VOICEPRINT IDENTIFICATION
EVIDENCE—OUT OF THE FRYE PANN AND INTO ADMISSIBILITY

JOHN F. DECKER*
JOEL HANDLER**

I. INTRODUCTION

Our judicial system has generally accepted the use of scientific and technological developments geared to apprehending criminals.¹ Some widely used crime detection techniques that have gained judicial support are blood,² urine,³ and breath tests,⁴ which determine bodily alcohol or narcotics content; radar equipment, which measures automobile speed;⁵ ballistic examinations, which assist in the identification of weapons;⁶ and handwriting,⁷ fingerprint,⁸ footprint,⁹ and hair sample¹⁰ analyses, which are used in the identification of suspects.

However useful such techniques are as investigatory tools, courts have long held that they are not acceptable as evidence in judicial

* B.A., 1966, Loras College; B.A., 1967, University of Iowa; J.D., 1970, Creighton University School of Law; LL.M., 1971, J.S.D. Candidate, New York University School of Law; Associate Professor of Law, DePaul University College of Law.
** B.A., 1972, University of Illinois; J.D., 1975, DePaul University College of Law; Associate, Kirkland & Ellis, Chicago.

5. See, e.g., People v. Abdullah, 82 Ill. App. 2d 312, 226 N.E.2d 408 (1967).
9. See, e.g., People v. Hanson, 31 Ill. 2d 31, 198 N.E.2d 815 (1964).
proceedings until they pass out of the “twilight zone” between their “experimental and demonstrable stages,”¹¹ and become generally accepted as reliable in their particular scientific field. Some principles and techniques have achieved this degree of scientific reliability and are now acceptable as evidence in judicial proceedings.¹² Others, however, are still the subject of great controversy within the scientific community, and are not yet generally regarded as sufficiently reliable for evidentiary use.¹³

The spectrographic or “voiceprint” identification process is one such controversial development.¹⁴ Analysis of voiceprints—graphic representations of recorded speech—can, it is asserted, assist in identifying the speaker.¹⁵ However, the experiments and conclusions re-

¹¹ Frye v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923).
¹² See cases cited in notes 2-10 supra.
¹³ Lie detector tests have been rejected by the courts for over 50 years. A recent case liberalizing this rule was promptly reversed. United States v. Zeiger, 350 F. Supp. 655 (D.D.C.), rev’d, 475 F.2d 1280 (D.C. Cir. 1972).
A new version of lie detecting has been developed in the “psychological evaluator,” which analyzes a person’s voice for psychological tension. Whether this device will gain the judicial approval heretofore withheld from other lie detection techniques remains to be seen, although its results were reportedly admitted in one case by stipulation. See N.Y. Times, June 5, 1972, § L, at 30, col. 4.

Another scientific development which remains in the Frye “twilight zone” is the germ indentification theory, which suggests that analysis of germs left at the scene of a crime can aid in identifying the criminal. See Wash. Post, June 11, 1972, § C, at 1, col. 1.

¹⁵ See, e.g., Kersta, Speaker Recognition and Identification by Voiceprints, 40
lied upon by advocates of voiceprint identification have been challenged as inadequate assurance of the reliability necessary for use as evidence in judicial proceedings. 16

Because of the tremendous controversy concerning the reliability of voiceprint identification in the scientific community, courts have been reluctant to admit such evidence in legal proceedings. 17 Some exceptions have been made, however, and it is to be expected that increasing judicial attention will focus on the admissibility of voiceprint identifications.

This article advocates the admission of voiceprints as evidence in judicial proceedings under certain conditions. Voiceprint identification, if conducted properly, can render extremely reliable results. However, juries are now completely deprived of any assistance these results may provide, due to the imposition of the unrealistically strict standard for admissibility set forth in Frye v. United States. 18 The present state of the art indicates that voiceprints cannot provide identifications with 100% accuracy; thus, the technique will be controversial within the scientific community for some time. However, any potential dangers posed by the failure of voiceprint identifications to render 100% reliable results can be guarded against by imposing conditions upon their admission. To the extent that unreliable results


Although this paper is considering the use of voiceprints in criminal prosecutions, its relevance is not limited to legal controversies or the field of criminology. For example, spectrographic analysis was used to prove that the mayor of East Lansing, Michigan had not called the Mayor of Highland Park, Michigan "a fulltime nigger" at a Michigan Elected Officials Employment Compensation meeting, as had been alleged. Mayor Graves of East Lansing insisted he had referred to Mayor Blackwell of Highland Park as "a fulltime mayor" at the meeting, even though the stenographer's transcript of the meeting indicated Graves had made the derogatory remark. A spectrographic analysis of the comment which was contained in a tape recording of the meeting verified Graves' assertion that he had simply called Blackwell "mayor," thereby ending what apparently had developed into a major controversy. See Hughes, Voice Expert Settles City Hall Tape Affair, The [Michigan] State Journal, July 24, 1975, at B-1.

are the product of an incompetent reading of the voiceprint, standards for experts may be imposed. To the extent that juries will improperly rely upon the voiceprint identification, compensating jury instructions may be developed. Cross-examination will also serve to prevent misuse of voiceprint identification by juries.

This article will evaluate the potential of the voiceprint technique as a reliable legal tool in light of the scientific as well as legal considerations raised by the process. In doing so, the following subjects will be discussed: the theory and mechanics of the technique and the empirical evidence offered to support it; judicial analysis of the evidentiary use of the process; the scientific and evidentiary problems of voiceprint identifications; and the possible constitutional implications that may result from admitting voiceprint evidence at trial.

II. The Voiceprint Technique

A. Mechanics and Theory

Put most simply, a voiceprint is a “picture” of the energy emitted by a person’s voice. Voiceprint identification of the speaker is produced by comparing the picture of an unknown speaker’s voice with the picture produced by a known speaker. Both aural and visual means are employed in the voiceprint identification process.

The first step in voiceprint identification involves recording the voices of the unknown and known speakers on magnetic tape. Both tapes are then dissected to extract the ten cue words preferred for comparison: “the,” “to,” “and,” “me,” “on,” “is,” “you,” “I,” “it,” and “a.” The segments of the tapes which contain these words are scanned electronically by a sound spectrograph, which converts the sound of the voice into a graph, or “spectrogram,” representing the loudness, pitch, and duration of the sound.

In attempting to identify voices through the voiceprint process, the operator will initially compare the known and unknown voices simply

19. For a more detailed explanation of the principles and techniques involved in making voiceprints than that provided here, see Kamine, supra note 14.


21. An initial aural comparison of the voices may disclose, beyond a reasonable doubt, that the two voices are not from the same person, in which case further comparison is unnecessary.

22. The spectrograph can produce a bar spectrogram or a contour spectrogram. Both represent loudness, pitch and duration, but the bar voiceprint indicates loudness variations with lighter or heavier printing; the contour voiceprint shows variations in loudness by depicting intensity in contours, as heights are shown on a topographical map. For a picture of both types of spectrogram, see Kamine, supra note 14, at 214.
by listening to recordings of the voices. Next, the trained observer will visually scan the two spectrograms of the same spoken words, noting any close similarities which indicate individuality in the voiceprints. From this latter examination, a decision is made as to whether or not the speakers are the same. Sixteen points of similarity between the prints are considered the minimum basis for concluding that the two voices are from the same person. The "points of similarity" are at the center of the controversy with regard to identifying voices through the use of high speed sound spectrograms inasmuch as the spectrograph was not designed for voice identification purposes, but rather was perceived as a therapeutic and speech research tool. Thus, the problem arises since the emphasis of the voiceprint analysis is on "the similarities and differences among words rather than between speakers." Several debatable assumptions underlie belief in the reliability of voiceprint identification. One is that each person's voice is unique, like a fingerprint. Another is that the spectrogram accurately reflects whatever uniqueness is inherent in a person's voice. The first premise, that all human voices are unique when speaking the same sounds, is based on the fact that voices are affected by anatomical differences among individuals such as the size, shape, and structure


24. Jones, The Non Sense of Voiceprint Identification, supra note 14, at 304; Jones, Danger—Voiceprints Ahead, supra note 16, at 550. When analyzing the two spectrograms produced from the recordings of the known voice and the unknown voice, the observer notes the total number of bars and the manner in which they change with respect to one another and with time. The observer, in considering contour prints, will note the number, size, and shape of the printed contours, comparing changes with respect to each other and to time. Comment, The Admissibility of Voiceprint Evidence, supra note 14, at 130.

25. Jones, The Non Sense of Voiceprint Identification, supra note 14, at 304. If the operator cannot find an adequate number of points of similarity, he cannot make a match or proffer an opinion as to whether the two voices are the same. Id.

26. Id.

27. Id.


30. For analysis and criticism of this assumption, see Bolt I, supra note 14; Kamine, supra note 14, at 218-22.
of the larynx and the oral and nasal cavities. Moreover, voice differences are apparently caused by the fact that “people exhibit different, but stable habitual patterns in the way they use the articulators [teeth, tongue, and lips], as well as other parts of the vocal apparatus, in speaking.” The combination of many factors appears to render one's speech different from that of all other persons. Nevertheless, this assumption has been criticized. The controversy that exists centers on the role of the articulators. Proponents of spectrographic analysis state that the positioning of the articulators becomes so habitual that the speaker cannot significantly change his voice patterns, thereby rendering the unique characteristics of each individual's voice immutable. However, until a person matures physically and linguistically, changes in voice patterns will occur. Thus, voice samples of children must be taken shortly after one another.

The debate concerning the second assumption, that the spectrogram accurately reflects the unique character of a person's speech, arises from the nature of the information provided by the voiceprint. While there is no disagreement that the spectrogram portrays the three dimensions of time, frequency, and amplitude accurately, there is a lack of accord among scientists as to whether the spectrogram's representation of the sound is adequate to identify persons. Because of these theoretical and mechanical imperfections of the voiceprint technique, a proper empirical evaluation is necessary to provide true insight into the reliability of this method of personal identification. An obvious vulnerability of the technique, as with most scientific evidence, lies in the potential fallibility of the expert who analyzes and compares the voiceprints.

B. Creation and Experimentation

Spectrographic identification of voices was first used during World War II in an attempt to identify enemy radio operators and locate

33. Kamine, supra note 14, at 226. Kamine indicates that since speech is a learned process whereby the infant experiments with positions for the articulators until he is satisfied with the intended sound, these habits can be changed even though the positioning eventually becomes habitual. Id.
34. See Bolt I, supra note 14, at 602-03.
Although the results of these early tests were inconclusive, a resurgence of experimentation commenced in the early 1960's under the guidance of Lawrence Kersta, who claimed the voiceprint process has a 93 to 99% identification accuracy. Kersta conducted four primary experiments to prove his assertion. In each of these examinations, prospective identifiers were trained for one week and subsequently asked to scan the spectrograms of known speakers and to compare them with a limited number of unknown speaker spectrograms, and to match unknown speaker samples with the known speaker samples. The results of the first three of four tests supported Kersta's claim of 93 to 99% identification accuracy. The fourth test dealt with voiceprints from identical twins and concluded with a less persuasive accuracy rate of 84% for the female twins and 90% for the male twins. From these experiments, as well as others he con-

36. O. Tosi, Voice Identification for Lawyers, supra note 15, at 21; Comment, Mr. Kersta's Magic Box: The Admissibility of Voiceprint Evidence in Criminal Cases, supra note 14, at 88; Kamine, supra note 14, at 227. Charles Grey and George Kopp of Bell Telephone laboratories were the first to investigate the spectrographic process. Id.

37. Mr. Kersta worked on developing voiceprint analysis in response to the need of law enforcement agencies to identify telephone bomb threat callers. Kamine, supra note 14, at 227.


39. The identifiers in the first two experiments were eight female high school students, ranging from 16 to 17 years of age. In the first experiment the identifiers, working in pairs, were presented spectrograms of 20, 36, and 48 isolated utterances of 5, 9, and 12 different speakers, respectively. Ten common words including "it," "is," "on," "you," "and," "the," "I," "to," "me," and "a" were spoken. The identifiers received four spectrograms per speaker in a random order. Therefore, when there were 5 speakers they received 20 spectrograms, with 9 speakers they received 36, etc. The result was an even match of 4 spectrograms per speaker in every test. The students sorted the voiceprints into groups of 4 matching prints for each speaker with an average accuracy rate of 99.2%. See Hennessy and Romig, supra note 14, at 188-90; Kersta, Voiceprint Identification, supra note 15, at 1255-56.

In the second experiment the same students were asked to identify two lists of five words: A. "to," "me," "and," "the," "that"; B. "a," "I," "is," "on," "you," by using the spectrograms of a single speaker. Each received five voiceprints representing the five words from one list and attempted to find a matching graph in a pile of fifty unknown spectrograms. The identifiers performed the task with both lists and attained an average accuracy rate of 99%. Id. at 190.

Kersta used five fingerprint experts as identifiers in his third experiment. After their week of training, these individuals were tested individually and in two-member teams using the identical procedure employed in the second experiment with the high school women. Their average accuracy rate was 93.46%. Kamine, supra note 14, at 228.

The fourth experiment attempted to resolve whether identical twins produce dissimilar sound patterns in their speech. The voices of 15 pairs of males and 15 pairs of female fraternal twins were recorded for the purpose of training two previously untrained female high school students. In the actual experiment the voices of 30 pairs of identical twins, ranging in age from 7 to 12 years old, were recorded as they uttered the words "you were" and "were you." Kersta then tested the identifiers by employing a
Kersta contended that the voiceprint technique was as unique in its personal identification value as fingerprints and thus was a reliable tool for positive identification of individuals. In his opinion, "neither the passage of time nor conscious efforts at mimicry could frustrate" such a system of identification. He also suggested that "the relatively higher pitch of the female voice would not affect the accuracy" of the voiceprint technique.

While Kersta's experiments with spectrographic voice analysis demonstrated (1) the sound spectrograph can be used to analyze an individual's voice, and (2) the potential of the voiceprint technique as a means of personal identification, they failed to firmly establish its reliability for identification purposes. The major shortcoming of his experiments was that they did not parallel the tests which would be necessary in forensic situations. Criticism of this sort has centered on Kersta's credentials as an expert, the basic premise of his experiment, and the methodology used in his texts.

Kersta's credentials as an expert have been challenged since apparently neither his education nor his employment encompassed any scientific or medical research which might demonstrate an acquired understanding of the dynamics of the physiology of speech. He has also been criticized for failing to publish the specific methods employed to obtain the announced results. Therefore, others were unable to duplicate his tests, a prerequisite to scientific validation of his studies.
Kersta's premise that a person's voice does not significantly change, which led to his conclusion that different speakers have immutably unique voiceprints, has also provoked criticism. Critics contend that an individual's voice may vary on different occasions since "each sound is influenced greatly by the sounds that precede and follow it." If this is true, it would be possible for one person to produce voiceprints which significantly differ from each other.

The methodology used by Kersta consisted of "closed" match conditions, so that the identifiers were assured in advance that the unknown voice matched one of the set of known spectrograms. An "open" test would have been more applicable to the forensic situation, since in actual criminal investigations, the examiner is generally compelled to match a given voice sample with one taken from an unlimited number of individuals. The impracticality of Kersta's "closed" tests was "enhanced by the limited number of speakers used and by the fact that no attempt was made to test the identification process with homogeneous speakers." Furthermore, Kersta's experiments have been attacked because the examiners were required to make only a relative judgment as to which set of voiceprints was the best match out of, at most, fifty other sets. Such decisions differ from the absolute judgments which are required in criminal investigations. Another problem with Kersta's methodology was that all spectrograms were produced from recordings made at one session; thus, no time-caused changes in spectrograms could occur. In an actual forensic situation, there is often a time lapse between the incriminating recording and the recorded sample from a suspect. Lastly, the recorded samples from the suspect were taken in isolation as opposed to words in context. Any effect of the preceding words on the sample word was not accounted for.

Therefore, it appears that while Kersta's experiments were useful, his conclusions were prematurely drawn. Hence, it is best to view his experiments as the initial rather than the conclusive step in proving the relevancy of the voiceprint technique.

48. Id. at 709.
49. Id.
50. Id.
52. Comment, Voiceprint Identification, supra note 14, at 710.
53. Id.
55. Id.
Kersta's experimentation with voiceprints was followed by four often noted experiments, the latest completed in 1971. The first of these was prepared by Bolt, Beranek and Newman, Inc., a Cambridge, Massachusetts firm, in which a comparative analysis was made between spectrogram voice identification and aural procedures to ascertain the potential of the spectrogram method. One experiment conducted under the Bolt Study involved a matching-to-sample test similar to the Kersta tests. An authentication experiment was also conducted in which eight "known" voice spectrograms were provided to the subjects who were then asked to determine whether each in a series of twenty-four "unknown" voiceprints was one of the known voices. The results of these experiments did little to encourage acceptance of the voiceprint technique. While Kersta claimed a 93 to 99% accuracy in voice identification, the Bolt matching-to-sample study achieved an average accuracy rate of only 79%. Moreover, results of the authentication experiment ranged from a mere 53% average accuracy rating for correctly identifying "unknown" voices to a 90% for the "known" voices. However, the discrepancy between the results of the Kersta and Bolt studies can be attributed to the fact that the Bolt subjects received absolutely no training for the experiments. The study was deficient at best, and did little to either verify Kersta's study, or more importantly, to offer any insight into the reliability of voiceprints in forensic conditions.

The Bolt experiments were followed in 1966 by a study conducted at Case Western University by Campbell and Young. The purpose of this study was to determine whether the accuracy of a voice identifier is affected by the context of spoken words. The test analyzed words spoken in isolation and those spoken in a fixed context. The iden-
tifiers were given one-word exemplars from five speakers and instructed to match those samples with fifteen voiceprints consisting of three voiceprints made by each of the five speakers. The experiment initially employed voiceprints of two isolated words and then used the same words taken from various contexts. Again, the results failed to solidly support Kersta’s claims. The identifiers’ accuracy rate for the isolated words averaged 78.4%, and dropped to 37.3% for the words taken from contextual passages. Like the Bolt tests, however, this study was replete with structural inadequacies. First, the training time for identifiers was too short; second, any training experience was of questionable assistance to the examiners since the study revealed that after being trained to analyze one type of word, the identifiers were tested on another type; and third, the study did not report how the words in context were marked or cut out of context, or if such a procedure was followed at all. Therefore, this study proffered little conclusive evidence concerning the value of the voiceprints technique for personal identification.

Stevens, Williams, Carbonell, and Woods conducted a subsequent experiment, using conditions similar to those in the above-noted attempts to verify the Kersta study. These experimenters modified should be similar to the accuracy for identifying speakers from words spoken in isolation. Young and Campbell, Effects of Context on Talker Identification, 42 J. ACoustical Soc’y Am. 1250, 1254 (1967); Hennessy and Romig, supra note 14, at 193.

64. The identifiers consisted of three assistant professors and seven doctoral candidates in speech pathology and audiology from Case Western University. All of the individuals were familiar with spectrographic analysis and each was individually trained and tested by either Young or Campbell. Young and Campbell, supra note 63, at 1251.

65. Young and Campbell indicated that two possible reasons for the discrepancy between their results and Kersta’s were the different matching and cuing procedures used. Id. at 1254; Hennessy and Romig, supra note 14, at 195. However, one commentator has noted that Kersta’s second and third series of tests dealing with pairs of high school girls and the fingerprint experts, respectively, were essentially the same as this experiment. Therefore, the discrepancy in results was attributable to the differing methods of excerpting sounds and of training identifiers. Kamine, supra note 14, at 231. But see Young and Campbell, supra note 63, at 1254.

66. Young and Campbell, supra note 63, at 1252.

67. The total training time for an identifier ranged from one and three-quarter hours to two and one-half hours. Young and Campbell, supra note 63, at 1252.

68. Hennessy and Romig, supra note 14, at 195.

69. Id. The function of marking or cutting is to indicate when a sound is starting and stopping. Much experience is required to perform this procedure correctly. If performed inaccurately, the identifier may be trying to match two different sounds. Id.

70. Stevens, Williams, Carbonell and Woods, Speaker Authentication and Identification: A Comparison of Spectrographic and Auditory Presentations of Speech Material, 44 J. Acoustical Soc’y Am. 1596 (1968). They recruited 3 male and 3 female college students as identifiers, while 24 individuals, ranging from 20 to 40 years old, were recruited as speakers. Id. at 1597. The experimenters decided to test with the following
the matching-to-sample test by adding speakers to the unknown group who were not previously in the known group so that certain spectrographs were unmatchable. The tests consisted of both aural and visual identifications. While aural recognition proved superior to visual recognition in terms of error rates, the validity of the study's conclusion that aural recognition may be more reliable than visual voiceprint identification may be questioned. Like the Kersta study, the Stevens experiment failed to report its methodology. The experimenters did not indicate whether the identifiers received training in visual identification or what cues were employed by the identifiers in making visual identifications. Whatever information the voiceprints revealed is of questionable validity since the standard sound spectrograph was not used. Furthermore, these experiments were performed with little attempt to simulate forensic conditions. Thus, the study failed to report essential factors necessary to make an effective comparative analysis, and illustrates the relatively poor caliber of experimentation characteristic of all the studies discussed above. The various conclusions drawn from the four studies, which often proved conflicting, were but "a consequence of the defects in the experiments." Thus, their estimation of the net worth of voiceprints has to be dismissed as unreliable.

Obviously, the shortcomings of these experiments did not preclude further empirical studies to validate the reliability of the voiceprint technique. In 1971, a study was completed under the direction of Dr. Oscar Tosi at Michigan State University which not only replicated nine words, one phrase, and one sentence: "baseball," "sidewalk," "pancake," "dovetail," "yardstick," "scarecrow," "that," "base," "side," "a baseball glove," "That sidewalk is broken." Id. at 1596.

71. Id. at 1601.

72. The first aspect of the experiment was strictly a matching-to-sample task, whereas the second part added the unmatchable speakers. The examiners initially had to determine whether the sample to be matched was in the known category at all. If the decision was in the affirmative, they tried to match it. If they concluded it was an unmatchable sample, they discarded it. Id.; Hennessy and Romig, supra note 14, at 196.

73. In the normal match-to-sample task, there was an 18% error rate in aural recognition, and a 28% rate of error in visual recognition. In the second part of the experiment, the error rate in aural recognition was 6%, and 21% in visual recognition. Stevens, Williams, Carbonell and Woods, supra note 70, at 1601; Hennessy and Romig, supra note 14, at 196.

74. Hennessy and Romig, supra note 14, at 196.

75. Id.

76. Id.


78. Hennessy and Romig, supra note 14, at 196.

Kersta's original experiments and sustained his high accuracy rates for matching-to-sample tests, but also tested the accuracy and reliability of spectrographic voice identification in experiments more forensic in application. Prior to the completion of these studies, Dr. Tosi had testified against the admissibility of voiceprint evidence. As a result of these experiments, however, Dr. Tosi concluded that given certain conditions, spectrographic identification is highly reliable.

Initially, Tosi attempted to correct the primary structural defects which characterized the Kersta study. While Kersta employed a heterogeneous sample of unknown voices of speakers having different accents, ages, and backgrounds, Tosi used a homogeneous sample of 250 male speakers with similar accents and no speech impediments. The use of a nonvaried selection thus presented a more difficult task in differentiating speakers than did the Kersta sampling. Additionally, under Kersta's testing procedures, the unknown voice always matched one in the group of known voices. Since there would always be one known voiceprint that would match the unknown voiceprint, an identification could invariably be made. Tosi's study, on the other hand, tested varying conditions including open and closed trials, single words and sentences, and tape recorded and tele-


82. Tosi Report, supra note 14, at 2033. These 250 males were selected from among 25,000 students at Michigan State University. All 250 spoke "general American English . . . with no markedly dialectal differences or speech defects." Id.


84. Tosi Report, supra note 14, at 2036. "In an open trial, the speaker population against which the unknown spectrogram must be compared may or may not contain the author of the known spectrogram. In a closed trial, on the other hand, a matching spectrogram is always contained in the speaker population." Comment, The Evidentiary Value of Spectrographic Voice Identification, supra note 14, at 347 n.33. Through the use of open and closed trials, the examiner is unable to ascertain whether the author of the unknown voiceprint is also included in the known speaker population. Id. at 347.

85. Tosi Report, supra note 14, at 2035-37. The use of contemporaneous and noncontemporaneous (the exemplar from which the matching spectrogram was made was recorded by the same person but at a later time) spectrograms tested the effect of a lapse of time on the ability of the examiners to make positive identifications or eliminations. Comment, The Evidentiary Value of Spectrographic Voice Identification, supra note 14, at 347. In the study, there was a time lapse of one month between obtaining the
phone speech. Obviously, these analyses more closely paralleled a forensic setting than any of the earlier studies. Moreover, each of the twenty-nine examiners received a month's training in basic acoustic speech principles and interpretation of speech spectrograms which far surpassed that afforded Kersta's identifiers. In each of the nearly 35,000 random trials the examiners were prohibited from listening to the recorded voices and were required to make a positive decision of visual identification or elimination within fifteen minutes. The de-

contemporary voiceprint used as the unknown and the noncontemporary matching spectrogram used as the known. Tosi Report, supra note 14, at 2033.

86. Id. at 2037. In the study, nine clue words, "it," "is," "on," "you," "and," "the," "I," "to," and "a," were spoken first in isolation, second in a fixed context, and then in a random context. Likewise, the words were spoken first into a tape recorder, then over a telephone line without any noise distortion, and finally over a telephone line in a noisy environment. Id. at 2037.

87. Id. at 2034. Tosi informed his identifiers of several objective points of similarity to look for when making comparisons between spectrograms. Id.

88. Id. at 2041. These factors would obviously not be applicable in an actual forensic application of voiceprints since the examiner would be allowed as much time as necessary to reach a conclusion. Moreover, he would normally make an initial aural comparison to select the speech sounds for spectrographic comparison. Id. at 2042. As one commentator on the Tosi Report stated:

[A] number of factors would substantially decrease the likelihood of erroneous identification of an unknown speaker as a known speaker. First, in actual forensic situations an examiner is not required to reach and testify to a certain conclusion. This had a demonstrable potential effect, reflected in Dr. Tosi's own research, of reducing the predictable rate of false identifications from five or six percent to approximately two percent. Second, while Dr. Tosi's experimental examiners could compare spectrograms only visually without listening to voice recordings, an examiner in a real-life situation aurally compares voices and visually compares voice spectrograms. This affords the examiners the use of the proven excellence of the ear as well as spectrographic analysis to identify the unknown speaker. Third, whereas Dr. Tosi's examiners were given only one month of training preparatory to their spectrographic analyses, real-life examiners, such as former Lt. Ernest Nash and Officer Lonnie Smrkovski of the Michigan State Police Department, have undergone extensive training and experience. Fourth, while the experimental examiners had an average of only 15 minutes per examination and were required to make a decision, in the typical real-life voiceprint examination the examiner is under no time pressure, and is not compelled to reach any conclusion. Fifth, Dr. Tosi's experimental examiners were afforded only six or nine clue words from which to make their determinations as to identification or nonidentification, while real-life examiners may work with numerous samples. Finally, Dr. Tosi has testified that the experimental examiners did not have any responsibility in the sense that they could not lose their jobs if they gave numerous wrong answers. Moreover, there were no appreciable consequences, such as a possible guilty verdict in a criminal trial, to the speakers from a misidentification by examiners. Consequently, Dr. Tosi found his experimental examiners frequently became bored with their task—a disability which he did not anticipate would affect the real-life examiner working under conditions where a mistake might have dire consequences.

gree of confidence in a decision was rated on a one-to-four scale.89

Based on the random trials, Kersta's published results were confirmed. Tosi's closed trial results indicated an error rate of less than 1%.90 The empirical results of the open trials revealed a 6% error rate for false identifications,91 and a 13% error rate for false eliminations.92 Dr. Tosi indicated that if the level of certainty is taken into account, the error rate was only 2% for false identifications and 5% for false eliminations.93 As a result of this study, Dr. Tosi has posited that under actual forensic conditions, the possibility of error in voiceprint identification is "negligible."94 Moreover, a field study was later conducted at the crime laboratory of the Michigan State Police by Lieutenant Ernest Nash to discover the differences between laboratory conditions and the situation a professional examiner would encounter in a forensic setting.95 After evaluating the laboratory and field conditions, Lieutenant Nash concluded that a combined method of aural and visual examination of spectrograms can be used for crime investigation, provided certain standards are maintained.96

89. Tosi Report, supra note 14, at 2036. The relative degrees of confidence in a decision assigned to the scale used for grading were: (1) almost uncertain; (2) fairly uncertain; (3) fairly certain; (4) almost certain. Id.
90. Id. at 2039.
91. Id. at 2041. False identification occurs where a match is not present but the examiner mistakenly believes there is one or a match is present but the examiner selects the wrong one. Id.
92. Id. A false elimination occurs when the examiner fails to match voices when a match is present. Id.
93. Id.; see also note 89 supra. It is important to note that 60% of the incorrect responses were given a low rating on the confidence scale by the examiner.
94. Note, Voiceprint Identification, supra note 14, at 714. This could well be a valid conclusion considering that "under actual field conditions, a trained examiner, with a high degree of job responsibility and training and with few time restraints, would use both visual and aural methods of identification and would employ a voiceprint spectrograph." Id.
95. Tosi Report, supra note 14, at 2036. The field study included 673 voices involved in actual criminal investigations and employed both visual and aural examination of unknown and known voices. From the 673 investigative voice examinations performed at the unit from 1967 to 1970, a positive identification was attained in 105 instances. Subsequently, roughly 30 of the identified individuals admitted criminal liability or were convicted by evidence other than that produced by their voices. A conclusion of "positive elimination" was reached in 172 situations. In another 31 tests, a "possibility of identification or elimination" was stated. In the remaining 396 cases, the examiner was unable to derive any conclusion due to the insufficient or poor voice samples. Id. at 2042.
96. The standards included:
   a) The examiner must be a qualified professional, trained in phonetics and speech sciences. Along with this academic training, a two year apprenticeship in field work should be a prerequisite to qualify a voice examiner as a professional.
   b) The professional examiner must abstain from offering any positive conclu-
With these results in mind, the impact of the study of the admissibility of voiceprint identifications in criminal cases will be analyzed.

III. JUDICIAL TREATMENT OF VOICEPRINT IDENTIFICATION EVIDENCE

A. Evidentiary Background

The introduction of spectrographic identification in criminal proceedings raises significant evidentiary problems, primarily concerning the question of relevancy. Determination of the relevance of proffered testimonial or real evidence involves a judicial consideration of both the materiality and probativeness of that which is offered.97 Generally, when courts consider the relevance of scientific evidence and the testimony of the expert interpreting it, they initially rely on scientific experts to sustain the value and veracity of the scientific technique.

It is settled that even without firsthand knowledge, witnesses skilled in a field encompassing a relevant test not within the range of common experience have been allowed to offer their opinions, inferences, or deductions if the testimony will aid the trier of fact.98 The issue to be settled in each case is the qualification of the expert witness in terms of his own skill or knowledge, the facts upon which he bases his assertion, and the field from which the expert must be drawn.99 This assures the court that the proffered evidence is of at least minimum probative value.100 Nevertheless, scientific evidence is

---

97. Comment, The Evidentiary Value of Spectrographic Voice Identification, supra note 14, at 349. "Materiality and probativeness together constitute relevance as that term is used to determine admissibility. Materiality is determined by the issue before the court. The tendency of a particular item to prove a material fact is referred to as probativeness." Id. at 349 n.56.


99. C. McCormick, Handbook of the Law of Evidence § 185 (2d ed. E. Cleary 1972). McCormick adds, however, that opinion evidence may be excluded on the grounds that "the state of the pertinent art or scientific knowledge does not permit a reasonable opinion even by an expert." Id. at 31.

not accepted simply on the basis of an expert's determination that a general proposition exists which confers probative value on the proffered item.¹⁰¹ Like other propositions, scientific propositions may lead to conclusions of questionable value for courts inasmuch as these propositions may infringe upon the resolution of the "ultimate issue" of a case¹⁰²—which is the province of the court or jury—or may instill an unjustified degree of certainty in the mind of the factfinding body.¹⁰³ Such possible confusion is enhanced in cases where electronic or mechanical devices are an integral part of the presentation of evidence, and where the output of such a device is to be interpreted by an expert witness.¹⁰⁴

Since the rationale for admitting expert testimony is the inexperience of the trier of fact with the proposition, the trier of fact is unequipped to evaluate the validity of the inferences.¹⁰⁵ As a result, the court is compelled to seek evidence concerning the validity of the scientific principle contained in the inference, and the reliability of the device used.¹⁰⁶ Therefore, in addition to the requirement that the expert be qualified to proffer or interpret the scientific principle,¹⁰⁷ the United States Court of Appeals for the District of Co-

---


¹⁰² See id. at 13. Courts are cognizant of the danger that a jury might tacitly accept the opinion of the expert witness and forego independent analysis of the facts. This awareness affects decisions on admissibility even though a majority of jurisdictions have abandoned the rule prohibiting testimony in the form of opinions or conclusions upon an ultimate issue. Jones, The Non Sense of Voiceprint Identification, supra note 14, at 306 (citing C. McCORMICK, HANDBOOK OF THE LAW OF EVIDENCE § 12 (2d ed. E. Cleary 1972)). One commentator has contended that voiceprint evidence would encroach upon the ultimate issue even more than would polygraph evidence. Id. at 306-07.

¹⁰³ Id. at 306.

¹⁰⁴ Id. Jones indicates that this fear may be particularly strong where an expert's interpretation is extremely subjective, as in the case of voiceprints. He contends that with voiceprint identification, there is a danger that the trier of fact will assign an undeserved degree of certainty to expert testimony. Id.

¹⁰⁵ Strong, supra note 101, at 4. This contrasts with the usual situation where a determination of relevancy is made by testing the inferences against common human experience. See James, Relevancy, Probability and the Law, 29 CAL. L. REV. 689, 693-94 (1941).

¹⁰⁶ The validity of the abstract principle and the ability of the device used to measure the principle accurately are separate determinations. Cf. Strong, supra note 101, at 17 (in many cases, "the distinction between validity of principle and validity of method is of no practical significance."). In any case, the validity of the method cannot sufficiently be established by a mere technician, but requires an expert in the field. Id. at 16.

¹⁰⁷ Where expert testimony is offered regarding scientific evidence, the initial evidentiary issue is the admissibility of expert testimony per se. The present federal
lumbia, in the case of Frye v. United States, first expounded the legal test for measuring the validity and reliability of a new scientific technique and thus its admissibility at trial. Under the Frye standard, the "[theory] from which the deduction is made [must] be sufficiently established to have gained general acceptance in the field in which it belongs." What in effect must be demonstrated is such general acceptance of the technique in the field of authority to which the technique relates as to allow for judicial notice of it.

The Frye standard sets forth a strict standard for admissibility of scientific evidence aimed at avoiding an inordinate degree of judicial discretion on issues of admissibility and the injection of irrelevant matter into the factfinding process. This rule allows a court to overcome its lack of knowledge of the utility of a particular scientific technique while minimizing the possibility that the factfinder will be swayed by unreliable evidence. New scientific principles or techniques are placed into what the Frye court characterized as a twilight zone of reliability. To escape this area, such principle or technique must cross the line between the experimental stage and the demonstrable stage.

rule provides: "If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion or otherwise." Fed. R. Evid. 702.

108. 293 F. 1013 (D.C. Cir. 1923) (lie-detector examination).
109. Id. at 1014.
111. Id. at 1265-66.
112. Id. at 1266.
113. The Frye standard of general acceptance has been continuously applied to polygraph tests, for which it was originally developed. United States v. Skeens, 494 F.2d 1050 (D.C. Cir. 1974) (polygraph evidence excluded); Marks v. United States, 260 F.2d 377, 382 (10th Cir. 1958), cert. denied, 358 U.S. 929 (1959) (defendant's polygraph evidence excluded). Opinion and data forms of testimony are excluded not only for corroborative and substantive purposes, but also for the purpose of proving that the test was in fact administered. C. Mccormick, supra note 99, § 207, at 506.

However, the general acceptance test has been extended to other areas of scientific evidence, in some cases modified to a more relaxed form. Compare United States v. Stifel, 433 F.2d 431, 438 (6th Cir. 1970), cert. denied, 401 U.S. 994 (1971) (neutron activation analysis of particles of bomb and cardboard wrapper admitted) and State v. Stout, 478 S.W.2d 368 (Mo. 1972) (neutron activation analysis of victim's blood excluded) with People v. Williams, 164 Cal. App. 2d Supp. 858, 860, 331 P.2d 251, 254 (Super. Ct. 1958) (Nalline test for narcotics admissible where generally accepted by those expected to be familiar with its use).

114. 293 F. at 1014.
B. Judicial Decisions on Voiceprint Identification Evidence

1. Early indications of a favorable judicial reaction

The first reported application of the voiceprint technique in a criminal proceeding occurred in the 1966 case of *People v. Straehle.*115 The defendant, a police officer, had telephoned the operator of an illicit gambling enterprise to warn him of an impending police raid. Later, during a grand jury inquiry, the police officer denied making the call. At the ensuing perjury trial, the prosecution introduced voiceprints of the telephone calls116 and sample voiceprints of the defendant's voice, supported by the expert opinion of Lawrence Kersta that all recordings were of the defendant's voice.117 After a preliminary hearing in which the court ruled that Kersta was qualified to testify, and that the jury would assess the weight of the evidence and the competency of the witness,118 the defense counsel objected to introduction of the spectrographs themselves. Relying on the earlier case of *People v. Davidson,*119 counsel argued that the de-
vice must be generally accepted by the courts before it is admissible as evidence. However, the court refused to read Davidson as mandating a general acceptance test, and found that the device was admissible if its evidentiary foundation demonstrated it to be "scientifically accurate." The trial ended in a hung jury, and appeal was taken on a later dismissal of the indictment.

Although the Straehle case was not reviewed by an appellate court, its impact on the admissibility of voiceprint identification was substantial. Most importantly, the court recognized the need for testimony from a qualified expert witness. Such a high degree of competence would help the factfinder to determine the probative utility of the proffered voiceprints. Secondly, Straehle lowered the rigid Frye "general acceptance" standard to one consistent with the factfinder's heightened responsibilities: the device must qualify as a scientifically accurate instrument. Moreover, the case appeared to dispel one of the considerations underlying the Frye rule—that the jury would assign undue weight to a scientific technique because of its mystique. Since the result in Straehle was a hung jury, it can be argued that juries "are not necessarily overly swayed by scientific evidence."

conduct the test, and no other witness had been called to either explain the principle underlying the device, or verify that the particular machine was in proper working order. Id. It is unclear whether the court intended to require an expert to conduct the test or simply to interpret the results in court. However, the holding implied that given a qualified expert, the court would admit the evidence to the trier of fact with a "reasonable explanation of the workings of [the] . . . device." Id.

121. See note 119 supra; Note, Evidence—Voiceprint Method of Identification, supra note 115, at 514.
123. Note, Evidence—Voiceprint Method of Identification, supra note 115, at 514. The voiceprint process itself is important to understand. Kersta's perfunctory qualifications were detailed on direct examination, and on voir dire outside the presence of the jury, the questions of how the voiceprint worked and what reliability had been achieved again revolved around his competence to testify. Id. at 511-14. The emphasis, comparable to that in Davidson, was upon the need for someone to explain the workings of the device to the trier of fact. See note 119 supra.
124. Id. at 514 (Frye standards are especially rigid when applied to evidence involving highly specialized technology). However, it appears that the court, after expounding the test, left it to the jury to determine scientific accuracy according to the weight accorded Kersta's testimony.
125. See text accompanying note 112 supra.
126. Comment, The Voiceprint Technique: A Problem in Scientific Evidence, 18 WAYNE L. REV. 1365, 1375 (1972). It could also be argued that the jury, allowed a great deal of discretion in assessing the scientific accuracy of the instrument, see note 21
The first appellate court\textsuperscript{127} to deal with the voiceprint technique affirmed the admission of Kersta's opinion identifying the defendant as the individual who had made obscene telephone calls. Wholly on the basis of Kersta's testimony, the Court of Military Appeals in \textit{United States v. Wright}\textsuperscript{128} concluded that "voice identification had, experimentally and in practical application, demonstrated a high degree of accuracy."\textsuperscript{129} Although it examined Kersta's technical background and found Kersta competent to make and interpret voiceprints,\textsuperscript{130} the court reserved judgment on his competency to testify on a particular subject until it could establish that the opinion bore "some measurable relation to empirical observation."\textsuperscript{131} Because Kersta testified to the high degree of verification in his own studies, and identified the particular defendant with twenty-three points of similarity—seven more than the minimum needed to establish identity—the court found the level of empirical observation supporting Kersta's competency required it to admit his opinion and the voiceprints as well as the tapes.\textsuperscript{132}

The court also held that it was not \textit{supra}, exercised more caution than a jury bound by a court's determination of scientific accuracy.

\textsuperscript{127} This article will focus primarily on appellate court decisions involving the admissibility of voiceprint identification evidence. For a comprehensive listing and discussion of trial court treatment of voiceprints, see Greene, \textit{Voiceprint Identification: The Case in Favor of Admissibility}, 13 AM. CRIM. L. REV. 171, 184-89 (1975).

\textsuperscript{128} 17 C.M.A. 183, 37 C.M.R. 447 (1967). Kersta evaluated spectrograms made from the tapes of the obscene caller's voice and the defendant's telephone voice. During the sample call to the victim, during which she was to identify the caller's voice, Wright was asked to make his voice slower and hoarser to match the speed and pitch of the obscene caller's voice. \textit{Id.} at 186, 37 C.M.R. at 450. Yet no effort was made to have Wright duplicate any of the obscene or threatening words used by the obscene caller. \textit{Id.} at 187, 37 C.M.R. at 451. Although the defendant claimed he had not been informed of the taping of the sample conversation, the court held that the secret recording did not violate his constitutional rights; he had been informed of his rights, and he had acknowledged in testimony that he "figured" it was being recorded. \textit{Id.} at 186-87, 37 C.M.R. at 450-51.

\textsuperscript{129} \textit{Id.} at 189, 37 C.M.R. at 453.

\textsuperscript{130} \textit{Id.} at 188, 37 C.M.R. at 452. The court drew its standard from the Manual for Courts-Martial:

\begin{quote}
An expert witness—that is, one who is skilled in some art, trade, profession or science or who has knowledge and experience in relation to matters which are not generally within the knowledge of men of common education and experience—may express an opinion on a state of facts which is within his speciality and which is involved in the controversy.
\end{quote}

\textit{Id.} at 188, 37 C.M.R. at 452 (quoting Manual for Courts-Martial, United States, 1951, \textsection 138(e)). Arguably, the federal rule of evidence is even broader. \textit{FED. R. EVID.} 702. See note 107 supra.

\textsuperscript{131} 17 C.M.A. at 188, 37 C.M.R. at 452.

\textsuperscript{132} Another justification tendered by the court in admitting the evidence was that the tapes used to make the voiceprints were played in open court and were available to
essential that the voiceprint technique be infallible or that all experts agree on the validity of the technique in order to sustain the admissibility of voiceprints.\textsuperscript{133}

Although the majority of the Court of Military Appeals held that the voiceprints were admissible in evidence, the court's opinion relied upon the qualifications of an expert rather than "the accuracy and acceptance of the expert's scientific technique."\textsuperscript{134} Such qualifications were particularly important, for in expressly abandoning the \textit{Frye} standard,\textsuperscript{135} the Wright court relied on the expert's articulation of concrete data and facts supporting his opinion. The issue of reliability of the evidence was thus defined in terms of the expert's qualifications.

\section*{2. The \textit{Frye} standard rigidly applied}

In the aftermath of \textit{Straehle} and \textit{Wright}, it appeared that voiceprint evidence might suddenly emerge as an acceptable identification procedure. Yet between the \textit{Wright} decision in 1967 and a 1971 decision by the Supreme Court of Minnesota admitting voiceprints for limited purposes,\textsuperscript{136} the only two state appellate courts to confront the issue relied upon the old \textit{Frye} standard of general acceptance, and excluded the evidence.

In \textit{State v. Cary},\textsuperscript{137} the prosecution applied for a pretrial order

\begin{flushright}
the court-martial members during their deliberation. Since aural voice identification was fully acceptable, the court members could "determine for themselves the margin of error, if any, in Mr. Kersta's expert opinion." \textit{Id.} at 189, 37 C.M.R. at 453. In addition, there was strong identity testimony from three other witnesses who had either received or listened in on the obscene telephone calls and had indicated that the voice of the defendant and the caller were the same. \textit{Id.} Therefore, though the court did not expressly limit its holding, it is possible that admissibility was approved only for purposes of supporting other testimony rather than as independent proof based upon reliable scientific devices. At the very least, the court was "satisfied that the shortcomings of Mr. Kersta's voiceprint system did not render his opinion inadmissible." \textit{Id.}
\end{flushright}

\begin{flushleft}
\textsuperscript{133} \textit{Id.}
\end{flushleft}

\begin{flushleft}
\end{flushleft}

\begin{flushleft}
\textsuperscript{135} The dissenting judge argued strongly in favor of the general acceptance standard. "[T]he prosecution's evidence is absolutely devoid of proof of any general acceptance of mechanical and electronic voice identification devices by the scientific community." United States v. Wright, 17 C.M.A. 183, 193, 37 C.M.R. 447, 457 (1967).
\end{flushleft}

\begin{flushleft}
\textsuperscript{136} State \textit{ex rel. Trimble v. Hedman}, 291 Minn. 442, 192 N.W.2d 432 (1971).
\end{flushleft}

\begin{flushleft}
\end{flushleft}
instructing the defendant to submit a voice exemplar to be used for spectrographic identification.\textsuperscript{138} The government’s request was granted subject to various restrictions,\textsuperscript{139} but on interlocutory appeal, the New Jersey Supreme Court reversed the trial judge’s order. Concluding from precedent\textsuperscript{140} that the fourth amendment right to privacy prohibited the taking of an exemplar unless the intended “product of the search” had “the capacity to be admissible into evidence,”\textsuperscript{141} the court remanded to determine the accuracy of voiceprints.\textsuperscript{142} To guide the trial judge, the court stated that it was the prosecutor’s burden to prove to the judge that voiceprint identification had “a sufficient scientific basis to produce uniform and reasonably reliable results and [would] contribute materially to the ascertainment of truth”;\textsuperscript{143} that an actual demonstration would be desirable; and that “something more than the bare opinion of one man, however qualified, is required.”\textsuperscript{144}

On remand, the court did consider the opinion of more than one man,\textsuperscript{145} but it mistakenly interpreted the New Jersey Supreme

\textsuperscript{138} 49 N.J. at 346, 230 A.2d at 385.
\textsuperscript{139} The various protections expressly afforded the defendant included the following: (1) the prosecution was prohibited from using any questions related to guilt or innocence; (2) the defendant was entitled to the presence of counsel and, if desired, a qualified expert; (3) counsel for the defense was to be furnished with any reports that were prepared if the state decided to use any evidence from the recording. \textit{Id.} at 346-47, 230 A.2d at 385-86. However, the defendant could be required to repeat some of the identical phrases used by the caller. \textit{Id.} at 346, 230 A.2d at 385. \textit{But cf.} United States v. Wright, 17 C.M.A. 183, 37 C.M.R. 447 (1967) (voiceprint evidence held reliable although defendant used different words).

\textsuperscript{140} The precedent cited was State v. Driver, 38 N.J. 255, 261, 183 A.2d 655, 658 (1962), which held evidence that the defendant refused to take the polygraph was a fortiori inadmissible because the polygraph itself was not yet scientifically accepted. The court acknowledged that a county court had issued a similar order to gather voiceprint evidence without ruling on admissibility. State v. Cary, 49 N.J. 343, 351, 230 A.2d 384, 388 (1967), \textit{citing} State v. McKenna, 94 N.J. Super. 71, 226 A.2d 757 (1967).

\textsuperscript{141} 49 N.J. at 351, 230 A.2d at 388.
\textsuperscript{142} \textit{Id.} at 352, 230 A.2d at 388-89.
\textsuperscript{143} \textit{Id.}
\textsuperscript{144} \textit{Id.} The court was specifically speaking of Kersta as the one man.
\textsuperscript{145} 99 N.J. Super. 323, 328-31, 239 A.2d 680, 683-84 (1968), \textit{aff’d}, 56 N.J. 16, 264 A.2d 209 (1970). The Superior Court conducted an extensive hearing on the voiceprint process at which both Lawrence Kersta and Dr. Oscar Tosi testified regarding the accuracy of such identification. While Kersta supported the voiceprint technique as reliable, Tosi was not prepared to give a scientific opinion on the reliability of spectrograms until further empirical analysis was available. In addition to testimony by Drs. Gerstman and Ladefoged, the defense attempted to introduce 39 letters from experts in the science of speech sounds. Although the court found these opinions hearsay if used for the truth of the matters contained therein, the letters were admitted into evidence as independently relevant to show the existing controversy over reliability in the related scientific field. \textit{Id.} at 331, 239 A.2d at 684.
Court's standard of reliability to mean that only scientific techniques worthy of judicial notice can be admitted.\textsuperscript{146} The court returned to \textit{Frye} and found that it was too early to gauge the accuracy and reliability of the voiceprint technique since it lacked scientific acceptance.\textsuperscript{147}

In \textit{People v. King},\textsuperscript{148} the California Court of Appeals reversed an arson conviction which had been rendered solely on the basis of a voiceprint identification made by Lawrence Kersta.\textsuperscript{149} The trial court had instructed the jury to decide whether the technique was accepted by scientists, and if so, to consider Kersta's opinion in their decision.\textsuperscript{150} However, the California Court of Appeals held it was reversible error to have submitted Kersta's opinion to the jury. Its decision was based upon two factors. First, Kersta had failed to qualify as an expert,\textsuperscript{151} and second, there was a lack of general acceptance

\textsuperscript{146} "As indicated in Cary, ... when scientific aids to the discovery of the truth receive general recognition scientifically as to their accuracy, courts do not hesitate to take judicial notice of this fact and admit evidence obtained through their use." \textit{Id.} at 331, 239 A.2d at 684. The court gave no indication that anything less than judicial notice would render a technique and its results admissible.

\textsuperscript{147} \textit{Id.} at 334, 239 A.2d at 685. After an appeal by the state, 53 N.J. 256, 250 A.2d 15 (1969), and on a second remand, the prosecution was given an opportunity to produce additional expert testimony in support of admissibility. It failed to do so; consequently, the superior court's holding denying the admission of voiceprint evidence was sustained by the New Jersey Supreme Court. 56 N.J. 16, 264 A.2d 209 (1970). For an extensive report of this hearing, see Cederbaums, \textit{Voiceprint Identification: A Scientific and Legal Dilemma}, 5 CRIM. L. BULL. 323, 327-36 (1969).

\textsuperscript{148} 266 Cal. App. 2d 437, 72 Cal. Rptr. 478 (Ct. App. 1968). During an interview conducted for a CBS documentary of the Watts Riots of 1965, an unidentified black male made incriminating statements about his role in the riots. After the airing of the program, the defendant was arrested on an unconnected narcotics charge and a CBS cameraman's card was discovered in his wallet during the booking procedures. Suspected by the police as the person interviewed on the television documentary, the defendant was interrogated in a room that was bugged, and his voice was recorded in order to obtain a spectrographic comparison with the voice on the CBS tape. The court found no violation of the defendant's constitutional rights in the manner in which the recording was made. \textit{Id.} at 464, 72 Cal. Rptr. at 495-96.

\textsuperscript{149} The defense tendered seven expert witnesses who challenged the scientific reliability of the voiceprint technique as well as Kersta's qualification to conduct the test. \textit{Id.} at 453-56, 72 Cal. Rptr. at 488-90.

\textsuperscript{150} \textit{Id.} at 460, 72 Cal. Rptr. at 493.

\textsuperscript{151} \textit{Id.} at 446-50, 456-58, 72 Cal. Rptr. at 485-87, 490-91. In discussing this factor, the court stated:

While Kersta has degrees in electrical engineering and physics, his field of knowledge is acoustical and audio engineering; there is no indication either from his educational background or his employment experience that he engaged in any scientific investigation or medical research to substantiate his analysis of the functions of the body which produce speech. \textit{Id.} at 450, 72 Cal. Rptr. at 486-87.
of voiceprint identification in the scientific field.\textsuperscript{152} The court cited the "aura of certainty"\textsuperscript{153} enveloping a new scientific process, and noted that the testimony of an engineer relative to the mechanical device in question does not necessarily qualify him to testify as a scientist regarding the accuracy of the results.\textsuperscript{154} The court relied on \textit{Cary}\textsuperscript{155} for its holding that it is the duty of the trial judge to insure general scientific acceptance before allowing expert opinion into evidence.

The judicial attitude in \textit{Cary} and \textit{King} was one of skepticism. Neither court wished to rely on the testimony of one authority whose qualifications were open to question.\textsuperscript{156} Both believed the voiceprint technique had not attained the degree of certainty or recognition necessary to justify the admission of such evidence under the \textit{Frye} standard.\textsuperscript{157}

Yet there is language in these two decisions which seemed to indicate that the courts would not demand absolute acceptance by the scientific community before admitting this type of evidence. While the \textit{Cary} court referred to the test of admissibility as "general scientific acceptance,"\textsuperscript{158} it did not suggest what variables it would consider persuasive in resolving the admissibility issue.\textsuperscript{159} Rather, it avoided the issue by refusing to admit the voiceprint evidence on the ground that testimony of one expert witness did not demonstrate the scientific acceptability and accuracy necessary for judicial notice of the technique.\textsuperscript{160} Although voiceprint identification failed to meet the \textit{Frye} "general acceptance" test in the \textit{King} case, the court did not

\begin{footnotesize}
\begin{enumerate}
\item \textsuperscript{152} \textit{Id.} at 460, 72 Cal. Rptr. at 493. The court cited Kersta's own testimony in reaching its conclusion on the second factor: Kersta's admission that his process is entirely subjective and founded on \textit{his opinion alone} without general acceptance within the scientific community compels us to rule [the] "voiceprint" identification process has not reached a sufficient level of scientific certainty to be accepted as identification evidence in cases where the life or liberty of a defendant may be at stake. \textit{Id.} at 460, 72 Cal. Rptr. at 493 (emphasis added).
\item \textsuperscript{153} \textit{Id.} at 461, 72 Cal. Rptr. at 493.
\item \textsuperscript{154} \textit{Id.} at 458, 72 Cal. Rptr. at 491.
\item \textsuperscript{156} The \textit{King} court cited the trial judge's characterization of Kersta's claimed expertise with approval: "He is pulling himself up by his own bootstraps." \textit{Id.}
\item \textsuperscript{158} 99 N.J. Super. at 332, 239 A.2d at 684.
\item \textsuperscript{160} \textit{Id.}
\end{enumerate}
\end{footnotesize}
demand judicial notice in every case, as did the Cary court.\textsuperscript{161} In addition, the court in King seemed to predict future judicial acceptance of the technique when it recognized that voiceprints might someday achieve the same status as blood tests.\textsuperscript{162}

3. Judicial response to the Tosi study

The decisions in Cary and King demonstrated that sufficient, accurate scientific data was a prerequisite for voiceprint admissibility. However, upon completion of Dr. Oscar Tosi's comprehensive studies,\textsuperscript{163} conducted in order to eliminate the scientific community's skepticism toward Kersta's work,\textsuperscript{164} a new judicial attitude pervaded judicial opinions on the issue of voiceprint evidence. In 1971, the Supreme Court of Minnesota in \textit{State ex rel. Trimble v. Hedman}\textsuperscript{165} held voiceprints admissible, not as direct and independent evidence on the issue of identity at trial, but for the limited purpose of establishing probable cause to issue arrest and search warrants. The court had requested Lieutenant Ernest Nash (then Detective Sergeant) of the Michigan State Police Crime Laboratory to make spectrograms of fourteen tapes, including that of the unknown caller, a conversation with the defendant, and the voices of twelve other persons.\textsuperscript{166} Based upon Nash's conclusion that the voice of the unknown caller and the voice of the suspect were the same, arrest and search warrants were issued and executed against the defendant.\textsuperscript{167} The lower court re-

\textsuperscript{161} The King court said: "Of course, the use, validity and accuracy of certain scientific devices may be of such common and universal knowledge that the court may take judicial notice of this fact and it is not necessary to call an expert witness to validate this fact." 266 Cal. App. 2d at 456 n.2, 72 Cal. Rptr. at 491 n.2 (emphasis added).

The court did not reverse the trial court's decision solely because voiceprint evidence was admitted. Other factors included "prejudicial misconduct by the deputy district attorney, the trial court's refusal to rule on Kersta's qualifications and abdication of this to the jury, improper showup procedure, and the refusal of the court to grant a new motion on newly discovered evidence." Comment, \textit{The Voiceprint Technique: A Problem in Scientific Evidence}, 18 WAYNE L. REV. 1365, 1377 n.56 (1972).

\textsuperscript{162} 266 Cal. App. 2d at 461, 72 Cal. Rptr. at 493.

\textsuperscript{163} See Tosi Report, supra note 14.

\textsuperscript{164} See text accompanying notes 79-96 supra.

\textsuperscript{165} 291 Minn. 442, 192 N.W.2d 432 (1971). In Trimble, a call to the St. Paul police from a woman requesting assistance had been routinely recorded. Responding to the call, one of the officers was shot and killed. Four months later, the defendant was summoned to the county welfare office where the police recorded her conversations without her knowledge. This recording was made with judicial approval. \textit{Id.} at 443-44, 192 N.W.2d at 433-34.

\textsuperscript{166} \textit{Id.} at 444, 192 N.W.2d at 433.

\textsuperscript{167} \textit{Id.} at 443-44, 192 N.W.2d at 434. Lieutenant Nash was the officer in charge of the voice identification unit of the Michigan State Police Crime Laboratory. \textit{Id.} at 443, 192 N.W.2d at 433. He has studied under both Mr. Kersta and Dr. Tosi. In June, 1974,
jected the defendant's argument that there was no probable cause to issue the warrants. The Minnesota Supreme Court affirmed the decision, and concluded that voiceprint evidence had become sufficiently reliable to be admitted into evidence to prove probable cause to issue a warrant.168

The significance of the *Trimble* decision may be analyzed in three dimensions: evidentiary, scientific,169 and constitutional.170 Concerning Lt. Nash was granted a leave of absence from the Michigan Department of State Police, being replaced by Detective Lonnie Smrkovski as head of the voice identification unit. O. Tosi, *Voice Identification for Lawyers*, supra note 15, at 43-44.

168. 291 Minn. at 458, 192 N.W.2d at 441. The court relied heavily upon empirical studies conducted by Dr. Tosi and the testimony of Tosi and Nash for admissibility. Tosi indicated that given certain field conditions, voiceprint identification is extremely reliable. Id. at 454, 192 N.W.2d at 439. Dr. Peter Ladefoged, Professor of Phonetics at U.C.L.A., testified for the defense and stated that spectrographic identification was still too unreliable to be admitted in court. Ladefoged expressed his concern that Tosi had tested only male voices and that it would be more difficult to make spectrographic comparisons of female voices due to their higher pitch. Id. at 456, 192 N.W.2d at 440. Tosi, however, claimed the ability to identify female voices. Id. Interestingly, Dr. Ladefoged has taken a cautious position in favor of voiceprint identification based on Tosi's study subsequent to his testimony in *Trimble*. See United States v. Raymond, 337 F. Supp. 641, 644-45 & n.23 (D.D.C. 1973), aff'd on other grounds sub nom. United States v. Addison, 498 F.2d 741 (D.C. Cir. 1974).

169. The Supreme Court of Minnesota gave weighty consideration to the Tosi study, and it was an integral factor in the court's determination that voiceprint analysis was sufficiently accurate to be admissible as evidence to prove probable cause. Therefore, analysis of the Tosi study as it relates to *Trimble* is imperative.

In his testimony, Tosi stressed the reliability of his voiceprint technique:

Q. Dr. Tosi, could you express an opinion as to the reliability of voiceprint examination . . . by the Kersta voiceprint spectrogram method by a trained examiner, who is given all of the time that he needs to make an examination, who listens to the spoken material as well as analyzes the voiceprint, who is allowed to grade and produce an opinion as to reliability of what he is saying, who is given adequate and sufficient training in the manufacture of voiceprints and reading voiceprints, who has a high degree of job responsibility and experience? Could you express an opinion as to the degree of reliability of such an examiner's opinion?

A. Well, yes, certainly. Providing that all these conditions that you have expressed, especially that the examiner is responsible, and he is allowed to say "Well, I don't know, I cannot produce in this case an identification," and only in those cases in which he is absolutely sure of his statement, I think that then the method is very highly . . . reliable.

Id. at 453-54, 192 N.W.2d at 438-39. Tosi stated that this method could be used to identify female voices. Id. at 456, 192 N.W.2d at 440. However, his experimentation had not utilized female voices. Comment, *The Voiceprint Technique: A Problem in Scientific Evidence*, supra note 14, at 1381. Furthermore, the experts failed to inform the court of the four-month time lapse between the original tape and the tape of the defendant's voice made for identification purposes. Again, Tosi's studies seem inadequate, for no experimentation had verified the use of samples taken more than one month apart. Id. at 1381-82. Thus, the court seemed to rely upon "anecdotal experience rather than on experimentally verified results." Id. at 1381.

170. The court dealt briefly with the constitutional implications of the voiceprint
ing the evidentiary aspect of the decision, it is apparent that Trimble did not represent a significant reversal of the previous decisions by the courts in Cary and King, which rejected voiceprints as unreliable. Trimble was appealing the pretrial dismissal of her petition challenging the admissibility of voiceprints to establish probable cause to issue a warrant. In the previous cases, the accused’s guilt or innocence would ostensibly be established through admission of voiceprint evidence at trial. The court held that the police were “entitled to rely upon . . . various . . . factors which would not be admissible in evidence against an accused on trial.” The court made only an oblique reference to the “general acceptance” standard, choosing instead to subsume the direct question under a discussion of qualifying the expert. Relying on the opinions of three experts on the reliability of the voiceprint technique, the Trimble court did not reject the reasoning of the prior cases, wherein the courts refused to admit voiceprint evidence. Instead, the court concluded that one of the objections to the admission of voiceprints—that of their questionable scientific accuracy—had been overcome by the results of recent extensive experimentation.

Technique in light of the manner in which the defendant’s voice sample was obtained. See note 165 supra. Holding that voiceprint analysis is a means of identifying a physical characteristic, the court disposed of a fifth amendment challenge. 291 Minn. at 456, 192 N.W.2d at 440. Cf. United States v. Wade, 388 U.S. 218, 222 (1967) (forcing defendant to utter words at a lineup held not violative of fifth amendment privilege); Schmerber v. California, 384 U.S. 757, 761, 764 (1966) (compelled blood test held not to deprive defendant of privilege against self-incrimination).

The Trimble court also discussed the propriety of the inducement employed to obtain the tape recording of the defendant’s voice. The court summarily disposed of this fourth amendment argument, with little attempt to clarify the precedents. 291 Minn. at 458, 192 N.W.2d at 441.

171. The court stated: “[W]e deal here with the sufficiency of the proof to justify issuance of an arrest and search warrant, not with the sufficiency of proof to sustain a conviction.” 291 Minn. at 445, 192 N.W.2d at 434.

172. However, the court indicated in dicta that they should be admissible for corroboration purposes at trial.

[W]e are convinced that in the trial of the case spectrograms ought to be admissible for the purpose of corroborating voice identification by aural means if a sufficient foundation is laid to satisfy the trial judge that the expert whose opinion is sought is qualified to assist the factfinder in coming to the right conclusion.

Id. at 458, 192 N.W.2d at 441.

173. 291 Minn. at 444-45, 192 N.W.2d at 434, citing Jackson v. United States, 302 F.2d 194, 197 (D.C. Cir. 1962).

174. Id. at 456, 192 N.W.2d at 440.

175. Dr. Ladefoged, for the defense, stated that a human ear, complemented by skilled analysis of spectrograms, could be more accurate than the ear alone. Nash indicated that beyond a reasonable doubt, the caller was Trimble. Id. at 454-55, 192 N.W.2d at 439. Tosi also testified as to the reliability of voiceprint evidence. Id. at 453-54, 192 N.W.2d at 438-39. See note 169 supra.

176. Note, Scientific Evidence—Admissibility of Voiceprints, 38 Mo. L. Rev. 326,
Soon after the *Trimble* decision, two District Courts of Appeal in Florida determined that voiceprint evidence was admissible at trial, largely due to the expert testimony of Dr. Tosi. In *Worley v. State*,\(^{177}\) evidence introduced against the defendant at his trial consisted of fingerprint identification, aural identification by a police officer, and a spectrographic identification by Dr. Tosi.\(^{178}\) The court affirmed the defendant’s conviction, holding that the voiceprints were properly admitted. However, since aural identification had previously been held admissible into evidence in Florida,\(^{179}\) the voiceprint evidence was merely corroborative.\(^{180}\) Choosing to ignore Frye’s “general acceptance” standard, the court based its holding on Tosi’s testimony that the accuracy rate for voice identification by voiceprints exceeded ninety-eight percent.\(^{181}\)

In *Alea v. State*,\(^{182}\) the court upheld the trial court’s determination that both voiceprints and related expert testimony were admissible as evidence of the defendant’s guilt.\(^{183}\) The trial court had admitted spectrographic analysis, based upon the testimony of Dr. Tosi and Lt. Nash,\(^{184}\) but, as in *Worley*, the court of appeals did not deal with the Frye standard.

While the *Worley* and *Alea* decisions were significant steps toward the admission of voiceprint evidence in criminal cases, there were shortcomings in these decisions.\(^{185}\) Neither court indicated what

---


177. 263 So. 2d 613 (Fla. Dist. Ct. App. 1972). In *Worley*, the police received and taped two anonymous bomb threats. After tracing the second call to a telephone booth, the police went to the scene and found the defendant nearby in his automobile. *Id.* at 613. See 1 Fla. St. L. Rev. 349 (1973); 4 Tex. Tech. L. Rev. 420 (1973).

178. A tape of the defendant’s voice was sent to the voice identification unit of the Michigan State Police Department along with tapes of the bomb threats. Voiceprints were made and matched to determine if they were made by the same voice. 263 So. 2d at 613.


180. 263 So. 2d at 614.

181. *Id.* The court speculated that had this data been available to the courts in *Cary* and *King*, both cases would have been decided differently.

182. 265 So. 2d 96 (Fla. Dist. Ct. App. 1972) (tape recordings of telephone conversations by an extortionist and a recording of defendant’s voice were compared under spectrographic analysis).

183. *Id.* at 96, 98.

184. *Id.* at 96.

185. It must be noted that neither court passed on the constitutional issues involved.
The court in *Alea* made no reference to any standard, while the court in *Worley* simply noted the broad discretion of Florida trial courts regarding the admission of experimental evidence which has attained certain standards of scientific reliability. In other words, both courts ignored application of the *Frye* standard to this type of scientific evidence. Moreover, both courts seemed to suggest, at least by implication, that voiceprints could only be used as corroborative evidence. The court in *Worley* so limited its holding, and while the court in *Alea* did not place any apparent restrictions upon the admissibility of voiceprint evidence, neither did it suggest that such evidence would be admissible directly and independently on the issue of identity at trial.

Both New Jersey and California—states which had previously rejected voiceprint evidence—have since reexamined the issue. *State v. Andretta* was an interlocutory appeal from the lower court's decision denying an order to compel the defendants to produce voice samples. In reversing the lower court, the Supreme Court of New Jersey because they were not raised by the parties. In *Worley*, there was no mention of a constitutional challenge with regard to the voiceprint evidence. In *Alea* the court expressly noted that the defendant's appeal did not include a challenge to the voiceprint evidence based on a violation of his constitutional rights. *Id.* at 96-97.


187. 263 So. 2d at 614; Note, Criminal Law: Voiceprint Evidence Is Being Heard, supra note 159, at 612. The *Worley* court found such standards were met in the case without delineating any particular requisites. 263 So. 2d at 614. The dissent took issue with the reliability of voiceprint identification on two grounds: (1) unlike fingerprints, voiceprints were not yet classified by type, and (2) lack of empirical data indicating that a person could not defeat the procedure by disguising his voice. *Id.* at 617-18 (White, J., dissenting). The dissent contended that these defects raised serious questions as to the reliability of the process and it thus was an unsafe form of proof. *Id.* at 618; see also Note, Criminal Law: Voiceprint Evidence is Being Heard, supra note 159, at 612.

188. See note 180 supra.

189. The court, quoting language from *Worley* as persuasive authority, indicated that there existed other substantial evidence upholding the conviction, although it cited only the fact that two witnesses had aurally identified the defendant as the perpetrator of the crime. 265 So. 2d at 98.


192. The *Andretta* case involved an individual who had been threatened with bodily harm unless he paid those who were threatening him. The state's request for the order compelling defendants to produce voice exemplars was denied because the state had failed to establish the general acceptance of voiceprints and because five years had passed since the original recording of the threatening telephone call was made. *Id.* at 545-46, 296 A.2d at 645.
Jersey relied heavily on support for the voiceprint method found in the studies of Dr. Tosi.\textsuperscript{193} The court instructed the trial judge to hold an additional pretrial conference to determine whether the spectrographic evidence would be admitted at trial, should the state decide to offer the results of the spectrographic tests into evidence.\textsuperscript{194} The trial judge was instructed to determine whether the evidence offered by the state was “sufficiently reliable to be admissible at trial in light of the proofs which [would] be deduced as to what the test shows, and such cross-examination of the State’s experts and such opposing proofs the defendants [could] be able to offer.”\textsuperscript{195} Final consideration of the question of admissibility at trial was specifically deferred.\textsuperscript{196}

The \textit{Andretta} decision was not a wholesale reversal of the New Jersey Supreme Court’s attitude relating to voiceprints articulated in \textit{Cary}.\textsuperscript{197} The \textit{Andretta} court did not rule that voiceprints were admissible at trial. The court held only that developments since \textit{Cary} justified compelling the defendant to give voice exemplars.\textsuperscript{198} The court’s resolution of the propriety of compelling a person to provide a voice exemplar is confusing in light of the same court’s assertion in \textit{Cary} that a person could not be forced to do so without violating the person’s right to privacy, unless the exemplars had the capacity to be

\begin{itemize}
  \item \textsuperscript{193} \textit{Id.} at 548, 551, 296 A.2d at 646, 648. Dr. Tosi, Dr. Ladefoged, and Lt. Nash testified for the state and indicated that the voiceprint method had been scientifically accepted. \textit{Id.} at 548-49, 296 A.2d at 646-47. However, the court called as witnesses Dr. Peter Denes, an associate of Bell Laboratories, and Dr. James Flanagan, Director of the Acoustics Research Department of Bell Laboratories. Dr. Denes testified that Dr. Tosi’s work had scientific value but represented only a “small step in the direction of having a general knowledge about how people can do this.” Yet he stated that he could not express a strong opinion since he had not made a careful examination of recent developments. \textit{Id.} at 549-50, 296 A.2d at 647. Dr. Flanagan considered Dr. Tosi’s work to be a carefully conducted laboratory experiment. Although he had not analyzed the Tosi report carefully, he was of the opinion that the scientific reliability of the tests may be diminished in unknown and unspecified field conditions. \textit{Id.}
  \item \textsuperscript{194} \textit{Id.} at 552, 296 A.2d at 648.
  \item \textsuperscript{195} \textit{Id.} Unless the state’s expert was able to make a positive identification, no voiceprints could be considered at trial. Thus, as the court indicated, if the experts were unable to make a positive identification, the application of the state for use of the voiceprint evidence at trial would become moot. \textit{Id.}
  \item \textsuperscript{196} \textit{Id.} at 552, 296 A.2d at 648. \textit{See also} Jones, \textit{The Non Sense of Voiceprint Identification}, \textit{supra} note 14, at 311. The voice recordings were subsequently made and a positive identification was reached at the Michigan State Police Voice Identification Unit. At the pretrial hearing, Dr. Tosi and Lt. Nash testified that the five-year time lag would not affect the validity of the identification. The trial judge concluded that the spectrographic evidence was admissible. Thereafter, the defendant pleaded guilty, ending any possibility for a final word from the New Jersey Supreme Court on the question of voiceprint admissibility. \textit{Id.}
  \item \textsuperscript{198} 61 N.J. at 551, 296 A.2d at 648.
\end{itemize}
VOICEPRINT IDENTIFICATION
admissible as evidence at trial.\footnote{199}{See note 140 & accompanying text supra.} No effort was made by the court or the parties in \textit{Andretta} to resolve the constitutional implications that voiceprint identification evidence presents. Either counsel for the defendant did not raise any constitutional argument in the case, or the issue was resolved at the trial level and was not appealed. \textit{Andretta} also presents a significant evidentiary consideration. The court, addressing itself to the factors the trial judge should consider at the preliminary hearing to determine the reliability of such evidence, appeared to depart from the \textit{Frye} standard of general acceptance. Instead of evaluating the acceptability of voiceprints in the scientific community, the court focused on the test results and cross-examination of the state’s experts, coupled with any evidence contradicting the experts.\footnote{200}{See note 193 & accompanying text supra.}

The California Court of Appeals for the Fourth District evaluated its stance on the issue of voiceprint identification in 1973. The testimony of experts convinced the court to reconsider and expand its previous decisions on the admissibility of voiceprint evidence. In \textit{Hodo v. Superior Court}\footnote{201}{30 Cal. App. 3d 778, 106 Cal. Rptr. 547 (1973). The defendant was a juror in a condemnation action. The property owner received a telephone call in which the caller indicated that he would like to see the owner make “a lot of money” from his property. The authorities were advised of this call and the police taped a subsequent call which led to an investigation during which the defendant gave police officers a tape recording of his voice. Lt. Nash identified the defendant’s voice as that of the person who had solicited the bribe. \textit{Id.} at 780-81, 106 Cal. Rptr. at 547-48.} the court compared the case before it with \textit{People v. King},\footnote{202}{266 Cal. App. 2d 437, 72 Cal. Rptr. 478 (1968). See notes 148-57 & accompanying text \textit{supra}.} the earlier California decision on voiceprint admissibility. Initially, they distinguished the qualifications of the expert witnesses for the prosecution in the two cases.\footnote{203}{30 Cal. App. 3d at 785-86, 106 Cal. Rptr. at 551.} The court felt that Dr. Tosi’s experiments had changed the opinion of the scientific community concerning the reliability of voiceprint identification,\footnote{204}{\textit{Id.} at 788-89, 106 Cal. Rptr. at 553 (emphasis added). It is interesting to note that while the \textit{Hodo} court did not mention \textit{Frye}, it relied upon a form of the \textit{Frye} standard of general acceptance. However, it is questionable whether the variant of the \textit{Frye} standard adopted by the \textit{Hodo} court would lead to the same result as strict application of the \textit{Frye} standard. See notes 207-09 & accompanying text \textit{infra}.} and noted that “the technique is generally accepted by those experts in the field \textit{who would be expected to be familiar with its use}.”\footnote{205}{\textit{Id.} at 788, 106 Cal. Rptr. at 553 (emphasis added).}

Although there may remain some individuals who do not agree with Dr. Tosi, such disagreement does not by itself preclude the ad-
mission of voiceprints as evidence. The court, relying not only upon Dr. Tosi's testimony, but also upon recognition of voiceprint admissibility in other jurisdictions, held that there had been no error in admitting the evidence.

_Hodo_ represents the pinnacle of judicial acceptance of voiceprint identification evidence since it was the first case to admit such evidence as direct and independent proof of identity. Moreover, the court adopted a new approach to the _Frye_ standard by emphasizing acceptance by recognized experts in the particular field rather than general acceptance by the related scientific community at large. The court said in effect that general acceptance is to be determined not by "those who would be expected to be familiar with the technique, but by those who are _in fact_ familiar with the technique and its application to forensic models." Although the court expressed no reservations in holding voiceprints a reliable forensic device, the recognized experts to which Tosi referred in his testimony had expressed an adverse reaction to "carte blanche admissibility of voiceprint identification." The court may have improperly applied its newly created evidentiary standard. _Hodo_ did not limit its holding to the facts of the case nor admit such evidence merely for corroborative purposes; consequently, the case indicated the development of a favorable judicial attitude toward this evidence.

4. A return to strict interpretation of the Frye standard

As a result of the differing scientific reactions to the Tosi study, the judicial attitude toward voiceprint identification evidence seemed to shift direction for a time, and become rooted in a rigid application of the _Frye_ standard of general scientific acceptance. In the 1974 case of _United States v. Addison_, the voiceprint issue was confronted by a

206. _Id._ at 789-90, 106 Cal. Rptr. at 553-54.
207. _Id._ at 784, 106 Cal. Rptr. at 550. See note 205 & accompanying text _supra._
210. 498 F.2d 741 (D.C. Cir. 1974). In this case, the defendants were charged with shooting a policeman who had responded to a telephone call reporting a policeman in trouble. The call had been routinely taped by the District of Columbia Police Department. The defendants were compelled by court order to produce voice exemplars. Upon analysis of the voiceprints, Lt. Nash concluded that one of the defendants was the caller. _Id._ at 742-43. See Comment, _Voiceprints—The Admissibility Question: What Evidentiary Standard Should Apply?_, 19 ST. LOUIS U.L.J. 509 (1975) for a complete...
federal court of appeals for the first time. The district court had permitted Lt. Nash to testify as a voiceprint expert. On appeal of the defendants' convictions, the United States Court of Appeals for the District of Columbia held that the lower court had erroneously admitted evidence based on spectrographic analysis, but that the error was not fatal and did not require reversal of the jury's verdict. While the court noted the potential that spectrogram analysis may have as a liability-resolving tool in criminal cases, it stated that voiceprint identification has not been sufficiently accepted by the scientific community "as a whole" to serve as the basis for a jury's determination of guilt or innocence. The court pointed out two defects in the district court's decision. First, the district court erroneously emphasized the reliability of Lt. Nash's conclusions rather than the general acceptance of his technique within the scientific community, and second, it improperly applied the Frye standard of admissibility since it relied too heavily on supportive testimony and too little on more cautious testimony in assessing the scientific community's present attitude toward voiceprint analysis. Therefore, the court of appeal's decision in the case. The views expressed by the District of Columbia Court of Appeals in Addison were subsequently reiterated in United States v. McDaniel, 538 F.2d 408 (D.C. Cir. 1976).

211. United States v. Raymond, 337 F. Supp. 641 (D.D.C. 1972), aff'd on other grounds sub nom. United States v. Addison, 498 F.2d 741 (D.C. Cir. 1974). The district court judge cautioned that his decision was not to be construed as a statement that spectrographic evidence is "mistake-proof" or that "any" voice identification should be admissible in court. 337 F. Supp. at 645. The court relied heavily on the Tosi studies, as well as an apparent change of opinion by Dr. Ladefoged, who now believed voiceprint identification to be "reliable." Id.

212. United States v. Addison, 498 F.2d 741, 745 (D.C. Cir. 1974). The court held that the government's proof against appellants was overwhelming, since the victim of the crime had an unusually good opportunity to recognize the identity of his attackers as a result of his recent prior contacts with each, as well as sufficient opportunity to see and identify both during the period immediately prior to the attack. Id. at 746-47. By holding that the admission of voiceprint evidence was erroneous, even to corroborate other types of evidence, the court implicitly rejected the holdings in Worley v. State, 263 So. 2d 613 (Fla. Dist. Ct. App. 1972), and Alea v. State, 265 So. 2d 96 (Fla. Dist. Ct. App. 1972), where voiceprint evidence was admitted to corroborate the prosecution's other forms of proof. See notes 186-89 & accompanying text supra. The court in Addison also held that there had been no fourth amendment violation, basing its decision on United States v. Dionisio, 410 U.S. 1, 13-15 (1973). Furthermore, the court dispelled defendants' contention that their sixth amendment right to counsel had been violated because counsel was denied adequate time to consider the novel issues posed by the government's motion to compel voice samples. 498 F.2d at 742 n.3. See notes 324-72 & accompanying text infra.

213. 498 F.2d at 745.

214. Id. (emphasis added).

215. Id. at 744.

216. The court of appeals examined the testimony of Dr. Ladefoged and found that
peals concluded that the district court had erred in determining that this type of evidence is admissible in criminal trials.

Addison represented a return to the rigid Frye standard to resolve questions of admissibility of expert testimony based on new scientific techniques. The court seemed to suggest that the existence of a significant number of expert opponents of a particular scientific technique mandate its inadmissibility, regardless of the integrity of the technique.

The criticism the court of appeals leveled at the district court for its application of the Frye standard is also troublesome. Although the court noted the problems associated with the Frye standard,217 it found two compelling reasons for retaining the general acceptance standard. This standard assures "that those most qualified to assess the general validity of a scientific method will have the determinative voice."218 It also protects both parties to the action by assuring that a "minimal reserve of experts exists who can critically examine the validity of a scientific determination in a particular case."219 In light of these rationales, however, the court's criticism of the district court's focus on the reliability of Lt. Nash's conclusion rather than on the general acceptance of the technique seems unfounded. On the contrary, it appears that the district court was shaping its decision around the above-mentioned rationales which justify retention of the general acceptance standard. Because of the high degree of specialization in this technique, there are few qualified experts in the field. Consequently, the court was forced to emphasize the testimony of Lt. Nash—the individual whom Dr. Tosi had described as "the best examiner . . . in the world."220 The district court did not rely solely upon Nash's testimony, however. It considered the testimony of Dr. Ladefoged, also a representative of the scientific community, who testified as a scientist who had previously questioned the reliability of voiceprints but who was now essentially convinced of their evidentiary value. His testimony reflected the important attitudinal change

although he had modified his earlier position toward such evidence, his current position—as representative of the scientific community—was not one of acceptance, but was one of "abatement of skepticism toward voiceprint." Id. at 744-45.

217. The court indicated that the Frye standard is neither common to criminal litigation nor easily applied in the individual case. Moreover, it recognized that the standard retards the admission of proof based on new methods of scientific investigation. Id. at 743.

218. Id. at 744.

219. Id.

in the scientific community. The skepticism encountered by voiceprint proponents in the early stages of spectrographic analysis had gradually been dissipated. Even if the court of appeals' conclusion that the district court did not sufficiently ponder Ladefoged's testimony relating to the shortcomings of voiceprints is accepted, Ladefoged's willingness to testify for the prosecution was arguably an acknowledgment that voiceprint evidence is scientifically acceptable.

In 1974, the California Fifth District Court of Appeals dealt with that state's equivalent of the Fraye standard in People v. Law. The court held that the prosecution had failed to prove, particularly with respect to disguised and mimicked voices, that voiceprint identification had gained general scientific acceptance in its field.

To support its holding, the court relied upon judicial precedent permitting them to take judicial notice of caselaw and scientific literature suggesting any error in tests regarding the scientific technique. The court attacked the Tosi study, noting the absence of experimentation with disguised or mimicked voices. The court stated that even if the Tosi study was accepted as a basis for establishing the reliability of the voiceprint technique, another judicial precedent prevented admission of this evidence: "[A] fundamental prerequisite to the introduction of any evidence regarding a scientific experiment is that the experiment relied upon must have been conducted under conditions substantially similar to those present in the occurrence which is the subject of the litigation." Since the Tosi study did not

---

222. California's version of the Fraye standard was set forth in Huntington v. Crowley, 64 Cal. 2d 647, 653-54, 414 P.2d 382, 388, 51 Cal. Rptr. 254, 260 (1966). The court stated:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.

Id. (emphasis added).
224. Id. at 84, 114 Cal. Rptr. at 718.
225. Id. at 75, 114 Cal. Rptr. at 711-12.
226. Id. at 77, 114 Cal. Rptr. at 713. In addition, criticism of the Tosi study was reflected in the court's citation to literature condemning the procedure as being unacceptable in the scientific community. Id. at 82-83, 114 Cal. Rptr. at 717-18.
227. Id. at 84, 114 Cal. Rptr. at 718.
include trials with disguised or mimicked voices, the court felt it necessary, particularly where the life or liberty of a defendant is at stake, to render the voiceprint evidence inadmissible.\textsuperscript{228}

5. \textit{The growing trend toward judicial acceptance of voiceprint evidence}

After the \textit{Law} decision, the future of voiceprints as evidence in criminal cases could best be characterized as uncertain. However, in 1975 a trilogy of cases appeared which seems to indicate a trend toward admission of voiceprint identification evidence.\textsuperscript{229}

In \textit{Commonwealth v. Lykus},\textsuperscript{230} the defendant was convicted on charges of kidnapping, murder, and extortion. The sole issue on appeal related to the admissibility of expert opinion regarding voice identification. The court, referring to the \textit{Frye} standard, assumed a relatively lenient stance when it declared "that neither infallibility nor unanimous acceptance of the principle need be proved to justify its admission in evidence."\textsuperscript{231} The court concluded that spectrographic analysis was within the ambit of this general acceptance standard inasmuch as it could reasonably be asserted that the chance of error had been reduced to "a negligible amount."\textsuperscript{232} The court noted several reasons for supporting the reliability of professional voiceprint identifications: (1) the visual inspection is supported by aural examinations of the voice; (2) the forensic examiner has experience and training in audiology and speech science; (3) the examiner has ample time to study the voice exemplars in his laboratory; and (4) the examiner has a wide range of alternative conclusions in terms of the degree of certainty of his identifications.\textsuperscript{233} The court did not consider any constitutional issues relating to the taking of the voiceprints.

In \textit{United States v. Franks},\textsuperscript{234} the Court of Appeals for the Sixth

\begin{itemize}
\item \textsuperscript{228} \textit{Id.} at 85, 114 Cal. Rptr. at 719.
\item \textsuperscript{229} However, the most recent decision considering the admission of voiceprints held such evidence inadmissible. \textit{See notes 245-52 & accompanying text infra.}
\item \textsuperscript{230} 75 Mass. Adv. Sh. 719, 327 N.E.2d 671 (1975).
\item \textsuperscript{231} \textit{Id.} at 723, 327 N.E.2d at 675.
\item \textsuperscript{232} \textit{Id.} at 725, 327 N.E.2d at 677.
\item \textsuperscript{233} \textit{Id.}
\item \textsuperscript{234} 511 F.2d 25 (6th Cir. 1975). In this case the defendants were charged with using explosives to obstruct commerce in violation of the Hobbs Act, and of transporting blasting caps in interstate commerce without a license. Certain conversations the defendants allegedly had with government informants had been taped. 511 F.2d at 30. Almost seven months after their arrest, a court order was issued over the defendant's objection compelling them to give voice exemplars. \textit{Id.} at 32-33. After comparing the voices on the informant's tapes and those on the court-ordered exemplar pursuant to spectro-
Circuit found no difficulty in admitting a voiceprint expert’s testimony at trial. The court indicated that the trial judge has a “considerable area of discretion” in admitting or refusing to admit scientific evidence. The court stated that “neither newness nor lack of absolute certainty in a test suffices to render it inadmissible in court. Every useful new development must have its first day in court, and court records are full of conflicting opinions of doctors, engineers, and accountants . . . .” The court noted that the district court judge had received extensive testimony from the expert regarding his qualifications and the reliability of the voiceprint process before admitting his testimony into evidence. Additionally, defense counsel had ample opportunity to cross-examine the expert, and the defense did not present any witnesses who might have rebutted the reliability of voiceprints. As a result, the court concluded that such scientific evidence had been properly admitted. Finally, the court ruled that the district court did not err in allowing the expert to testify as to what he had heard on the tape as well as to the identity of the taped voices. In the court’s opinion, this allowed the jury to weigh the expertise of the expert witness. The court also concluded that the compelled taking of a voice exemplar was not violative of either the fourth or fifth amendments.

In United States v. Baller, the court recognized the growing judicial trend toward accepting voiceprint identification evidence, graphic analysis, an expert witness was allowed to testify at trial that the voices were the same.

236. Id.
237. Id.
238. Id. at 33-34.
239. The court relied on United States v. Dionisio, 410 U.S. 1 (1973), in disposing of both arguments. The court held that the taking of the exemplars was not a search or seizure for fourth amendment purposes. 511 F.2d at 32. With regard to the fifth amendment, the court asserted that “compelling voiceprints even of the same words used in the crime does not violate the constitutional privilege against self-incrimination.” Id. Presumably, the court was implying that the utterances were not testimonial in nature and thus not covered by the fifth amendment.
240. 519 F.2d 463 (4th Cir. 1975). This case dealt with a defendant who allegedly made four telephone bomb threats in violation of federal law. The various calls had been recorded and compared with voice exemplars of the defendant through a spectrographic analysis conducted by Lieutenant Nash. Id. at 464. Nash testified at trial that the voice of the threatening caller and that of the defendant were the same. The defense did not present any expert witnesses, but objected to the testimony of Nash on the grounds that spectrographic analysis was not of sufficient reliability and that Nash was not sufficiently qualified as an expert. Id.
241. Id. at 465-66.
and concluded that voiceprints could be admissible as evidence in a criminal trial. The court stated:

Unless an exaggerated popular opinion of the accuracy of a particular technique makes its use prejudicial or likely to mislead the jury, it is better to admit relevant scientific evidence in the same manner as other expert testimony and allow its weight to be attacked by cross-examination and refutation.\textsuperscript{242}

According to the court, the district court judge had adequately guarded against dangers inherent in admitting new scientific evidence such as the undue weight a jury might assign to a technique which purports to have an objective scientific basis, and the difficulty in rebutting such expert opinions. The possibility of prejudice to the defendants had been effectively minimized inasmuch as the trial court had relied on an expert who had "as much experience in forensic voice spectrography as anyone."\textsuperscript{243} Furthermore, the trial court had considered the evidence's probative value in an extensive voir dire, listened to authoritative information regarding the shortcomings of the process, presented the defense with a list of other experts who could examine the tapes, allowed a detailed cross-examination of the expert, permitted the jury to hear the various tapes for comparison purposes, and instructed the jury that they could disregard Nash's testimony if they did not believe it to have a proper scientific basis.\textsuperscript{244} No constitutional attacks were raised relative to the procurement of the voice sample from the defendant.

The courts in \textit{Lykus, Franks}, and \textit{Baller} relied on a less stringent interpretation of the general acceptance standard. While acknowledging the criticism of many authorities concerning the reliability of the voiceprint process, the courts suggested that such criticism was inevitable, considering the newness of the process. Thus, the courts indicated it was proper to rely on the testimony of those most knowledgeable about voiceprints, \textit{i.e.}, those persons instrumental in developing the process. By cautioning the jury that they must determine the degree of reliability of the process, and by allowing the defense to vigorously attack the spectrographic process and the voiceprint experts by cross-examination and rebuttal evidence, over-reliance on such expert opinion could be avoided. Moreover, the courts recognized assertions by the voiceprint proponents that the technique was becoming more sophisticated as time progressed. The

\textsuperscript{242} \textit{Id.} at 466.

\textsuperscript{243} \textit{Id}.

\textsuperscript{244} \textit{Id.} at 466-67.
validity of the latter conclusion is difficult to assess in the absence of further empirical study on the subject. Additionally, two problems arose in the Franks decision which may have been dealt with too summarily: (1) the six-month time lapse between the recording of the unknown voice and the taking of the defendant’s voice exemplars, and (2) the introduction of possibly inadmissible evidence wherein the expert repeated the words which he heard on the allegedly incriminating tapes.

Despite the favorable judicial attitude indicated in the three cases discussed above, one recent ruling on the voiceprint issue appears contrary to the growing trend. In People v. Kelly, the California Supreme Court held that a trial court erred in admitting the testimony of Lt. Nash into evidence. The court accepted the defendant’s arguments that the government had not met its burden of proving that voiceprint analysis is generally accepted in the scientific community and that Lt. Nash was not qualified to express an opinion that such evidence is so accepted.

Three aspects of the trial court’s decision to admit Nash’s testimony were dealt with by the court on appeal. First, the court questioned whether a single witness could ever speak for the entire scientific community concerning the reliability of a new scientific technique. Second, it inferred that Nash, who was a pioneer in the development and promotion of spectrographic analysis, might not be an impartial assessor of the technique. Third, the court suggested that Nash did not possess sufficient academic qualifications to express a competent opinion on the general acceptance issue, since he possessed a strong background as a technician, but no similar training as a scientist.

245. 17 Cal. 3d 24, 549 P.2d 1240, 130 Cal. Rptr. 144 (1976). Nash was asked to analyze and compare tape recordings of threatening phone calls received by an apparent extortion victim and tapes of the defendant’s voice. At trial, Nash testified as to the reliability of spectrographic evidence, and that in his opinion the voice of the extortionist and that of the defendant were the same. Id. at 29, 549 P.2d at 1242-43, 130 Cal. Rptr. at 147.

246. Id. at 29, 549 P.2d at 1243, 130 Cal. Rptr. at 147. Accord, Commonwealth v. Topa, N.Y. Times, March 8, 1977, at 13, col. 1 (Pa. Sup. Ct. March 7, 1977), where the court held that the voiceprint technique had not yet been generally accepted by the scientific community. The court noted: “Thus, as with the lie detector, there is the danger that the trial judge or jury will ascribe a degree of certainty to the testimony of the expert spectrography witness which may not be deserved.” Id.

247. 17 Cal. 3d at 37, 549 P.2d at 1248, 130 Cal. Rptr. at 152.

248. Id. at 38, 549 P.2d at 1249, 130 Cal. Rptr. at 153.

249. Id. at 38-39, 549 P.2d at 1249-50, 130 Cal. Rptr. at 153.

250. Id. at 39, 549 P.2d at 1250, 130 Cal. Rptr. at 154.
The Kelly court did not, however, foreclose the possibility that spectrographic identification evidence would be deemed admissible in California. The court noted that "[a]lthough the present record is insufficient to justify the admissibility of voiceprint evidence, the future proponent of such evidence may well be able to demonstrate in a satisfactory manner that the voiceprint technique has achieved that required general acceptance in the scientific community." In addition, the court pointed out that the prosecution failed to call upon experts in the science of speech analysis, such as Dr. Tosi or Dr. Ladefoged, to testify as to the utility of the voiceprint technique. Had the prosecution bolstered its argument with the testimony of a recognized member of the scientific community, it might have overcome the objections articulated by the court. Viewed in this light, the Kelly decision cannot be perceived as a major setback in the general movement toward admitting such evidence.

While a significant number of courts have rejected spectrographic identification evidence in criminal cases, the great majority of trial and appellate courts have approved the voiceprint process for evidentiary purposes. The 1975 trilogy of decisions tipped the balance among the major appellate courts clearly in favor of admissibility. Indeed, these cases suggest that voiceprint identification evidence has gained enough favorable judicial reaction to have gained general acceptance in the legal community. Nevertheless, judicial response to the use of voiceprint identification evidence has been inconsistent and often conflicting. Even though a favorable trend has developed on the issue of spectrographic analysis, the various jurisdictions have not unequivocally accepted the process. The failure of all courts to accept this type of evidence can be explained both scientifically and legally. The remainder of this article will analyze the major obstacles to judicial acceptance of voiceprint iden-

251. Id. at 41, 549 P.2d at 1251, 130 Cal. Rptr at 155.
252. Id. at 40-41, 549 P.2d at 1250, 130 Cal. Rptr. at 154.
253. E.g., United States v. Addison, 498 F.2d 741 (D.C. Cir. 1974). For a listing of the trial courts which have refused to admit voiceprint evidence in criminal cases, see Greene, supra note 88, at 184-85 nn.66-67.
255. See Greene, supra note 88, at 176 n.24 for a list of appellate courts which have upheld admitting such evidence.
256. See notes 223-45 & accompanying text supra.
tification evidence which are the scientific community's criticism of the Tosi study and the evidentiary standard for admitting new scientific techniques or processes enunciated in *Frye*. The constitutional implications raised by the voiceprint technique will also be considered.

IV. PROPRIETY OF VOICEPRINT IDENTIFICATION EVIDENCE

A. Criticism of the Tosi Study

Dr. Tosi and the results of his study have had a profound impact on the courts, as evidenced by the role the study has played in every case since 1970. The study has also received plaudits from various members of the scientific community for its design and scientific objectivity. Certain scientists, however, have expressed misgivings about the study largely because it failed to prove the reliability of the voiceprint technique of speaker identification.

A detailed analysis of the published results of the Tosi study was undertaken by six members of the Technical Committee on Speech Communication of the Acoustical Society of America, headed by Dr. Bolt. The group, which in 1970 had concluded that "the available results are inadequate to establish the reliability of voice identification by spectrograms," did not change its conclusion after evaluating the Tosi study. These scientists indicated that the Tosi study failed to explain why the error rate for the voiceprints of the unknown voices that were noncontemporary was more than twice that for the contemporary voiceprints. Moreover, the Bolt study noted that the error rate more than doubled when the test words were utilized in an isolated context as opposed to random application in sentences. These factors led Bolt and his colleagues to conclude that any experimental condition that was likely to result in a change

---

257. The two areas are related since the *Frye* standard is based on general acceptance in the scientific community. For the purpose of considering the various criticisms of the Tosi study as well as the problems arising from the application of the *Frye* standard, the two areas will be considered separately.


259. Bolt I, supra note 14, at 603.


261. See note 85 & accompanying text *supra*.

262. Bolt II, *supra* note 14, at 532. Bolt noted that although speakers' voices might change from one recording to another, the percentage of false identification should not change if the examiner used the same average criteria for a match and if there were no differences in similarity among the voices included in the several test sets. *Id.*
in the acoustical characteristics of an utterance would increase the probability of error.\textsuperscript{263} Another reason for their belief that voiceprint identification has not yet been scientifically established as reliable was the lack of knowledge regarding the speech signals most useful for identification.\textsuperscript{264} Finally, they found problems with the Tosi study’s failure to identify the criteria the observers used to make a decision.\textsuperscript{265}

Neither the Bolt study nor other criticisms of the Tosi study have been confined to what Tosi actually studied; of equal importance in these evaluations was Tosi’s failure to take into account variables claimed to be important in any attempt to extrapolate the results of the study to field conditions. Variables which apparently have not been adequately tested include the quality of the tape recordings of voices,\textsuperscript{266} the large number of untested groups of speakers, \textit{i.e.}, women and children,\textsuperscript{267} the effect of emotional stress on a speaker’s

\begin{itemize}
  \item \textsuperscript{263} \textit{Id.}
  \item \textsuperscript{264} \textit{Id.} at 533. The inability to ascertain which speech signals are most pertinent for identification is the major cause of what has been called interspeaker confusability. Comment, \textit{Voiceprints: The End of the Yellow Brick Road, supra} note 208, at 719-20. See Comment, \textit{The Evidentiary Value of Spectrographic Voice Identification, supra} note 14, at 352.
  \item \textsuperscript{265} Bolt II, \textit{supra} note 14, at 533. The study concluded:
    \begin{quote}
    The present level of knowledge about personal voice characteristics, their recognition, and how they change under different conditions is still rudimentary. The recent work on speaker identification from spectrograms does not provide any new understanding as to which spectrographic features correlate most clearly or efficiently with the speaker’s identity . . . . At the present time . . . the spectrographic identification of a voice by a trained observer appears to rely on a broad assessment of loosely defined points of similarity rather than on a carefully specified set of objectively defined spectrographic attributes. The Tosi experiments, in fact, show considerable disagreement among different panels of observers as to what constitutes a match when they are given the same matching task . . . .
    
    Further studies are needed to provide a better understanding of the decision process. For example, no explanation is now possible as to why, in open tests, an observer who is uncertain cannot simply reject the unknown spectrogram as not being similar enough to any of the known spectrograms.
    \textit{Id.}
    
    \item \textsuperscript{266} Comment, \textit{Voiceprints: The End of the Yellow Brick Road, supra} note 208, at 721. Dr. Hecker has indicated that the quality of recordings used in the Tosi study were superior to those obtained under field conditions. He noted that battery-operated tape recorders and excess noise, factors which lower the quality of the recordings, were likely to be found in actual field conditions. Yet tests under these circumstances were not conducted by Dr. Tosi. \textit{Id.} (citing Affadavit of Dr. Michael Hecker at 3, United States v. Clore, Crim. No. 12,850-N (M.D. Ala. July 26, 1973)). Dr. Kenneth Stevens has also tendered this same criticism. \textit{Id.} at 721 n.118; Jones, \textit{Danger—Voiceprints Ahead, supra} note 16, at 567.
    
    \item \textsuperscript{267} Comment, \textit{Voiceprints: The End of the Yellow Brick Road, supra} note 208, at 721-22. Dr. Peter Ladefoged has pointed out that one of the weaknesses of the Tosi
speech signals, the effect of changes in the psychological state of the speaker, and the effect of time lapses between the recording of the unknown voice and the exemplar taken from a particular suspect. Additionally, critics have argued that the Tosi study was deficient in that its implementation was subjective in nature. Thus, while the Tosi study was recognized by most as methodologically sound, scientific criticism has emphasized that it did not go far enough to parallel actual field conditions.

Criticisms of the Tosi study's failure to demonstrate the reliability of voiceprint identification are confusing. These criticisms imply that voiceprints should not be allowed into evidence unless spectrographic analysis is proven 100 percent reliable in all cases--irrespective of the conditions and frequency range of the voice samples, psychological alterations of the speaker, and distortions caused by the recording systems and background noise. However, alleging that Tosi failed to demonstrate the reliability of the spectrographic process because he has not exhibited such absolute certitude in his various analyses reflects a misinterpretation of the hypothesis of Tosi's study. First, Dr. Tosi never asserted in his study, or in any of the cases in which he testified, that positive decisions could be achieved in all cases.

---

268. Comment, Voiceprints: The End of the Yellow Brick Road, supra note 208, at 721-22; Bolt II, supra note 14, at 532.

269. Comment, Voiceprints: The End of the Yellow Brick Road, supra note 208, at 721-22. The Bolt study indicated that alteration in the speaker's psychological state could cause a significant deviation in his characteristic speech sound. Id. Jones has suggested that the potential for psychological alterations may be intensified where one is suspected of a crime. Jones, The Non Sense of Voiceprints Identification, supra note 14, at 317.

270. Comment, Voiceprints: The End of the Yellow Brick Road, supra note 208, at 722. It has been asserted that age might have a significant impact where there is a significant time lapse between the two speech samples. Id. A study which sought to discover whether voices are inherently invariant concluded that the "human phonation system may change predictably with increasing age." Endres, Bambach & Flosser, Voice Spectrograms as a Function of Age, Voice Disguise, and Voice Imitation, 49 J. ACOUSTICAL SOC'Y AM. 1842, 1847 (1971).

Dr. James Pickett has indicated that error rates increase as the interval between recordings increases. This is important inasmuch as the lapse of time between the two recordings is often substantial under actual field conditions. Jones, supra note 16, at 568.

271. Comment, Voiceprints: The End of the Yellow Brick Road, supra note 208, at 731; Welch, Voiceprint Identification: A Reliable Index?, TRIAL, Jan./Feb. 1973, at 46.


analyzed. Second, these critics failed to consider the standards enunciated by Tosi for application of the voiceprint technique in a forensic setting. Since the decision in State ex rel. Trimble v. Hedman, Dr. Tosi has indicated that a combined method of aural and visual examination of voiceprints may be used in the investigation of a crime provided that certain restrictions and standards are maintained concerning the training and professional honesty of the examiner, the examiner's decisionmaking process, and the length of time spent on each sample.

These standards and restrictions indicate that any sample which is distorted by the psychological or physical condition of the subject, or by the transmission and recording system, should compel the expert to automatically render a negative decision or a decision couched in terms of probabilities, but never a positive identification. In other words, observance of these standards precludes issuing an absolute decision whenever an element appears which renders such a conclusion suspect. If, however, a voiceprint expert renders a decision in absolute terms, he is expressing his belief that the possibility of error in his decisionmaking process is zero. He is not asserting that he can issue absolute decisions in all cases he analyzes or that he is infallible. Additionally, the fact that any shortcomings of the voiceprint identification process will be exposed to the factfinding body at trial insures that the expert's positive identifications or positive eliminations are placed in proper perspective.

274. Id. at 48.
275. 291 Minn. 442, 192 N.W.2d 432 (1971).
276. Tosi & Nash, Voiceprint Identification: Rules for Evidence, TRIAL, Jan./Feb. 1973, at 44. Tosi indicated that the examiner must be a qualified professional trained in phonetics and speech sciences. Along with the academic training, he suggests a two-year apprenticeship in field work should be required to qualify a professional voice examiner. Id.
277. Id. In a forensic setting, the professional examiner is permitted to make the following alternative decisions: (1) positive identification; (2) positive elimination; (3) possibility that the unknown speaker is one of the suspected persons, but more evidence is necessary to reach a positive identification; (4) possibility that the unknown speaker is none of the available suspected persons, but more evidence is necessary to reach a positive elimination; and (5) unable to reach any conclusion with the available voice samples. Id. Dr. Tosi indicates that if the professional examiner has the least doubt as to the identification of the voiceprint, he must abstain from offering any positive conclusion. Id. Moreover, the examiner should exercise the utmost prudence in the decisionmaking process since the success of the voiceprint method of identification relies heavily on his expertise. Id.
278. Id. "The examiner must be entitled to spend as much time and to use as many samples as he deems necessary to reach a conclusion." Id.
279. See note 277 supra.
Although the subjectivity of the examiner may give rise to such problems as human bias and fatigue, remedial action to counteract these potential problems has been taken. On May 14, 1971, the International Association of Voice Identification, a nonprofit corporation, was legally chartered in Michigan for the purpose, *inter alia*, of establishing institutionally minimum qualifications for professional examiners and for encouraging continued research in this area.\(^{281}\) The association not only intends to eradicate potential problems associated with a subjective method of voice identification, but also to provide assistance to other law enforcement agencies in the creation of units similar to the voice identification unit of the Michigan State Police.\(^{282}\) Despite these efforts, it is questionable whether a totally objective voiceprint identification method, in the sense of an operation performed by mechanical or electronic means, will ever be developed. First, present research indicates objective methods are more suitable for speaker authentication or verification than for speaker identification in legal prosecutions.\(^{283}\) Second, for legal purposes, voice examinations will always require an examiner to prepare the sample and interpret the test results.\(^{284}\) An examiner is essential where a computer is used, since its performance is dependent on the examiner’s preparation of instructions and programming.\(^{285}\) Therefore, while objective possibilities should not be ignored,\(^{286}\) it appears that the best solution for dealing with the subjective shortcomings of voice identification is to bring this fact to the jury’s attention and allow them to decide what weight should be assigned such evidence.\(^{287}\)

---


282. The association has three categories of associates: members, trainees, and friends. Members are those individuals who qualify through a two-year apprenticeship in actual cases under the supervision of a member, and pass a theoretical-practical examination. Trainees are those associates completing their two-year practical apprenticeship. There are no requirements to become a friend of the association. O. Tosi, *Voice Identification for Lawyers*, supra note 15 at 44-45.

283. *Id.* at 32.

284. *Id.* at 5.

285. *Id.*

286. Dr. Tosi believes that a combination of objective and subjective methods to conduct a legal voice examination will strengthen the conclusion in cases where no contradiction is found. *Id.* at 38. Dr. Tosi has engaged in a voiceprint identification study in which he used a computer. An examination of twenty subjects speaking three languages, French, Italian, and German, was made. While the results achieved indicated a margin of error of only 5%, Dr. Tosi felt compelled to conclude that the use of the computer is not infallible. Tosi Interview, supra note 56.

287. Comment, *Voiceprints: The End of the Yellow Brick Road*, supra note 208, at 721.
In analyzing the weight to be accorded voiceprint identification evidence, analogy to other forms of scientific evidence offers assistance. While voiceprint analysis has traditionally been characterized as a procedure which falls between fingerprint and polygraph analysis,\textsuperscript{288} it may more appropriately be viewed as falling between fingerprint and handwriting analysis.\textsuperscript{289} Although all four of these techniques involve examination of certain patterns produced by individuals, various differences exist between them. First, the polygraph is not an identification tool, rather it is a lie-detection device.\textsuperscript{290} The polygraph test includes an analysis of the individual's subjective belief of truthfulness as well as an analysis of his physiological responses; fingerprint analysis, on the other hand, measures no cerebral function.\textsuperscript{291} Handwriting and voiceprint analysis can be placed somewhere between these extremes since both are primarily concerned with reflex action, in the sense that "the individual exercises no conscious control over the muscles which cause him to write or speak a given word,"\textsuperscript{292} although conscious control influences the writing and the speech.\textsuperscript{293}

In determining whether voiceprints are more analogous to fingerprint or to handwriting analysis, certain factors emerge as important. For example, while fingerprints do not change during the lifetime of a person, an individual's voice and handwriting change to some degree every time a word is spoken or written.\textsuperscript{294} Indeed, one commentator

\begin{footnotes}
\item[289.] Cf. Note, Evidence—Voiceprint Method of Identification, supra note 115, at 514-17, where voiceprint evidence was viewed as falling between fingerprint and polygraph analysis. After comparing the various characteristics of each to voiceprint analysis, the author suggested that because voiceprint analysis "possesses the ease of visual identification of fingerprints, while it shuns the need of expertise in interpretation as in the polygraph," voiceprints should be viewed as an efficient and reliable source of evidence. Id. See generally J. Waltz, Criminal Evidence 395-400 (1975) for a discussion of handwriting and document analysis.
\item[290.] Comment, The Voiceprint Technique: A Problem in Scientific Evidence, supra note 14, at 1394. The other devices are used solely to link a suspect to some physical piece of evidence. Id.
\item[291.] Id.
\item[292.] Id.
\item[293.] Id. See also Note, Evidence—Voiceprints—The Value of Spectrographic Analysis, 9 Ga. S.B.J. 242, 250 (1972).
\item[294.] Comment, The Voiceprint Technique: A Problem In Scientific Evidence, supra note 14, at 1394. Variations that occur in fingerprint patterns are not changes in patterns
\end{footnotes}
VOICEPRINT IDENTIFICATION

has contended that spectrographic analysis is more analogous to handwriting analysis in terms of the degree of accuracy attained in empirical studies. On the other hand, voiceprints resemble fingerprints more closely with respect to the uncertainty in the decisionmaking process. In identifying an individual by his fingerprints or voiceprints, the expert incorporates an identification system in which a requisite number of contacts or points of similarity are necessary before a positive identification can be made. If the required contacts are not found, the expert can make a positive elimination. Handwriting differs in the sense that it is not as rigidly classified. At best, the handwriting expert can say he is uncertain. Unlike the fingerprint expert and like the voiceprint expert, the handwriting examiner must develop characteristics from a number of samples of the suspect's handwriting. Considering these factors, spectrographic analysis seems most analogous to handwriting comparison, although it is similar to fingerprint analysis as well.

B. The Frye Standard Revisited

The judicial trend denying admissibility of voiceprint identification evidence was based on a literal interpretation of the Frye standard of general scientific acceptance. Since the standard was drawn from

from one type to another, but rather are expansions, obliterations, smudges, or incompleteness. Bolt I, supra note 14, at 600.

295. Note, Evidence—Voiceprints—The Value of Spectrographic Analysis, supra note 293, at 250. The author noted that while the examiners in Tosi's study attained a 94% accuracy level in positive identification, an experiment involving handwriting experts achieved an accuracy level of 96%. Id. (citing Inbau, Lay Witness' Identification of Handwriting, 34 ILL. L. REV. 433, 440 (1940)).

296. Id. While the standard for points of identity for fingerprints is generally 15, id. at 249, the standard for voiceprints ranges from 16 to 20. See text accompanying note 25 supra.

297. Note, Evidence—Voiceprints—The Value of Spectrographic Analysis, supra note 293, at 250. It should be noted that since the Tosi study, the expert has other alternatives to select in the absence of a positive identification. See note 277 supra.

298. Note, Evidence—Voiceprints—The Value of Spectrographic Analysis, supra note 293 at 250-51. The characteristics identified in the text accompanying notes 296-98 are utilized by the author in reaching a different conclusion. It is his contention that with respect to the uncertainty feature, voiceprint analysis is more like handwriting analysis than fingerprint analysis. Id.

299. Id. at 250.

300. The similarity to fingerprint analysis does not, however, mean that Kersta's claim that voiceprints are as unique as fingerprints is valid. Rather, this similarity may afford the jury an opportunity to make its decision solely on the basis of the expert testimony regarding the voiceprints of the disputed voices. For a discussion further distinguishing fingerprints and voiceprints, see Note, Voiceprint Identification, 61 GEO. L.J. 703, 725 (1973).
dicta and formulated more than fifty years prior to advancements in science and technology such as spectrographic identification analysis, it is necessary that its validity be re-examined.

The standard enunciated in Frye is one that is "neither common to criminal litigation nor easily applied in the individual case." Since its inception, the Frye standard has been the subject of criticism because of the limiting effect it has had on judicial acceptance of new methods of scientific investigation. In light of the rationale behind the Frye rule and its practical application to voiceprint identification evidence cases, it is apparent that the criticism is quite warranted.

One of the reasons for the rule was to prevent the development of arbitrary decisions on issues of admissibility. Yet, enunciation of the Frye standard, without any definitive criteria as to who and how large the pertinent scientific community must be, has unnecessarily limited the discretion a trial court should have in utilizing relevant input. Indeed, while the Frye standard was utilized in State v. Cary and People v. King, it was not until United States v. Addison that one could find a comprehensive discussion of general scientific acceptance and how it ought to operate in the spectrographic analysis setting.

The Frye standard has not been wholly accepted by the judiciary. Not only have courts rearticulated or disregarded the Frye standard in the context of voiceprint identification evidence, but several courts, in cases involving other areas of scientific evidence, have in-

301. Kamine, supra note 19, at 239.
304. Id. See also Comment, The Evidentiary Value of Spectrographic Voice Identification, supra note 14, at 349. Proponents of logical relevancy have criticized the Frye test, and suggested that there would be greater unanimity in the treatment of all forms of scientific evidence if the Frye rule were modified in conformance with the doctrine of logical relevance. That is, scientific evidence could be submitted to the jury upon a showing of reasonable reliability. Based on its determination of the accuracy and reliability of the evidence, the jury would decide the weight to be accorded it. Boyce, Judicial Recognition of Scientific Evidence in Criminal Cases, 8 UTAH L. REV. 313, 325-26 (1963-64); Note, Evolving Methods of Scientific Proof, 13 N.Y.L.F. 677, 681-85 (1967).
305. See text accompanying note 111 supra.
309. See text accompanying notes 214-21 supra.
terpreted Frye in terms of the apparent policy behind the rule rather than in accord with the letter of the rule.310 Strict application of the Frye standard requires trial court judges to implement a standard which may theoretically be plausible but practically incomprehensible. The general acceptance standard must be defined more clearly so that it will neither confuse those forced to apply it nor straitjacket courts who wish to utilize reliable scientific information.

The other rationale posited for the Frye rule, that of protecting a court against its ignorance of a scientific technique, and thus preventing unreliable evidence from reaching the factfinder,311 is also a problem in practical application. This policy objective, carried to extremes, could bar all but the most reliable scientific evidence. Conceivably, whenever a significant dispute is raised by a particular scientific discipline relative to the technique or process,312 the Frye standard requires the trial court to automatically reject the proposed scientific evidence. Indeed, a strict reading of the decisions in United States v. Addison313 and People v. Law314 by courts considering the admissibility of spectrographic analysis could indefinitely prolong an absolutist interpretation of the general scientific acceptance standard simply by giving recognition to a few scientists who are skeptical of

310. Comment, The Evidentiary Value of Spectrographic Voice Identification, supra note 14, at 349. In People v. Williams, 164 Cal. App. 2d 858, 331 P.2d 251 (Super. Ct. 1958), the court, ruling on the admissibility of the results of a Nalline test used for determining narcotics addiction, stated: "[T]he results of tests of the type here under attack, as well as opinions based thereon, are admissible only if the tests have gained acceptance in the field of learning in which they are in use." Id. at 860, 331 P.2d at 253 (emphasis added).

A further recharacterization of Frye occurred in Coppolino v. State, 223 So. 2d 68 (Fla. Ct. App. 1968), appeal dismissed, 234 So. 2d 120 (Fla. 1969), cert. denied, 399 U.S. 927 (1970). In that case, the expert testimony related to a unique, specifically designed test for the presence of a certain toxic poison in the deceased. In sustaining the trial judge's ruling admitting the experts' testimony, the court stated: "The problem presented to the trial judge was, were the scientific tests performed by Umberger so unreliable and scientifically unacceptable that their admission into evidence was error." Id. at 70 (emphasis added). One commentator has interpreted the Coppolino rule as focusing "on a test or technique which is analytically and scientifically valid, . . . notwithstanding the relative newness of the test or technique and lack of exposure to the profession . . . ." Comment, The Evidentiary Value of Spectrographic Voice Identification, supra note 14, at 350.

311. See text accompanying note 112 supra.

312. It is interesting to note that in the King case, the court indicated the scientific disciplines relevant to voiceprints include psychology, anatomy, medicine, physiology, phonetics, and linguistics. People v. King, 266 Cal. App. 2d 437, 456, 72 Cal. Rptr. 478, 491 (Ct. App. 1968).


the technique, though they have conducted no empirical research which demonstrates the failings of the technique. This seems to have been the case in the scientific community's criticism of the Tosi study. Much of the criticism was based not upon the merits of the technique itself, but on extrinsic factors such as the case with which a voiceprint can be edited to produce an incriminating statement.\textsuperscript{315} By incorporating this approach, the courts may be unwisely deferring to a small, highly vocal group of scientists whose evaluation may be highly suspect.\textsuperscript{316} By placing too much emphasis upon the number of scientists who do not support use of the technique, courts may be overlooking a major qualitative consideration: the reliability of the evidence.

The rationale of protection against the court's ignorance of a scientific technique also relates to the danger that a jury might assign substantial weight to a scientific technique lacking probative value. This concern is reflective of the doctrine of logical relevancy whereby consideration is given to the logical relationship between the evidence offered and the issues before the court and whether its probative value outweighs probable prejudice.\textsuperscript{317} The doctrine does not require the court to determine that the evidence has reached a certain minimum level of probative value.\textsuperscript{318} The irony of adopting the basic theory of the logical relevancy doctrine as a rationale for the Frye rule is that proponents of logical relevancy have been outright critics of the Frye standard, claiming that general scientific acceptance, in addition to logical relevancy, unnecessarily hinders the legal process.\textsuperscript{319} If the logical relationship test is applied to voiceprint identification evidence, it is necessary to ask what could be more "probative in convicting an arsonist than to listen to his confession, as in King, and then to link the voice making the confession to the defendant."\textsuperscript{320} Assuming that the various facets of the technique are explained clearly and completely to the jury, the factfinder could fairly and properly evaluate and place into perspective the scientific

\textsuperscript{315} Comment, The Voiceprint Technique: A Problem in Scientific Evidence, supra note 14, at 1386 & n.108.

\textsuperscript{316} Compare id. (Frye test criticized) with Comment, The Voiceprint Dilemma: Should Voices be Seen and Not Heard?, 35 Md. L. Rev. 267, 287-96 (1975) (Frye test approved).

\textsuperscript{317} Cederbaums, supra note 14, at 337.

\textsuperscript{318} Id.

\textsuperscript{319} Note, Evolving Methods of Scientific Proof, supra note 304 at 682-85.

\textsuperscript{320} Comment, The Voiceprint Technique: A Problem in Scientific Evidence, supra note 14, at 1387. At the same time, there may be nothing more prejudicial to a defendant. Id.
evidence without overemphasizing its probative value.\textsuperscript{321} In summary, this rationale is more antagonistic to than supportive of the \textit{Frye} standard.

While the objectives underlying the \textit{Frye} standard have merit, implementation of the rule in cases involving voiceprint identification evidence has proved contradictory, if not irrational. When the inflexible standard of general scientific acceptance is used as the principal, if not the sole determinative factor, it is questionable whether useful scientific evidence will be deemed admissible. While a number of substitute tests have been proposed,\textsuperscript{322} it is apparent that the admissibility of scientific evidence could be obtained within the ambit of the usual rules of evidence by focusing on the relevancy and expert testimony requirements. If the proponent of specific scientific evidence is required to prove to the court which scientific disciplines are relevant to an evaluation of the new technique, and if the court determines which experts in the disciplines have the necessary expertise and background to apply such a technique in a forensic setting,\textsuperscript{323} courts could conduct a qualitative legal analysis of scientific evidentiary issues. The fact that the type of evidence is not generally accepted in the scientific community would be an important factor in determining whether the evidence offered is relevant to the inquiry and whether the expert interpreting is credible, but would not be determinative of the admissibility issue. In this way, the court could establish a minimum level of probativeness that must be reached before the jury is allowed to consider the scientific evidence. The court should carefully caution the jury to assign only such weight to the evidence as it believes warranted. Opponents should be given the opportunity to attack the evidence after the court has admitted it. This approach would not stifle the introduction of new scientific techniques into evidence, and at the same time, it would encourage further empirical tests of a scientific analysis being considered for introduction into evidence.

\textbf{C. Constitutional Implications of Voiceprint Identification Evidence}

Even if voiceprint identification evidence is admissible in criminal prosecutions for evidentiary purposes, constitutional issues may arise

\textsuperscript{321} \textit{Id.} Moreover, the prejudice to the defendant would only be in proportion to the probative value of the evidence. \textit{Id.}

\textsuperscript{322} \textit{Id.} at 1388-96.

regarding both the manner in which the voice exemplars are procured and the identification process itself.324 While courts have differed regarding the scientific reliability of spectrographic analysis and the propriety of admitting the results as evidence, they have been in accord on questions relating to the constitutional propriety of seizing and using spectrographic evidence. Courts have summarily dismissed the constitutional issues, focusing instead on the evidentiary standard of admissibility.325 To properly analyze the important fourth, fifth, and sixth amendment issues relating to voiceprint identification evidence, certain comparisons must be made with decisions involving aural voice identifications326 and other physical and bodily examinations.327

1. The fourth and fifth amendments

While the principal fifth amendment328 question posed by voiceprint identification evidence concerns whether such evidence is a compelled testimonial utterance,329 the fourth amendment issue focuses on unreasonable searches and seizures, the concomitant right to privacy, and the necessity for probable cause or a warrant prior to the making of a voice recording.330 Yet, as was seen in the King,331

324. Comment, The Status of Voiceprints as Admissible Evidence, supra note 110, at 1273.
328. The fifth amendment provides that "[n]o person ... shall be compelled in any criminal case to be a witness against himself ... ." U.S. CONST. amend. V. The fifth amendment was made applicable to the states through the fourteenth amendment. Malloy v. Hogan, 378 U.S. 1, 7-8 (1964).
330. The fourth amendment provides that "[t]he right of the people to be secure in their person, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause ... ." U.S. CONST. amend. IV. The fourth amendment was also made applicable to the states through the fourteenth amendment. Mapp v. Ohio, 367 U.S. 643 (1961).
Trimble, Addison, and Franks decisions, neither amendment forced the courts to exclude voiceprint identification evidence solely on constitutional grounds. Perhaps the Addison and Franks decisions have provided the greatest insight regarding the disposition of constitutional challenges to the admission of voiceprint evidence. In Addison, the United States Court of Appeals for the District of Columbia relied on United States v. Dionisio in rejecting any possible fourth amendment attack on compelled voice exemplars. In Franks, the Court of Appeals for the Sixth Circuit indicated that Dionisio precluded any fourth or fifth amendment attack on forced voice samples.

In Dionisio, twenty witnesses were subpoenaed before a grand jury and requested to furnish voice exemplars. Some of the individuals refused, contending that their fifth amendment privilege would be violated if they were compelled to submit to a voice exemplar test; that an impermissible seizure under the fourth amendment had resulted by summoning twenty persons to furnish voice exemplars; and that a voice exemplar test is a search within the meaning of the fourth amendment. The Supreme Court, relying on several of its earlier decisions, rejected the contention that the compelled production of voice exemplars would violate the fifth amendment. By analogizing voice exemplars to physical characteristics such as fingerprints and handwriting, the Court held that the voice recordings were used solely for measuring the physical properties of the witnesses' voices, and not for the testimonial or communicative content of what was to be said. In refuting the fifth amendment argument, the Court noted that "[i]t has long been held that the compelled display of identifiable physical characteristic infringes no interest protected by the privilege against self-incrimination." In holding that neither the summons to appear before the grand jury nor its directive to make a voice recording violated any protected interest under the fourth amendment, and thus, there was no basis for requiring the grand jury to satisfy even the minimal requirements of rea-

337. 410 U.S. 1, 7 (1973).
338. Id. at 5-6.
sonableness. The Dionisio holding makes it clear that when a voiceprint is procured from a suspect pursuant to a grand jury subpoena, any contention that the grand jury summons must meet the fourth amendment principles of probable cause or reasonableness, or that a voice exemplar constitutes a search, will be rejected.

This does not mean that seizure of a voiceprint will never encounter fourth amendment difficulties. It does appear that a fourth amendment challenge to voiceprint identification evidence may arise where a person is detained for the purpose of obtaining a voice exemplar on evidence not amounting to probable cause. The concern here may not involve the legality of the seizure of the voiceprint evidence, but rather the reasonableness and legality of the detention. For example, the Supreme Court in Davis v. Mississippi held that investigatory seizures of persons by the police for purposes of obtaining fingerprints were governed by the fourth amendment even though the fingerprints themselves were not protected by that amendment. The Court further stated that it might be constitutionally proper for a court to order persons to submit to law enforcement authorities for a limited period of time, even in the absence of probable cause, in order to allow the police to fingerprint them. Therefore, temporary detentions to acquire voiceprint identification evidence may be consistent with the fourth amendment because of the government’s interest in effective law enforcement.

However, seizure of the voiceprint evidence itself may constitute a violation of the fourth amendment unless the probable cause standard and the warrant requirement are satisfied. In Schmerber v. California, the Supreme Court indicated that extraction of blood by law enforcement authorities from a person who was involved in a

339. Id. at 15.
340. Comment, The Status of Voiceprints as Admissible Evidence, supra note 110, at 1277. However, the court in United States v. Franks, 511 F.2d 25, 32 (8th Cir. 1975), rejected such a contention when it stated that “compelling a voiceprint is neither a ‘search’ nor a ‘seizure’ . . . . We reject [the defendant] Mitchell’s attempt to limit Dionisio to the grand jury context . . . .”
343. Id.
344. Id. at 727.
345. Comment, The Status of Voiceprints as Admissible Evidence, supra note 110, at 1277. Since the tape recording of a suspect’s voice may be the only lead the police have in a particular crime, limited detention to obtain a voice exemplar is likely to be considered consistent with the fourth amendment standards of reasonableness. Id. at 1277-78.
fatal automobile accident, and who was believed to be intoxicated, constituted a "search" for fourth amendment purposes. Since the blood sample was taken from the defendant in a reasonable fashion—the blood was drawn from the defendant in a hospital setting by medical personnel—the court upheld the seizure. Because the alcohol level in an individual's blood might dissipate before a warrant can be procured, the Court did not feel compelled to require the police to obtain a warrant before taking a blood sample. Thus, it is not surprising that one federal district court considering the compelled taking of voice exemplars outside the grand jury setting held that the takings must be preceded by consideration of the probable cause and warrant requirement.

2. Sixth amendment—right to counsel

The sixth amendment raises the issue of whether an individual has the right to have counsel present at the taking of a voice exemplar. The standard test enunciated by the Supreme Court is whether the particular prosecutorial activity is a critical stage of a criminal proceeding demanding the assistance of counsel. The decision in United States v. Addison is the only reported case involving voiceprint identification evidence which confronted the issue of a suspect's right to counsel at the taking of an exemplar. In Addison, the defendant had appointed counsel present when the sample was taken, but he contended that he was deprived of effective assistance of counsel because his attorney had been denied adequate time to consider the novel issues presented by the government's motion to compel the voice samples. The defendant argued that more time would have enabled his lawyer to plead a successful fourth amendment objection to the court's order requiring the exemplar to be taken. Relying on the decision in Dionisio, the court held that no sixth amendment right to effective assistance of counsel had been violated.

347. Id. at 771.
348. Id. at 770-71.
350. The sixth amendment provides that "[i]n all criminal prosecutions, the accused shall enjoy the right... to have the Assistance of Counsel for his defence." U.S. Const. amend. VI.
353. Id. at 742 n.3.
355. 498 F.2d at 743 n.3. The court stated:
The conclusions drawn from the Supreme Court decisions in *United States v. Wade* and *Gilbert v. California* indicate that there is no constitutional right to counsel for a defendant compelled to give voice exemplars. While the Court in *Wade* held that an accused has the right to counsel at an identification proceeding, they indicated this right did not extend to such procedures as the taking of fingerprints or blood tests. The Court reiterated this position in *Gilbert* when it held that the taking of handwriting exemplars was not a "critical stage" of the criminal prosecution. It seems clear that the rationales presented by the Court for denying the presence of counsel relative to these types of scientific evidence are equally applicable to spectrographic identification. Specifically, the Court noted in *Gilbert* that since the source and technology used in handwriting analysis was readily available and the methods used in reaching these results could be verified, the accused could be protected from a prejudicial result through cross-examination or by presentation of his own test results at trial. Although the admission of voiceprint identification evidence may be prejudicial to the accused, the methodology of the technique is certainly well-known, and its prejudicial impact can be diminished by effective cross-examination. Since voiceprint tests can be reproduced, the defense counsel has an opportunity to produce his own evidence to refute the prosecution's results.

And, once appellant's underlying reliance on a Fourth Amendment right of privacy is stripped away, it can be seen that none of the other arguments were lost by not being raised at that time. Thus, even assuming the validity of appellant's assertion that the rapidity of procedures deprived counsel of time for research and study of the questions involved, it is clear that appellant suffered no injury that would begin to suggest that he might have been deprived of his Sixth Amendment right to effective assistance of counsel.

---

356. 388 U.S. 218 (1967). The Court in *Wade* held that an accused has the right to counsel at an identification proceeding. In *United States v. Ash*, 413 U.S. 300 (1973), however, the Court held that the right to appointed counsel does not extend to persons who are the subject of identification from a photographic display conducted by the government. In *Kirby v. Illinois*, 406 U.S. 682 (1972), the right to appointed counsel in lineup situations was limited to suspects formally charged with a crime.

357. 388 U.S. 263 (1967) (no right to counsel at the taking of handwriting samples).


360. *Id.*


362. *Id.* It is important to note that since fifth as well as sixth amendment rights do not attach to voiceprint identification evidence, the warnings necessitated by *Miranda v. Arizona*, 384 U.S. 436, 444-45, 467-79 (1966), would not be required before one is compelled to give a voice exemplar. Note, *Voiceprint Identification*, supra note 14, at 737-38.
3. Due process of law.

In United States v. Askins, 363 a federal district court in Maryland considered whether the procurement of a voice exemplar by law enforcement authorities for voiceprint identification purposes violated the defendant’s due process rights guaranteed by the fifth and fourteenth amendments. 364 The court stated that “[c]learly, requiring a person to speak, an activity engaged in by the vast majority of people every day of their lives, cannot, in any sense, be considered the type [of] conduct which offends ‘those canons of decency and fairness which express the notions of justice of English-speaking peoples.’” 365

It has been contended that spectrographic identification analysis violates another due process right—the guarantee of fundamental fairness. Commentators have suggested that if the procedures employed in a given voiceprint case were shown to be “unnecessarily suggestive and conducive to irreparable mistaken identification,” 366 the spectrographic identification evidence could perhaps be excluded. 367 This protest is founded upon the belief that, due to the incriminating nature of the recorded statement itself, an examiner might develop bias and prejudice toward a defendant in his evaluation of a voiceprint derived from an exemplar consisting of a confession or other incriminating statement. 368 Against the findings of the Tosi study concerning the training and professional honesty of the spectrographic examiner, 369 the fears regarding his integrity are largely hypothetical. Therefore, the requirements of due process would not seem to bar either the taking of the defendant’s voiceprint exemplar or its analysis by an expert.

V. Conclusion

Voiceprint identification evidence has become a controversial topic in scientific, legal, and academic circles within the last few years. Presently, there exists no single completely reliable technique of
voice identification that will correctly identify or eliminate the speaker in all cases. However, by combining both aural and visual examination of spectrograms, and emphasizing the qualifications of the examiner rather than the accuracy rate of the procedure, it is possible to reliably identify or eliminate an unknown speaker among several known ones in a forensic setting. Because of a growing recognition of the reliability of voiceprint identification, there is a developing judicial trend toward acceptance of spectrographic test results into evidence in criminal cases. Some courts have determined that strict adherence to the Frye rule only impedes effective factfinding and the uncovering of reliable evidence. Consequently, the Frye rule has either been ignored, tacitly recognized and overcome by finding general acceptance in the scientific community for spectrographic evidence, or reinterpreted in a fashion which gives credence only to experts who have extensively studied and worked with spectrographic analysis. These developments in voiceprint testing may be the first major step away from the Frye rule as it has historically been applied. Nevertheless, admitting spectrographic evidence does not mean that all defendants against whom it is used will be routinely convicted. Juries can and should be cautioned to give no more weight to voiceprints than they feel is proper in the case before them.

Resolving the controversy concerning the reliability and admissibility of voiceprint identification should not be monopolized by the particular scientific disciplines claiming knowledge of the voiceprint technique, or by the judges who have no firsthand knowledge of the technique. Resolution of the issue should be shared by the attorneys whose skill will determine the weight a jury will assign such evidence, and the ultimate factfinder, the jury itself.

372. A comprehensive study of the jury system indicated that "contrary to an often voiced suspicion, the jury does by and large understand the facts and get the case straight. [Also], . . . the jury's decision by and large moves with the weight and direction of the evidence." H. Kalven & H. Zeisel, The American Jury 149 (1971). See also Greene, supra note 88, at 191, wherein the author states that: "[O]f those [federal] cases tried by juries in which voiceprint identification testimony has been admitted, just over 61 percent, excluding the single mixed verdict case, have resulted in guilty verdicts—a percentage significantly less than the percentage of guilty verdicts returned generally in criminal cases tried by juries."