Digital Sampling: The Copyright Considerations of a New Technological Use of Musical Performance

Jeffrey S. Newton
Digital Sampling: The Copyright Considerations of a New Technological Use of Musical Performance

by JEFFREY S. NEWTON*

Introduction

Digital sampling is a process that records and stores sounds in computer memory and permits them to be recalled, edited, and utilized as the sound source for a synthesizer. This Note explains the sampling process and its uses in music, and explores the copyright and intellectual property issues involved.

I. Sampling Technology

A. The Physics of Recorded Sound

1. The Acoustical Nature of Sound

"Reduced to its essential physical nature, sound is no more than a pressure fluctuation in the air."\(^1\) Air pressure fluctuations are translated into nerve impulses in the ear, which the brain interprets as sound.\(^2\) Air pressure fluctuations (sound) "can be expressed graphically by means of a waveform . . . ."\(^3\) Sounds perceived as having a definite pitch "have waveforms

---

* J.D., University of Michigan School of Law (December 1986), member of the State Bar of Michigan, and Jazz musician. The author would like to thank the Los Angeles County Bar Association and the members of its Committee on Patents, Trademarks, and Unfair Competition for sponsoring the Entertainment Law Writing Competition, and the editorial board of Comm/Ent for their participation in the Competition. An earlier version of this Note was awarded First Prize in the 1987 Nathan Burkan Memorial Copyright Competition (ASCAP) at the University of Michigan School of Law. The author would like to express his appreciation to Professor Layman Allen, for whom the note was originally written, and to Professor Jessica Litman, for her interest in the subject, encouragement, and advice in the preparation of the manuscript.

2. *Id.*
3. *Id.* A waveform is "a plot of how the ambient air pressure varies as a function of time." *Id.*
that exhibit a nearly periodic variation in pressure. The pitch of a sound corresponds directly to the variation’s frequency of repetition." For example, the note A above middle C on the piano is produced by a pressure variation that repeats 440 times per second. Timberal (or “tonal color”) variations between different musical instruments or different players of the same instrument producing the same pitch result from variations in a waveform’s contours (or “envelope”), the degree to which harmonic overtones (or “partials”) are present, and the interrelation of these concepts. A distinct musical sound is therefore produced by a “complex periodic waveform.”

2. Analog Recording

When sound is recorded by an analog storage system, such as magnetic tape, air pressure fluctuations are translated into signals which vary the voltage of an electrical current. When this current is applied to an electromagnet, ferrous oxide particles in a magnetic tape passed over the electromagnet form patterns, thus encoding the tape. The encoded information can be retranslated into electrical signals by passing the tape over an electromagnet connected to an amplifier. When the amplified signals are converted into air pressure fluctuations through a loudspeaker, the brain perceives them as a close approximation of the original sound.

3. Digital Recording

Digital recording reproduces sound by expressing waveforms in terms of binary numbers. Air pressure fluctuations expressed as electrical signals are translated into a sequence of numbers in proportion to the signal’s voltage, which is encoded and stored in computer memory. When the numerical

4. Id.
5. Id. at 128-29. Fundamental frequencies exhibit pure “sine” waves. However, the Fourier Theorem states that “all complex, periodic waveforms are composed of a harmonic series of sine waves.” Di Perna, Gourmet Sampling: A Culinary Course for Weekend Chefs, MUSICIAN, Special Edition: Understanding MIDI 2, 1987, at 56. The presence of a tone’s various partials vary throughout its envelope. Mathews & Pierce, supra note 1, at 128-29.
6. Mathews & Pierce, supra note 1, at 126.
7. Id. at 127. See generally id. at 126 (discussion of the Sampling Theorem, upon which the exact numerical representation of waveforms is premised); Di Perna, supra note 5, at 56 (stating that a sampled waveform’s accuracy increases in proportion to the sampler’s “input sample rate,” a measure of the number of times
sequence is retranslated into electrical signals that are then filtered (or "smoothed") into a continuous waveform,\(^8\) "any perceptible sound [can] conceivably be [re]produced in all its acoustic intricacy."\(^9\) Compact discs, digital audio tape, and digital sampling all use this method of storing and retrieving data.

II. The Digital Revolution in Music

A. The Pervasiveness of Sampling

Digital recording reproduces sound with greater sonic fidelity than does analog recording.\(^10\) Additionally, digital recordings are much more useful in the production of music than are analog recordings.\(^11\) A "digital sample" is a short digital recording of a particular sound source, ranging from a few milliseconds to approximately two and one-half minutes in length.\(^12\) The recording may be stored in floppy disc or ran-
dom access memory chip format, and used as a sound source when triggered by a “tactile controller.”

The use of sampled sound sources as a replacement for traditional acoustic instruments has become widespread in the last few years, despite the samplers’ contradictory assertions. However, sampling is not limited to emulating conventional instruments. Samples can also be edited or combined with other sound sources, sampled or otherwise, to create new sounds. Additionally, digital recordings can be programmed to produce rhythmic patterns, simulating a musician’s technique. The “digital revolution” has changed commercial pop music from a performing to a recording art, and is even in-
trating the domain of the symphony orchestra. In fact, this "electro-musical toy of choice for the '80's" has become so pervasive that sampling is now "indispensable in the music industry, [and is] used on every record in the Top 40." Such widespread use raises the question of whether musicians may obtain copyright protection of their tone colors and therefore prohibit sampling without their consent. Regardless of the medium in which sampling is employed, the methods by which samples are acquired and used determine the scope of federal copyright protection available.

B. Sample Acquisition and Use

Even samples acquired with explicit consent may present legal problems in the copyright arena. However, much sampling is performed surreptitiously, either live or from record-playing real instruments. Often, the human beings aren't up to it, and the synthesizer or drum-machine parts are preset and programmed before [a] show." Levy, supra note 11, at 110. Cf. Alvaro, What is Musical Property? The Ethics of Sampling, KEYBOARD, Oct. 1986, at 10 ("I've worked with . . . players who have spent years trying to achieve that one perfect tone that would make their playing instantly identifiable. But now there's an easy answer for all of you who know you could achieve stardom, if only you could get that extra punch in your sound. Sample it.") (emphasis original).

19. The current repertoire of French composer and conductor Pierre Boulez includes works for orchestra and computer-generated sound. Mathews & Pierce, supra note 1, at 126. Even musical art forms such as jazz improvisation, in which composition and performance combine simultaneously, are not immune. Artificial intelligence based "expert systems" are now being developed that respond to "tactile controller" input data, such as a soloist, to interpret the data using a set of compositional rules and conditions, thus providing a "rhythm section" for the soloist. Tully, supra note 14, at 32.

20. Tully, supra note 14, at 49.

21. Reich, supra note 14, at 8. The potential use of sampling outside the music industry may transcend that of copyright or labor concerns. One synthesists' magazine featured a "rap" re-recording of former President Reagan saying, "God's greatest gift is human life." Id. at 9. Future technological advances may allow convincing renditions of spurious political speech to be manufactured. Id. This use of sampling implicates the common law doctrine of the "right of publicity," an analysis of which is beyond the scope of this Note. See generally Marks, An Assessment of the Copyright Model in Right of Publicity Cases, 32 COPYRIGHT L. SYMP. (ASCAP) 1 (1986).

22. Since samples may be stored, combined and infinitely varied absent contractual limitations, the end-use value of a sample far exceeds that of a recorded performance. For example, keyboardist Jan Hammer, composer and creator of the soundtrack for the hit TV show Miami Vice, sampled the unique Conga Drum sound of his friend David Earl Johnson. The sampled drums are prominently featured in Miami Vice's theme song. Although Johnson consented to Hammer's sampling, he did not consent to unfettered, uncompensated, and unlimited re-use. Reich, supra note 14, at 8. See generally Tully, supra note 14, at 181 (discussing lack of contractual protection in industry collective bargaining agreements against re-use).
ings.\footnote{Reich, supra note 14, at 8 (such protection exists for “traditional” recording session re-use).} Due to the relative ease with which a sample may be clandestinely acquired and duplicated, a thriving “black market” in sample trading is blossoming across the country.\footnote{Reich, supra note 14, at 9. See also, e.g., \textit{Keyboard Magazine}, Classified Section, (display of advertisements for samples). Sample “bootlegging” and digital audio tape both present many issues similar to the record piracy problems of the late 1960s, although on a more complex level. See \textit{infra} text accompanying notes 150-59 (legislative history of the 1971 “Sound Recording Amendment”).} Although the way a sample is acquired is largely irrelevant to how useful it is to the samplist, the method of sample acquisition determines whether the act of sampling constitutes infringement under the Copyright Act of 1976 (the “Copyright Act”).\footnote{17 U.S.C. §§ 101-914 (1982).} Thus, the potential legal protection against sampling from recorded sources, live performances, radio broadcasts, and studio recording sessions is addressed separately. Similarly, the various sample end-uses are addressed separately.\footnote{A sample may be used to replicate the artist’s style, see supra note 21. Samples may be utilized in both recording and live performance situations. See \textit{infra} text accompanying note 5.} Before examining the legal protection against various sample acquisition methods and uses, the threshold issue of sound source copyrightability will be examined independently.

III. The Case for Timberal (Tone Color) Copyrightability

A. Tonal Color Variation Among Particular Instruments

Timberal differences between particular sound sources of the same pitch result from amplitude and frequency variations over the duration of the frequency’s waveform.\footnote{Individual vocal quality originates solely with the singer, imparting a great degree of recognizability. The use of vocal samples may involve the right of publicity. See \textit{generally} Marks, supra note 21. In comparison, the tone color of a piano is perhaps more significant than the manner in which it is played. Reed, string, and brass instruments exhibit diverse timberal differences. Although somewhat dependent upon the particular brand of instrument, strings, reeds, and mouthpiece used, a distinctive tone is primarily an achievement of the instrumentalist, and nearly impossible to alter once developed. Indeed, playing each note}
ever, whether tone color is sufficiently original to be afforded protection under the Copyright Act must be determined according to constitutional, rather than artistic, standards. The next section examines the constitutional requirements of copyright protection for this important musical asset.

B. The Constitutional Grant of Copyright Protection

1. *The Purpose of Copyright, Authorship Considerations, and the “Writing” Requirement*

Prior to sampling, it was unnecessary to copyright tone, as tone was useful solely to its creator. However, a sampled timbre may be appropriated wholesale, potentially reducing its commercial value to its creator. Before determining if the Copyright Act affords protection for timbre, it is necessary to determine if such protection lies within the constitutional grant of power. To be within the scope of the constitutional grant, protection should fall within the purpose of copyright and be applicable to constitutional subject matter—“writings” produced by “authors.”

Granting copyright to “tone colors” would serve the textually stated purpose of copyright, often an important con-
sideration when statutory provisions appear ambiguous.\textsuperscript{31} Although it is not imperative that affording copyright protection to timbre serve the clause’s textual purpose, such a grant would do so.\textsuperscript{32} The expansive meaning ascribed to the constitutional mandate that only “authors”\textsuperscript{33} be granted copyright protection should include creators of timbres in the same way that creators of “sound recordings” are already protected.\textsuperscript{34}

The term “writings” has been construed “to reflect the broad scope of constitutional principles.”\textsuperscript{35} “Any physical rendering of the fruits of creative intellectual or aesthetic labor” is considered a “writing” for copyright purposes.\textsuperscript{36} Thus, to qualify as a “writing,” a work must be the product of intellectual labor, no matter how minimal, and exist in some material form.

\textsuperscript{31} “When technological change has rendered its literal terms ambiguous, the Copyright Act must be construed in light of this basic purpose.” Twentieth Century Music Corp., 422 U.S. at 156. See \textit{infra} text accompanying notes 47-103 (statutory requirements).

\textsuperscript{32} It is not necessary that “each of the ‘writings’ protected by copyright in fact promote science or useful arts, . . . [merely that] Congress shall be promoting these ends by its copyright legislation.” M. Nimmer, \textit{Nimmer on Copyright} § 103[B] at 32.2 (1985).

\textsuperscript{33} The constitutional definition of an “author” for copyright purposes is “[h]e to whom anything owes its origin; originator, maker.” Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884). Thus, one who copies from others is not an author, although truly independent creation of a pre-existing work is not a bar to copyrightability. M. Nimmer, \textit{supra} note 32, § 106[A] at 37. However, there is an implicit de minimis requirement of originality. Mr. Justice Holmes has stated that “[p]ersonality always contains something unique. It expresses its singularity even in handwriting, and a very modest grade of art has in it something irreducible, which is one man’s alone. That something he may copyright unless there is a restriction in the words of the act.” Bleistein v. Donaldson Lithographing Co., 188 U.S. 239, 250 (1903).


\textsuperscript{35} \textit{Goldstein}, 412 U.S. at 561. The term comprehends “the artistic and technological developments of [a] contemporary society” if “the new subject-matter . . . ha[s] some relation to the [constitutional] grant, . . . for [the Constitution] is not a strait-jacket, but a charter for a living people.” Reiss v. National Quotation Bureau, 276 F. 717, 719 (S.D.N.Y. 1921).

\textsuperscript{36} \textit{Goldstein}, 412 U.S. at 561.
(a) Intellectual Labor

The requirement that a writing must result from intellectual labor is de minimis. Although the labor must be more than trivial, it need not be "intellectual" in the sense that the ideas communicated must be analytically intelligible; any aesthetic or emotional content will suffice. A vocal or instrumental tone, which requires years of intense study, refinement, and practice, is clearly the product of intellectual labor. A tone is the very essence of creativity and surely satisfies the minimal standard required by the copyright clause.

(b) Material Form

Tangibility is an explicit statutory requirement. Although the copyright clause does not expressly require tangibility, a "writing" must necessarily evince some material form. However, tone colors, and indeed music itself, are inherently evanescent, despite the possibility of facsimilal reproductions in tangible form. Tone color is an aspect of musical perform-

37. See Trademark Cases, 100 U.S. 82 (1879). See also M. Nimmer, supra note 32, § 108[C] at 48 (trademarks, blank charts, facts, and simple directions are not "writings," even if they are the product of independent creation); cf. Eltra Corp. v. Ringer, 579 F.2d 294 (4th Cir. 1978) (typefaces are inseparable from intended use and are not independent works of art, thus uncopyrightable under the 1909 Act and Mazer v. Stein, 347 U.S. 201 (1954)). But cf. Notice of Inquiry, 51 Fed. Reg. 36,410 (1986) (Copyright Office request for public comments on the copyrightable elements of digitized typefaces registered as computer programs or data base compilations). See generally text accompanying notes 91-103 (utilitarian aspect) and sec. IV (copyrightability of digitally-created tone colors).

38. "[A]lmost any ingenuity in selection, combination or expression, no matter how crude, humble or obvious, will be sufficient to render the work a writing." M. Nimmer, supra note 32, § 108[C] at 49.

39. Id. at 48-49.

40. "Copyright protection subsists ... in original works of authorship fixed in any tangible means 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." 17 U.S.C. § 102(A) (1982).

41. See M. Nimmer, supra note 32, § 108[C] at 49-50. However, there are no decisions which directly require tangible embodiment as a constitutional prerequisite to federal copyright protection. Indeed, dicta exists both in support of, and in contradiction to, such a prerequisite. Id. The requirement's constitutional underpinnings derive from an attempt to retain some significance to the textual use of the word "writings." Id. at 50. Professor Nimmer notes that one court has stated that a writing must merely have "some material form, [be] capable of identification and hav[e] a more or less permanent endurance." Id. (quoting Canadian Admiral Corp. v. Rediffusion, Inc., Ex. C.R. 382, 383 (1954)).

42. In the purest sense, music is inherently incapable of reproduction. In an unintentional yet paradoxical observation on the Constitution's "writing" requirement, the late jazz saxophonist, clarinetist, and flutist, Eric Dolphy, stated that "when you
ance, and performance is not entitled to federal statutory protection. Only the tangible sound recording of a performance is capable of copyright protection and, hence, possible infringement. A sampled tone color must be in tangible form to be of any significant use, but either the samplist or the timbre's creator may make the initial fixation. It is only the tangible expression of a timbre that sampling violates, since a sample is a material embodiment of a tone color. Thus, it seems that the same embodiment that makes possible infringement should also satisfy the constitutional "writing" requirement. Samples may be acquired from sound recordings and live performances, which are examined in section III(C)(3) of this Note. Both sources would seem to be constitutional "writings" if they conform to statutory requirements.

The constitutional purpose of promoting the arts is served if tone colors are considered copyrightable. Similarly, the copy-

---

43. Goldstein v. California, 412 U.S. 546 (1973); Capitol Records, Inc. v. Mercury Records Corp., 221 F.2d 657 (2d Cir. 1955); M. Nimmer, supra note 32, § 1.08[C] at 51. Performers' rights per se (as distinguished from rights in performers' sound recordings) are probably excluded from the ambit of federal copyright protection due to the tangibility requirement. Id. Separate consideration of the related, or neighboring, rights of performers is beyond the scope of this paper.

44. Samples may be stored, and thus fixed, in disc or chip format. See supra text accompanying note 13. Such storage is a separate act occurring after recordation. The initial recordation captures the sample momentarily in the "buffer" (transient memory) of the computer, from which it is capable of being edited, played on a synthesizer, or permanently stored. However, transient "buffer memory" storage does not constitute fixation. H.R. Rep. No. 2237, 89th Cong., 2d Sess. 145 (1966) (reporting on H.R. 4347, an earlier version of the current Copyright Act) (hereinafter H. Rep. No. 2237) ("[t]he discussions on this point... further emphasized the need for a clear definition of 'fixation' that would exclude from the concept purely evanescent or transient reproductions such as those... captured momentarily in the 'memory' of a computer.") (emphasis added). Unless a timbre is either permanently "saved," or recorded, while being played from buffer memory, it would remain wholly evanescent throughout its original manifestation, sampling, and sampling use, and thus would never pass constitutional muster as a "writing." A momentarily captured sample not otherwise "fixed" could therefore be used in live performance without infringement.

45. See supra text accompanying note 12.

46. However, whether or not a tone color is a "writing" within the meaning of the copyright clause is ultimately an issue "of constitutional rather than of statutory dimension." M. Nimmer, supra note 32, § 108[C] at 52. If a tone color is not a "writing," then it cannot be tangible under the Copyright Act.
right clause’s definition of “authors” should include creators of tone colors, since timbre originates from the musical artist. Tone colors should be deemed constitutional “writings,” since they result from intellectual labor and can be reduced to a material form, from which they may be sampled.

C. Federal Statutory Copyrightability Requirements

1. Originality

Even if a work satisfies the constitutional requirements of copyrightability, it must still fulfill statutory criteria in order to be protected under the Copyright Act. The first requirement is that only “original works of authorship” qualify for protection.\(^\text{47}\) However, the standard of originality is de minimis. Both congressional intent\(^\text{48}\) and judicial construction\(^\text{49}\) have established that independent creation\(^\text{50}\) is all that is required. If an independently created work, even if identical to a prior one, is original, it is entitled to copyright protection.\(^\text{51}\) Conversely, works that merely imitate an original do not owe their origin to their creator and are thus not the product of authorship.\(^\text{52}\) “[T]here must be at least some substantial variation, not merely a trivial variation such as might occur in

---


\(^\text{48}\) “This standard [of originality] does not include requirements of novelty” as does the Patent Act. H. REP. NO. 1476, supra note 47, at 51.

\(^\text{49}\) See, e.g., Runge v. Lee, 441 F.2d 579 (9th Cir. 1971), cert. denied, 404 U.S. 887 (1971).

\(^\text{50}\) The originality requirement is “little more than a prohibition of actual copying. No matter how poor the ‘author’s’ addition, it is enough if it be his own.” Alfred Bell & Co. v. Catalda Fine Arts, Inc., 191 F.2d 99, 103 (2d Cir. 1951) (partially quoting Bleistein v. Donaldson Lithographing Co., 188 U.S. 238, 250 (1903)).

\(^\text{51}\) Thus, as Judge Learned Hand stated, “if by some magic a man who had never known it were to compose anew Keats’ Ode On a Grecian Urn, he would be an ‘author,’ and, if he copyrighted it, others might not copy that poem, though they might of course copy Keats.” Sheldon v. Metro-Goldwyn Pictures Corp., 81 F.2d 49, 54 (2d Cir. 1936), aff’d, 309 U.S. 390 (1940).

\(^\text{52}\) See Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 58 (1884). “[A]n artist who makes such an exact reproduction of a Rembrandt that even the experts cannot distinguish it from the original, undoubtedly exhibits great skill, training, knowledge and judgement, but in failing to create a ‘distinguishable variation,’ [he] has not ... engaged in an act of authorship.” M. Nimmer, supra note 32, § 2.01[A] at 9. Cf. infra text accompanying notes 160-75 (examining the distinction in 17 U.S.C. § 114(b) between “actual” and “imitative” sounds).
the translation to a different medium.\textsuperscript{53}

Although the degree of originality required for statutory protection is slight, and the courts refuse to deny copyrightability for lack of artistic merit,\textsuperscript{54} there appears to be at least a technical quantitative limitation upon copyrightability. A fragmentary phrase\textsuperscript{55} may fall short of the de minimis standard of originality if it lacks sufficient creativity.\textsuperscript{56} The implications of this apparent limitation in relation to the copyrightability of tone color are treated separately in sections V(D) and VI of this Note.

2. \textit{Authorship}

In addition to the constitutional limitations and the statutory requirement of originality, a work must also qualify under the federal statute as a "work of authorship." "Works of authorship include . . . (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; and (7) sound recordings."\textsuperscript{57}

To qualify for copyright protection, a work must either fit into one of the statutorily delineated categories of works, or be within the scope of works Congress intended to protect.\textsuperscript{58} The

\begin{itemize}
\item \textsuperscript{53} L. Batlin & Son, Inc. v. Snyder, 536 F.2d 486, 491 (2d Cir. 1976). \textit{See also} Durham Indust. Inc. v. Tomy Corp., 630 F.2d 905 (2d Cir. 1980). Professor Nimmer notes that the originality side of copyright judicial "line drawing" will "[include] almost any independent effort on the side of sufficient originality." M. \textit{Nimmer}, \textit{supra} note 32, § 2.01[B] at 11. "[I]f any author's independent efforts contain sufficient skill to motivate another's copying there is \textit{ipso facto} a sufficient quantum of originality to support a copyright." \textit{Id.} at 12.1 (citing \textit{Drop Dead Co. v. S.C. Johnson & Son, Inc.}, 326 F.2d 87 (9th Cir. 1963)). \textit{See also supra} note 33 and accompanying text. \textit{Compare infra} sec. V (discussion of compilation copyrights for digital samples).
\item \textsuperscript{54} \textit{See} Bleistein \textit{v. Donaldson Lithographing Co.}, 188 U.S. 239, 250 (1903).
\item \textsuperscript{55} Kanover \textit{v. Marks}, 91 U.S.P.Q. (BNA) 370 (S.D.N.Y. 1951).
\item \textsuperscript{56} Professor Nimmer notes an apparent "reciprocal relationship between creativity and independent effort [where the] smaller the effort . . . the greater must be the degree of creativity in order to claim copyright protection." M. \textit{Nimmer}, \textit{supra} note 32, § 2.01[B] at 15.
\item \textsuperscript{57} 17 U.S.C. § 102(a) (1982). Both the drafting of the statute and the legislative history indicate that a work need not fit neatly into one or more of the above categories to qualify for protection. \textit{See H.R. REP. NO. 1476, supra} note 47, at 53. However, Nimmer notes that a similar legislative intent regarding the 1909 Act was "largely frustrated by the courts." M. \textit{Nimmer}, \textit{supra} note 32, § 2.03[A] at 25.
\item \textsuperscript{58} Congress deliberately declined to exercise its full authority to legislatively provide copyright protection for all possible constitutional "writings." For this rea-
scope of protectable writings was “purposely left undefined” to avoid freezing the scope of copyrightable subject matter at the present stage of communications technology or allowing unlimited expansion into areas completely outside the present congressional intent.\(^59\) However, a possible limit upon the scope was suggested by the House Report accompanying a prior version of the current Copyright Act (the “House Report”), which stated that “scientific discoveries and technological developments have made possible new forms of creative expression that never existed before,” and compared such expressions with those that have been “in existence for generations or centuries, [but that] have only gradually come to be recognized as creative and worthy of protection.”\(^60\) Accordingly, works that have been in existence but are not within the seven statutorily enumerated categories would probably be excluded from the scope of protection.\(^61\) New works, however, that are “sufficiently analogous to the kinds of works which are expressly protected in the seven categories” would probably be included.\(^62\) Acoustic tone colors are within the scope of protectable writings because they fit within the category of sound recordings. Although tone colors have existed for centuries, protection for them has only recently become necessary. Synthetically produced sounds, although new works, seem to be analogous to sound recordings and also deserve protection.

3. **Fixation in Tangible Form**

Another requirement for statutory protection is fixation in tangible form. Under the present Copyright Act, “[c]opyright

---

\(^{59}\) Id. A further possible limitation may be found in the House Report on a prior version of the Act, which contained an identical section to the present § 102. A footnote there excluded unfixed performances, broadcast emissions, short expressions, and color schemes, inter alia, as not per se copyrightable. H.R. Rep. No. 2237, supra note 44, at 44 n.1. See also Subcomm. No. 3 of the House Comm. on the Judiciary, 89th Cong., 1st Sess., Copyright Law Revision (pt. 6), Supplementary Report of Register of Copyrights on the General Revision of the U.S. Copyright Law: 1965 Revision Bill 3 (Comm. Print 1965) [hereinafter Register’s Supp. Report (pt. 6)] (similar limitations suggested).

\(^{60}\) H.R. Rep. No. 1476, supra note 47, at 51.


\(^{62}\) Id. at 27. While an acoustic instrumentalist’s tone is within the latter category, a previously unimaginable tone color created through digital programming is arguably within the former, although both are “sounds.”
protection subsists . . . 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.”

This section is an intentional legislative overruling of White-Smith Music Publishing Co. v. Apollo Co., which had established the rule that a “copy” must exist “in a form which others can see and read.” Thus, under White-Smith, a “piano roll” was not considered a copy of the musical composition which it recorded. Under the current Copyright Act, however, a phonorecord is considered a sound recording of a musical composition. Both sound recordings and live performances may be sampled, and tone colors from both these sources may satisfy the statutory fixation requirement.

(a) Sound Recordings

Sound recordings are a fertile hunting ground for samplers. A “sound recording” may “fix” a performance in a

64. See H.R. REP. NO. 1476, supra note 47, at 52.
65. 209 U.S. 1 (1908).
66. Id. at 17. The White-Smith definition of “copy” was implicitly adopted by Congress in the 1909 Act. Data Cash Sys. v. JS&A Group, Inc., 480 F. Supp. 1063, 1069 (N.D. Ill. 1979), aff’d on other grounds, 628 F.2d 1038 (7th Cir. 1980). In comparison, the House Report accompanying the current Copyright Act states that 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.’
67. The White-Smith Court further held that piano rolls were merely “parts of a machine which, when duly applied and properly operated in connection with the mechanism to which they are adapted, produce musical tones in harmonious combination. But we cannot think that they are copies within the meaning of the copyright act.” 209 U.S. at 18. That a “work of authorship” may qualify for copyright protection under the present Copyright Act, even though it may be made intelligible to humans only via a mechanical device, is an exception to the general prohibition against granting copyright protection to works that are intrinsically “utilitarian” in character. This exception is a necessary condition to according copyright protection to sound recordings, and as such the above portion of the White-Smith holding was overruled by the 1971 “Sound Recording Amendment.” See infra sec. V; see also infra text accompanying notes 91-103 (discussion of the significance of the exception on the copyrightability of digitally produced tonal colors).
68. See infra sec. IV.
69. Reich, supra note 14, at 9, col. 1. Some musical artists have included prohibi-
Timbres embodied in phonorecords first fixed after February 15, 1972, are tangible copies, but still must satisfy the statutory definition of a sound recording. The Copyright Act defines "sound recordings" in terms of a "series of . . . sounds." Whether sampling timbres consisting of a singular sound infringes as a sound recording under the Copyright Act is addressed in section V(D) of this Note.

(b) Live Performances

Live performances in clubs, concerts, and studios are another major sampling source. A samplist may record the performance directly into a sampler, or into a conventional tape recorder for later sampling. Although a live performance is inherently evanescent, its embodiment in a sound recording is considered fixed under the Copyright Act if it occurs simultaneously with both the performance and its transmission.

---

70. Sound recordings are defined as "works that result from the fixation of a series of musical, spoken, or other sounds . . . regardless of the nature of the material objects, such as disks, tapes, or other phonorecords, in which they are embodied." 17 U.S.C. § 101 (1982). Computer chips are considered "phonorecords" for registration purposes.

71. The Copyright Act provides that a "work is 'fixed' in a tangible medium of expression when its embodiment in a copy or phonorecord, by or under the authority of the author, is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration." 17 U.S.C. § 101 (1982).

72. The Act states: 'Phonorecords' are material objects in which sounds . . . are fixed by any method now known or later developed, and from which the sounds can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. The term 'phonorecords' includes the material object in which the sounds are first fixed. 17 U.S.C. § 101 (1982).

73. Sound recordings" fixed prior to this date are ineligible for federal copyright protection. 17 U.S.C. § 301(c). However, they may obtain state common law copyright to the same effect. See M. Nimmer, supra note 32, § 2.10[B].


75. See generally infra sec. V (discussion of the statutory scope of the exclusive rights in sound recordings).

76. "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 transmission." 17 U.S.C. § 101 (1982). The section further provides that "[t]o 'transmit' a performance or display is to communicate it by any device or process whereby images or sounds are received beyond the place from which they are sent." Id.
Sound recordings of performances thus simultaneously fixed\textsuperscript{77} and broadcast satisfy the statutory requirement of tangibility, if not the constitutional writing requirement.\textsuperscript{78} Transmitting a performance seems to be an unreasonable requirement for performers who wish merely to statutorily fix their works in this manner.\textsuperscript{79} It is clear, however, that live radio broadcasts intended to be received by the listening public, rather than used exclusively for fixation purposes, are statutorily tangible.\textsuperscript{80} Similarly, the sound recordings of live recording studio performances may be considered statutorily tangible.\textsuperscript{81} Although unauthorized samples fixed simultaneously with the performance (as distinguished from those subsequently fixed from the master tapes recorded at the session)\textsuperscript{82} appear to sat-

---

\textsuperscript{77} However, a work's fixation must occur “by or under the authority of [its] author.” 17 U.S.C. § 101 (1982). Thus, unauthorized fixations made by audience members are not considered tangible under the Copyright Act, although they are as constitutionally (and practically) “tangible” as one that is authorized. Even the performer who transmits a performance, unless it is simultaneously fixed by or under the performer's authority, will not have created a statutorily “tangible” work.

\textsuperscript{78} Although technically, a work that is copied at the exact moment it is fixed (as distinguished from one that is copied a moment later), is not a constitutional “writing” when copied, it has in fact become “tangible” at that moment. M. Nimmer, \textit{supra} note 32, § 108[C] at 52.

\textsuperscript{79} Nimmer suggests that telephoning one's performance is sufficient for this purpose. \textit{Id.} Although the statute is more limited than the Constitution's use of the term “writings,” Congress need not utilize its full constitutional power when enacting copyright legislation. Goldstein v. California, 412 U.S. 546, 562 (1973).

\textsuperscript{80} The legislative history of the Copyright Act's definition of fixation indicates that the simultaneous recordation requirement was enacted in order to render broadcasts tangible. \textit{See} H.R. Rep. No. 1476, \textit{supra} note 47, at 52. Additionally, the Copyright Act's language describes the requirement as a method by which “work[s] . . . that are being transmitted” may be considered fixed. 17 U.S.C. § 101 (1982). \textit{See generally} 3 M. Nimmer, \textit{Nimmer on Copyright} § 13.05[F][5] (rev. ed. 1985) (discussion of a possible implied “fair use” noncommercial home recording exemption for radio broadcasts of sound recordings and live performances). Commercial use of performances taped off-the-air has been held to infringe. Pacific & Southern Co. v. Duncan, 744 F.2d 1490 (11th Cir. 1984), \textit{cert. denied}, 471 U.S. 1004 (1985).

\textsuperscript{81} The transmission requirement appears to be satisfied in the recording studio, because the performance is “communicate[d]” by “any device” (the microphone and tape recording equipment) “whereby . . . sounds are received” (by the samplist) “beyond the place from which they are sent” (to the recording booth from the performance studio). \textit{See} 17 U.S.C. § 101 (1982). A club or concert hall samplist of acoustic instruments would receive the sounds \textit{beyond} “the place from which they are sent.” These instruments produce sound naturally, and microphones, amplifiers, and speakers transmit their sound to the audience sampler. Audience sampling of non-acoustic instruments, unless they are both amplified on stage and transmitted through a public address system, would seem to occur at “the place from which [the sounds] are sent.” \textit{Id.}

\textsuperscript{82} Because such tapes are recorded by the engineer under the authority of the
isfy the transmission requirement, their unauthorized fixation renders them statutorily invalid.\textsuperscript{83} Thus, a performer's "sound check"\textsuperscript{84} surreptitiously sampled but not otherwise recorded is statutorily intangible if unauthorized.\textsuperscript{85} However, sound recordings of performances that are simultaneously fixed both by unauthorized sampling and by authorized recordations would, by virtue of the latter, be statutorily fixed, and thus tangible.

4. \textit{The Idea-Expression Dichotomy}

A basic principle of copyright law is that the expressions of ideas are protected, but not the ideas themselves. Section 102(b) of the Copyright Act provides that "[i]n 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."\textsuperscript{86} However, the mandate is not really a limitation on copyrightability, but rather a measure of the degree of sim-

\begin{thebibliography}{1}
\bibitem{83} See generally Jalon, \textit{supra} note 14, at col. 2 (discussion of the prevalence of this practice).
\bibitem{84} A "sound check" is a test performance to determine the proper microphone position, volume, balance, etc. Sound checks present a perfect opportunity for sampling, since they often consist of the playing of each note of the chromatic scale. \textit{Id.}
\bibitem{85} A sound recording engineer's authority to fix a performance for the legitimate recording may include the authority to fix the sample as well. If the performance is considered a "Work Made for Hire" under section 201(b) of the Copyright Act, any actions committed by agents of the employer (i.e., fixations by recording engineers under contract) may be considered to be within the scope of employment under master and servant law. \textit{See infra} note 157 (discussion of "Work[s] Made for Hire"). Surreptitious fixations made outside of a "Work Made for Hire" employment relationship may be subject to an action under state common law for violation of the author's right to initially fix the work. Federal statutory copyright protection requires a work's fixation. 17 U.S.C. § 102 (1982). However, the Copyright Act expressly preserves the states' authority to protect unfixed works. 17 U.S.C. §§ 301(a), 301(b)(1) (1982); M. Nimmer, \textit{supra} note 32, § 1.01[B]. Currently, only California accords statutory protection to unfixed works. \textit{See} CAL. CIV. CODE § 980(a)(1) (West Supp. 1986). No cases have been brought under the California statute. \textit{See} Litman, Performers' Rights in the U.S. and Japan: The Example of Digital Sampling, at 5 (lecture prepared for the June 5, 1987, meeting of the Copyright Law Society of Japan).
\end{thebibliography}
ilarity which must exist between a copyrightable work and an unauthorized copy for the latter to infringe. 87

Some samplists claim that complex periodic waveforms are not copyrightable. 88 However, a particular complex periodic waveform is an expression of the idea of a given fundamental pitch. All sounds perceived as having a definite pitch exhibit nearly periodic waveforms. 89 Any perceptible difference between two tone colors of the same pitch (e.g., ‘E flat’) results from the presence of harmonic overtones in addition to the fundamental pitch. A pure sine wave sounding at the fundamental frequency, rather than overtones, determines the pitch of a sound. Thus, a particular combination of fundamental and harmonic sine waves produces a tone color that expresses the idea of a single sine wave which exhibits a definite pitch. 90

5. The Utilitarian Aspect

Another potential roadblock to tone color copyrightability is its usefulness as a means to expression. The limitation on the copyrightability of “useful articles” is related to the idea-expression dichotomy. The Copyright Act defines a “useful article” as “an article having an intrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information. An article that is normally a part of a useful article is considered a ‘useful article.’” 91 Unlike patent law, the “bundle of rights” granted by copyright “do[es] not include the right to prevent others from using the copyrighted

87. M. Nimmer, supra note 32, § 2.03[D] at 33. The idea-expression dichotomy and the doctrine of substantial similarity are addressed in some detail at section V(D) of this Note.

88. Dominic Milano, Editor of Keyboard Magazine, proclaims that “[t]he bottom line, I'm afraid, is that you cannot copyright a particular sound or a particular pitch. That's like trying to copyright the letter 'A', and saying people can't use any words that use that letter.” Reich, supra note 14, at 9. Cf. Fryer, The Legality of Sampling From Unauthorized Sources, Keyboard, Dec. 1986, at 120 (inquiry whether ‘A-440’ is copyrightable). The relevant inquiry is the copyrightability of sound, not pitch.

89. See supra text accompanying note 5. The perception of a sound as representative of a particular “pitch” of the Western chromatic scale (e.g., ‘A’ or ‘B flat’) results from the division of infinite pitch into twelve discernible parts, or “notes.”

90. The argument that granting copyright in one's representation of the sound of a given musical instrument (e.g., trumpet) would foreclose the availability of other “tone colors” representative of that instrument is not well taken. Just as one's individual voice is the expression of the idea of the human “voice,” so too is one's particular trumpet tone the expression of the “idea” of the trumpet. As with the voice, there exists an unlimited variety of possible trumpet tones.

work."92 Thus, those works that may not be used for the *purpose for which they were designed* without infringing one of the author's potential "bundle of rights" may not be copyrighted.93 The doctrine was first established in the leading case of *Baker v. Selden.*94 Further, explanation of the art is subject to the "use" limitation. As the *Baker* Court stated, "[t]he use by another of the same methods of statement, whether in works or illustrations, in a book published for teaching the art, would undoubtedly be an infringement of the copyright."95

Although the *Baker* rule is not expressly codified in the Copyright Act, it is adopted implicitly, with its reach subject to judicial determination.96 While the *Baker* doctrine has developed

---


93. Acoustically produced sounds are "designed" for the purpose of the musical expression of their creator. In comparison, digitally created samples are "designed" to be fungible tone colors for use in all sampling synthesizers. Assuming that an acoustically produced tone color is otherwise copyrightable, its duplication (in sample format) would be an infringement of the owner's section 106(1) exclusive right to duplicate the work, and the owner's section 106(2) exclusive right to prepare derivative works. *See infra* text accompanying notes 106-75 (discussion of right to prepare derivative works in sound recordings). Although an acoustically produced tone color may not be "used" as a sample without infringement in this manner, this does not appear to bar copyrightability since duplication in sample format is not the "purpose for which [the acoustic sound] was designed."

94. 101 U.S. 99 (1879). The *Baker* doctrine has been phrased as follows: [W]here the use of the 'art,' i.e., the idea, which a copyrighted work explains (or embodies) necessarily requires a copying of the work itself, then such copying will not constitute an infringement of copyright. However, if such copying occurs not in using the art but rather in explaining it, then such copying will constitute an infringement. M. NIMMER, *supra* note 32, § 2.18[B] at 199.

The *Baker* Court denied Selden's claim of copyright in a system of bookkeeping as embodied in a set of special forms supplied with his book. To use the system necessarily required substantial copying of the forms. The Court reasoned that [w]here the art it teaches cannot be used without employing the methods and diagrams used to illustrate the book, or such as are similar to them, such methods and diagrams are to be considered as necessary incidents to the art, and given therewith to the public.

101 U.S. at 103. However, the forms used by the defendant in *Baker* were in fact not "substantially similar" to those of plaintiff. Thus, the system was capable of being utilized without infringing plaintiff's forms. M. NIMMER, *supra* note 32, § 2.18[B] at 198.

95. 101 U.S. at 104.

96. Section 113(b) of the Copyright Act provides:
oped into a limitation on the copyrightability of utilitarian works, it has also received strong criticism in this regard. Nonetheless, where there is only one way or a very limited number of ways to express a given idea, or where all that is appropriated is the non-copyrightable ideas contained in a work, the doctrine’s application appears valid.

The question arises, then, whether tone color is uncopyrightable upon utilitarian grounds. A musical artist’s tone color, although utilitarian in the sense that it is a means to expression, is intimately connected with the individual’s artis-

---

97. Professor Nimmer notes that all works may be copied “for purposes of explanation” as well as for use. It has been held that there is “nothing in the copyright statute to support the argument that the intended use or use in industry of an article eligible for copyright bars or invalidates its registration.” M. NIMMER, supra note 32, § 2.18[C] at 200 (quoting Mazer v. Stein, 347 U.S. 201, 218 (1954)). He thus concludes that “Baker at most ... constitutes a defense in an infringement action where the defendant has copied for purposes of use rather than for purposes of explanation.” Id. While Nimmer concedes the validity of denying copyrightability to a system or method in order to prevent a monopoly in it, he argues that to deny copyright to the expression of that system on the assumption that it embodies the only expression of the system, is “factually erroneous,” citing the lack of substantial similarity between the forms at issue in Baker itself. Id. at 202-03.

98. Herbert Rosenthal Jewelry Corp. v. Kalpakian, 446 F.2d 738 (9th Cir. 1971), applying Baker, holds that where a jewel-encrusted bee pin is incapable of expression in more than one form, it is thus merely an “idea” incapable of copyright protection. But cf. Herbert Rosenthal Jewelry Corp. v. Grossbardt, 436 F.2d 315 (2d Cir. 1970); Herbert Rosenthal Jewelry Corp. v. Zale Corp., 323 F. Supp. 1234 (S.D.N.Y. 1971) (bee pin at issue in Kalpakian found infringing without discussion of Baker). See also Sid & Marty Krofft Television Prods., Inc. v. McDonald’s Corp., 562 F.2d 1157 (9th Cir. 1977) (holding that if a work’s idea and its expression are indistinguishable, the work may be protected only as against identical copying). However, it would seem as though nonidentical (though substantially similar) copying of the work would establish a distinction between the work’s “idea” and its “expression.”

99. See, e.g., Morrissey v. Procter & Gamble Co., 379 F.2d 675, 678-79 (1st Cir. 1967) (“when the uncopyrightable subject matter is very narrow [and] ... at best only a limited number [of expressive forms are possible] ... copyright does not extend to the subject matter at all ... even if [plaintiff’s] particular expression was deliberately adopted”). Morrissey appears limited to circumstances where both “de minimis copying and [the] availability of only limited number of forms of expression” exist. Telex Corp. v. IBM Corp., 367 F. Supp. 258, 361 (N.D. Okla. 1973) (emphasis original).

100. Only this limited reach of Baker is adopted by § 102(b) of the Copyright Act. M. NIMMER, supra note 32, § 2.18[D] at 207.
try. It is the artist's only means of expressing musical sound. In comparison, a digitized tone color is a fungible commodity to be traded on the open market,\textsuperscript{101} and edited or combined to produce new sounds. While the artistry may be transformed into the fungible commodity by sampling, the reverse is not true.\textsuperscript{102} Between the two, only the fungible sample is potentially uncopyrightable upon utilitarian grounds.\textsuperscript{103}

IV.
The Copyright Status of Digitally-Created "Tone Colors"

As noted earlier,\textsuperscript{104} a digitized tone color may consist of an exact digital recording of an "acoustically" produced sound or sounds, a wholly samplist-created set of "programmed" waveform instructions, or a combination thereof. Samples may be stored in floppy discs, integrated circuit chips, or magnetic tape. The nature of the object in which the sample is embodied is irrelevant to a determination of its copyrightability.\textsuperscript{105} A copyrightable work must be embodied in either a "copy"\textsuperscript{106} or a "phonorecord."\textsuperscript{107} Copyrightable works are capable of being fixed only in these two mediums.\textsuperscript{108} Although

\begin{itemize}
\item \textsuperscript{101} See supra text accompanying notes 24, 28.
\item \textsuperscript{102} The author plays the wind synthesizer, an instrument capable of playing samples. He uses this instrument in a manner consistent with the principles set forth in this note.
\item \textsuperscript{103} See infra notes 112, 126.
\item \textsuperscript{104} See supra note 26.
\item \textsuperscript{105} This is only true for works which first acquired statutory copyright after January 1, 1978, the effective date of the present Copyright Act. See M. Nimmer, supra note 32, § 2.04[D] at 45. Since sampling was invented after 1978, all samples will satisfy this condition.
\item \textsuperscript{106} The Copyright Act states:
\begin{quote}
"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.
\end{quote}
\item \textsuperscript{107} See supra note 72. The rationale for the statutory distinction between "copies" and "phonorecords" arguably is unnecessary, but resulted from a legislative fear that the White-Smith doctrine would somehow survive in the courts. The distinction makes it clear that "sounds" may be embodied in "copies." M. Nimmer, supra note 32, § 2.03[D] at 32.
\item \textsuperscript{108} H.R. Rep. No. 1476, supra note 47, at 53.
\end{itemize}
only a phonorecord may embody "sounds,"\textsuperscript{109} the Copyright Office accepts a sample for copyright registration and deposit only when submitted "in a form which others can see and read."\textsuperscript{110} Although the term "phonorecord" is broad enough to include a hard-copy printout which can be seen and read,\textsuperscript{111} the Office does not accord copyright protection to a sample as a sound recording,\textsuperscript{112} but as a "literary work."\textsuperscript{113}

\textsuperscript{109} Indeed, the term "copies" is defined residually, as "material objects, other than phonorecords." 17 U.S.C. § 101 (1982) (emphasis added).

\textsuperscript{110} This limitation is tantamount to the limitation upon copyrightable works imposed by \textit{White-Smith v. Apollo}. See supra text accompanying note 66. Telephone conversation with a Copyright Information Specialist, Copyright Office, Library of Congress, Washington, D.C. (Feb. 27, 1987).

\textsuperscript{111} Phonorecords are defined as "material objects in which sounds . . . are fixed by any method . . . and from which the sounds can be perceived . . . or otherwise communicated, either directly or with the aid of a machine or device." 17 U.S.C. § 101 (1982) (emphasis added). Thus, a hard-copy printout can be run through a "decompiler" to recovert it to a form that a sampler may communicate to humans, such as a floppy disk. Further, a work qualifies as a sound recording under the Copyright Act "regardless of the nature of the material objects, such as disks, tapes or other phonorecords, in which they are embodied." \textit{Id.} (emphasis added). See also H.R. REP. NO. 1476, supra note 47, at 56. Thus, a "'sound recording' copyright may be claimed in . . . any tangible medium, including . . . player piano rolls, and other material objects in which sounds are fixed . . . ." M. NIMMER, supra note 32, § 2.10[A] at 140 (citing H.R. REP. NO. 1476, supra note 47, at 56).

The Copyright Office's practice of accepting a sample for registration and deposit only when embodied in a human-perceptible "copy" is somewhat nonsensical. While the Office will accept a "hard-copy" printout of the numerical contents of a sample (e.g., "00110100110 . . ."), it is only the auditory "display," the tone color, of a sample that humans can perceive in any meaningful sense. The Office's rationale for the practice apparently stems from the fact that they do not possess a sampling synthesizer on which to listen to the samples. Telephone conversation with Larisa Pastuchiv, Copyright Office, Library of Congress, Washington, D.C. (Mar. 6, 1987).

112. The Copyright Office is currently undertaking a study to determine the copyrightability of both digital synthesizer "patches" (programs) and digitally created sound sources. Telephone conversation with Larisa Pastuchiv, Copyright Office, Library of Congress, Washington, D.C. (Mar. 6, 1987).

A digitally stored sample is inherently no more or less a sound than is a recorded acoustically-produced sound. Neither is a "sound" in its evanescent sense. Nonetheless, any digital sample clearly possesses qualities that acoustically produced sounds do not: the abilities to be (1) transferred freely among users, (2) altered through sample manipulation, and (3) represented "in a form which others can see and read." This distinction imparts a utilitarian aspect to a sample that is per se nonexistent for an acoustic tone in its pristine state. See supra text accompanying notes 91-103.

\textsuperscript{113} 17 U.S.C. § 102(a)(1) (1982). "'Literary works' are works, other than audiovisual works, expressed in words, numbers, or other verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks, or cards, in which they are embodied." 17 U.S.C. § 101 (1982). The material embodiment of a literary work is irrelevant for determining copyrightability; the work merely must be able to be perceived "either directly or with the aid of a machine or device." 17 U.S.C. § 102(a) (1982). Samples
A. The Essence of the “Literary Work” Copyright and its Relation to Digital Samples

The “essence of a literary work is . . . that it consist of ‘verbal or numerical symbols or indicia.’”\textsuperscript{114} As such, the copyright context of the term “literary” “does not connote any criterion of literary merit or qualitative value.”\textsuperscript{115} The term is expansive enough to include catalogs and directories,\textsuperscript{116} computer data bases and programs,\textsuperscript{117} and digital samples.

The variety of literary work that a digital sample constitutes implicates both the copyrightability of acoustically produced sounds and the nature of the rights protected by the literary work copyright. Samples exhibit characteristics of both computer “programs,”\textsuperscript{118} and computer “data bases.”\textsuperscript{119} However, while computer data bases constitute copyrightable compilations “regardless of whether the individual items in the material have been or ever could have been subject to copyright,”\textsuperscript{120} computer programs are copyrightable only “to the extent that they incorporate authorship in the programmer’s expression of original ideas, as distinguished from the ideas themselves.”\textsuperscript{121} Thus, if a sample is copyrightable solely as a data base compilation which is not also a “collective work,”\textsuperscript{122} the individual tone colors comprising it need not themselves be copyrightable.\textsuperscript{123} However, the copyrightability of a sample as

\begin{itemize}
  \item qualify as literary works due to their ability to be represented numerically in hard-copy form.
\end{itemize}


\textsuperscript{115} H.R. Rep. No. 1476, \textit{supra} note 47, at 54.

\textsuperscript{116} Id.

\textsuperscript{117} Id.

\textsuperscript{118} “A ‘computer program’ is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.” Act of Dec. 12, 1980, Pub. L. No. 96-517, § 10(a), 94 Stat. 3028 (1980) (codified as amended at 17 U.S.C. § 101 (1982)).

\textsuperscript{119} Data bases are copyrightable “compilations.” M. Nimmer, \textit{supra} note 32, §§ 2.04[B]-[C]. \textit{See also} 17 U.S.C. § 101 (1982) (defining "compilation" as a work formed by the collection, assembly, selection, coordination, or arrangement of preexisting material; collective works are compilations).

\textsuperscript{120} H.R. Rep. No. 1476, \textit{supra} note 47, at 57.

\textsuperscript{121} Id. at 54.

\textsuperscript{122} “A ‘collective work’ is a work, such as a periodical issue, anthology, or encyclopedia, in which a number of contributions, \textit{constituting separate and independent works in themselves}, are assembled into a collective whole.” 17 U.S.C. § 101 (1982) (emphasis added).

\textsuperscript{123} As noted \textit{supra} note 12, a single tone color of a given pitch may be transposed or “stretched” over the entire range of a keyboard. However, acoustic instruments have definite, separable “registers” with varying tone colors. \textit{See}, \textit{e.g.}, Fryer,
a collective work compilation or a computer program turns on the copyrightability of the individual tone colors themselves. It is, therefore, necessary to determine whether a sample is a computer program or a data base.

B. Computer Programs Compared with Data Bases

The Copyright Act defines a “computer program” as “a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.” Programs are copyrightable as literary works, since the Copyright Act’s definition of that term is broad enough to include the hard-copy printout of a program’s contents. Despite concern over the wisdom of extending copyright protection to computer programs, both the Copyright Act and case law ex-

Realistically Sampling Multi-register Acoustic Instruments, KEYBOARD, Oct. 1986, at 104. Multi-sampling is required to accurately sample acoustic instruments. See supra note 12. However, “even if a compilation consists merely of a selection or arrangement of [elements] which individually would not be copyrightable, the originality involved in the selection and/or arrangement of such [elements] is sufficient to constitute the resulting compilation a protectible literary work.” M. NIMMER, supra note 32, § 2.04[B] at 41-42. It has been suggested that in order to be copyrightable, such “selection” must exhibit “significant subjective judgement.” See New York Times Co. v. Roxbury Data Interface, Inc., 434 F. Supp. 217 (D.N.J. 1977). Further, the “selection” may not be “dictated solely by functional considerations.” Dow Jones & Co. v. Board of Trade, 546 F. Supp. 113, 116 (S.D.N.Y. 1982) (quoting M. NIMMER, supra note 32, § 2.01[B] at 14). Thus, the selection or arrangement of various multi-samples is copyrightable under the New York Times and Dow Jones tests to the extent dictated by artistic rather than merely functional considerations.

125. See supra notes 113, 118.
126. There are three objections to the copyrightability of computer programs. First, programs in “object code” version do not communicate any meaningful expression to humans. Note, Copyright Protection of Computer Program Object Code, 96 HARV. L. REV. 1723, 1724-26 (1983). However, the Copyright Act may require communication with a human audience. 17 U.S.C. § 102(a) (1982) (requiring that a work must be in a form from which it “can be perceived, reproduced, or otherwise communicated”); NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT at 32 (1979) [hereinafter CONTU REPORT] (Hersey, Comm’r, dissenting); Samuelson, CONTU Revisited: The Case Against Copyright Protection for Computer Programs in Machine-Readable Form, 1984 DUKE L.J. 663 (1984); contra Note, supra, at 1730-32 (protection given to collections of facts and literary works in binary format, neither of which meaningfully communicates to humans; and object code can communicate to humans when being “debugged”).

Second, object code programs perform a “utilitarian” function in computers, and may be thought of as “machine parts,” “embodiments of useful arts,” or “processes,” all of which are the subject of patent law. Note, supra, at 1733.

Third, object code programs are unintelligible, and unable to disclose their contents to the user. Since disclosure is the quid pro quo of copyright, such protection is at odds with copyright’s textually stated purpose. See, e.g., Twentieth Century Music
plicitly assure their copyrightability. However, an understanding of the functional characteristics of computer programs reveals that digital samples do not fit within the Copyright Act's definition. The one common characteristic that all computer programs share is that they "prescribe an order for the hardware's execution of its primitive functions." That is, computer programs interact with the computer itself to enable it to carry out certain basic operations. Indeed, all programs are capable of being "hardwired" into the computer itself. In comparison, a digital sample merely supplies a "sound source" which may be manipulated by the sampling


129. There are three types of computer programs: (1) microcode or "firmware"; (2) operating systems or "systems software"; and (3) application programs or "software." Samuelson, supra note 126, at 676. Microcode controls the fine details of the primitive functions of a computer, and substitutes for certain elements of the hardware circuitry. Id. at 677. An operating system attends to the interrelation between the hardware and the application program. Id. at 678. An application program brings about the desired result that one wants a computer to perform. Whether or not a given program is an application program "depends on what the user wants to do with a computer at any given time." Id. at 680. All three types of programs are required for a computer to perform a given task, combining together to form a "virtual" or universal machine. Id.

130. Id. at 676.

131. Id.

132. A "program itself... is a machine-control element, a mechanical device... [that] eventually becomes an essential part of the machinery that produces the results." CONTU REPORT, supra note 126, at 28 (Hersey, Comm'r, dissenting) (emphasis original). For example, a word processing program turns a computer into a word processor. See Samuelson, supra note 126, at 681 (programs "determine... what kind of machine [a] computer will be"). Samuelson views this capability as a main objection to object code copyrightability, because "the same kind of machine, if not a computer, would be disqualified from copyright protection." Id. at 748. Cf infra note 134 (samplers as "universal musical instruments").

133. See supra note 12. A sampler's operating system program, rather than the sample itself, performs this task. A sample's increased utility over an acoustic sound results from the binary representation of the sampled sound and the sample's transposition from its original pitch.
A synthesizer to transform it into a particular instrument. A sample does not interact with the sampler to make it perform its basic functions. As such, a sample is a "data base," rather than a “program” in the technical sense of the word.

The determination that a sample is a data base, rather than a program, is important in that the two mediums are subject to differing copyrightability requirements under the Copyright Act and differing deposit requirements under Copyright Office regulations. While both are literary works, the House Report states that the definition of literary works “includes computer data bases, and computer programs to the extent that they incorporate authorship.” While a data base is copyrightable as a non-collective work compilation regardless of whether or not it is comprised of copyrightable elements, a computer program that does not “incorporate authorship” is uncopyrightable. In comparison, the copyrightability of a sample as a program turns on whether “authorship” was involved in the creation of the sounds of which it is comprised. However, since a sample is a data base, a compilation copyright may be obtained to the extent that the samplist exhibits “artistic” originality in the selection or arrangement of the sampled sounds.

The distinction acquires added importance because the
Copyright Office requires content disclosure for data base registration, but not for program registration.140 Perhaps more significantly, the key obstacle to extending copyright protection to computer programs was the legal effect of "inputting" copyrighted works into automated data bases.141 It was unanimously concluded that the insertion and storage of a copyrighted work in a computerized data base was making a copy within section 106 of the Copyright Act, and thus constituted infringement unless authorized.142 Despite the Copyright Office's practice of accepting a hard-copy printout of a sample for registration and deposit, the protection accorded is not based on the copyrightability of the sounds embodied within the sample; rather, protection is based on the compilation of the selection or arrangement of the sounds.143 Thus, a determination of the copyrightability of complex periodic waveforms, or tone colors, must be based upon satisfaction of the constitutional copyright requirements enumerated earlier in section III(B) and the extent to which tone colors have been accorded copyright protection as sound recordings under the Copyright Act.

V.
The Copyright in "Sound Recordings" Under Section 114

Performer's rights for musicians are accorded protection

140. "Data bases [and] compilations . . . shall be accompanied by a . . . statement containing . . . the . . . content of each separate file within the data base, including the subject matter involved [and] the origin(s) of the data." The corresponding deposit regulation for computer programs has no such disclosure requirement. Copyright Office Regulations, 37 C.F.R. § 202.20(c)(2)(vii)(B) (1986) (emphasis added).

141. Indeed, CONTU was established because the debate and lobbying on this issue was so intense as to seriously delay the entire effort at general revision of the Copyright Act. See, e.g., R. Saltman, COPYRIGHT IN COMPUTER-READABLE WORKS 27 (1977); CONTU REPORT, supra note 126, at 39 n.163; Samuelson, supra note 126, at 695.

142. "The protection afforded by section 106 . . . seemingly would prohibit the unauthorized storage of a work within a computer memory, which would be merely one form of reproduction, one of the exclusive rights granted by copyright." CONTU Report, supra note 126, at 39. CONTU determined that no statutory amendment would be required to recognize this right, which has been upheld in the courts. See, e.g., Rand McNally & Co. v. Fleet Management Systems, Inc., 634 F. Supp. 604 (1986).

143. This argument is buttressed by the fact that the Copyright Office is currently undertaking a study to determine the copyrightability of digitally created sounds. See supra note 112.
under the Copyright Act only to the extent that they coincide with the Act's protection of "sound recordings." The nature of the rights accorded the owner of a copyrighted sound recording is more limited in scope than those which may be claimed by owners of other copyrighted works. Of the basic rights granted a copyright owner by section 106 of the Copyright Act, section 114 operates to limit the rights of performance and reproduction. Specifically, there are no "performance" rights in sound recordings, and one is free to

144. The Copyright Act states that "sound recordings" are "works of authorship." 17 U.S.C. § 102(7) (1982). Performer's rights per se, sometimes referred to as "neighboring" or "related" rights, have been explicitly recognized abroad. See generally M. Nimmer, Cases and Materials on Copyright and Other Aspects of Law Pertaining to Literary, Musical and Artistic Works, Ch. 12 (1971).

145. Section 106 provides, in pertinent part, that

subject to sections 107 through 108, the owner of copyright under this title has the exclusive rights to do and to authorize any of the following: (1) to reproduce the copyrighted work in copies or phonorecords; (2) to prepare derivative works based upon the copyrighted work; (3) to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending; (4) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, to perform the copyrighted work publicly.


146. Section 114 provides in pertinent part:

(a) The exclusive rights of the owner of copyright in a sound recording are limited to the rights specified by clauses (1), (2), and (3) of section 106, and do not include any right of performance under section 106(4); (b) The exclusive right of the owner of copyright in a sound recording under clause (1) of section 106 is limited to the right to duplicate the sound recording in the form of phonorecords, or of copies of motion pictures and other audiovisual works, that directly or indirectly recapture the actual sounds fixed in the recording. The exclusive right of the owner of copyright in a sound recording under clause (2) of section 106 is limited to the right to prepare a derivative work in which the actual sounds fixed in the sound recording are rearranged, remixed, or otherwise altered in sequence or quality. The exclusive rights of the owner of copyright in a sound recording under clauses (1) and (2) of section 106 do not extend to the making or duplication of another sound recording that consists entirely of an independent fixation of other sounds, even though such sounds imitate or simulate those in the copyrighted sound recording; (c) This section does not limit or impair the exclusive right to perform publicly, by means of a phonorecord, any of the works specified by section 106(4).


147. The issue of "performance rights" was expressly deferred by section 114(d) of the Copyright Act. Indeed, the issue was so volatile that it threatened the entire revision effort. See infra notes 158–59; House Comm. on the Judiciary, 95th Cong., 2d Sess., Report on Performance Rights in Sound Recordings (Comm. Print 1978) (authored by Barbara A. Ringer) (report by Register of Copyrights concluding that granting such rights was proper and economically feasible).
reproduce the copyrighted work as long as he or she does not take the "actual sounds" embodied in the recording. However, a close analysis of the section's operation is necessary to determine the exact nature of the rights granted to owners of copyrighted sound recordings and the relation of these rights to the protection of individual sound source tone colors.

A. The Nature of the Rights Protected in Copyrighted Sound Recordings

There are three separate and distinct contributions to a "sound recording":

(1) The contribution of the authors: the musical or literary works performed on the record, including the contributions of the various secondary authors such as arrangers;

(2) The contribution of the performers: this includes the instrumental musicians and singers;

(3) The contribution of the record producer: this includes the work of sound engineers, directors, and others who capture, edit, and mix the sounds reproduced on the record.148

Because any federal statutory copyright in individual sound source tone colors is dependent upon the sound's fixation in a tangible medium of expression,149 the extent of copyright in tone color is limited by section 114. That section's legislative history is particularly helpful in determining the scope of the exclusive rights accorded to sound recordings.

B. The Legislative History of Section 114

Attempts to accord copyright protection to sound recordings include not only the more than 20 years of efforts aimed at general revision of the 1909 Copyright Act (the "1909 Act"), but specific legislative attempts dating to 1912.150 Although section 114 first appeared as part of the 1976 omnibus general revision legislation, it was not the first legislation to accord copyright protection to sound recordings. Rather, the great explosion of record and tape piracy in the late 1960s and early 1970s resulted in separate federal legislation prior to the omni-


150. Ringer, supra note 148, at 18-38.
bus legislation. The 1971 "Sound Recording Amendment" (the "1971 Amendment") to the 1909 Act was enacted as temporary legislation, and later made permanent by further amendment in 1974.

Despite the 1971 Amendment's admitted purpose as an anti-piracy statute, granting federal copyright protection to sound recordings required the recognition of the artistic contributions of performers. Since the subject matter of copyright law is limited to the "writings of authors," the recognition of this contribution was crucial in keeping the legislation within the Copyright Act. The mere inadequacy of non-copyright legislation to combat the piracy problem is not grounds for a remedy in copyright.

Copyright protection was perceived as benefitting performers, and it became clear that explicit recognition of their artistic contribution was long overdue. Nonetheless, the identity of the owner of copyright in sound recordings is not specified in the language of either the 1971 Amendment or the current section 114. That the copyright owner's identity is

---

154. State common law actions such as unfair competition and misappropriation were perceived as inadequate to combat piracy. H.R. REP. No. 487, supra note 153, at 2-3.
156. Id. at 14-15 (testimony of Barbara Ringer, former Register of Copyrights, reviewing judicial statements that a performer's interpretation of a composition is entitled to copyright because a composition by itself is an incomplete work, and that an artist's intangible property right, though always present, was impossible to violate and thus unnecessary to assert prior to sound recordings. Note that this reasoning is equally true for sampling.) See also REGISTER'S SUPP. REPORT (PT. 6), supra note 59, at 50 (aggregate of sounds in a sound recording clearly satisfies constitutional "writing" requirement); accord, H.R. REP. No. 2237, supra note 44, at 93.
157. This omission is significant. First, explicit statutory identity of the copyright
unmentioned is not, however, fatal to a determination that section 114 accords an interest to the performer. Although an explicit division of such ownership would have been necessitated had performance rights\textsuperscript{158} been granted to the owner of copyright in sound recordings, the grant of copyright protection is in fact based upon the contributions of both the performers and the record producer. Indeed, the omission of performance rights appears merely to be an effort to complete the revision process, rather than a limitation of the section to an "anti-piracy" provision.\textsuperscript{159}

owner would help prove that the section was not included within the Copyright Act merely to preserve record company risk capital. \textit{See Hearings} (1971), \textit{supra} note 155, at 25 (statement of Stanley M. Gortikov, representing the Recording Industry Association of America, Inc.) (only ten percent of released records recoup investment costs, and only hit records earn profits, but since hit records cannot be predicted, investment can't be confined to them). Usually, only hit records are "bootlegged," allowing pirates to "cream skim" the only profitable product of legitimate record companies.

Second, statutory identity of the copyright owner would help resolve a record company's conflicting interests with performing artists. The 1971 Amendment was supported by "the entire music industry." \textit{Id.} at 6 (statement of Hon. Richard H. Fulton (Tennessee)). In comparison, digital sampling pits producers and record companies, eager to reduce costs, against performers, particularly "backup" musicians. One conflict occurs when an artist's performance on one record is utilized on another record produced by the same company. A detailed analysis of copyright ownership principles is beyond the scope of this paper. \textit{See generally} M. \textit{Nimmer}, \textit{supra} note 32, Ch. 6.

Another conflict results from the Copyright Act's "Work Made for Hire" doctrine. \textit{See} 17 U.S.C. § 201(a) (1982) (copyright vests initially in the author of the work), 17 U.S.C. § 201(b) (1982) (the employer or other person for whom a "work made for hire" is prepared is the "author" and owns the copyright absent contractual agreement). Unfortunately, "almost all sound recordings... made in the United States are made under contracts that expressly provide that the performer's contributions are works made for hire." Litman, \textit{supra} note 85, at 4. Professor Litman suggests that such performers may sue as a beneficial owner of copyright or persuade the copyright owner to bring suit. \textit{Id.} at 12. \textit{See supra} note 85 (implications of the "Work Made for Hire" doctrine on fixation).


The "Williams Amendment" defined "performers" and sought to implement performance rights. S. 597, 90th Cong., 1st Sess., 113 CONG. REC. 7078 (1967) (adopted by the Senate to the then-pending copyright revision bill, S. 543, 91st Cong., 1st Sess. (1969)). \textit{See also} S. REP. No. 1219, 91st Cong., 2d sess. 7 (1970) (amendment divides ownership of performance rights between record producers and performers); Ringer, \textit{supra} note 148, at 47-48 (commenting that administrative convenience favors ownership by record companies, while artistic contribution favors ownership by performers, and that revision legislation should clearly indicate ownership).

159. Due to the fiercely opposed economic interests of copyright owners (record companies and performers) and users (broadcasters and jukebox owners), adoption of an amendment which deleted the performance royalty appeared crucial to the
The recognition of a performance right, in addition to entitling performers to long overdue compensation for the commercial usage of their works, would have explicitly divided the ownership of copyright in sound recordings evenly between the record company and the aggregate of performers, thus explicitly recognizing the contribution of the performers themselves. This grant of rights would have not only further grounded the inclusion of sound recordings within the constitutional ambit of the "writings of an author," but explicitly recognized that the prohibition against duplication was based upon something other than the preservation of record company "risk capital." The performer would have had an explicit statutory basis for recognition of his or her performance, apart from any contribution of the record company, economic or otherwise. Nonetheless, it can safely be concluded that recognition of the performers' contribution to a sound recording is (1) implicit in section 114, notwithstanding the absence of explicit inclusion, and (2) was in fact crucial to copyright protection of sound recordings. Section 114's inclusion within the Copyright Act protects a fixed musical performance as a performance, rather than merely as a sound recording. The next section of this Note examines the extent to which sampling violates this protection. It explores tone colors and their relation to sound recordings as "derivative works" of such recordings.

C. The Scope of the Exclusive Right to Prepare Derivative Works in "Sound Recordings"

A derivative work is an original work of authorship. A derivative work is defined as a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial revisions, annotations, elaborations, or other
that is based on, or derives from, a prior work or works. Thus, a sound recording is itself a derivative work of a musical composition, and a digital sample is a derivative work of the sound recording from which it is taken. The owner of copyright in a sound recording is granted by section 114(b) the exclusive right to prepare derivative works under section 106(2).

An exclusive right to prepare derivative works was not included in either the 1971 Amendment or the early drafts of section 114. The right first appeared in an earlier draft of the revision legislation as the inclusion of section 106(2) within the rights accorded the owner of copyright in a sound recording in section 114(a). However, the wisdom of including the right relates back to a comment made at a 1964 Draft Discussion on the general revision effort.

The rationale for excluding the right from the 1971 Amendment was to clarify that independent fixations of performances imitative of the copyrighted sound recording were permitted. However, the absence of the exclusive right to pre-

161. The copyright in a new version of a work covers only the material added and has no effect on the original work's copyright status. H.R. REP. NO. 1476, supra note 47, at 57. Further, to be an infringement, the derivative work must be "based upon the copyrighted work [and] ... must incorporate a portion of the copyrighted work in some form." Id. at 62. Finally, "[t]he exclusive right to prepare derivative works ... is broader than [the right of reproduction] ... in that reproduction requires fixation [whereas a derivative work may infringe] even though nothing is ever fixed in tangible form." Id.

162. See supra notes 145-46.

163. S. 22, 94th Cong., 1st Sess. § 106(2) (1975) (as recorded out by Comm. on Judiciary). The accompanying Senate Report merely states that "[s]ubsection (a) of Section 114 specifies that the exclusive rights of the owner of copyright in a sound recording are limited to the rights to reproduce, [and to] prepare derivative works ...." S. REP. NO. 473, 94th Cong., 1st Sess. 87-88 (1975).

164. OMNIBUS COPYRIGHT REVISION LEGISLATIVE HISTORY PART 3 PRELIMINARY DRAFT FOR REVISED U.S. COPYRIGHT LAW AND DISCUSSIONS AND COMMENTS ON THE DRAFT 199 (1964) [hereinafter PRELIMINARY DRAFT](Leon Kellman of the American Guild of Authors and Composers, commenting that the draft should clearly indicate that the right to make imitative "mirror" copies does not include the right to use actual sounds from the imitated recording).

165. REGISTER'S SUPP. REPORT (PT. 6), supra note 59, at 52 (only to avoid an implication that the sound recording copyright owner has rights against unauthorized imitation or simulation of the performance embodied in the recording, but not to authorize substantial reproductions of the copyrighted work, whether or not edited or combined with other sounds).

Editing software allows samples to be "reverse-engineered" by decompiling them into binary form (e.g., "0110011001"), which may conceivably be notated by hand and
pare derivative works left a "loophole" in the 1971 Amendment, which was soon realized in United States v. Taxe. The inclusion of an exclusive right to prepare derivative works was implemented at the request of the Justice Department, which had completely missed the concern regarding imitative works expressed in the Register's 1965 Report. The Copyright Office concurred in the Justice Department's concern, and the Department's recommendations were adopted by the Senate in its Report on the then-pending legislation.

Under section 114(b) as finally adopted by the Copyright Act, a sound recording copyright owner's exclusive right to prepare derivative works does not extend to the preparation of

\[\text{then re-inputted to digitized status. This practice appears to use the actual sounds, rather than their imitatations, since manual labor is merely substituted for a machine process, with identical results. The same argument, if unpersuasive in the context of a digital audio tape duplication of a compact disc, would in effect sanction piracy outright.} \]

166. "As [the sections] are presently written, it might be possible to 'pirate' a sound recording simply by adding certain additional sounds, music or otherwise, and claim the resulting work to be a derivative work outside of the scope of protection for sound recordings." 4 Omnibus Copyright Revision Legislative History Part 5 - 1964 Revision Bill With Discussion and Comments 317 (Comm. Print 1965) (comments of Professor Nimmer).

167. 380 F. Supp. 1010 (C.D. Cal. 1974) (unauthorized duplication infringes a sound recording notwithstanding superficial changes, such as altering the recording's speed, adding or deleting frequencies and tones, or adding sounds from a synthesizer, and infringing work need not be characterized as a derivative work to so find, but criminal infringement found only if the final product is recognizable as the original), aff'd, 540 F.2d 961 (9th Cir. 1976) (doctrine of substantial similarity applied by inclusion of comparison test between the two works). See generally A. Miller & M. Davis, Intellectual Property Patents, Trademarks, and Copyright in a Nutshell 400 (1983) (record piracy is one of the few areas of copyright that involves possible criminal liability).

168. The Justice Department was concerned that "[t]here is a real possibility that an unauthorized duplicator who made a 'derivative' work by slightly altering the original copyrighted sound recording would claim that he did so legally since the copyright owner is given no exclusive right to make derivative works." Copyright Law Revision: Hearings on H.R. 2223 Before the Subcomm. on Courts, Civil Liberties and Administration of Justice of the House Comm. on the Judiciary, 94th Cong., 1st Sess. 137 (1975) [hereinafter Hearings (1975)]. "Proposed section 114 should be amended to provide for the copyright owner . . . to have the right to make derivative works or . . . to clarify that persons other than the copyright owner do not have such a right absent consent . . . notwithstanding the fact that the . . . copyright owner would have no such right." Id.


171. The problem "could be eliminated by including part (2) of section 106 in the list in section 114 of exclusive rights granted to a sound recording copyright owner . . . an action which would grant to . . . [such an owner] no more rights than they presently possess." Id. at 137.
works which consist "entirely of an independent fixation of other sounds." This limitation resulted from the Copyright Office's concern that granting copyright owners the exclusive right to prepare derivative works would prohibit unauthorized persons from preparing imitative recordings, although the House Report accompanying the enacted legislation merely hints at this concern. As enacted, section 114(b) was thus intended to close the "loophole" existing under the 1971 Amendment while still permitting truly independent fixations of imitative unauthorized recordings. The term "entirely" limits the meaning of "independent fixations of other sounds" to prohibit recordings where the copyrighted sound recording was altered in an attempt to dodge the 1971 formula. A sample taken from a sound recording does not consist "entirely" of "independent fixations of other sounds," and therefore does not merely imitate the tone color contained within. Rather, a sample takes an actual sound from the recording, which is not permitted by section 114. However, a sample from a sound recording may involve momentary sounds which are a de minimis amount of copyrighted material. The next section explores whether there is a minimum quantitative measure below which an appropriation would not infringe a sound recording.

D. Section 114(b)'s "All or Any Substantial Portion" Limitation on Copyright Infringement and the Doctrine of "Substantial Similarity"

A literal reading of section 114(b) would prohibit any unauthorized sampling of copyrighted sound recordings since such samples do not "[consist] entirely of . . . independent fixation[s] of other sounds." However, the House Report accompanying the 1976 Act indicates that "infringement takes place

172. See supra note 146 (17 U.S.C. § 114 (b)). The limitation also extended to "duplication" of these independent fixations. Id.
173. Hearings (1975), supra note 168, at 1906; Register's Report (1975), supra note 159, at 22 (unpublished report supporting derivative work right, but reflecting concern that language might be interpreted to prohibit "mirror" recordings, which are permissible because they are "independent fixations of other sounds").
175. Sample length may range from 5 milliseconds for the taking of one note, to more than two minutes, as when phrasing and drum patterns are sampled. See supra note 12 and accompanying text.
whenever all or any substantial portion of the actual sounds that go to make up a copyrighted sound recording are reproduced . . . by repressing, transcribing, recapturing off the air, or any other method." While a short sample would arguably not satisfy this standard in quantitative terms, there is no statutorily imposed "floor" below which an appropriation is not considered infringing. Further, the courts have found infringement where a quantitatively de minimis appropriation constitutes a qualitatively significant portion of the copyrighted work. Conversely, where the appropriated material is nonessential to the copyrighted work, though of quantitative significance, no infringement has been found. It seems, then, that since tone color is an essential component of a sound recording, the taking of even one note should constitute infringement.

The doctrine of "substantial similarity" is used to determine if an appropriation constitutes an infringement. Substantial similarity between the copyrighted work and any alleged infringement thereof "is an essential element of copying." Yet, determining whether a work is substantially similar to

177. H.R. REP. NO. 1476, supra note 47, at 106 (emphasis added). But cf. Taxe, 380 F. Supp. 1010, 1014 (concluding that neither "the most trivial re-recording (the re-recording of one or two notes)" nor a re-recording unrecognizable as the original would constitute infringement under the 1971 Amendment). However, the 1971 Amendment contained no derivative works clause. If Taxe was the original impetus for the derivative works clause, the fact that neither the statute itself nor the accompanying House and Senate Reports contemplate Judge Hill's concerns is indeed curious. Note that Taxe clearly contemplated sampling as nearly as possible in 1974. Id. at 1010.

178. Elsmere Music, Inc. v. National Broadcasting Co., 482 F. Supp. 741, 744 (S.D.N.Y. 1980), aff'd, 623 F.2d 252 (2d Cir. 1980) (four notes out of 100 measures found to be "heart of the composition" and thus infringing although the copying was found to be a "fair use," and thus defendant was not held liable); Harper & Row, Publishers, Inc. v. Nation Enterprises, 723 F.2d 195 (2d Cir. 1983), rev'd, 471 U.S. 539, 565 (1985) (.0015% of the work infringing, as "heart of the book"); Henry Holt & Co. v. Liggett & Myers Tobacco Co., 23 F. Supp. 302 (E.D. Pa. 1938) (three sentences held infringing); Higgins v. Baker, 309 F. Supp. 635 (S.D.N.Y. 1969) (motion for summary judgment denied; appropriation of only 0.8% of plaintiff's work may be enough to infringe copyright due to qualitative significance); Meredith Corp. v. Harper & Row, Publishers, Inc., 378 F. Supp. 686, 690 n.12 (S.D.N.Y. 1974), aff'd, 500 F.2d 1221 (2d Cir. 1974) (The district court noted that "even a small usage may be unfair if it is of critical importance to the work as a whole and taken by the infringer in order to save the time and expense incurred by the copyright owner.").


180. M. NIMMER, supra note 32, § 13.03[A] at 20. Fundamentally, "there are only two elements necessary to the plaintiff's case in an infringement action: ownership
another “presents one of the most difficult questions in copyright law.” Judge Learned Hand stated that “[t]he test for infringement of a copyright is of necessity vague” and that the line “wherever it is drawn, will seem arbitrary.” However, at least with respect to unaltered samples, questions as to the degree of abstraction between the two works are irrelevant, since a portion of the copyrighted material has been literally appropriated. Thus, an unaltered sample may at most constitute what has been termed “fragmented literal similarity,” since the similarity between the two works is not comprehensive in nature. As with non-literal similarity, a determination of whether infringement has occurred “in the last analysis requires a value judgement.” The classic guiding judicial principle in making this determination was stated by Justice Story: “If so much is taken, that the value of the original is sensibly diminished, or the labors of the original author are substantially to an injurious extent appropriated by another, that is sufficient, in point of law, to constitute a piracy pro tanto.” However, a determination of when such “sensible diminution” or “injurious appropriation” occurs is ultimately a question for the trier of fact, based on the “importance of [the] material which is common to both parties’ works.”

Given that a comparatively small degree of qualitative similarity will establish infringement with regard to artistic works, and since a musician’s “sound” is perhaps the most indispensable, distinguishing, and fundamental aspect of their artistry, it seems that the requisite qualitative similar-

of the copyright by the plaintiff, and copying by the defendant.” Id. § 13.01 at 3 (footnotes omitted).

181. Id. § 13.03[A] at 20.
183. Nichols v. Universal Pictures Corp., 45 F.2d 119, 122 (2d Cir. 1930).
185. “Comprehensive literal similarity occurs when two works are literally identical with respect to a quantitatively substantial portion. However, most copyright litigation involves comprehensive non-literal similarity, where, rather than a literal taking, the “fundamental essence or structure of one work is duplicated in another.” Id., § 13.03[A] at 20.1.
186. Id. at 39.
189. Id.
190. It has been said that a musical artist’s sound “is their soul.” Conversation with Marcus Belgrave, jazz trumpeter, Detroit, Mich. (Nov. 19, 1988).
ity necessary to establish infringement should normally be found to exist.\textsuperscript{191}

Proving infringement when a sample is made of combined or altered tone colors is more complex. Such a sample may cross the line between the permissible taking of one’s “idea,” and the prohibited taking of one’s “expression” of that idea.\textsuperscript{192}

Although the appropriation is still literal, the sample can be too dissimilar to the original tone color to infringe. The problem is one of detection. Judge Learned Hand’s famous “abstractions test,”\textsuperscript{193} and Professor Zechariah Chafee’s “pattern test”\textsuperscript{194} are both helpful in determining whether the line has been crossed.\textsuperscript{195} Additionally, the use of auditory and visual

\begin{itemize}
\item \textsuperscript{191} Where the appropriated copyrighted material represents the “heart” of plaintiff’s work, it will be found to infringe even when the taking is quantitatively de minimis. See Harper & Row, Publishers, Inc. v. Nation Enterprises, 471 U.S. 539, 565 (1985) (Justice O’Connor, writing for the Court, found that approximately 300 words of Gerald Ford’s autobiography, \textit{A Time to Heal}, purloined in a magazine article were “essentially the heart of the book.” Since Ford’s complete manuscript was 200,000 words, the amount taken was a mere .0015% of the work). See also Salinger v. Random House, Inc., 811 F.2d 90, 98-99 (2d Cir. 1987) (material that is “at least an important ingredient” is sufficiently qualitatively significant even if it is not the “heart of the book.”).
\item \textsuperscript{192} The principle has been codified. See 17 U.S.C. § 102(b). See also supra text accompanying notes 86-90 (discussion of the “idea-expression dichotomy” within the context of the Copyright Act).
\item \textsuperscript{193} The test states:
\begin{quote}
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 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.
\end{quote}
Chafee, Reflections on the Law of Copyright, 45 COLUM. L. REV. 503, 513-14 (1945). The test helps to determine where the level of abstraction crosses the line between expression and idea.
\item \textsuperscript{194} The test states:
\begin{quote}
No doubt, the line does lie somewhere between the author’s idea and the precise form in which he wrote it down. I like to say that the protection covers the “pattern” of the work . . . the sequence of events and the development of the interplay of characters.
\end{quote}
\item \textsuperscript{195} Since the problem is both abstract and concrete, the tests should be considered together. M. NIMMER, supra note 32, § 13.03[A] at 22-23. The tests may be viewed, respectively, as models of deconstructive and reconstructive component analysis.
\end{itemize}
Hand’s “abstractions test” could be applied in sampling by comparing printouts of the waveforms. Since tone color results from a complex periodic waveform consisting of a particular series of harmonic sine wave partials, a complex periodic
DIGITAL SAMPLING

waveform displays to compare the complex waveforms at issue with pure fundamental pitch sine waves and with the most banal waveforms that sound like the relevant instrument may be helpful, particularly when a sample from a "sound library" subject to a literary work copyright as a computer database is at issue. The use of these comparative methods appears appropriate since the standard used by the trier of fact in copyright infringement proceedings is that of the "ordinary observer," or lay audience.

VI.
The Defense of "Fair Use"

Even if copyright infringement is found, a defendant may escape liability through the defense of "fair use." While a comprehensive analysis of the defense is beyond the scope of this paper, a cursory application of the doctrine to sampling indicates that sampling does not constitute "fair use." "Fair use" is a judicially created doctrine which places limi-

196. See generally M. Nimmer, supra note 32, § 13.03[E] at 46-60. The author's own experience with lay audiences is that they often cannot distinguish the tonal difference between a trombone and an oboe, much less the difference between the tones of two players of the same instrument.

198. Professor Nimmer notes that a determination of whether "fragmented literal similarity" constitutes infringement "cannot be answered without a consideration of the purpose for which the defendant's work will be used." M. Nimmer, supra note 32, § 13.03[A] at 36. The "purpose" of defendant's work is one of the factors considered in determining whether a use is "fair." Id.
tations on the exclusive rights of copyright owners. The doctrine is flexible, and "permits courts to avoid rigid application of the copyright statute when, on occasion, it would stifle the very creativity which that law is designed to foster." The codification of the doctrine was "intended to restate the judicial doctrine of fair use, not to change, narrow, or enlarge it in any way." Four nonexclusive factors are to be considered in application of the doctrine: "(1) the purpose and character of the use, including whether the use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect on the potential market for or value of the work."

Commercial sampling points against a finding of fair use, though such use merely weakens, and is not fatal to, a fair use defense. Both the sample and the appropriated work are creative works, which also points against a finding of fair use. Whether or not the appropriated work is published is significant. While the quantitative amount of the portion


201. Id. (citing H.R. Rep. No. 1476 at 66).


203. Many samplists are noncommercial hobbyists. Such use points towards a finding of fair use. Also relevant to the 'character' of the use is the "propriety of defendant's conduct." Harper & Row, 471 U.S. at 462 (quoting 3 M. Nimmer, Nimmer on Copyright § 13.05[A] at 72-73 ("[f]air use presupposes 'good faith' and 'fair dealing' ")). Use of the work despite a declined request is not lack of "good faith," at least in the context of parody. Fisher v. Dees, 794 F.2d 432, 437 (9th Cir. 1986). However, the "perceived merit" of either plaintiff's or defendant's works should not be considered. Haberman v. Hustler Magazine, Inc., 626 F. Supp. 201, 210 (D.Mass. 1986).


206. Harper & Row, 471 U.S. at 564 ("[t]he fact that a work is unpublished is a critical element of its 'nature' . . . the scope of fair use is narrower with respect to unpublished works."); cf. Salinger v. Random House, 811 F.2d 90, 97 (2d Cir. 1987) ("[n]arrower 'scope' seems to refer to the diminished likelihood that copying will be fair use when the copyrighted material is unpublished," not that "the amount of copyrighted material that may be copied as fair use is a lesser quantity for unpub-
sampled may suggest a fair use defense, the \textit{qualitative} substantiality of a sampled tone color is significant under the third factor of Section 107, and strongly works \textit{against} fair use.\textsuperscript{207}

The effect on plaintiff's potential market or the work's value "is undoubtedly the single most important element of fair use."\textsuperscript{208} The factor asks "whether unrestricted and widespread conduct of the sort engaged in by the defendant (whether in fact engaged in by the defendant or by others) would result in a substantially adverse impact on the potential market for or value of the plaintiff's present work."\textsuperscript{209}

\textsuperscript{207} The third factor "includes a determination of not just quantitative, but also qualitative substantiality," and "may be regarded as relating to the question of substantial similarity rather than whether the use is 'fair.'" M. NIMMER, supra note 32, § 13.05[A][3] at 78. The quantitative aspect of the test looks to how much of the copyrighted work was appropriated, without considering how much noninfringing material constituted the infringing work. The \textit{qualitative} test looks to the value of the copied material whether or not a substantial portion of the infringing work consists of appropriated material. \textit{Harper & Row}, 471 U.S. at 565. See also Sheldon v. Metro-Goldwyn Pictures Corp., 81 F.2d 49, 56 ("no plagiarist can excuse the wrong by showing how much of his work he did not pirate."). (L. Hand, J.). Note that a momentary sample used as a synthesizer sound source may constitute a significant portion of the infringing work.

\textsuperscript{208} \textit{Harper & Row}, 471 U.S. at 566. The relevant test is not whether the infringing work may potentially "destroy or diminish the market for the original . . . but . . . whether it \textit{fulfills the demand} for the original." \textit{Fisher}, 794 F.2d at 438 (emphasis original). However, even an appropriation which may diminish the interest in the original work, yet not totally displace the market for the original, may weigh slightly against fair use if consumers may mistake the appropriation for the original. \textit{Salinger}, 811 F.2d at 99. The propriety of the market effects test "is not lessened by the fact that [the] author has disavowed any intention to publish . . . during his lifetime." \textit{Id}.

\textsuperscript{209} M. NIMMER, supra note 32, § 13.05[A] at 79. The inquiry "must take [into] account . . . harm to the market for derivative works." 471 U.S. at 568. This factor is not directed towards the harm potentially suffered by plaintiff's \textit{future} works. Consumers Union of U.S., Inc. v. General Signal Corp., 724 F.2d 1044, 1050 (2d Cir. 1983) ("The Copyright Act was not designed to prevent such indirect negative effects of copying. The fourth factor is aimed at the copier who attempts to usurp the demand for the original work.").

However, \textit{Consumers} is distinguishable on its facts from sampling. \textit{Consumers} involved the potential erosion of a magazine sales market due to fear that defendant's commercial use "could lead the public to view Consumers Union as an unfair tester of products." \textit{Id}. In comparison, sampling may affect the market for \textit{any} of plaintiff's works, past, present, and future, due to the utilitarian nature of a sample. If a musician's tone is an inherent quality of their artistry, an appropriation which may serve to obviate the future need for that artistry may hardly be adjudged fair. See also Marcus v. Rowley, 695 F.2d 1171, 1177 (9th Cir. 1983) ("The mere absence of measurable pecuniary damage does not require a finding of fair use.").
Whether the fourth factor of Section 107 points towards or away from fair use depends upon one's definition of a "work." While the potential market for or value of the sound recording from which a sample is taken may not be appreciably diminished by samples used to create new works not imitative of the original, the effect upon the musician's market as a musician may well be significantly eroded.\footnote{210}{See supra notes 14, 15, 18, 22, and 29.}

It seems, therefore, that the work protected by a sound recording is not merely the immediate commercial product, but the tangible performance as a performance. The textually stated purpose of copyright,\footnote{211}{See supra note 30. When used as substitutes for acoustic instruments, samplers do not "promote the arts" or "stimulate creativity." They are best used to create new sounds, not to obviate the creators of existing sounds. The eventual demise of the performing arts may hardly be termed "progress." See supra note 29.} the inclusion of sound recordings within the Copyright Act,\footnote{212}{"Sound recording" copyrights were in part based upon the preservation of employment opportunities for performers. See supra note 155. Such copyrights recognize the inherent existence of a musician's property right in their performance. See supra note 156. A performance's tangible recording permits it to be copyrighted. In comparison, a sample's utility cuts against its copyrightability. Both of these qualities are necessary to allow samples to infringe sound recordings. It would indeed be curious if sampling were to erode sound recording copyrights because of this utility.} and the basic concept of fair use\footnote{213}{The guiding rationale of fair use is to avoid "stifl[ing] the very creativity which [the copyright] law is designed to foster." Iowa State Univ. Research Found., Inc. v. Am. Broadcasting Co., 621 F.2d 57, 60 (2nd Cir. 1980).} all support this conclusion. A sample's utility is precisely the reason why sampling is unfair to the sound's original creator, and is the very cause of future adverse economic effects upon the original artist. An infringement should not be excused because of its value to the infringer.

**Conclusion**

Tone colors are artistic expressions deserving of protection under the Copyright Act. While digital technology benefits the reproduction of music by offering increased fidelity and by producing new sounds, it also makes possible the theft of an important musical asset. This theft is easily accomplished and can occur in any setting.

Granting copyright protection to musical tone colors promotes the arts, the textually stated purpose of copyright. Tone colors are "writings" in the constitutional sense. The creation of tone colors requires intellectual labor, and
although musicians do not enjoy "performance rights" under the Copyright Act, tone colors become tangible when embodied in sound recordings or when sampled.

Tone colors also meet federal statutory requirements for copyrightability. They are tangible expressions of works of authorship, assuming that they become permanently stored at some point. Although they are useful to their creator as a means of musical expression, they are not utilitarian in the way a sample of them is utilitarian to a synthesist. Additionally, tone colors are a true expression and not merely an uncopyrightable idea, since their varieties are virtually limitless.

A digital sample of a tone color is copyrightable as a literary work data base compilation under the Copyright Act. Tone colors should be copyrightable as a sound recording under the Copyright Act. The grant of copyright protection to sound recordings implicitly recognized the performance contributions of musicians. The derivative works right available in sound recordings permits imitation, but not the sampling of actual sounds from the recording. Although a sample may be of a small portion of a sound recording, the importance of tone color to the recording is significant enough to render such a sample an infringement.

The test of substantial similarity will reveal whether a sample infringes a tone color. Auditory and visual displays of the tone color's waveforms can help prove whether or not the sample takes actual sounds from a sound recording, especially when the tone color has been altered or combined. Finally, a careful application of the doctrine of fair use should ordinarily not excuse a sample from infringement.