

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

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Paper No. 372

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

YALE NEMERSON, WILLIAM H. KONIGSBERG
and ELEANOR K. SPICER
Junior Party,¹

v.

THOMAS S. EDGINGTON and JAMES H. MORRISSEY,
Junior Party,²

v.

RICHARD M. LAWN, GORDON A. VEHAR
and KAREN L. WION
Senior Party.³

Patent Interference No. 103,203

FINAL HEARING: February 16, 2000

Before DOWNEY, WILLIAM F. SMITH, and ELLIS, Administrative Patent Judges.

ELLIS, Administrative Patent Judge.

¹ Application 07/732,991, filed July 18, 1991. Accorded the benefit of U.S. Application 07/632,616, filed December 26, 1990; Application 07/208,895, filed June 17, 1988; Application 07/167,870, filed March 14, 1988; and Application 07/062,166, filed June 12, 1987 (all abandoned).

² Patent No. 5,110,730, issued May 5, 1992, based on Application 07/067,103, filed June 25, 1987. Accorded the benefit of U.S. Application 07/033,047, filed March 31, 1987 (now abandoned).

³ Application 08/437,989, filed May 10, 1995. Accorded benefit of U.S. Application 08/167,785, filed December 15, 1993; Application 07/969,863, filed October 30, 1992; and Application 07/013,743, filed February 12, 1987 (all abandoned).

FINAL DECISION AND DECISION ON MOTIONS

This is an interference between Nemerson et al., Edgington et al. and Lawn et al. Lawn et al. are senior party by virtue of U.S. Application 07/013,743, filed February 12, 1987.

Background

The subject matter at issue is directed to a DNA sequence encoding mature human tissue factor. The mature human tissue factor protein is 263 amino acids in length and is said to play an important role in blood coagulation. Nemerson Brief, p. 1.

All the parties took testimony, filed briefs and were represented by counsel at Final Hearing.

None of the parties raised the issue of no interference-in-fact.

The main briefs of the parties present the following issues for our decision:

(1) Whether Edgington et al. have established priority of invention over Nemerson et al. and Lawn et al.

(2) Whether Nemerson et al. have established a date of invention prior to February 12, 1987.

(3) Whether the Lawn et al. application(s) constitute a constructive reduction to practice of an invention within the scope of the count.

In addition, the following motions which were denied, dismissed or deferred to final hearing, are raised in the briefs:

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(1) Lawn et al.'s Preliminary Motion 1 pursuant to 37 C.F.R. § 1.633(c)(1) to substitute proposed Count A or, in the alternative, Count B, for the existing count. Paper No. 171. The motion stands opposed by Edgington (Paper No. 189) and a reply was filed (Paper No. 195).

(2) Lawn et al.'s Preliminary Motion 2 pursuant to 37 C.F.R. § 1.633(f) to be accorded the benefit of the filing dates of the applications for which priority is claimed for their proposed Count A or Count B. Paper No. 172. The motion stands opposed by Edgington (Paper No. 191) and a reply was filed (Paper No. 196).

(3) Lawn et al.'s Preliminary Motion 3 pursuant to 37 C.F.R. § 1.635 to amend the specification. Paper No. 187. The motion stands opposed by Edgington (Paper No. 205) and a reply was filed (Paper No. 217).

(4) Nemerson et al.'s motion pursuant to 37 C.F.R. § 1.634 to add Dr. Spicer as a co-inventor. Paper No. 23. The motion stands opposed (Paper No. 38) and a reply was filed (Paper No. 53).

(5) Nemerson et al.'s preliminary motion for judgment pursuant to 37 C.F.R. § 1.633(a) that Edgington et al.'s claims 1 through 7 are unpatentable under 35 U.S.C. § 112, first paragraph (enablement). Paper No. 27. The motion stands opposed by Edgington (Paper No. 39) and a reply was filed (Paper No. 51).

(6) Nemerson et al.'s preliminary motion for judgment pursuant to 37 C.F.R. § 1.633(a) that Edgington committed fraud and inequitable conduct before the PTO. Paper No. 32. The motion stands opposed by Edgington (Paper No. 41) and a reply was filed (Paper No. 52).

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(7) Nemerson et al.'s preliminary motion for judgment pursuant to 37 C.F.R. § 1.633(a) because Edgington et al. fail to name Dr. Yale Nemerson as a co-inventor on the involved Edgington et al. patent. Paper No. 34. The motion stands opposed by Edgington (Paper No. 37). No reply was deemed necessary (Paper No. 49).

(8) Edgington et al.'s Preliminary Motion 3 for judgment pursuant to 37 C.F.R. § 1.633(a) that Lawn et al.'s claims 9, 11 through 14, 30 and 32 through 38, are unpatentable as being based on a specification which fails to satisfy the written description requirement of 35 U.S.C. § 112, first paragraph. Paper No. 166. The motion stands opposed by Lawn (Paper No. 182) and a reply was filed (Paper No. 206).

(9) Edgington et al.'s Preliminary Motion 4 for judgment pursuant to 37 C.F.R. § 1.633(a) that Lawn et al.'s claims 9, 11 through 14, 30 and 32 through 38, are unpatentable as being based on a specification which fails to satisfy the enablement and best mode requirements of 35 U.S.C. § 112, first paragraph. Paper No. 167. The motion stands opposed by Lawn (Paper No. 183) and a reply was filed (Paper No. 207).

(10) Edgington et al.'s Motion to Suppress exhibits offered by Party Nemerson et al. pursuant to 37 C.F.R. §§ 1.635 and 1.656(h). Paper No. 350. The motion stands opposed by Nemerson et al. Paper No. 355.

DECISION ON MOTIONS

(1) Lawn et al.'s preliminary motion to substitute Count A (hereinafter, Count 2) for

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Count 1 is GRANTED for the reasons set forth therein (Paper No. 171), as well as in the Reply (Paper No. 195) and the main Brief (Paper No. 343). The motion is DISMISSED AS MOOT with respect to Count B.

The subject matter which is at the crux of this interference is a DNA sequence encoding mature human tissue factor. Thus, since the mature tissue factor protein is 263 amino acids in length, said protein is manifestly encoded by 789 nucleotides.⁴ Yet, original Count 1 is directed to a DNA segment which comprises “no more than about 1133 nucleotide base pairs.” Neither the existing count, nor the Edgington specification from which the referenced phrase was derived, specifies what the additional 344 (1133 - 789 = 344) nucleotides are. Since Count 1 is only specific with respect to the nucleotide sequence which encodes the mature human tissue protein (i.e., from the amino acid residues from position 1 to 263), and does not specify the nature of the additional 344 nucleotides, we agree with Lawn et al. that the additional nucleotides encompassed by the recitation of “no more than about 1133 nucleotide base pairs” is not material to the invention described therein.⁵ Viewed from another

perspective, had the presence of the additional 344 nucleotides encompassed by Count 1 (i.e., those nucleotides which are not required to encode amino acids 1 to 263 of human

⁴ For purposes of background, we point out that amino acids are encoded by groups of nucleotides known as codons. Codons are composed of three adjacent nucleotides. Thus, if a group of three nucleotides encodes an amino acid, the 263 amino acids of mature tissue factor, manifestly, are encoded by 789 (263 x 3 = 789) nucleotides.

⁵ Contrary to Edgington et al.'s argument, we find that the elimination of the referenced phrase from the count eliminates any ambiguities as to what nucleotides are encompassed by a count which is directed to more than the 789 nucleotides needed to code for amino acid residues 1 to 263 of Figure 1 of the Edgington patent. Edgington Opposition, Paper No. 189, pp. 3-4.

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tissue factor) been essential, or needed for any purpose whatsoever, the Edgington et al. specification would have specified the nature of said nucleotides. Since they did not, we hold that only the 789 nucleotides required to encode amino acids 1 to 263 of mature tissue factor are necessary to define the interfering subject matter between the parties.

We note Edgington et al.'s argument that noncoding regions are not per se irrelevant. Edgington Opposition, Paper No. 189, pp. 5-7. According to Edgington et al., (i) the noncoding regions of the DNA sequence can control transcription and translation, (ii) the 5' noncoding region of human TF gene contains an Alu sequence and that such sequences have been demonstrated to regulate production of some proteins, and (iii) start and stop codons that define the open reading frame of the DNA sequence encoding tissue factor would not be included in a DNA segment which encodes only the 263 amino acids of the mature protein. Id. We find these arguments unpersuasive for the reasons set forth in the Lawn et al. Reply (Paper No. 195) and Brief (Paper No. 343). In addition, we point out that Count 1 does not contain a limitation to (i) the noncoding regions of the DNA sequence which control transcription and translation, (ii) the Alu sequence in the 5' noncoding region of human TF gene, and (iii) start and stop codons that define the open reading frame of the DNA sequence encoding tissue factor. Since Count 1 does not mandate that the additional 344 nucleotides encode the regulatory sequences listed by Edgington et al., we do not find that these arguments address a limitation present therein.

In view of our disposition of this motion, a redeclaration of the interference which reflects the substitution of Count 1 with Count 2 is set forth, infra. In said redeclaration

each of the parties is accorded the benefit of their earliest-filed applications.

(2) Lawn et al.'s Preliminary Motion 2 (Paper No. 172) for benefit is GRANTED for the reasons set forth therein. See the redeclaration of the interference, infra. In order to show benefit of an earlier application, the movant must show that the earlier-filed applications satisfy the requirements of 35 U.S.C. § 112, first paragraph, for at least one species within the scope of the count. Weil v. Fritz, 572 F.2d 856, 865 n.16, 196 USPQ 600, 608 n.16 (CCPA 1978). We are satisfied that Lawn et al. have sustained their burden of proof in view of their disclosure of a DNA segment comprising a nucleotide sequence coding for amino acids 1 to 263 of the mature tissue factor protein.⁶ See Application 07/013,743, filed February 12, 1986, Figure 2a.

In their Opposition, Edgington et al. argue that there are three (3) versions of the text of the Lawn et al. applications and because Version 3 (Lawn et al. Application 07/620,431, filed November 30, 1990) differs in length (i.e., the number of pages), and in the determination of the biological activity of the tissue factor protein, from Version 1 (Application 07/013,743, filed February 12, 1987) and Version 2 (which includes, inter alia, Application 08/437,989, filed May 10, 1995, which is involved in the interference),

⁶ As background, we point out that most secretory proteins are synthesized with a sequence of approximately 16 to 30 amino acids at the N-terminus known as the signal sequence (a.k.a. the leader peptide). The signal sequence directs a newly synthesized protein to the endoplasmic reticulum (ER) membrane and initiates the transfer of the protein across said membrane. The signal sequence is usually cleaved in the lumen of the ER. Darnell et al., Molecular Cell Biology, 2nd Edition, Scientific American Books, NY (1990), pp. 646-60. The cleavage of the signal sequence from human tissue factor results in the production of the mature human tissue factor protein. Nemerson Brief, p. 4. Figure 1 of Edgington et al.'s U.S. Patent 5,110,730 shows the amino acid sequence of the mature human tissue factor protein as being represented by amino acids 1 to 263. Therefore, throughout this decision, when we refer to amino acids 1 to 263 of mature tissue factor, we are referring to the amino acids set forth in Figure 1 of U.S. Patent 5,110,730.

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Versions 1 and 2 fail to disclose the best mode of practicing an invention within the scope of Count 2. Paper No. 191, pp. 3-4.

Edgington et al. further argue that the Lawn et al. benefit application (Application 07/013,743) fails to provide written descriptive support for a species within the scope of proposed Count A (now, Count 2) and Count B.⁷ *Id.*, pp. 5-16. Edgington et al. point to various passages in the Lawn et al. specification for support of their argument.

We find these arguments lack merit.

With respect to the best mode issue, the burden of persuasion is on Edgington et al. to establish that Lawn et al. knew that one mode of practicing the invention corresponding to the count (now, Count 2) was better than another, and if so, they must then establish that the earlier-filed applications would not have enabled one of ordinary skill in the art to practice the best mode in making and using a species within the scope of Count 2. *Cf. Chemcast Corp. v. Arco Industries Corp.*, 913 F.2d 923, 927, 16 USPQ2d 1033, 1036 (Fed. Cir. 1990). With respect to the written description issue, the burden of persuasion rests on Edgington et al. to establish that the Lawn et al. benefit applications fail to provide an adequate written description of a species within the scope of Count 2.

⁷ Edgington et al.'s arguments with respect to Count B are moot in view of our decision to redeclare the interference by substituting Count 1 with Count A (now, Count 2), and not Count B. Accordingly, we have not addressed these arguments.

Starting with the latter issue, we find Edgington et al.'s reliance on various statements within Lawn et al. Application 07/013,743, to establish lack of written descriptive support, to be misdirected. We point out that said application discloses an isolated DNA segment encoding amino acids 1 to 263 of the human tissue factor protein, as required by Count 2. See, Application 07/013,743, Figure 2a. Accordingly, contrary to Edgington et al.'s argument, we find that the Lawn et al. disclosure of a complete and correct DNA sequence which encodes the mature tissue factor protein provides an adequate written description of subject matter within the scope of Count 2. University of California v. Eli Lilly and Co., 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997); Fiers v. Revel, 984 F.2d 1164, 1170-71, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993).

As to the best mode issue, we point out that Edgington et al. must establish that (i) at the time of filing their earlier applications, the Lawn et al. co-inventors possessed a best mode of practicing a species within the scope of the count, and (ii) the Lawn et al. benefit applications would not have enabled one skilled in the art to practice the best mode. Cf. Eli Lilly & Co. v. Barr Laboratories Inc., ___ F.3d ___, ___, 55 USPQ2d 1609, 1614 (Fed. Cir 2000); Chemcast Corp. v. Arco Indus. Corp., 913 F.2d at 927-28, 16 USPQ2d at 1036-37. Here, we do not find that Edgington et al. have even begun to explain how the difference in the number of pages in each "Version" of the specification, and the alleged difference in the determination of the biological activity of the tissue factor protein, demonstrate that Lawn et al. knew of a better mode of making a DNA sequence encoding mature tissue factor. Nor have Edgington et al. explained

how given the disclosure of a DNA segment comprising a correct nucleotide sequence

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encoding the mature human tissue factor protein, the Lawn et al. application would not have enabled one of ordinary skill in the art to make and use an invention corresponding to Count 2. Accordingly, we do not find that Edgington et al. have satisfied their burden (of persuasion) of establishing that the Lawn et al. benefit applications do not comply with the best mode and written description requirements of 35 U.S.C. § 112, first paragraph.

(3) Lawn et al.'s Preliminary Motion 3 (Paper No. 187) is DISMISSED AS IMPROPER. As noted in the Decision on Preliminary Motions, "Issues raised in dismissed motions are not entitled to review on their merits at final hearing. See[,] inter alia, 37 C.F.R. [§] 1.655; Land v. Dreyer, 155 F.2d 383, 386, 69 USPQ 602, 604 (CCPA 1946); and Jacobs v. Moriarity, 6 USPQ2d 1799, 1802 (Bd. Pat. App. & Int. 1988)." Paper No. 220, p. 7, fn 3. We point out, however, that minor informalities in the application can be corrected by the examiner prior to issue. Manual Of Patent Examining Procedures (M.P.E.P.) § 1320.04.

(4) Nemerson et al.'s motion to add Dr. Spicer as a co-inventor is GRANTED for the reasons set forth therein.

Edgington et al. argue that the "Statement of the Material Facts, etc." provided by Nemerson et al. to support the motion, and the accompanying Petition, are not sworn evidence, but are mere attorney argument. Paper No. 38, p. 1. Edgington et al. further argue that there are (i) inconsistencies in the declarations of the Nemerson et al. co-inventors, and (ii) discrepancies between what the Nemerson et al.

specification teaches and what Dr. Spicer said that she did and what Drs. Nemerson and

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Konigsberg say Dr. Spicer did. *Id.*, pp. 2-3. We find these arguments lack merit.

We have carefully reviewed the referenced documents and find them to be in compliance with 37 C.F.R. § 1.48(a). In addition, we agree with Nemerson et al. that the declarations are not inconsistent. Rather, they indicate that Dr. Spicer worked in collaboration with Drs. Nemerson and Konigsberg. Accordingly, the motion is granted.

(5)(6)(7) Nemerson et al.'s preliminary motions for judgment on the grounds that (i) Edgington et al.'s claims corresponding to the count are unpatentable under 35 U.S.C. § 112, first paragraph, (ii) Edgington et al. committed fraud and inequitable conduct before the PTO, and (iii) Edgington et al. improperly failed to name Dr. Nemerson as a co-inventor, are DISMISSED AS MOOT in view our final decision, *infra*.

(8) Edgington et al.'s Preliminary Motion 3 for judgment stating that Lawn et al.'s claims which correspond to the count are unpatentable because the specification fails to satisfy the written description requirement of 35 U.S.C. § 112, first paragraph, is DENIED.

The burden is on Edgington et al., as the moving party, to prove by a preponderance of the evidence, that the claims in the involved Lawn et al. application fail to satisfy the requirements of 35 U.S.C. § 112, first paragraph. 37 C.F.R.

§ 1.637(a). This, they have not done.

Here, Edgington et al. allege that neither the involved Lawn et al. Application 08/437,989 ('989 Application) nor the scientific literature incorporated therein, contain a teaching of how to make a DNA segment defined by Count 1 which is directed to "[a]n isolated DNA segment comprising no more than about 1133 nucleotide base pairs" Paper No. 166, pp. 2-4. In addition, Edgington et al. contend, *inter alia*, that the Lawn et al. '989 Application (i) does not specify with particularity the length of the cDNA clone on

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which their sequence is based, (ii) states that “the cDNA clones appear to contain virtually the entire 5' untranslated region of the message,” (iii) states that the insert encoding tissue factor protein is approximately 1232 base pairs in length, (iv) the 5' end of the cDNA sequence in Figures 2 and 3 is different from the sequence required by the Sal1 restriction enzyme, and (v) the Nco1 restriction enzyme site shown in Figure 3 would result in a DNA segment ending at base 1228, and not 1232. Id., pp.

5-6. Edgington et al. conclude that:

Proper written description of the invention defined by the Count [sic], or by the claims designated as corresponding to the Count, is clearly lacking. The involved LAWN ET AL. Application fails to meet the written description requirement of 35 U.S.C. § 112, paragraph 1. Id., p. 9.

We find these arguments unpersuasive.

First, we point out that Edgington et al.’s argument with respect to the failure of the involved Lawn et al. specification to provide a teaching of how to make a DNA segment defined by the count is irrelevant. “The count of an interference is merely the vehicle for contesting the priority of invention and determining what evidence is relevant to the issue of priority.” In re Van Geuns, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1058-59 (Fed. Cir. 1993). Here, the relevant issue is whether the specification of the involved ‘989 Application provides an adequate written description of the subject matter encompassed by the claims corresponding to the count. That is to say, the interference rules state that a party may file a motion for judgment against an opponent on the ground that an opponent’s claim(s) corresponding to the count are not patentable. 37 C.F.R. § 1.633(a). Since none of Lawn et al.’s claims are identical to the original Count 1, the involved application need not provide a written description of the

subject matter encompassed therewithin.

Second, as to their remaining arguments, Edgington et al. allege that the involved Lawn et al. '989 Application contains numerous deficiencies (see (i)-(v), supra), but they have not explained how said deficiencies fail to provide an adequate written description of the subject matter described in claims 9, 11 through 14, 30 and 32 through 38, corresponding to the count. All the referenced claims encompass the DNA sequence encoding human tissue factor shown in Figure 2 of the involved application, or specify the nucleotide sequence intended in the claim itself. Since Lawn et al. disclose the claimed nucleotide sequences in the involved '989 Application, we find that said application provides an adequate written description of the subject matter encompassed by the claims corresponding to Count 2. Accordingly, the motion is denied.

(9) Edgington et al.'s Preliminary Motion 4 for judgment stating that Lawn et al.'s claims which correspond to the count are unpatentable because the involved '989 Application fails to satisfy the enablement and best mode requirements of 35 U.S.C. § 112, first paragraph, is DENIED.

Enablement

As we understand it, Edgington et al. contend that lack of enablement is established, inter alia, by (i) Lawn et al.'s statement in their benefit applications that "[t]he first 32 amino acid residues are mostly hydrophobic amino acids and probably represent an amino-terminal signal sequence peptide," (ii) Lawn et al.'s failure to provide evidence of a deposit of clone 8TF14 and vectors pCIS2.8c26D, pCIS2.CXXNH and

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pCIS.TF, in an appropriate depository, in their involved '989 Application and benefit applications, and (iii) in their benefit applications, Lawn et al. instruct one skilled in the art to make a human placental cDNA library starting from human adipose RNA. Paper No. 167, pp. 4-7. Edgington et al. urge that due to these shortcomings, it would require undue experimentation for one skilled in the art to make and use the claimed invention. *Id.*, pp. 14-16.

We find these arguments unpersuasive.

First, we find that Edgington et al. have confused the requirement that benefit applications in the context of 35 U.S.C. § 120, must satisfy the requirements of 35 U.S.C. § 112, first paragraph, in order for a later-filed application to receive the benefit of the earlier filing date, and the requirement that a specification must satisfy the enablement (and best mode) requirements of 35 U.S.C. § 112, first paragraph, in order for the claims to be patentable. As recently set forth by our appellate reviewing court in *Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1346, 54 USPQ2d 1915, 1918 (Fed. Cir. 2000):

Analysis of the disclosure in ancestor applications is appropriate when benefit of an earlier filing is sought under 35 U.S.C. §120:

35 U.S.C. §120. An application for patent for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in an application previously filed in the United States ... shall have the same effect, as to such invention, as though filed on the date of the prior application....

Although §120 incorporates the requirements of §112 ¶1, these requirements and the statutory mechanism allowing the benefit of an earlier filing date are separate provisions with distinct consequences. In accordance with §120, claims to subject matter in a later filed application not supported by an ancestor application in terms of §112 ¶1 are not invalidated; they simply do not receive the benefit of the earlier applications filing date [emphasis added].

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Here, Edgington et al. filed a motion for judgment under 37 C.F.R. § 1.633(a) alleging that the claims corresponding to the count in the involved '989 Application are unpatentable as being based on a non-enabling disclosure. Paper No. 167, pp. 4-7 and 14-16. Thus, the patentability of the Lawn et al. claims corresponding to the count depends upon whether the teachings of the '989 Application would have enabled one skilled in the art to make and use the claimed subject matter. The teachings of the benefit applications with respect to the patentability under 35 U.S.C. § 112, first paragraph (enablement), of the claims corresponding to the count in the involved '989 Application, are irrelevant. Reiffin v. Microsoft Corp., 214 F.3d at 1346, 54 USPQ2d at 1918.

Turning to the involved '989 Application, we find that Lawn et al. disclose a nucleotide sequence encoding human tissue factor. See, e.g., Figure 2 of the '989 Application. We further find that the Lawn et al. claims corresponding to the count, are directed, inter alia, to a DNA sequence encoding mature tissue factor protein (e.g., claim 33), expression vectors encoding said DNA sequence (e.g., claim 35) and a host cell transformed with said expression vectors (e.g., claim 13). We still further find that some of the claims recite the nucleotide sequence of the DNA segment being claimed therein (e.g., claim 30). Given the disclosure of the complete and correct nucleotide sequence encoding the tissue factor protein in the involved Lawn et al. application, it is not clear to us, and Edgington et al. have not explained, why the involved '989 Application would not have enabled one skilled in the art to make and use the invention described in claims 9, 11 through 14, 30 and 32 through 38, corresponding to the count.

To the extent that Edgington et al.'s contention that the claims corresponding to the

count of the involved '989 Application are not enabled because the specification fails to disclose whether clone 8TF14 and vectors pCIS2.8c26D, pCIS2.CXXNH and pCIS.TF were appropriately deposited,⁸ we point out that not one of Lawn et al.'s claims corresponding to the count requires the use of the referenced clone and vectors. Thus, this argument does not address a limitation present in the claims. In addition, enablement does not require that the specification disclose that which is well known in the art. Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1385, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987). Here, the Lawn et al. application states that there are numerous eucaryotic and procaryotic expression vectors known in the art. See, e.g., the '989 Application, pp. 22-23. Accordingly, absent evidence to the contrary, we find that those skilled in the art would have understood that any vector known in the art at the time the application was filed could have been employed to express the human tissue factor DNA sequences disclosed therein.

As to Edgington et al.'s arguments with respect to the description of the signal sequence peptide and the starting material for the cDNA library in the '989 Application,⁹ we again point out that said application discloses the complete and correct nucleotide sequence of the human tissue factor protein. See, e.g., Figure 2 of the '989 Application. Absent evidence to the contrary, we find that the disclosure of said nucleotide sequence is

⁸ Paper No. 167, pp. 4-7.

⁹ Paper No. 167, p. 4 (para. 7) and p. 7 (para. 18).

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sufficient to enable one skilled in the art to make and use the invention described in the claims corresponding to the count. Edgington et al. have not pointed to any evidence that given the Lawn et al. disclosure, in its entirety, those skilled in the art would not have been able to identify the signal sequence and the appropriate source of mRNA to make a cDNA library. Fiers v. Revel, 984 F.2d at 1171-72, 25 USPQ2d at 1607 (Fed. Cir. 1993).

Accordingly, in view of the foregoing, we do not find that Edgington et al. have met their burden of establishing that the teachings of the '989 Application would not have enabled one skilled in the art to make and use the invention(s) described in claims 9, 11 through 14, 30 and 32 through 38, corresponding to the count.

Best mode

As to the failure of the '989 Application to disclose the best mode of making the claimed invention, Edgington et al. argue that the scientific publications cited in the benefit applications (e.g., 07/133,743 and 07/035,409), direct one skilled in the art to extract tissue factor protein from cells, and not from the surrounding aqueous medium. Paper No. 167, pp. 7-10. However, the examples in the specifications of the benefit and involved '989 applications direct one skilled in the art to extract tissue factor from the medium. Id., pp. 10-14. Edgington et al. contend that because the teachings in the specification examples are inconsistent with the teachings of the references incorporated therein, Lawn et al. have failed to disclose their known best mode. Id., pp. 17-18.

We find these arguments unconvincing.

First, we direct attention to our discussion, supra, that the burden is on Edgington et al. to establish that the Lawn et al. co-inventors possessed a best mode for practicing the claimed invention at the time their application was filed, and that the teachings of the involved '989 Application fail to disclose Lawn et al.'s best mode of making and using the subject matter described in the claims corresponding to the count. Reiffin v. Microsoft Corp., 214 F.3d at 1346, 54 USPQ2d at 1918. For purposes of determining the patentability of said claims under the first paragraph of § 112, the earlier-filed applications are irrelevant.

Second, as to Edgington et al.'s argument with respect to the disclosure in the '989 Application to extract tissue factor protein from cells, we again direct attention to the subject matter encompassed by claims 9, 11 through 14, 30 and 32 through 38, corresponding to the count. Not one of said claims is directed to the human tissue factor protein. It is well established, and recently reiterated by the court in Eli Lilly & Co. v. Barr Laboratories, ___ F.3d ___, ___, 55 USPQ2d at 1616, "[i]t is concealment of the best mode of practicing the claimed invention that section 112, ¶ 1 is designed to prohibit." Since all of the claims corresponding to Count 2 in the involved '989 Application are directed to a DNA sequence encoding human tissue factor, and since Edgington et al. have not explained why the method of extracting the tissue factor protein is necessary for one skilled in the art to carry out the best mode of making the claimed invention, we do not find that they [Edgington et al.] have sustained their burden of establishing that the Lawn et al. disclosure violates the best mode requirement of § 112, first paragraph. Eli Lilly & Co. v. Barr Laboratories, 2000 U.S. App. LEXIS at 19021, 55

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USPQ2d at 1616, quoting Engel Indus. v. Lockformer Co., 946 F.2d 1528, 1531, 20 USPQ2d 1300, 1302 (Fed. Cir. 1991) (“Unclaimed subject matter is not subject to the disclosure requirement of § 112; the reasons are pragmatic: the disclosure would be boundless and the pitfalls endless”).

(10) Edgington et al.’s Motion to Suppress is DENIED. We have carefully considered Edgington et al.’s arguments set forth in support of the motion, but find that they are more germane to the evidentiary weight the exhibits should be accorded, rather than their admissibility.

Redeclaration of the Interference

The interference is herein redeclared by substituting Count 1 with Count 2.

Count 2 is as follows:

An isolated DNA segment comprising a nucleotide sequence coding for a human tissue factor heavy chain protein having an amino acid residue sequence represented by FIG. 1 from about residue 1 to about residue 263.

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The claims which correspond to Count 2 are:

Nemerson et al.: Claims 1, 2, 14, 28 through 31, 38, 39 and 44 through 50.

Edgington et al.: Claims 1 through 7.

Lawn et al.: Claims 9, 11 through 14, 30 and 32 through 38.

In view of the granting of Nemerson et al.'s motion under 37 C.F.R. § 1.634 to add Dr. Spicer as a co-inventor, the correct listing of the inventors for Nemerson et al. now reads as follows: Yale Nemerson, William H. Konigsberg and Eleanor K. Spicer.

Findings of fact related to Edgington et al.'s case for priority

(1) Edgington et al. filed a patent application (Application No. 07/033,047) describing an invention within the scope of Count 2 on March 31, 1987. Application 07/033,047, Figure 1.

(2) The earliest date argued in the Edgington et al. Brief for an actual reduction to practice of an invention within the scope of the count is March 6, 1987. Edgington Briefs, see, e.g., Paper No. 128, pp. 16, 18, 40-41; Paper No. 347, pp. 9 and 31.

The Nemerson et al. position with respect to Edgington et al.

Nemerson et al. argue that Edgington et al. did not (i) isolate a DNA molecule as defined by Count 1, or (ii) construct a DNA molecule encoding full length human tissue factor. Nemerson Brief, pp. 41-49. Thus, Nemerson et al. contend that Edgington et al. did not establish an actual reduction to practice of a species within the scope of the count.

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Id., pp. 43-45. According to Nemerson et al., at best, Edgington et al. can only rely on their filing dates for a constructive reduction to practice of subject matter defined by the count.

Id., pp, 41-49.

In view of our disposition of this case, infra, these arguments are now moot. Accordingly, they have not been addressed.

The Lawn et al. position with respect to Edgington et al.

Lawn et al. state that Edgington et al. have not proven an actual reduction to practice prior to the effective filing date of the Lawn et al. application; i.e., prior to February 12, 1987, but they provide no reasons or argument in support thereof. Lawn Brief, p. 100, the penultimate sentence.

Findings of facts related to Lawn et al.'s case for priority

(1) Lawn et al. filed a patent application (Application No. 07/013,743) describing a species within the scope of Count 2 on February 12, 1987. Lawn Brief, pp. 6-7, Facts 2 and 6; p. 23; pp. 69-71.

(2) Lawn et al. rely on the benefit of Application 07/013,743 to establish a constructive reduction to practice of a species within the scope of Count 2. Lawn Brief, pp. 69-71.

(3) Lawn et al.'s Preliminary Motion 2 for benefit of Application 07/013,743 was

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granted. See p. 7, supra.

The Edgington et al. position with respect to Lawn et al.

Edgington et al. argue that the Lawn et al. applications do not constitute a constructive reduction to practice of a species within the scope of the count because of nucleotide sequence discrepancies in the Figures and a lack of enabling teachings in the text of the specification. Edgington Brief, Paper No. 347, pp. 33-37. In addition, Edgington et al. contend that Lawn et al. have not described the best mode for carrying out the invention in the early parent applications. Id., pp. 38-44. According to Edgington et al., the parent applications direct one skilled in the art to extract recombinant tissue factor protein from the medium; whereas, the inventors represented to the scientific community that the protein must be obtained from the cells. Id., p. 39 and 42-43.

The Nemerson et al. position with respect to Lawn et al.

Nemerson et al. did not file a supplemental brief after the interference was redeclared making Lawn et al. a party to the present proceedings. Thus, Nemerson et al. have not presented any arguments to Lawn et al.'s motions or the statements in their brief.

Nemerson et al.'s case for priority (as set forth in their brief)

(1) Nemerson et al. state that on January 23, 1987, Dr. Ronald Bach, a researcher in Dr. Konigsberg's laboratory at Yale University, "received a computer listing

of nucleotide sequence compiled from human tissue factor subclones, encoding more than 80% of the complete amino acid sequence of mature human tissue factor protein, including the amino terminal end of mature human tissue factor protein (amino acids 1-244) (NR 99-100; 96; NRE 276).¹⁰ Nemerson Brief, p. 19, para. 39.

(2) Dr. Bach is said to have “prepared a document aligning actual tissue factor amino acid sequence with tissue factor-encoding nucleotide sequence, including the nucleotide sequence encoding mature human tissue factor from amino acid 1 to amino acid 217 [from the January 23, 1987 computer listing]. NR 39-43; 93; 91; 96-98; 1833-834; 3748-750; NRE 83; 275.” Nemerson Brief, p. 19, para. 39.

(3) On pp. 20-22 of their brief, Nemerson et al. state the following:

41. On February 3, 1987, Nemerson printed computer listings of nucleotide sequence, compiled from tissue factor subclones encompassing the entire coding region of the full length, mature tissue factor protein with minor uncertainties. NR 3822-3825; 116-119; NRE 100; 278.

42. By February 3, 1987, Dr. Ronald Bach of Nemerson had prepared a handwritten nucleotide sequence encoding the complete amino acid sequence for full length, mature tissue factor from amino acid 1 to amino acid 263 and the complete amino acid sequence for full length, mature tissue factor from amino acid 1 to amino acid 263. See NR 101-111; 156; NRE 277.

43. On February 3 and 4, 1987, Dr. Ronald Bach of Nemerson communicated to others working on the tissue factor project that he had

¹⁰ The Nemerson et al., Edgington et al. and Lawn et al. record will be referred to as NR, ER and LR, respectively, followed by the appropriate number. Similarly, the Nemerson et al., Edgington et al. and Lawn et al. exhibits will be referred to as NRE, ERE and LRE, followed by the appropriate number.

determined that (a) full length, mature tissue factor consisted of 263 amino acids, (b) the sequence of a nucleotide molecule encoding the complete amino acid sequence of full length, mature tissue factor from amino acid 1 to amino acid 263, and (c) the complete amino acid sequence for full length, mature tissue factor from amino acid 1 to amino acid 263. NR 111-113; NRE 277; NR 1982-1983; NR 173-174; NR 2861-2862; NR 173-174. On February 3, 1987, Dr. Yale Nemerson of Nemerson sent a letter reflecting that, by that date, Nemerson had determined the entire coding sequence of the human tissue factor clone. NR 2873, ¶18; 3295. Nemerson had obtained sufficient information regarding the full length tissue factor clone to isolate a DNA segment of not more than 1133 nucleotides encoding full length, mature human tissue factor from amino acid 1 to amino acid 263. See NR 1952, l. 6 to 1957, l. 3; NRE 282.

44. On February 19, 1987, Dr. Ronald Bach of Nemerson listed in his handwriting the complete amino acid sequence of full length, mature human tissue factor from amino acid 1 to amino acid 263 (NR 131-135; NRE 271), from which a nucleotide sequence encoding full length, mature human tissue factor from amino acid 1 to amino acid 263 could be derived. NR 135.

45. On February 23, 1987, Dr. Ronald Bach of Nemerson printed a computer listing of the complete amino acid sequence for full length, mature human tissue factor from amino acid 1 to amino acid 263 (NR 136-138; NRE 279), from which a nucleotide sequence encoding full length, mature human tissue factor from amino acid 1 to amino acid 263 can be derived (NR 131-1350 [sic, 135?]; 3750 [sic]), and which demonstrates the structure of the protein encoded by the clone isolated by Nemerson.

49. On March 24, 1987, Dr. Eleanor Spicer of Nemerson printed a computer listing of the nucleotide sequence of the 8 10, 3 clone isolated in October 1986 (NFB 13) which encodes full length, mature human tissue factor protein from amino acid 1 to amino acid 263, and the complete amino acid sequence for full length, mature human tissue factor protein from amino acid 1 to amino acid 263 which is encoded by the clone. NR 48-49; 1834-1835; 3782-3786; NRE 93.

The Edgington et al. position with respect to Nemerson et al.

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Edgington et al. contend that Nemerson et al. have not established conception¹¹ [sic] of the subject matter of the count because (i) “Dr. Bach’s testimony during direct examination contradicts the Nemerson et al. purported Fact Paragraph 43 (N Br. 20),” Edgington Brief, Paper No. 128, p. 29; Paper No. 347, p. 81; (ii) Dr. Spicer’s testimony demonstrates that Nemerson et al. had not obtained the complete nucleotide sequence of a DNA encoding mature human tissue factor by February 10, 1987, Edgington Brief, Paper No. 347, p. 80; (iii) Dr. Horton, a researcher who worked under the direction of Dr. Konigsberg, testified that as late as February 14, 1987, the complete nucleotide sequence for mature human tissue factor had not yet been determined, Edgington Brief, Paper No. 347, p. 81; and (iv) that it was not until March 24, 1987 that Dr. Spicer allegedly deduced the complete nucleotide sequence shown in computer printout NRE 93. Edgington Brief, Paper No. 128, p. 29; Paper No. 347, p. 81.

The Lawn et al. position with respect to Nemerson et al.

Lawn et al. state that Nemerson et al. have not proven an actual reduction to practice prior to the effective filing date of the Lawn et al. application; i.e., prior to February 12, 1987, but they provide no reasons or argument in support thereof. Lawn Brief, p. 100, the penultimate sentence.

¹¹ Since Edgington et al. acknowledge that priority in the present interference falls within the doctrine of simultaneous conception and reduction to practice (see Burden of Proof section, *infra*), we have interpreted their arguments as meaning that Nemerson et al. have failed to prove an actual reduction to practice of a species within the scope of the count (now, Count 2).

Burden of Proof

Nemerson et al. as a junior party whose application was copending with the Edgington et al. and Lawn et al. applications, bears the burden of proving their case for priority by a preponderance of the evidence. 37 C.F.R. § 1.657(b). Similarly, Edgington et al. as a junior party whose application was copending with the Nemerson et al. and Lawn et al. applications, must also prove their case for priority by a preponderance of the evidence. Id.

All the parties agree that the case for priority in the present interference falls within the doctrine of simultaneous conception and reduction to practice as set forth by our appellate reviewing court in Amgen Inc. v. Chugai Pharmaceutical Co., 927 F.2d 1200, 1207, 18 USPQ2d 1016, 1021 (Fed. Cir.) cert. denied, 502 U.S. 856 (1991). Nemerson Brief, pp. 34-36; Edgington Brief, Paper No. 128, pp. 23-26, Paper No. 346, pp. 24-28; Lawn Brief, p. 100. Under this doctrine the court has found that with respect to a complex chemical compound, such as a gene, “conception does not occur unless one has a mental picture of the structure of the chemical, or is able to define it by its method of preparation, its physical or chemical properties, or whatever characteristics sufficiently distinguish it. ... [W]hen an inventor is unable to envision the detailed constitution of a gene so as to distinguish it from other materials, as well as a method for obtaining it, conception has not been achieved until reduction to practice has occurred, i.e., until after the gene has been isolated.” Amgen, Inc. v. Chugai Pharmaceutical Co., 927 F.2d at 1207, 18 USPQ2d at 1021 (Fed. Cir.), cert. denied, 502 U.S. 856 (1991).

Since Count 2 is directed to a DNA segment comprising a nucleotide sequence coding for a human tissue factor protein from residue 1 to 263 of the amino acid sequence

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set forth in Figure 1 [of the Edgington patent], in order to establish priority the junior parties must demonstrate an actual reduction to practice of a nucleotide sequence encoding said amino acid residues.¹²

To prove actual reduction to practice, the court recently held in Estee Lauder Inc. v. L'Oreal, S.A., 129 F.3d 588, 592, 44 USPQ2d 1610, 1613 (Fed. Cir. 1997) that . . . an inventor must establish that he “actually prepared the composition and knew it would work.” Hahn v. Wong, 892 F.2d 1028, 1032, 13 USPQ2d 1313, 1317 (Fed. Cir. 1989) (quoting Mikus v. Wachtel [II], 542 F.2d 1157, 1159, 191 USPQ 571, 573 (CCPA 1976)); see also Burroughs Wellcome Co. v. Barr Lab., Inc., 40 F.3d 1223, 1228, 32 USPQ2d 1915, 1919 (Fed. Cir. 1994) (reduction to practice requires “the discovery that an invention actually works” (emphasis added)); see also Standard Oil Co. (Indiana) v. Montedison, S.p.A., 494 F. Supp. 370, 206 USPQ 676 (D. Del. 1980), aff'd, 664 F.2d 356, 212 USPQ 327 (3d Cir. 1981) (reduction to practice requires a showing of three elements: (i) production of a composition of matter satisfying the limitations of the count, (ii) recognition of the composition of matter, and (iii) recognition of a specific practical utility for the composition).

In the case before us, we find that the evidence of record demonstrates that each of the junior parties recognized (1) that the DNA which they were sequencing encoded human tissue factor based on the amino acid sequence data generated from the purified protein, and/or the ability of the expression product of the isolated clones to react with polyclonal antibodies (Nemerson Brief, p. 10; Edgington Brief, Paper No. 347, p. 8, Facts 9-12; Lawn Brief, pp. 7-10), and (2) the utility of the nucleotide sequence encoding mature human

¹² As to the recitation of “[a]n isolated DNA segment” in both the original Count 1 and the present Count 2, we construe this phrase as meaning that the DNA segment of the count does not “read on” the DNA as it occurs in its natural state in the human genome. That is, we construe the term “isolated” as introducing a “hand of man” aspect to the count and, thus, the DNA segment described therein is not a product of nature. Diamond v. Chakrabarty, 447 U.S. 303 (1980).

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tissue factor. Thus, in our view, this case turns on a determination of which party was the first to be in possession of the complete and correct sequence encoding amino acid residues 1 to 263 of the mature human tissue factor protein set forth in Figure 1 of the Edgington patent. Cf. Fiers v. Revel, 984 F.2d at 1171-72, 25 USPQ2d at 1607 (Fed. Cir. 1993).

Actual reduction to practice must be proven by corroborating facts and circumstances independent of information received from the inventor. Coleman v. Dines, 754 F.2d 353, 359, 224 USPQ 857, 862 (Fed. Cir. 1985); Reese v. Hurst, 661 F.2d 1222, 1225, 211 USPQ 936, 940 (CCPA 1981). That is, performance of the work may be done by another on behalf of the inventors; however, if done by the inventor, the inventor's activities must be corroborated. Holmwood v. Sugavanam, 948 F.2d 1236, 1239, 20 USPQ2d 1712, 1715 (Fed. Cir. 1991). This does mean that an actual "over the shoulder" observation of the inventor's work is necessary. Cooper v. Goldfarb, 154 F.3d 1321, 1330, 47 USPQ2d 1896, 1903 (Fed. Cir. 1998). Rather, a "rule of reason" applies to determine whether the inventor's testimony has been sufficiently corroborated. Price v. Symsek, 988 F.2d 1187, 1192, 26 USPQ2d 1031, 1036-37 (Fed. Cir. 1993). The purpose of the rule requiring corroboration is to prevent fraud. Berry v. Webb, 412 F.2d 261, 267, 162 USPQ 170, 174 (CCPA 1969). Whether an actual reduction to practice has been corroborated must be decided on the facts of each case. Berges v. Gottstein, 618 F.2d 771, 776, 205 USPQ 691, 695 (CCPA 1980).

Opinion on Priority

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Edgington et al. v. Lawn et al.

Lawn et al. have been accorded an effective filing date of February 12, 1987. See above, Decision on Motions, p. 7.

As noted on pp. 20-21 above, in the “Findings of fact related to Edgington et al.’s case for priority,” the earliest date of an actual reduction to practice of a nucleotide sequence encoding amino acid residues 1 to 263 of the human tissue factor protein alleged by Edgington et al. in their briefs is March 6, 1987. Edgington Brief, Paper No. 128, pp. 16, 18, 40-41; Paper No. 347, pp. 9 and 31. Even if we assume, arguendo, that Edgington et al. have met their burden of proving by a preponderance of the evidence that they had an actual reduction to practice of an invention within the scope of the count on the alleged date, this date does not “beat” the effective filing date of senior party Lawn et al. of February 12, 1987. Accordingly, between Edgington et al. and Lawn et al., we conclude that Lawn et al. were the “first to invent” within the meaning of 35 U.S.C. § 102(g).

In an attempt to defeat Lawn et al.’s constructive reduction to practice date of February 12, 1987, Edgington et al. argue that the earlier-filed Application 07/013,743 (the ‘743 Application) does not describe a species within the scope of the count. Edgington et al. contend that there are discrepancies between the nucleotide sequences set forth in Figures 2 and 3 of the earlier-filed ‘743 Application and the sequence in the Figures of the involved ‘989 Application. Edgington Briefs, Paper No. 347, pp. 33-34. Specifically, Edgington et al. point to differences in the sequence at

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nucleotides 1121, 1141, 1341, 1851 and 1861. Id., p. 34. According to Edgington et al., because of these discrepancies in the nucleotide sequences, the earlier-filed '743 Application does not establish a constructive reduction to practice of a species within the scope of the count. Id., p. 33. We disagree.

Not one of the nucleotide sequence discrepancies pointed out by Edgington et al. is in the region which codes for the mature tissue factor protein; i.e, in the region encoding amino acid residue 1 to residue 263 of Figure 1 [of the Edgington patent]. In order to establish constructive reduction to practice of a species within the scope of Count 2, the Lawn et al. benefit applications need only to disclose a DNA segment comprising a nucleotide sequence as described therein (i.e., as described in Count 2). Weil v. Fritz, 572 F.2d at 865 n.16, 196 USPQ at 608 n.16. To that end, we direct attention to Figure 2a of the '743 Application wherein Lawn et al. disclose a complete and correct nucleotide sequence encoding the referenced amino acids . Thus, since the '743 Application discloses a "DNA segment comprising a nucleotide sequence

coding for a human tissue factor heavy chain protein having an amino acid residue sequence represented by Figure 1 [of the Edgington patent] from about residue 1 to about residue 263," as required by Count 2, we hold that Lawn et al. are entitled to the benefit of the '743 Application filing date of February 12, 1987, for a species within the scope of the count.

Edgington et al. allege that the Lawn et al. parent applications fail to enable one

skilled in the art to practice the claimed¹³ [sic] invention. Edgington Brief, Paper No. 347, p. 36. Edgington et al. contend that

the contradictory information about constructing a library (Fact Statement 48), the lack of deposits or commercial availability of expression vectors (Fact Statements 43 and 44), the large number of vectors that would have to be manipulated to produce the vectors described in the specification, and the fictional mode disclosed for expression and purification of recombinant tissue factor protein lead to only one conclusion -- that the invention as described and claimed is not enabled by the specifications of the aforesaid early Lawn et al. applications. Id., p. 37.

We find these arguments unpersuasive.

First, we note that Edgington et al. have not pointed to any evidence which establishes that the teachings of the earlier-filed Lawn et al. applications would not have enabled those skilled in the art to make and use an invention within the scope of the count. That is, Edgington et al. have not pointed out any evidence which demonstrates that in view of the teachings of the '743 Application, it would have required undue experimentation for one skilled in the art to make and use a species within the scope of Count 2. Rather, on this record, all we have is attorney argument as to what the Lawn et al. parent applications disclose and why such disclosure is not sufficient to satisfy the

¹³ In their arguments with respect to whether the earlier-filed Lawn et al. applications satisfy the requirements of 35 U.S.C. § 112, first paragraph (enablement and best mode), it appears that Edgington et al. have confused two concepts. That is, Edgington et al. appear to argue that the earlier-filed Lawn et al. applications do not satisfy the requirements of § 112, first paragraph, with respect to the claimed invention. See, e.g., Paper No. 347, p. 35 ("one skilled in the art at the time the invention was allegedly made, i.e., in early 1987, would not have been able to practice the claimed invention based on the teachings of the specification" [emphasis added]). We point out that the issue here is priority. Thus, the earlier-filed applications must satisfy § 112, first paragraph, for a species within the count in order for Lawn et al. to be accorded the benefit of their filing date. Accordingly, we have interpreted Edgington et al.'s arguments as meaning that the earlier-filed Lawn et al. applications fail to enable one skilled in the art to make and use a species within the scope of the count.

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enablement requirement of § 112, first paragraph, of an invention within the scope of the count. It is well established that such arguments cannot take the place of objective evidence and, thus, we accord them little evidentiary weight. In re Payne, 606 F.2d 303, 315, 203 USPQ 245, 256 (CCPA 979); Meitzner v. Mindick, 549 F.2d 775, 782, 193 USPQ 17, 22 (CCPA), cert. denied, 434 U.S. 854 (1977); In re Pearson, 494 F.2d 1399, 1405, 181 USPQ 641,646 (CCPA 1974)(“Attorney’s argument in a brief cannot take the place of evidence”).

Second, in order for Lawn et al. to be accorded the benefit of their earlier-filed applications, said applications must provide an enabling disclosure of a species within the scope of the count. As discussed above, Count 2 is directed to a nucleotide sequence encoding the mature human tissue factor protein of Figure 1 [of the Edgington patent]. Count 2 does not require the use of a specific expression vector, specific starting material for a cDNA library, or the purification of the recombinant tissue factor protein. Accordingly, we do not find that Edgington et al.’s arguments with respect to these issues are directed to limitations described in the count.

Edgington et al. argue that Lawn et al. do not describe the best mode for carrying out the claimed invention¹⁴ in the earlier-filed applications. Edgington Brief, Paper No.

¹⁴ See footnote 13, supra, with respect to Edgington et al.’s arguments that the earlier-filed applications do not disclose a best mode for carrying out the claimed invention. We have interpreted this

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347, p. 38. According to Edgington et al., the earlier-filed and involved Lawn et al. applications direct those skilled in the art to extract recombinant tissue factor protein from the medium. Id., p. 39, para. 1. We find this argument to be misdirected.

Again, we point out that Count 2 is directed to a DNA segment comprising a nucleotide sequence coding for amino acids 1 to 263 of the mature human tissue factor protein. Count 2 is not directed to the tissue factor protein or a method of isolating said protein. Since Edgington et al. have not explained why the method of isolating the tissue factor protein is necessary to carry out the best mode of making a species within the scope of the count, we do not find that they have sustained their burden of establishing that the earlier-filed Lawn et al. applications violate the best mode requirement of § 112.

Edgington et al. argue that the Lawn et al. inventors do not satisfy the requirements of constructive reduction to practice because they were not certain of what they had on February 12, 1987. Edgington Brief, Paper No. 347, p. 42. Edgington et al. do not mention the nucleotide sequence set forth in Figure 2 of the '743 Application, but rather they focus on the protein and urge that the specification states that said Figure depicts “the predicted amino acids of the tissue factor protein together with a presumed leader signal Also, the methionine codon in the region of nucleotides 100-102 was only presumed to initiate translation of pretissue factor protein.” Id. We find this argument to be misdirected.

In our view, Edgington et al. have not considered the quoted passage in the context of the '743 Application as a whole. That is, we understand from the application, as a whole, that the quoted passage intends to convey the concept that Figure 2 shows the

argument to mean that the Lawn et al. parent applications do not disclose a best mode for making a species within the scope of the count.

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human tissue factor nucleotide sequence and the corresponding amino acids which said sequence encodes. We do not find any uncertainty with the well-known concept that a nucleotide sequence can be used to determine the amino acid sequence of a protein.

See footnote 4, above. As to the use of the term “presumed,” we point out that Websters II, New Riverside Dictionary, The Riverside Publishing Co. (1994), p. 932, defines “presume” as “to assume to be true without proof to the contrary.” Thus, we find Edgington et al.’s arguments to be semantical, and not substantive.

Nemerson et al. v. Lawn et al.

Lawn et al. have been accorded an effective filing date of February 12, 1987. See above, Decision on Motions, p. 7. Nemerson et al. did not challenge Lawn et al.’s motions. See The Nemerson et al. position with respect to Lawn et al., p. 23, above.

In order to prevail over Lawn et al., Nemerson et al. must establish an actual reduction to practice of a species within the scope of Count 2 prior to Lawn et al.’s effective filing date of February 12, 1987. To that end we note that Nemerson et al. argue that they “completed sequencing of the isolated, characterized DNA molecule encoding full length mature human tissue factor during the first week of February 1987.” Nemerson Brief, p. 40, first complete sentence. To support their case-in-chief, Nemerson et al. rely exclusively on Facts 41 through 45 and 49, reproduced on pp. 24-25, above. Id., lines 3-4. Accordingly, we have considered only these “Facts” in rendering our decision. Of these, only Facts 41 through 43 describe events which are said to have occurred prior to February 12, 1987.

Turning to the “Facts,” we note that, on their face, there appear to be several inconsistencies. In Fact 41, it is said that on February 3, 1987, Nemerson et al. had a

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computer printout of the nucleotide sequence encompassing the mature tissue factor “with minor inconsistencies.” Emphasis added. Nemerson Brief, p. 20. Facts 42 and 43, state that Dr. Bach prepared a handwritten nucleotide sequence encoding the complete mature tissue factor from amino acid 1 to amino acid 263 and communicated this information to others on February 3 and 4, 1987. Id. However, in Fact 44 it is stated that on February 19, 1987, Dr. Bach prepared a handwritten amino acid sequence of the complete mature tissue factor from which a nucleotide sequence encoding amino acids 1 to 263 could be derived. Id., p. 21. Fact 45 alleges that on February 23, 1987, Dr. Bach “printed a computer listing of the complete amino acid sequence for the full length, mature human tissue factor from amino acid 1 to amino acid 263,” from which a nucleotide sequence could be derived. Id. Finally, Fact 49 states that on March 24, 1987, Dr. Spicer, a co-inventor, printed a computer listing of a nucleotide sequence which encodes the complete mature tissue factor protein from amino acid 1 to amino acid 263. Id., p. 22. Thus, on their face, the Nemerson et al. “facts,” are not consistent with one another as to the actual date Nemerson et al. were in possession of a complete and correct nucleotide sequence within the scope of Count 2. Cf. Fiers v. Revel, 984 F.2d at 1171-72, 25 USPQ2d at 1607. That is, Nemerson et al. are stating as a “fact” that on February 3, 1987, the computer printout of the nucleotide sequence encoding mature human tissue factor in which they were possession had “minor uncertainties” (Fact 41) yet, on the same date, Dr. Bach’s handwritten nucleotide sequence is alleged to be complete (Facts 42 and 43) and correct. However, on February 19 and 23, 1987, Dr. Bach does not appear to be in possession of the complete nucleotide sequence (Facts 44 and 45). Rather, on the former date he is

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only in possession of a complete handwritten amino acid sequence of the mature human tissue factor from which it is alleged that a nucleotide sequence “could be derived,” and on the latter date he is in possession of a complete computer listing of the amino acid sequence from amino acid residue 1 to residue 263, from which it is also alleged that a nucleotide sequence “could be derived.”

In view of the aforementioned inconsistencies, we find that careful consideration of the evidence provided to support the “Facts,” is crucial. We consider first the evidence provided to support Facts 41 through 43, which are said to establish that Nemerson et al. were in possession of a species within the scope of the count prior to the “critical date,” i.e., prior to Lawn et al.’s effective filing date of February 12, 1987.

As we understand it, Nemerson et al. are relying on the work and testimony of Dr. Bach (NR 101-119, NR 156) and Dr. Spicer (NR 3822-25) to demonstrate an actual reduction to practice of a species within the scope of Count 2. Nemerson Brief, p. 10, lines 18-19; pp. 20-22, Facts 41-45 and 49; p. 40, lines 1-4. Dr. Bach is not an inventor; however, reduction to practice of an invention does not have to be done by the inventor, as long as it [the reduction to practice] was performed on his behalf. In re DeBaun, 687 F.2d 459, 463, 214 USPQ 933, 936 (CCPA 1982); Litchfield v. Eigen, 535 F.2d 72, 76, 190 USPQ 113, 116 (CCPA 1976). Thus, as a non-inventor, his testimony need not be corroborated, but it must be credible. In view of the granting of Nemerson et al.’s motion pursuant to 37 C.F.R. § 1.634, see above, Dr. Spicer is now a co-inventor. Accordingly, her statements require corroboration. Hahn v. Wong, 892 F.2d at 1032, 13 USPQ2d at 1317.

Turning first to the testimony of Dr. Bach, we find that he testifies with respect to

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Exhibits NRE 277 and 278.¹⁵ Dr. Bach states that he “wrote down the correct sequence of the mature Tissue Factor protein on document 277. And that was written on February 3, 1987, and it contains the correct nucleotide sequence and the correct amino acid sequence for the mature Tissue Factor protein.” NR 156, lines 20-24. NRE 277 is a handwritten document which is dated “1/23/87” and which consists of six (6) pages of nucleotide and amino acid sequence data which are said to have been derived from Dr. Bach’s laboratory notebook. NR 101.

Dr. Bach testifies that NRE 277 is a revised version of NRE 275. NR 101, line 25-102, line 2. According to Dr. Bach, NRE 275 is the original 1/23/87 document (NRE 275) which ended on page five (5) (MS&Y 07701) at amino acid 244. NR 108, lines 20-23. In our review of NRE 277, we find that in addition to containing further nucleotide and amino acid sequence data (i.e., beyond amino acid 244), the revised version of the 1/23/87 document (i.e., NRE 277) contains numerous modifications to said sequences. Such modifications include nucleotide and amino acid residues being crossed out and/or written over, calculations changed, etc. For example, page 6 of NRE 277 (MS&Y 7693) appears as follows:

¹⁵ In the portion of Dr. Bach’s testimony relied upon by Nemerson et al., NRE 275 is also explained.

Line No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
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As to the numerous modifications throughout NRE 277, Dr. Bach testifies that

The modifications that are -- appear on this document [NRE 277], with the exception of those circles, or those green circles, were all done on February 3, 1987. And they were -- the additional information that occurs in the later pages of the document with respect to DNA sequence was derived from a computer printout that was printed out on that date and handed to me [NRE 278] [emphasis added] [NR 103, line 24 - p. 104, line 6].

Dr. Bach further testifies that the entire page 5 of NRE 277 was “clearly a rewrite, it’s not written over or modified from the original page, it’s a rewrite of this page [MS&Y 7701], plus additional information.” NR 108, lines 1-6. Dr. Bach also testifies with respect to some of the other modifications on the revised document (NRE 277). Specifically, he testifies that (i) on page 2 (MS&Y 7689, line 20) a “GGA” codon was changed to “GGG” and a “CCT” was changed to a “GCT”; (ii) on page 3 (MS&Y 7690, line 22) additional sequence was added from residue 132 to 144 (peptide 58a);¹⁶ (iii) on page 4 (MS&Y 7691, line 10), he did not originally indicate peptide 84b which runs from amino acid residue 170 to 181; and (iv) on page 5 (MS&Y 7692, line 2), in addition to the entire page being rewritten, codon 5 was a copying error on his part. NR 105-108.

With respect to page 6 (MS&Y 7693), which has the greatest number of modifications (reproduced above), Dr. Bach states:

And the indicated open reading frame for the amino acids runs from 251, which is a glycine, and terminates with 263, which is a serine. There is [sic, are] a codon and amino acid markings that are crossed out and written over in some instances, which indicate that -- that at some point we terminated the sequence at what would have been a Histidine 259 followed by a stop codon. And this is clearly a correction of that -- that previous sequence. Instead of terminating at 259, we terminated at 263 [NR 110, lines 3-11].

¹⁶ When asked when the information about the additional peptide sequence (peptide 58a) was obtained, Dr. Bach stated, “I can’t date that exactly, but it was sometime prior to 2-3-87.” NR 106, lines 22-23.

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-- prior to the computer printout that I received on February 3, '87, I believed that the protein terminated at Histidine 259. The computer printout of that date clearly shows an open reading frame going out to 263 followed by a stop codon. And I have indicated on that computer printout a question mark, circling a cytosine residue, and written -- above that I have written a "typo ? ?," meaning was this the correct sequence or was this a typographical error on input of the data into the computer.

My recollection is that on the previous week we had written the sequence out to Histidine 259 and -- followed by the stop codon. I believed at that point, which was up -- the week preceding the weekend of the end of January, beginning of February, that we had finished the sequence and had the correct sequence as of -- out to 259.

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On Tuesday, which is February 3rd, I received a new computer printout, which indicated a different carboxy terminal in the protein. That surprised me, that is why I made the marking on the computer printout questioning whether that residue, in fact, was a cytosine or a typographical error. On rechecking of the data that was inputted into the computer, it clearly was not a typographical error, therefore, I changed this document before me, [MS&Y] 7693, to reflect the fact that the protein - - that the DNA sequence indicated that the protein sequence terminated at 263 rather than 259 [emphasis added] [NR 110, line 3- 111, line 18].

Dr. Bach testifies that he informed Drs. Nemerson and Konigsberg as well as other members of the group, in particular, Drs. Spicer, Bloem and Horton, on February 3 and 4, 1987, that the tissue factor protein was 263 amino acids in length, and not 259. NR 112, line 8- NR 113, line 1.

Conspicuous in its absence, is any explanation by Dr. Bach as to how he was able to determine the complete and correct nucleotide sequence of amino acids 1 to 263 of human tissue factor from the computer printout of the nucleotide sequence which was said to be in his possession; i.e., from NRE 278. That is, Dr. Bach has not explained how he was able to generate a complete and correct handwritten sequence (both nucleotide and

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amino acid) of mature human tissue factor from the computer printout which is incomplete and incorrect.¹⁷ We point out that the computer printout, NRE 278, contains numerous handwritten notations as to questionable nucleotides (e.g., MS&Y 7666, gaps in the sequence in nucleotide line 241 and Frame A), underlining, an amino acid insertion (e.g., MS&Y 7667, between Frames A and C), several frameshifts in the amino acid sequence (e.g., MS&Y 7667, the underlining indicates a frameshift from Frame A to Frame C and then from Frame C to Frame B), etc. In our view, the computer printout and the markings thereon indicate (i) that there were numerous inconsistencies between the known protein data and the nucleotide sequence data, (ii) that the nucleotide sequence data were incomplete and incorrect on February 3, 1987, and (iii) in contrast to Dr. Bach's testimony,¹⁸ numerous frameshifts which show that the nucleotide sequence data (NRE 278) do not provide a complete open reading frame going out to amino acid 263.

37 C.F.R. § 1.671(f)¹⁹ requires a witness to explain entries on the various pages of an exhibit. However, Dr. Bach fails to provide any explanation of the numerous notations and underlining on the computer printout (NRE 278), who made them, and when they were added. Rather, Dr. Bach testifies only with respect to the "typo ? ?" [sic, "? typo"] notation

¹⁷ In addition, we point out that Dr. Bach testified that the amino acid sequence data from the various peptide fragments was not known beyond amino acid 244 on February 3, 1987. NR 109, lines 17-21. See also, NRE 277, p. 5 (MS & Y 07694), last line. Thus, there was no peptide sequencing data which were available and which could be used to indicate the length of the nucleotide/amino acid sequence of human tissue factor.

¹⁸ We direct attention to Dr. Bach testimony that "the computer printout clearly shows an open reading frame going out to 263" (NR 110, lines 16-18).

¹⁹ 37 C.F.R. § 1.671(f) states:

The significance of documentary and other exhibits identified by a witness in an affidavit or during oral deposition shall be discussed with particularity by a witness.

as indicating a question with respect to a single cytosine residue and that as a result he rechecked “the data that was input into the computer” (NR 111, lines 13-15) and determined that there was no typographical error in the nucleotide sequence.²⁰ However, Dr. Bach does not disclose when he rechecked the data, or how it was done. Thus, we do not find that Dr. Bach’s testimony with respect to the data on the computer printout (NRE 278) provides a sufficient explanation as to how he was able to derive a complete and correct handwritten amino acid/nucleotide sequence from one which was incomplete and contained numerous errors.

Moreover, in NRE 278 with respect to the notation “? typo” (MS&Y 7669, line 961), we find that it [the notation] indicates that the “C” (cytosine residue) is to be removed. When the “C” is removed, the protein ends at the histidine residue at position 259. In fact, we find that the “His” residue at 259 is underlined and the “End” following said “His” residue circled, thus, appearing to indicate that the “His” residue is the end of the protein.²¹ That is, in Frame B, the underlining continues up to the final Trp, Lys, Glu, Asn, Ser. Then it skips to Frame C where the “His” residue is underlined and the “End” following said “His” residue is circled. Thus, in contrast to Dr. Bach’s testimony, we find that the notations in the computer printout of the nucleotide sequence dated February 3, 1987, suggest that the

²⁰ We point out that this statement appears to be inconsistent with his testimony with respect to the cytosine residue being a typographical error, that he “had to interact with the people who had read the sequence and who had entered it into the computer to verify which sequence they -- was the correct sequence. ... I do not remember who had that -- who read that sequence, but it would have been Eleanor Spicer or her technician who would have enter in it into the computer, so she certainly would have been consulted [NR 113, lines 8-15].” Dr. Bach does not indicate when such a consultation occurred or what was discussed with Dr. Spicer.

²¹ We also note that downstream from the “His” residue at position 259 and the “Ser” residue at 263, eight more “End” residues are circled. It is not clear to us, and Dr. Bach has not explained, the significance of these markings.

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protein ends at the “His” residue at position 259.

In addition, we find that Dr. Bach’s testimony is inconsistent with other evidence and the testimony of two of the Nemerson et al. co-inventors (Drs. Spicer and Konigsberg) and another witness (Dr. Horton). For example, we find that Dr. Bach’s testifies that he determined the correct nucleotide sequence of tissue factor protein and that it [the protein] was 263 amino acids in length on February 3, 1987, yet computer printouts of the nucleotide/amino acid sequence data, apparently generated by co-inventor Dr. Spicer, on later dates (e.g., NRE 282, dated February 14, 1987) still contained errors in the nucleotide and amino acid sequences. See the testimony of Dr. Horton, NR 1958- NR 1970; Dr. Spicer, NR 3953-57, NR 3965; and Dr. Konigsberg, NR 1983, discussed below.

Thus, on this record, we do not find Dr. Bach’s testimony, which is inconsistent (i) with other physical evidence, i.e., the computer printout of the nucleotide sequence which is dated February 3, 1987, as well as those generated on later dates, and (ii) with the testimony of the other witnesses; to be credible. Semiconductor Energy Laboratory v. Samsung Electronics, 4 F. Supp. 2d 477, 483 n.8, 46 USPQ 1874, 1879 n.8, (E.D. Va 1988). Accordingly, we do not find that the testimony of Dr. Bach, in combination with other evidence and testimony, establishes, by a preponderance of the evidence, that Nemerson et al. had an actual reduction to practice of a nucleotide sequence within the scope of Count 2 on February 3, 1987.

As to the testimony of Dr. Spicer, now a co-inventor, we find that Nemerson et al. rely only on her testimony at NR 3822-3825 wherein she briefly testifies about the computer listing of the nucleotide sequence of which she was in possession on February 3, 1987 (NRE 100, Fact 41). Thus, for Nemerson et al.’s case-in-chief, we have limited our

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consideration to this portion of Dr. Spicer's testimony. In addition, as we discussed above, Dr. Spicer is a co-inventor, and as such her testimony must be corroborated. See Decision on Motion, p. 10, supra. Hahn v. Wong, 892 F.2d at 1032, 13 USPQ2d at 1317; Larson v. Johanning, 17 USPQ2d 1610, 1611-12 (Bd. Pat. App. & Int. 1990)(where a witness is actually a co-inventor, even though not so named in the application, his or her testimony cannot be used for corroboration).

Dr. Spicer appears to testify that, based on the data set forth in NRE 100, she was in possession of a nucleotide sequence encoding full length human tissue factor (NR 3823, lines 12-15).²² However, we point out that the computer printout about which Dr. Spicer testifies, i.e., NRE 100, contains numerous handwritten notations as to questionable nucleotides (e.g., MS&Y 7636, gaps in the sequence in nucleotide line 241 and Frame A), highlighting, several frameshifts in the amino acid sequence (e.g., MS&Y 7637, the highlighting indicates a frameshift from Frame A to Frame C and then from Frame C to Frame B), an ambiguity between the nucleotide sequence and the protein data (e.g., MS&Y 7639, nucleotide line 781, Frame B), etc. In addition, the notations on the computer printout appear to indicate that the protein ends at the histidine residue at position 259. To that end, we direct attention to NRE 100, MS&Y 7640 wherein there is a handwritten notation "# 259" and the His residue is underlined. We note that there is also a notation in NRE 100, MS&Y 7639, nucleotide line 961, wherein a "C" is crossed out and "keep" is

²² Dr. Spicer testifies as follows [NR 3823, lines 10-15]:

Q. So this is not the nucleotide sequence incoding [sic, encoding] full-length tissue factor?

A. Yes, it does. It's not the entire mRNA sequence, but it encodes the entire protein because a lot of the mRNA is not need for the protein sequence.

handwritten above the line. The significance of these markings, and when they were made, is not clear to us and has not been explained in the portion of Dr. Spicer's testimony relied upon by Nemerson et al.²³

Moreover, as pointed out by Edgington et al., Dr. Spicer's testimony that the nucleotide sequence set forth in the computer printout dated February 3, 1987, coded for the full-length tissue factor protein is inconsistent with her statements made during cross examination with respect to the nucleotide sequence data set forth in computer printouts generated at a later date. Edgington Brief, Paper No. 128, p. 29, first complete para. That is, during cross examination, Dr. Spicer was asked to compare a computer printout of the nucleotide sequence dated February 10, 1987 (NRE 102), with the final nucleotide sequence Nemerson et al. published in a scientific journal (NRE 64). NR 3953-57; NR 3965; NR 3972. Dr. Spicer testified that there were five differences in the nucleotide sequence data generated on February 10, 1987 (NRE 102), two of which were in the coding region of the mature protein and which resulted in errors in the amino acid sequence. NR 3953-57; NR 3965. Dr. Spicer acknowledged that the error in the nucleotide sequence resulted in a frameshift in the peptide sequence set forth in the "A" reading frame. NR 3972. During cross examination, Dr. Spicer discussed the error in the nucleotide sequence on page 3, nucleotide line 301-360, of NRE 102 (MS&Y 7629). Due

²³ Like the computer printout discussed above by Dr. Bach, NRE 100 contains highlighting and many handwritten notations. However, Dr. Spicer does not testify as to when the highlighting was added to the sequence. When asked about the handwritten notations, she stated that she did not know when all of them were made with the exception of a note to herself on page 3 (MS&Y 7637) that is dated 2/5/87. NR 3824. "So that was made after the printing, obviously." NR 3824. In addition, Dr. Spicer acknowledges that not all the handwritten notations are hers. NR 3822, lines 2-13. For example, she could not identify who made the notation about missing nucleotides on page 2 (MS&Y 7636) and the "switch to long read" notation on page 3 (MS&Y 7637). Id. Thus, viewing NRE 100 in its entirety, we cannot conclude that Nemerson et al. were in possession of a species within the scope of the count on February 3, 1987.

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to this error, the last four amino acid residues of reading frame A are Asn-Ala-Phe-Thr-Gln. The sequence continues incorrectly through eleven (11) more amino acids and ends with a stop codon at approximately amino acid residue 63.²⁴ NRE 102, p. 3, nucleotide line 361-420. The final and correct published sequence (NRE 64), reads Lys-Cys-Phe-Tyr-Thr- etc. through to the Ser residue at position 263.

In addition, Edgington et al. point out that the statements made during the cross examination of Dr. Horton,²⁵ are inconsistent with Dr. Spicer's testimony that the computer printout that she [Dr. Spicer] was in possession on February 3, 1987 described a nucleotide sequence encoding the full-length tissue factor protein.²⁶ NR 3823. Dr. Horton testifies that there are nucleotide sequencing errors in a computer printout of the nucleotide sequence dated February 14, 1987 (NRE 282), which result in a stop codon at approximately nucleotide 373 (NRE 282, page 3, MS&Y 8454). NR 1958-1961. Edgington Brief, Paper No. 128, p. 29, second complete para. She testifies, inter alia, that the "frame shift mutation -- not mutation, a frameshift error and so-- I forgot exactly where, but I recall there being -- so it goes out of frame and then goes back into frame." NR 1961, lines 1-4.

To briefly summarize, from Dr. Horton's testimony we find that there must be at least

²⁴ We note that in contrast to Dr. Bach's testimony, NRE 102, dated February 10, 1987, indicates that the human tissue factor protein ends at the "His" residue at position 259.

²⁵ Dr. Horton worked under the direction of Drs. Konigsberg and Spicer. Nemerson Brief, p. 10. According to Nemerson et al., Dr. Horton read sequencing gels and entered sequence data into the computer which generated the computer printouts of the nucleotide and amino acid sequences of the tissue factor clones. Id.

²⁶ Dr. Horton's statements are also inconsistent with Nemerson et al. Facts 41-43 and Dr. Bach's testimony that he was in possession of the nucleotide sequence encoding the full-length tissue factor protein on February 3, 1987. Nemerson Brief, p. 20; NR 156, lines 20-24.

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two errors in the nucleotide sequence shown in the computer printout of February 14, 1987, NRE 282, because the correct amino acid sequence shifts from reading frame A at approximately nucleotide 347 (amino acid 47 of mature tissue factor) to reading frame B and shifts back to being the correct amino acid in reading frame A at approximately amino acid 82 (nucleotide 450). Dr. Horton acknowledges that because of the errors in the sequence, the amino acid sequence of the tissue factor protein is not the same as Nemerson's final published version shown in NRE 64. NR 1961-1970. Dr. Horton eventually concedes that the nucleotide sequence shown in NRE 282 is not the correct sequence coding for human tissue factor. NR 1970. Thus, we find Dr. Horton's testimony to be inconsistent with Dr. Bach's, and fails to corroborate Dr. Spicer's, testimony that Nemerson et al. were in possession of the nucleotide sequence encoding the complete tissue factor protein on February 3, 1987. To the contrary, the computer printout, NRE 278, indicates that as late as February 14, 1987, Nemerson et al. still were not in possession of a species within the scope of count 2.

As to the testimony of Dr. Konigsberg, we find that he states that during a laboratory meeting on February 4, 1987, Dr. Bach showed Nemerson Exhibit 277. NR 1982. Dr. Konigsberg further states that as a result of the discussions during said meeting they decided to (i) rerun some of the sequencing gels to confirm an ambiguity between the DNA and protein sequence, and (ii) rerun some other sequencing gels

of the subclones where the DNA was in a reverse orientation to determine whether the frameshift interpretation was due to G compression, thus leading to an apparent error in the DNA sequence. From the results of this experiment, we also hoped to confirm that the carboxy-terminus of human tissue factor beginning at amino acid residue 258, consisted of Ser-Pro-Leu-Asn-Val-Ser, rather than His-Ser [NR 1983].

We do not find Dr. Konigsberg's statements establish that Nemerson et al. were in possession of a species within the scope of Count 2 on February 3 (or 4), 1987.

First, Dr. Konigsberg is a co-inventor and, thus, his statements require independent corroboration. Price v. Symsek, 988 F.2d 1187, 1195, 26 USPQ2d 1031, 1037 (Fed. Cir. 1993); Hahn v. Wong, 892 F.2d 1028, 1032-33, 13 USPQ2d 1313, 1317 (Fed. Cir. 1989). Second, Dr. Konigsberg does not provide any explanation as to the ambiguity which was said to exist, which sequencing gels needed to be re-run, where the G compression was, what sequencing error he is referring to, etc. Thus, since Dr. Konigsberg fails to (i) point any factual evidence to support his position, and (ii) explain precisely what experiments remained to be done, we find that his testimony consists of broad generalizations and conclusions. Third, in our view, Dr. Konigsberg's statement that from re-running the sequencing gels they hoped to confirm the length of the mature tissue factor protein indicates that further research was necessary to determine the complete and correct nucleotide sequence of said protein. Thus, we find that Dr. Konigsberg's affidavit is inconsistent with Dr. Bach's testimony and, if anything, evinces that the Nemerson et al. co-inventors were not in possession of a complete and correct nucleotide sequence encoding human tissue factor from about residue 1 to 263 on February 3, 1987.

As we understand Fact 43, Nemerson et al. are relying on the testimony of Drs. Bloem and Lin, two research scientists in Dr. Konigsberg's laboratory, to corroborate Dr. Bach's communication

to others working on the tissue factor project that he had determined that (a) full length, mature tissue factor consisted of 263 amino acids, (b) the sequence of a nucleotide molecule encoding the complete amino acid sequence of full length, mature tissue factor from amino acid 1 to amino acid 263, and (c) the complete amino acid sequence for full length, mature tissue factor from amino acid 1 to amino acid 263 [Nemerson Brief, p. 20, Fact 43].

Nemerson et al. point to Dr. Bloem's statement that

In early February 1987, following a regular Wednesday lab meeting for the tissue factor project, I received information from Dr. Ronald Bach ("Dr. Bach") indicating that he had determined that no significant gaps remained in the nucleotide sequence encoding mature human tissue factor that had been compiled in the laboratory of Dr. Konigsberg [NR 174, para. 5].

Dr. Bloem further testifies that she called Dr. Spicer at home after the meeting to inform her that this milestone had been reached. NR 174, para. 6.

Nemerson et al. also point to Dr. Lin's statement that in January or February 1987, he attended a lab meeting for the tissue factor project and that he

received information from Dr. Bach indicating that a complete nucleotide sequence encoding the full length mature human tissue factor had been determined and that the identity and order of all of the encoded amino acids to full length mature human tissue factor, from amino acid 1 to amino acid 263 had been identified. NR 2861-2861, para. 3.

We find Nemerson et al.'s reliance on these statements to be misplaced. First, Dr. Bach is not a co-inventor and, thus, his testimony does not require corroboration. Second, we discussed above, our reasons for finding that Dr. Bach is not a credible witness. To the extent that Nemerson et al. are relying on the oral testimony of Drs. Bloem and Lin, taken some eight (8) years later, as further evidence that on February 3, 1987, Dr. Bach was in possession of a species within the scope of Count 2, we find their testimony insufficient for several reasons.

First, neither Dr. Bloem nor Dr. Lin testify as to the actual date of the lab meeting

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during which they received information about the nucleotide sequence from Dr. Bach.

Evidence of an actual reduction to practice must be to a specific point in time. Revise and Caesar, Vol I, § 152, p. 490. Second, it is not clear to us, and Dr. Bloem does not explain, what is meant by “no significant gaps” in the remaining nucleotide sequence. In our view, gaps in the nucleotide sequence indicate that Nemerson et al. were not in possession of a nucleotide sequence within the scope of the count on February 3, 1987. Third, neither Dr. Bloem nor Dr. Lin provide first-hand knowledge of the nucleotide sequence data available on February 3, 1987. Thus, their testimony adds little to the testimony of Dr. Bach in establishing an actual reduction to practice of a species within the scope of the count by the critical date; i.e., by February 3, 1987.

Finally, we note that Dr. Nemerson testifies that

On February 3, 1987, I sent a letter to Rochelle K. Seide (MS&Y 6723) reflecting that, prior to that date, we had determined the entire coding sequence of the human tissue factor clone [NR 2873, para. 18].

However, Dr. Nemerson is a co-inventor, and as discussed above, independent corroboration is needed. Price v. Symsek, 988 F.2d at 1195, 26 USPQ2d at 1037; Hahn v. Wong, 892 F.2d at 1032-33, 13 USPQ2d at 1317. Moreover, a letter sent by a co-inventor stating what he has done does not constitute independent corroboration of his work or circumstantial evidence independent of the inventors. To the contrary, the letter is merely Dr. Nemerson’s statement as to what he had done and, thus, it is self-serving.

In view of the foregoing, it is our judgment that the Nemerson et al. record fails to prove, by a preponderance of the evidence, that they were in possession of a complete and correct nucleotide sequence encoding a human tissue factor protein having an amino

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acid sequence represented by Figure 1 [of Edgington's patent] from about residue 1 to about residue 263, on the date alleged; i.e., February 3, 1987. To the contrary, as pointed out by Edgington et al., Nemerson et al. were still trying to determine the correct nucleotide sequence as late as February 14, 1987. NR 1958-1970. Accordingly, since this date is two days after the critical date; i.e., February 12, 1987, we hold that Nemerson et al. have not established an actual reduction to practice of an invention within the scope of Count 2 prior to the effective filing date accorded Lawn et al. Thus, Lawn et al. as senior party must prevail.

Nemerson et al. v. Edgington et al.

In view of our decision with respect to Nemerson et al. and Edgington et al. and their respective failure to establish actual reduction to practice of a nucleotide sequence within the scope of the count prior to Lawn et al.'s effective filing date of February 12, 1987, the case for priority between Nemerson et al. and Edgington et al. is now moot.

JUDGMENT

In view of the foregoing, judgment of the subject matter of the count is awarded to senior party to RICHARD M. LAWN, GORDON A. VE HAR and KAREN L. WION and against junior party, YALE NEMERSON, WILLIAM H. KONIGSBERG and ELEANOR K.

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SPICER and junior party THOMAS S. EDGINGTON and JAMES H. MORRISSEY.

Accordingly, on the present record,

NEMERSON, KONIGSBERG and SPICER are not entitled to a patent containing claims 1, 2, 14, 28 through 31, 38, 39 and 44 through 50, corresponding to the count;

EDGINGTON and MORRISSEY are not entitled to their patent containing claims 1 through 7, corresponding to the count; and

LAWN, VEHAR and WION are entitled to a patent containing claims 9, 11 through 14, 30 and 32 through 39, corresponding to the count.

Mary F. Downey)	
Administrative Patent Judge)	
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William F. Smith)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
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