale for synthetic biologists. It may be that a challenger will assert that the biological functioning of a synthetic organic creation can only be achieved in the exact form and expression as that of the first biologist. Thus, others must be permitted to copy that form and

154. See 133 F. Supp. 2d at 323-28.

155. *Id.* at 324.

156. *Id.* at 325-26.

157. *Id.* at 326.

158. *Id.* at 323-25 & n.10.

expression or the first biologist will have a monopoly on a useful, functional idea achieved not in patent law but in copyright law. 17 U.S.C. § 102 precludes this monopoly.

The difference between *Kaplan* and *Mannion* is that the *Mannion* court correctly rejects the application of the merger and scenes a faire doctrines to visual works because it held that the idea-expression distinction should be severely limited in cases involving visual works. *Mannion* discussed the abstraction analysis of *Nichols* and the concept of the “line” that must be drawn where the second work takes too much protected original expression because it encompasses too specific an abstraction of the first work.¹⁵⁹ *Mannion* stated that with respect to visual media, such as photography:

the line itself is meaningless because the conceptual categories it purports to delineate are ill-suited to the subject matter. . . . The idea/expression distinction arose in the context of literary copyright. For the most part, the Supreme Court has not applied it outside that context. . . . In the visual arts, the distinction breaks down. . . . [O]ne cannot divide a visual work into neat layers of abstraction in precisely the same manner one could with a text. . . . [L]ittle is gained by attempting to distinguish an unprotectible “idea” from its protectible “expression” in a photograph or other work of visual art. . . . The idea/expression distinction in photography, and probably the other visual arts, thus achieves nothing . . . [and] is not useful or relevant.¹⁶⁰

The *Mannion* opinion preserves the creative original components of photography and original combinations of unprotectable components that are meant to be protected under the holdings of *Feist* and *Sarony*. It accomplishes this by limiting the application of the idea-expression distinction in cases involving visual works and rejecting the expansive application of the merger and scenes a faire doctrines to visual works.

C. Effects of the Expanding Application of the Merger and Scenes a faire Doctrines on Living Works

The courts have not been content to limit the application of the merger doctrine and the scenes a faire doctrine to literary or dramatic settings. Instead, courts have applied these doctrines to claims of infringement of visual works wherein the elements of visual works that are claimed to be

159. *Mannion v. Coors Brewing Co.*, 377 F. Supp. 2d 444, 457 (S.D.N.Y. 2005).

160. *Id.* at 458, 459, 461 (inner citations and reference to inner quotations omitted).

unprotected under the merger doctrine or scenes a faire doctrine are filtered out and purposefully ignored when comparing a competing work against the original in a test of substantial similarity.¹⁶¹ The results in far too many cases is that visual works are reduced down to nothing which further results in the award of summary judgment or judgment as a matter of law for the defendant before the finder of fact even gets a chance to make an intrinsic evaluation of the substantial similarity of the two works. With living visual media, there are opposing cases that do not strip away the works, and the artist should exploit this body of cases to the fullest.¹⁶² This points to two recommendations for synthetic biology: make multiple records, descriptions, and depictions of the biological creation so as to multiple the elements that might be protected under copyright

A biologist or her lawyer may argue that it is enough if the printout of the sequence she identified or created is protected, then she can enjoy the further protection from other biologists who might use “her” sequence for their own ends through the operation of the copyright derivative use rights. This is true, but comes with certain limitations.

One, if the sequence merely is identified, in what way is a copyright over the description of the sequence to prevent others from “finding” the same sequence in the world, or further to prevent others from replicating the sequence or using it for their own ends. The first person to identify a species and write up a careful, scientific description of the species, does not obtain the right to prevent others from breeding the species, working with the species, or even from writing about the species. Similarly, the first person who discovered the properties of natural substances, such as petroleum or natural gas, and wrote up a careful description of these properties, did not obtain the right to prevent others from working with the natural substances, or even to write about the substances. All that is protected is the actual word-for-word terms used by the first author. Not even the ideas represented by those terms are subject to protection.

Two, if the sequences are created, the issue is a bit more friendly to the concept of copyrightability, but the issue remains whether a dynamic,

161. The most common formulation of the test is called the abstraction-filtration-comparison test, which is traced to *Computer Associates International, Inc. v. Altai, Inc.*, 982 F.2d 693 (2d Cir. 1992) (applying the abstraction-filtration-comparison test in the evaluation of similarity of merged and scenes a faire elements of computer programs).

162. E.g., *Mattel v. Goldberger Doll, Bannion*, etc. See generally Michael D. Murray, *Copyright, Originality, and the End of the Scènes à Faire and Merger Doctrines for Visual Works*, 58 BAYLOR L. REV. 779, 799-848 (2006).

replicative, and perennial component of living organisms¹⁶³ may be subject to a copyright monopoly. The issue may be cast as, is the biologist truly the author of this life, not God or Mother Nature? Hopefully, this is answered by the Supreme Court's acceptance of the patent-eligibility of living, organic creations coupled with the analogy that biological works are like computer programs with expressive, albeit functional characteristics.

VI. Conclusion

The answer is that copyright can protect a great many aspects of synthetic biological creations. The subject matter issue is best addressed by application of the metaphor that synthetic biological creations are like computer programs. This also provides a recognizable framework for the analysis and large body of precedent that will allow the creations to withstand the merger and scenes a faire doctrines that competitors will attempt to use to strip away non-copyrightable elements of the creations. Fixation and authorship seem easier to resolve: the concepts in copyright law are not meant to impose heavy burdens on authors. Fixation has one practical requirement: can you observe the creation sufficiently with the senses or through some mechanical means so that you know what it is and can avoid copying it. It is incongruous to suppose that it means works cannot occasionally be in motion, or grow and develop, or age, wither, and change their expression over time. Virtually all works made with organic or naturally occurring materials would be banned from copyright if this logic were correct. The same can be said of authorship. No one copyrights natural forces. Aspects of a work that are attributable to natural forces cannot be claimed within the copyright of artists or scientists because they are not created by them. Many of the changes observed or predicted in works are not part of the copyright of the original artist because they were not created by the artist. The decaying of paint or the decaying of the life of an organic creation is not claimed under copyright unless the artist brings it about through a conception and application of a work of the mind. But the expressive, communicative aspects of the work may be protected in all of the forms created and recorded by the artist or scientist. In the end, this may be an acceptable formula for the protection of scientific and artistic works of living media.

163. My thanks are given once again to Osman Mirza, my consultant on synthetic biology, for supplying the proper descriptors here.