

THE
AMERICAN LAW REGISTER.

AUGUST 1882.

EXPERT TESTIMONY—SCIENTIFIC TESTIMONY IN
THE EXAMINATION OF WRITTEN DOCUMENTS;
ILLUSTRATED BY THE WHITTAKER CASE, &c.

(Continued from p. 442, ante.)

NEXT I come to Expert Gayler's testimony, as published in the Criminal Law Magazine. (I could not, perhaps, contrive a better way of illustrating what I claim to be the only proper method of arriving at a just conclusion in such investigations, than to give the testimony of the experts in this case so far as it may be necessary to this end, and by comparing, side by side, actual fac-similes of the letters commented upon.) First. "The letter 'd,'" says Expert Gayler, "in the word 'fixed,' I found no other example of its use in any of the other writings examined, except in No. 8." (Whittaker's writing, I suppose he means), for he goes on to say, "in all the thirteen papers mentioned (of No. 8), this form of 'd' is almost invariably used." On plate 1, in the word "fixed," this "d" is seen, and also in the sixth line of plate 3. The first letter in this group is from the "note of warning," the second two (No. 27), (who, as it was stated at the trial, was one of the cadets at West Point, as I have noticed before), and in whose specimens of handwriting in my possession, it is very common; the fourth is from "No. 8," or Whittaker. Certainly, the second is as much like the first as is the fourth. It seems quite strange that Expert Gayler did not find any "example of its use in No. 27," where it so constantly occurs. It is still further separated

from "No. 8" by the hook with the point to the right, which never occurs in Whittaker's writing. Not one of the experts seems to have noticed this, and yet, if one may quote poetry in a legal paper,

"Oh, the little more, and how much it is,
And the little less and what worlds away."

"Second" (from Gayler), "the letter 'f' in 'fixed' and 'friend' I found no such resemblances in the 'f's' used in any of the other writings examined." On plate 2 line 6 these letters are given from the "note of warning" marked with a star, those from No. 27 with a "J," and those from No. 8 (Whittaker) with an "I;" certainly the two letters in the group marked "J" are made on the same principles as the one marked with a star, while the fourth letter "b" in this line might as well do service for an "f," as the letter which follows it, which is the "f" from the "note of warning" in the word "fixed."

"Third. The "p" in the words "April" and "keep" in the "note of warning" (plate 1).

This form of "p" is almost invariably used by No. 8. On plate 2, line 6, will be found two of these from the "note of warning," also from No. 27 and No. 8. It will be noticed that the backward sweep of the pen which makes the middle loop is carried across the shaft in the first two groups, while in the third it is carried barely to the shaft. I have never found it to cross the shaft in all the hundreds of these letters made by Cadet Whittaker, which I have in my possession. Here certainly is an important fact which connects No. 27 with the "note of warning," while it as *surely* separates No. 8 from it. This peculiarity is not mentioned by Expert Gayler.

"Fourth. "The letters 'th' following the figure 4 in the 'note of warning.' They are very similar to the 'th' habitually used by No. 8." He adds: "It must be noted, however, that the knee of the 'h' is less sharp at the top than No. 8 usually makes it." Had this expert stated what would seem to be the truth in the case, that nowhere in the writing of No. 8 could this letter be found with a rounded knee, he would have done strict justice in the premises. This letter, as made by No. 8, may be seen in the sixth line on plate 2 compared with the same letter from the "note of warning" and from No. 27. On plate 2, it may also be seen in the third line, which consists of a fac-simile signature of

Whittaker. Out of one hundred and fifty of these letters written in both pencil and ink taken without selection, I have not found one that has a rounded "knee."

Fifth. The capital "A" in the "note of warning." Both of these are given in plate 3, and also one from No. 27 and two from No. 8. The second "A" in the group marked "I" is the one alluded to by Expert Gayler as being "used in the date of the Requisition for Supplies." "The formation of the legs of these letters," he tells us, "is similar" (which it is not), as the second "legs" of those from No. 8 curve in an opposite direction from that of the first, and also contrast with the straight line of the second. The first "legs" of these begin with very obvious differences, and the lower "loops" of the one form almost perfect ovals, while in the other these loops swell at the bottom and end off with an acute angle at the top. And in addition to this may be seen the flourishes in the first, and the engraver-like nicety of their whole.

Sixth. The capital "M's." "These," he says, "bear resemblance to those used by No. 8." The first "M" in plate 3 is from the "note of warning," the second from No. 27, the third from No. 8. It is the only form of this letter that I find in any of Cadet Whittaker's writings.

Seventh. This takes up the small "w's," on these I make no comment. They are to be seen in the fifth line, plate 2.

Eighth. The small letter "a." I give those from "the note of warning," compared with as many from No. 27 on plate 3. On plate 4 I give all these from the "note of warning" and the envelope, six in number, seven from No. 27, and twelve from Whittaker's papers used in the case. The first and fourth lines are from Whittaker; the second from the "note of warning," the third from No. 27. In both cases I have selected letters nearest like those in the original document. It would not seem very difficult to say which of the two, No. 8 or No. 27 wrote the second row of letters in this plate. And yet Mr. Gayler says: "In conclusion, I have to report that the writing of No. 8 is the only one among all that I have examined which presented points of resemblance to the Whittaker note, sufficiently strong and numerous to warrant me in recommending the court to pursue its investigation vigorously in the direction of No. 8." In view of the four lines of the letter "a" on plate 4, should not the word resemblance read *non-re-*

semblance, and thus the conclusion be based on the same ground as that expressed in the legal publication before noticed. Or shall we conclude that there is "form blindness" as well as color blindness, and that the experts thus far incur no responsibility for their opinions?

I proceed next to notice the testimony of Expert Southworth. While attending the court in this case, there was put in my hands some fourteen photographic copies of writings, which were designated as No. 27, as I have before noted and stated, to be the production of some one of the cadets at West Point. These are the same writings with which comparisons have already been made. On page 162, Criminal Law Magazine, Mr. Southworth says: "I have no doubt, in my own mind, that the question note" (meaning the "note of warning") "was by the hand that wrote No. 27." If this is the same No. 27 from which I have taken so many of the letters in my plates, it will be seen that for some reason Mr. Southworth subsequently testified quite differently upon this point, for he says, page 152, *Id.*, that he "had been obliged to abandon the ground taken in his former report." This change was brought about by the means of some new papers being brought to his notice. The report goes on further to say: "Without going again into an analysis of the anonymous note, Mr. Southworth pointed out the cross of both the capital 'A's' and the two 'f's' in the questioned note as being *natural* and belonging to the character, &c., when fully made out by the same hand." If we look at these letters on plates 2 and 3, we shall see that the method of crossing these letters is common to all these cases. Why then should it be used to connect the "note of warning" with No. 8, rather than with No. 27? Perhaps the author of the paper in *The Criminal Law Magazine* may be able to tell us also what he means by the following, on page 170: "While it is the commonest thing in the world to attempt to disguise one's own hand by writing *worse* than he is able, no writer can follow models that are unknown to him, or write *better* than he is able." This is a truism which no one will be so rash as to dispute.

The second capital "S," on plate 3, is made on the same principles as that of the first from the "note of warning;" the next two are Whittaker's. These, with the other letters on the first line of this plate, have been commented on before. The first letter 'B' on the second line is from the "note of warning;" the second two

are from No. 27, the third two from No. 8. The second two are exactly like the first in principle, and only differ as respects the bending of the first limb of the letter. The last two differ from the others in being much more angular, in having no open loops in the central portion of the last limb, and in being comparatively of an awkward form. The "Y" has been fully discussed elsewhere. The "F" is given to show the corresponding form of the bottom loop with that of the "Y." The two last capitals in this group show a contrast as to the top loop and the bottom terminal finish. There are seven specimens of this letter "Y" on plate 3, line 5, one from the "note of warning," and three each from No. 27 and No. 8. I call especial attention to these last in reference to the terminal end. This *club shaped* end is very common with No. 27 in this letter and other analogous letters—"g" for illustration; while in Whittaker's writing I have never found it; and when he ends off his letters in this manner, *i. e.*, with the shaft bent at a right angle, the end is *pointed*, as seen in the plate. This seems an important point, for while it connects No. 27 with the "note of warning," it as surely separates No. 8 from it.

The small letters "u" and "un" are to be designated as they are marked, those with a * from the "note of warning," with "J" from No. 27, with "I" from No. 8. The bottom curves of the last limb of the "u" in the first two are remarkably characteristic, while no such broadening or elongation of this curve is seen anywhere in No. 8. The "n" also in the first two are curiously alike. Nothing of the kind can be found in Whittaker's writing. The next line is made up of the letter "a." Their origin is indicated by the characters placed over them. They are fully described in another part of this paper. By a comparison of these letters on this plate (3) we shall again arrive, I think, at a full confirmation of what was said in my first notice of this letter. The letter "d" I have given as it occurs twice in this form in the "note of warning." The first two groups are certainly alike, each to each, as are those in the last group to those in the second. The "ri" is a characteristic form of No. 27. I have never found it in No. 8. The "wo" and "wi" are given as they are found with the two letters connected in this manner in No. 27. It was stated on the trial that such a connection of these letters could be nowhere found in his writings. This was also said of "ou" which is seen in the last line of plate 2. The group marked "J" is

from the word "compounds" in one of the photographs of No. 27, numbered 13. It is from a paper on colors and "The Solar Spectrum." The last line in this plate (3) is from a genuine address on a letter (not from the Whittaker papers) and an imitation of the same in smaller characters. It is given to illustrate to some slight extent what has been called the "rhythm of pressure" in handwriting. It will be noticed in the first or genuine signature that the down strokes for the most part swell at the bottom, while in the other this fact has been evidently overlooked. This constitutes the main difference between the two signatures. It might not be deemed of much value as testimony in the absence of all other facts, but if under this condition we could obtain a good number of different specimens of the same hand and should find this habit to be constant in the down strokes of the letters, I think we should be warranted in placing considerable confidence in our conclusions. There are some other points which might be noticed, such as the difference in the middle loops of the "B," which point in a different direction in the two cases. In this illustration the expert could point out the facts in the case as I have noticed in another connection, and leave the jury to draw their own conclusions without any guidance from him. Under such conditions the idea of the expert favoring either side of a question would of course be incorrect. He would simply give the facts in the case, as would the surveyor in the measurement of a field, or the architect in stating the number and size of the rooms in a building. And even better than these, for he would verify his facts by an actual exhibition of them before the jury.

I next proceed to the examination of plate 2. A part of the letters on this plate have already been described. The first line, "Cadet Whittaker," is from the envelope of the "note of warning." The second is *made up* from the papers of No. 27. The syllable "ade" is from the word "cadet" in one of these papers. The "h" and "t" with the single letters were taken from the writing of No. 27. They were drawn, as were all the others, under the microscope, and reduced by means of the photographic process to their present size and copied at the same time on the wooden block, thus giving an almost perfect representation of the originals. If we compare the two "Cs" in the first and second signatures, and the first four capital "Cs" in the third line, and the first five small letters "c" in the fifth line we can hardly escape the

conclusion, I think, that they all belong to the same family, that of No. 27. The first "C" in the third line, the last three in the fourth, and the last four in the fifth, are *known* to belong to one family, that is they are Whittaker's production. To which of the families do the two forms marked with a * which are duplicates of each other belong? The two capitals "W," marked thus * are from the "note of warning" and the envelope. The next two are from No. 27. The last two from Whittaker's papers No. 8. As in every other case I have selected letters for comparison nearest in form to those of the same kind in the "note of warning." The signature in the third line is selected on the same principles. The second and third "b" on the sixth line of this plate are at least as much like the first from the "note of warning" as are the two marked "I" from No. 8. The fourth and fifth letter "b" and "f" on this line have been before noticed on account of their similarity of form, so that either would serve to do duty as one and the same letter. It would certainly seem as if they must have been made by one and the same hand. The "xe" on the seventh line is from the "note of warning." The second "xe" from No. 27 shows a similar method of joining this letter "x" to the succeeding letter. The other letters "x" with their connections in this plate, four in number, are all the forms of this letter I have found in Cadet Whittaker's writing. It would seem that if he had used the form seen in the "note of warning" it certainly must have occurred at least once in the numerous documents in his handwriting which I have in my possession. The three last letters on this plate show some marked contrasts of form.

On plate 5 the name "Whittaker" occurs three times. Two of the signatures on this plate, the first and third, are from Expert Hagen's plate, given as fac-similes of Whittaker's writing, and used as evidence in the last trial. The second is from the "note of warning." I have already compared the letters constituting the "note of warning" with similar letters from Whittaker's own papers. These examples, as well as those constituting the first two rows in this plate, are given as illustrations of the "standards" on which Expert Hagen based his conclusion that the person who wrote No. 8 was the same "person who wrote the contents of the note addressed to Cadet Whittaker;" and this in spite of the fact that he must have had the very same papers which I have noted as No. 27.

It will be remembered that Expert Gayler, in summing up his testimony, said: "It must be noted that the knee of the "h" is less sharp at the top than No. 8 usually makes it." This distinction is very clearly seen here. It does not seem to have been noticed by Mr. Hagen, or at least to have been thought of any value; and so of the bottom turn of "h" and the following "i." Here the same important distinction seems to exist. Notice also the letters "h" and "k" in these signatures. To say nothing of the entire difference of shape in the last letters; in the first (Whittaker's) the ink stroke is much the heavier in its last third, while in the "note of warning" the heaviest part of the letter is where the up line crosses the shaft. The "i" is also separated from the "t" in the second example, and the "t's" have solid tops in both cases, while in the "note of warning" one has an open top. There is also a very marked and important distinction in the crossing of these letters. In the one the initial portion of the stroke points distinctly upwards and the terminal portion downwards, while in the other the reverse is the fact, and moreover, in the last the crossing stroke begins heavy and grows lighter at the terminal end. This seems to be universally the fact in Cadet Whittaker's writing, whether of pen or pencil, when the crossing line is made as a single unconnected stroke, as seen in these two cases, while in the writing of No. 27 the analogy of equal thickness of stroke is everywhere to be seen. There is also a marked difference between the terminal letters "r" in the three signatures. The general aspect of the two hands, as seen in these chosen examples, is quite different. I do not allude to the comparative roughness of outline, as this is dependent upon the fact of the one being photographed from a penciled original, while the other two are copies from Mr. Hagen's plates, written in ink as I suppose. Be this as it may, he has chosen to give them as exhibits on which his conclusions were based, as I have noticed above. It would seem, from this view of the subject, that one could hardly help coming to the conclusion that his opinion was based upon the same ground as that of the other witness before mentioned, that No. 8 must have been the author of the note in question on account of its being written in a hand entirely different from his usual style.

In the last line of writing on this page is shown a method of presenting facts by which any person, however innocent, might be

convicted of any crime whatever, involving or depending upon such facts as testimony. The letters marked with a star are from the "note of warning;" the others are from a so-called "fac-simile" of this note given in the Criminal Law Magazine, pp. 147, 148. I need scarcely call attention to these letters to show how entirely they differ from those they claim to represent. The "C's" for illustration—what a caricature it is of the original! and of the others it would seem as if the intention was in thus changing them into a pointed hand to bring them nearer to Whittaker's, which is in contrast in this respect to the disputed note. Here we have made objective, what in the testimony I have noticed is clearly subjective, I think, and which is based in part upon the inability to take note of differences and resemblances of form, as is the case of some persons with regard to color. I cannot well understand the facts under consideration in any other manner; for Mr. Hagen's "fac-similes" are fairly well made, while these are, as we see them, and still the same conclusions have been arrived at in both cases. And further, these so obviously incorrect conclusions may have grown out of the want of a proper arrangement of the letters thus compared, so that they could be seen side by side with each other. In the comparison of handwriting it is simply, as I believe, impossible to carry in the mind to any great extent the forms of letters, so as to distinguish them from each other, where there is any marked similarity, and especially if these differences (which is very liable to be the case in attempted forgeries of documents) are of so minute a character as to require a microscope to detect them. By reproducing the magnified images, and placing them side by side, this difficulty may be overcome. On page 166, of this same Criminal Law Magazine, is a diagram which, with the alleged facts connected with it, I proceed to notice in this connection, as they have gone out to the world as evidence in this trial.

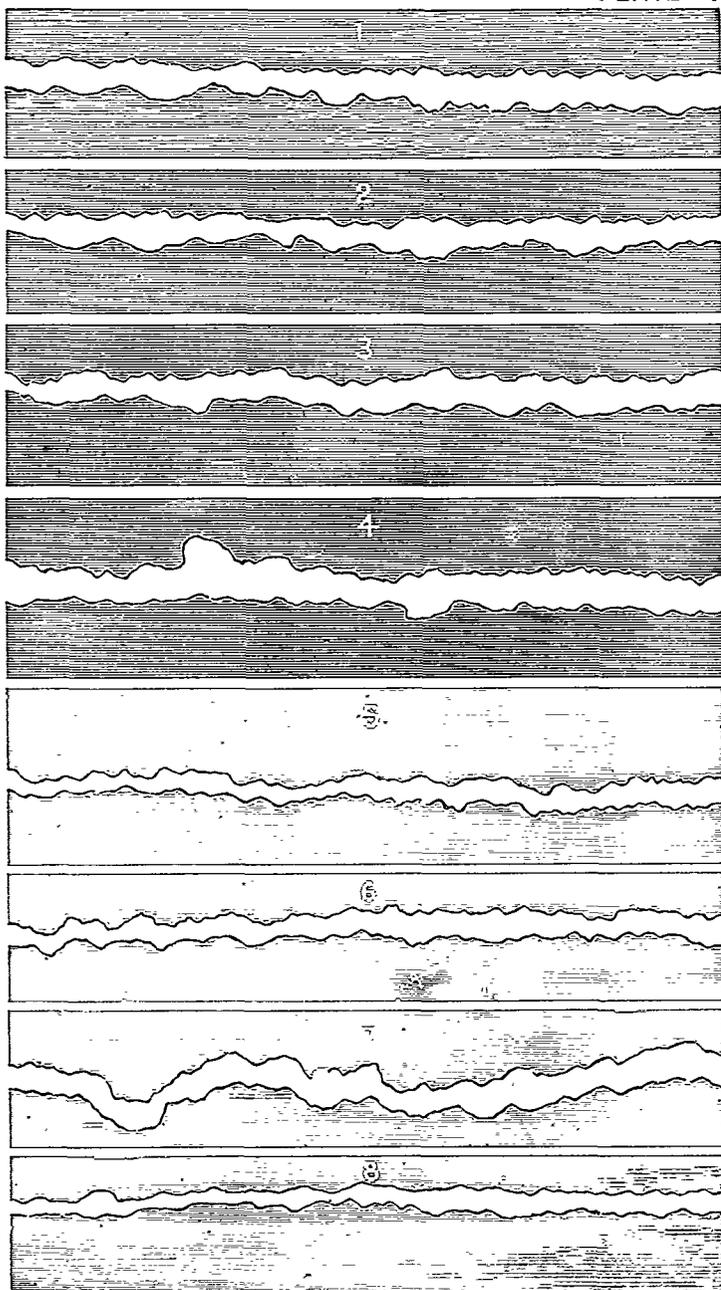
The diagram is made to represent the half of a sheet of letter paper which has been divided (torn) into three pieces for certain specified purposes; on one of these pieces it is said the "note of warning" was written, while the other two were used for purposes which were not brought under my notice for examination. If the diagram is intended to convey a correct idea of one of the facts in the case, *i. e.*, the relative size of the different pieces of paper which constitute the entire sheet, it fails to do so, as it entirely

misrepresents the matter in this respect. A sheet of this paper, as I measured it, contains, as is the fact with many other samples of paper of this form, over one hundred and sixty (160) square inches of surface; a half sheet some eighty (80) square inches. Now the "note of warning" is represented in this diagram as occupying more than one-third of the area of the half sheet, that is at least thirty square inches. The "note of warning" itself measures three and two-tenths (3.2) inches by two and six-tenths (2.6) inches, giving an area of eight and thirty-two one hundredths (8.32) inches. There is nothing in the text of this paper to show that the diagram alluded to was not intended to correctly represent the original. It is, therefore, at least as fair to say of it that it goes as far in this direction as does Mr. Southworth's testimony, which was based upon the relation of facts which it professes in part to set forth.

Expert Southworth says (Criminal Law Magazine, pages 165-6): "I have a sheet of paper from which the paper on which the anonymous note is written was torn. The fact is easily discernible to ordinary vision with the naked eye." Again. "The torn edges of the paper in two places, the ruling and the machine cut at the original transverse edge, it was apparent without any microscope, fitted exactly."

Here are three facts mentioned, only one of which, nor that, indeed, necessarily, goes to connect Cadet Whittaker with the authorship of the "note of warning." The fact that the ruled lines "fitted" could not well help to be so, as the paper was the same manufacture as is used by the other cadets at West Point, and the "machine cut," if it means anything, goes to the same end of showing that the paper was of the same manufacture as that in the hands of the other cadets, and that, therefore, not one of them would have had any trouble in this direction in producing the note in question. The question then only remains: did the "torn edges of the paper fit" so as to be "easily discernible by the ordinary vision," or, indeed, was there any proof whatever in this respect, that they fitted at all. On the contrary, did not the facts in this connection all tend to show that no such union as is here alleged ever existed? I certainly examined the originals with great care, both with the unaided eye and with magnifiers, and came to this last conclusion. Further, there were placed in my hands, at the trial, photographs of the pieces of paper in juxta-

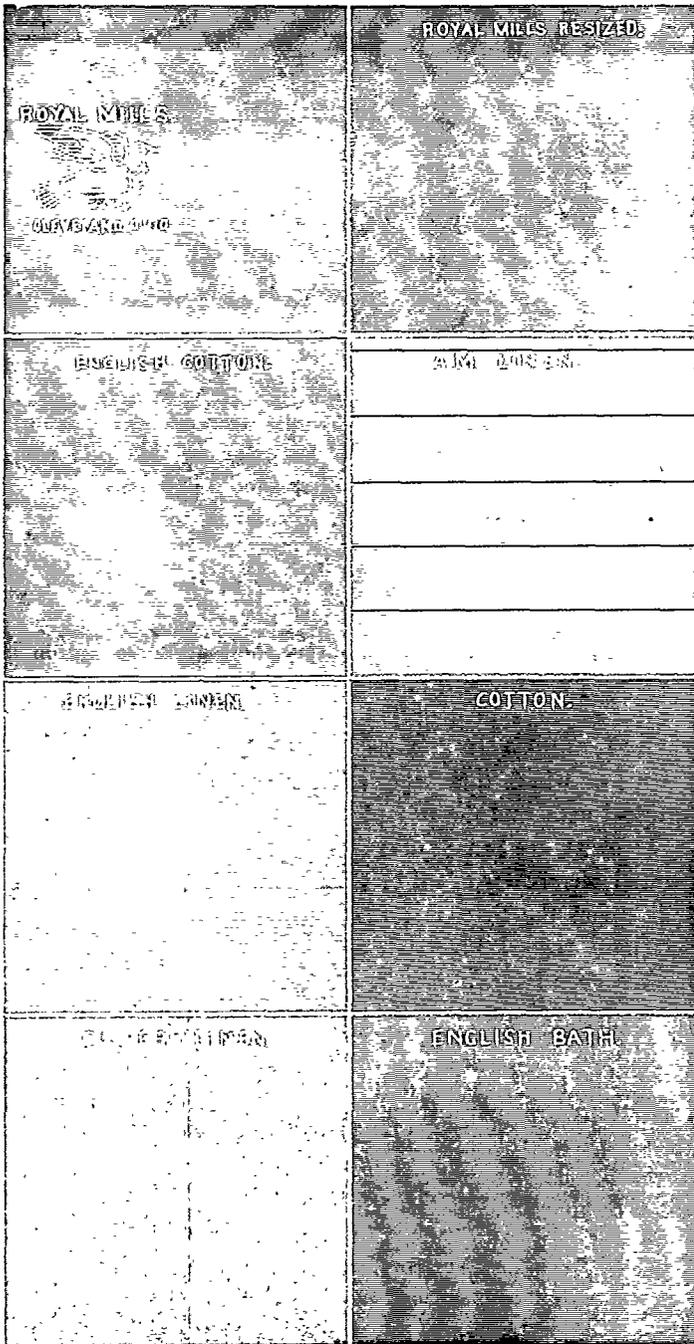
PLATE 6.



position as described by Expert Southworth, and these viewed by the unaided eye and also by the help of the microscope, fully confirmed this conclusion. The photographs alluded to were "Southworth's, Diagram C, No. 3." I made careful drawings of the torn edges of the paper, as shown by these photographs, under the microscope, and testified on them at the trial. Since then I have gone over the whole ground again, and hereby exhibit the results in plate 6. The first, second, third and fourth diagrams of plate 6 are from the papers described, showing the value of Mr. Southworth's statement, where he says: "An inserted spot (indentation) on one edge has its corresponding tooth opposite." The magnifying power in these cases is about seven diameters, hence, one of these strips represent the length of half an inch of the edges of the original documents. The lower diagram (No. 8) is from the "note of warning" (and the piece of paper from which it was divided, as testified by Mr. Southworth. It was copied from the photographs, as described above.) It is magnified some five diameters, and shows about three-fourths of an inch of the torn edges of the paper. The remaining three diagrams (5, 6, 7) are from actual experiments on two kinds of paper, No. 5, legal cap, Nos. 6, 7, linen paper torn in two directions. These specimens were torn under precisely the same conditions by the side of a metallic plate; the magnifying power was the same as in the first four specimens. It will be seen by this, I think, that some evidence of the fitting of the torn edges of paper should be shown, in order to render such testimony of any value in the courts. There is a method by which paper can be torn so that different kinds may be made to fit as well as in the genuine experiments shown in diagrams 5, 6, 7. Hence, in the absence of other testimony corresponding with it, such fitting of edges could be deemed of but little value. What should be said in this case then where it can be shown to a demonstration that the edges of the specimens in question could not, so far as anything can be deduced from the appearance, have ever been united?

There is one other fact which I proceed to mention in this connection, as it relates to my general subject; I have given a plate (plate 7) illustrating this subject, as far as this can be done by means of an engraving. It consists, in the main, in the results obtained by exposing, at the same time and under the same conditions of arrangement, certain substances regarded or seen as

PLATE 7.

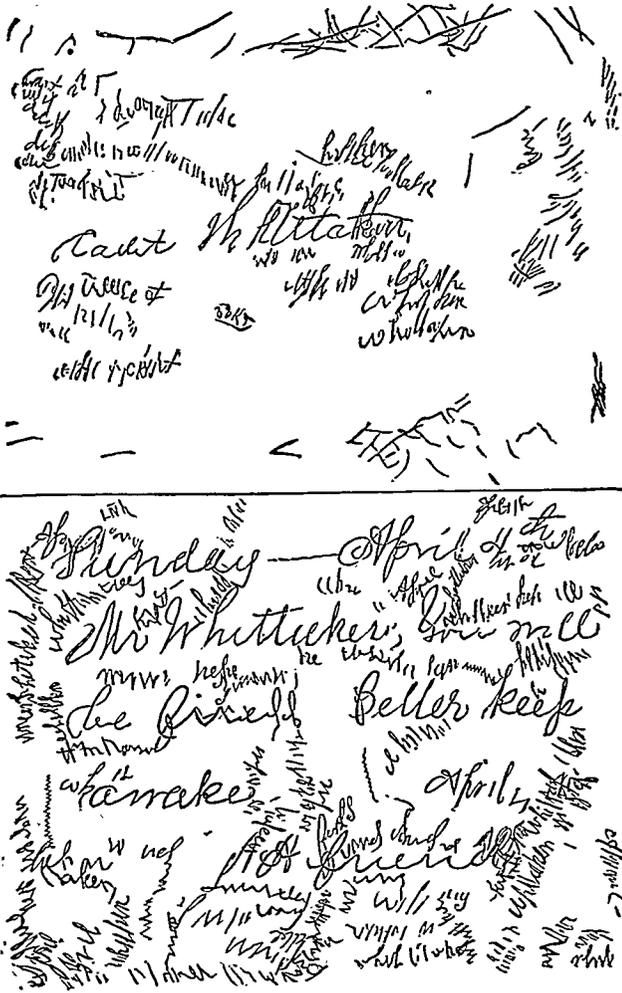


similar, to the photographic process. Thus, white paper, from pieces of which mounted on other paper the plate is made, shows not only differences of color and depth of shade, as seen in the engraving, but differences of texture as well. It is also a fact that paper which has undergone a change by keeping, so as to become in the slightest degree yellow, will take many shades deeper than fresher paper of the same kind. And so of inks used in ruling, &c., under the ordinary photographic process—*e. g.* yellow or orange lines, as seen in one of the specimens on the plate, while light blue or purple will show but faint, if at all. A dark or deep blue sometimes shows quite distinctly by the side of a fainter blue.

Now if all these conditions should obtain in a given case; if two pieces of paper should be arranged side by side, as in the plate, and the resulting photograph in the one should be darker than the other, if the two should also differ in color so that one should appear of a reddish grey while the other should appear of a blueish grey, and, moreover, the ruled lines in the one case should appear quite plain, while in the other they were hardly perceptible, we might feel warranted, I think, in coming to the conclusion that the two pieces of paper, thus compared, never belonged to one and the same piece. Now this is precisely the fact in regard to the photographs I have described as being used on the Whittaker trial. Duplicates of these photographs lie before me as I write, on one of which I testified at that trial. I remark here that all the documents on which this paper is founded, with the exception of the original note, and the two pieces of paper said to be torn from the same sheet, are in my possession, and I appeal to them for the substantial correctness of all of my statements. .

Next comes the most remarkable piece of testimony exhibited in this most remarkable trial, and perhaps the most remarkable which has ever been known in any court since such institutions first came into existence. This piece of testimony has gone out to the world in such a guise as to have been frequently cited as unanswerable proof of the guilt of the accused. Its character may be inferred, perhaps, from the fact that it is the production of the last witness whose testimony I have examined, *viz.*, Expert Southworth. It was not produced on the first trial. Plate 8, embodies as far as may be, perhaps, the ideas which go to make up this piece of testimony. This plate consists of a fac-simile copy of the "note of warning," and the address on the envelope,

PLATE 8.



together with other writings on the same papers, professed to be as brought out by Mr. Southworth on enlarged photographs of these papers. On the original "note of warning" and the envelope, no such writing could be seen either by the unaided eye, or by means of the microscope. Neither could it be seen on photographs of these papers which were made of the same size, or nearly the same size as the originals; but when magnified three diameters, that is, nine areas, according to Expert Southworth, this underwriting is

plainly visible. Now, on these enlarged photographs, the original writing on the note and envelope appears nine times as large as on these papers themselves, while this *underwriting* is mainly of the same size on these enlarged photographs as that on the original papers in their normal size. Thus, the original letters, as seen on these photographs, appear of gigantic size by the side of the underwriting which is of normal size, so, that when Mr. Southworth's tracing is reduced to its original size, as it was when both the underwriting and overwriting was made, we find that a good deal of the underwriting is microscopic in its character. Mr. Southworth's theory is that Whittaker practised this underwriting as a preparatory exercise previous to producing the note and envelope; that this underwriting was in pencil, as was the note; and that it was rubbed out, and afterwards the note itself written on the same paper. Had so foolish a scheme as this been put into execution, the note being written as it was on ruled paper, it will be at once inferred that in the operation of rubbing out the pencil-marks, the ruling would have been as surely obliterated. This was found to be the fact by repeated experiments, once in the presence of the court and under their direction. In this case some of the "West Point paper" (ruled) was taken and penciled over with a soft pencil, to the extent and in the manner directed by the court. Next, the pencil-marks were removed by means of India rubber, when it was found that the ruled lines had also disappeared. These lines were intact on the original note, and also show as I have before stated on the photographs made from this note.

The above facts alone would seem to amount to a demonstration that this whole piece of testimony was but the production of the imagination. If such hallucinations are to be received at all, as testimony in any court, surely, as here set forth, the jury would be as competent to arrive at a conclusion in regard to it as the expert witness, whose province it is thus to state it. It may be well to notice here that the faculty of being able to see, or imagine the presence of letters and other forms on irregularly darkened paper surfaces, as produced by the photographic process, &c., is common enough as I have found by actual experiment. In the present case, I, myself, with others, could trace the appearance of writings on Mr. Southworth's photographs. But no two individuals, when making these tracings by themselves, would see the same letters, nor would they seem to be in any recognisable hand. In some

cases grotesque images would appear, mingled with forms of letters and other objects. The strange fact in the matter is, that any one should have once thought of using this "stuff, of which dreams are made," as testimony in any case.

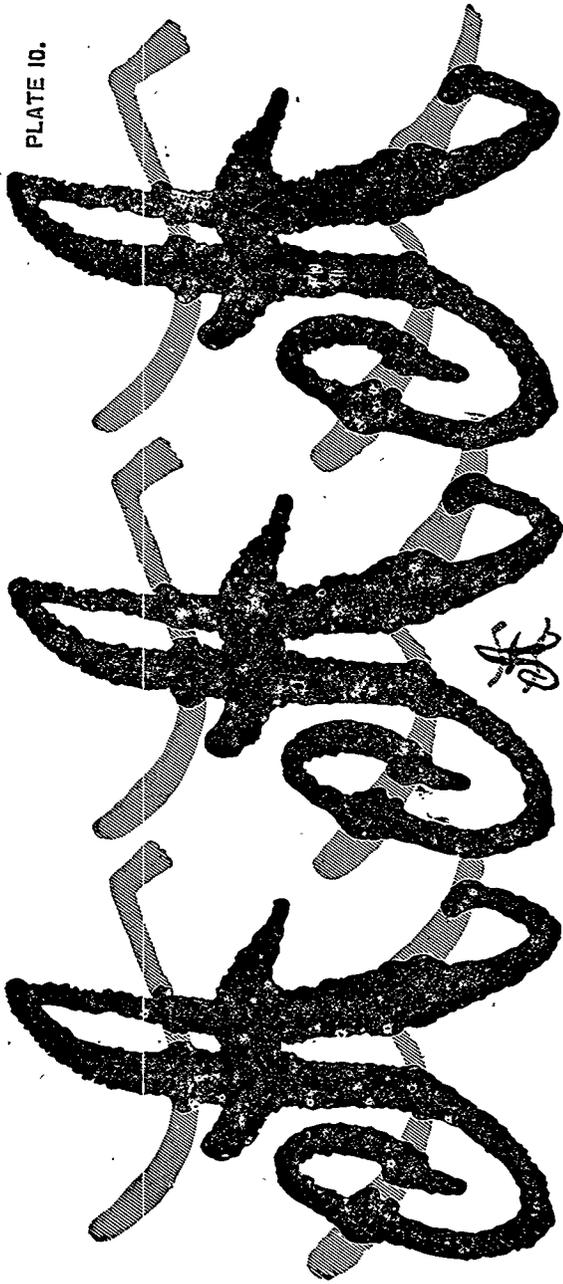
I ought perhaps to add, as a further illustration of this matter, a description of what I showed on the trial, *e. g.*, an enlarged photograph of a clean piece of paper of a slightly yellowish aspect, on which I had made some lines of writing. Of course, as in the photograph of the "note of warning" which I have been discussing, these letters appeared enlarged in the same proportion as the paper itself. On this paper I myself, as well as several other persons to whom I submitted it, could trace letters and various other forms precisely as we could do on Mr. Southworth's enlarged photographs as before stated. These "imaginary" letters appeared, as in his case, of the normal size, and had the paper with the genuine and imaginary writing been reduced to its original size of course this *underwriting* would, as shown in the plate, appear of a *diminished size*, as must have been the fact had it existed on the paper previous to my executing the "lines of writing" as stated above.



PLATE 9.

Plate 9, illustrates the fact that letters written in pencil may be made to appear quite different on photographs taken before and after the pencil dust has been moved by rubbing. The single "p" in the group is a magnified reproduction of the letter in the word April on the photograph of the "note of warning" furnished me early in the case, as I have mentioned before. The other "p" is from a later photograph presented to the court by the judge advocate as showing that this letter was of different form from my

PLATE 10.



representation of it. It is an exact reproduction of this letter as seen in this photograph, a copy of which I have in my possession, it being the one on which I testified. All the letters on this photograph, with the exception of this, appear as clean in their open spaces as does the "A" in this plate. This fact joined with the other that in my first photograph this letter is thus clean, shows to a demonstration that this letter must have been somehow changed between the times of taking the two photographs. In my examination of the original note I could clearly see that this letter had been rubbed as I have described. And, further, under the microscope, even on the photograph, the original lines can be distinctly seen as exhibited in the plate. I do not know that this fact had much bearing on the case. It seemed as if it were deemed of importance by the manner in which it was presented to the court. It certainly should be placed, I think, in the same category as all the other testimony I have thus far examined in this case.

My tenth plate is made to show how, under the microscope and in the hands of a skilful engraver, a letter may be so copied as to represent every appreciable fact connected with it with the exception of color. Thus, heavy or light lines, crossing lines, the one under or over, which frequently becomes an important question in these cases, and other facts as shown in my plates. The three large drawings of letters in this plate are made from the small one under the microscope on three separate times. They have been transferred directly on the wood block, and are in the true sense of the term actual fac-similes of the originals. These enlarged images also serve to show how under the microscope every form and feature of a letter, however small, may be brought out and placed in a condition, as I have before said, so that the court and jury in a given case may be as well qualified to decide the value of such testimony as the expert himself whose province it is thus to present it.

I wish to acknowledge here the care and skill of Messrs. Baker & Co., who have enabled me to present such perfect fac-similes of my original illustrations.

R. U. PIPER.
