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COMMONWEALTH OF MASSACHUSETTS

NORFOLK, ss.
No.

IN THE SUPERIOR COURT,
Criminal Session.

COMMONWEALTH OF MASSACHUSETTS

v.

NICOLA SACCO and BARTHOLOMEO VANZETTI

AFFIDAVIT OF ALBERT H. HAMILTON

Albert H. Hamilton, being duly sworn, deposes and says:

My name is Albert H. Hamilton. I reside in Auburn, New York. I am sixty-two years old. By profession I am a micro-chemical investigator and criminologist. I have been engaged in this work thirty-seven years. In the course of my experience I have been employed in one hundred and sixty-four homicide cases throughout the United States; and in about ninety per cent of these cases I was employed by the prosecuting officers, that is, on behalf of the Government. I have also been employed in a number of cases by the United States Postal Department, and by Attorneys General of the State of New York on various occasions.

I am a graduate of the then New York College of Pharmacy, Chemistry, and Microscopy, now a department of Columbia University.

In connection with my work I have repeatedly visited all the leading American cartridge, revolver, and pistol factories, and have inspected critically the machines used, their products, the working of their machine tools, and the peculiarities of manufacture that give individuality to a firearm or to cartridges used therein. I have also fired many thousands

of cartridges of various calibers in revolvers, pistols, rifles, and shotguns, and have examined critically the products and results of these test shots.

In a great many of the homicide cases in which I have been engaged one of the important questions of fact has been, Did the fatal bullet pass through the disputed weapon?

My attention was first attracted to the Sacco-Vanzetti case by reading a short press article in an Auburn, New York, newspaper sometime in 1921 or 1922, after the trial, and while some form of motion was being made for a new trial. The article referred to a conflict in the testimony of the gun experts.

On March 20, 1923, I was asked by Fred H. Moore, Esq., one of the counsel for the defendants, to come to Boston and examine the exhibits and review the expert testimony. I made it a condition of employment as an expert for the defence that I should first, before making any engagement, be permitted to examine the pistols, cartridges, and other similar exhibits in the case falling within the scope of my profession so that I might impartially and independently reach a conclusion as to what may be called the expert facts, and also the facts patent to intelligent lay observation. I was permitted to make this examination, which lasted the entire afternoon of April 6, 1923, and the entire forenoon of April 7 from 9.30 A.M. to 1.30 P.M., in one of the court rooms at the Court House in Dedham. In making my examination of the exhibits I first used a pocket simple microscope, and afterwards a Bausch & Lomb professional compound microscope equipped with their Filar micrometer, an instrument that can measure to one one-hundred-thousandth of an inch.

The result of my examination satisfied me that I was entirely justified in furnishing my services to the defence, both on the general motion of both defendants for a

new trial, and on the particular motion of both defendants for a new trial on the ground of alleged misconduct of the juror Ripley. My present affidavit is confined to the facts which I observed bearing upon what may be called the Ripley motion last above mentioned.

I made a careful comparison and microscopical examination of the three Ripley cartridges and of the five Vanzetti cartridges (Exhibit 32) taken from Vanzetti's Harrington & Richardson revolver (Exhibit 27). Incidentally I may say that I found the manufacturer's number of Vanzetti's revolver to be G82581. That number was not testified to by any witness in the case.

I annex to this affidavit and make a part hereof and mark Exhibit A, an album containing three photo-micrographs, pages 1-3 inclusive, of the Ripley and Vanzetti cartridges magnified to about two and one-half diameters. In making my microscopic investigations, however, I used powers running as high as fifty diameters. My photography was confined to the court room and it was impracticable to photograph more than two and one-half diameters in the court room. In a laboratory I could have photographed much higher degrees of magnification. There is one important purpose for which a photograph of a higher degree of magnification would be very important to exhibit a fact which I have observed and which is not shown on the three photographs contained in the album, namely, the land and groove markings on the ~~Vanzetti~~ Ripley bullet shown at the extreme right hand of the ~~five~~ three cartridges on the ~~top~~ bottom of the photograph p. 1. I will explain further in a moment the significance of these markings. I was not permitted to take the cartridge out of the court room to the laboratory for the purpose of making this photograph.

I regard it as of extreme importance to discriminate between the conclusion which an expert would draw from an examination of the Vanzetti cartridges as to their probable age,

and the conclusion that would be drawn by a non-expert comparing the Vanzetti cartridges with other cartridges of a known age.

Three of the five Vanzetti cartridges are of one make and two of another. The three at the left hand of the picture on p. 1 are made by the U. S. Cartridge Company of Lowell, Mass., and the two at the right hand by what is now known as the Remington-Union Metallic Cartridge Company of Bridgeport, Conn., which I know to be a consolidation of the Remington Arms Company of Ilion, N.Y., and the Union Metallic Cartridge Company of Bridgeport, Conn. This consolidation was made about ten years ago.

A casual or even a careful comparison of the color of the metal of the primers of the three Ripley cartridges and of the five Vanzetti cartridges shows that the color is substantially the same, and is in fact a discoloration of the copper which is the result of time, and may occur with greater or less rapidity depending upon the conditions to which the cartridges have been exposed. But the three primers marked "U.S." among the five Vanzetti cartridges shown on p. 2 of the photographic album contain evidence plain to an expert, but not obvious to an ordinary observer, that the shells containing the letters "U.S." were only recently taken from the original package. In other words, the appearance of the lettering on the three "U.S." Vanzetti cartridges offsets the inference that would ptherwise be drawn from the general discoloration of the metal of the primers on all five of the Vanzetti cartridges. My confident belief is that all five of the Vanzetti cartridges were taken from the original packages to which they respectively belonged within less than four years of the present time; but I am equally confident of the opinion that that conclusion would not be drawn by anyone who limited his observation to the coloring of the metal of the primers alone. The force of

the evidence drawn from the lettering is only apparent under the compound microscope, and cannot be observed by the unaided eye. Under a compound microscope such as the one I used, the appearance of the lettering not only upon the primers of the three "U.S." Vanzetti cartridges, but also the appearance of the lettering upon the shell itself of those three cartridges and upon the shells of the two "Rem.-U.M.C." cartridges, confirms the conclusion just above stated. On the other hand, the discoloration of the brass on all five Vanzetti cartridges, not only of the primers but of the shells themselves, would lead the unaided eye to the contrary conclusion, namely, that all of said shells were of considerable age. X

X Applying the same tests to determine the actual age of the three Ripley cartridges, we find the same discoloration of the metal, and I also found under the microscope a well-defined corrosion of the metal in the lettering which was consistent with and confirmed the appearance of age indicated by the discoloration of the end of the shell itself. The three Ripley shells cannot, in my judgment, have left the original factory package less than fifteen or at least ten years ago. The middle one of the three Ripley cartridges shown on p. 1 of the photographic album is the oldest of the three, having a bullet of soft lead (a "soft head"), and being more discolored on the sides of the brass than the other two. X

Further referring to the three Ripley shells, I observed first under the microscope plain and unmistakable signs that the Ripley cartridge of which the primer is marked with an X, being the cartridge shown on the extreme left of the three on p. 2 of the album, and the one shown upright at the extreme right of the lower row of three on p. 1 of the album, had been pressed into the muzzle of a thirty-eight calibre revolver; and after putting the rim of the muzzle of the Vanzetti revolver under the microscope, using a magnifica-

tion of only five diameters, I found an exact correspondence shown by micrometer measurements between the marks on the bullet of said last mentioned cartridge and the width of the lands in the Vanzetti revolver, showing that this bullet had been pressed by someone into the muzzle of a thirty-eight calibre Harrington & Richardson revolver having the exact muzzle measurements of the Vanzetti revolver. Upon making a comparison between the marks on this bullet and the muzzle measurements of the Ripley revolver I found that the marks on the bullet did not correspond, so that I am able positively to affirm that this bullet was not pressed into the muzzle of the Ripley revolver.

I further observed three markings, each different from the other, scratched upon the primers of the Ripley shells. They are shown in the photographs of the base of the three Ripley cartridges on p. 2 of the photographic album. Beginning at the right the photograph shows a primer with a straight scratch across it. This cartridge is the cartridge shown on p. 1 as at the left of the lower three. The middle shell on p. 2 is also marked with a straight scratch and two scratches projecting from the same not at the same point. This is the middle cartridge shown in the row of three on p. 1 of the album. The third, at the left of the three shown on p. 2 of the album, being the one shown on the extreme right of the three on p. 1 of the album, is marked with a heavy line through the middle and a small cross at the right of the heavy line.

On each of the three primers of the three Ripley shells it is apparent on an examination through the compound microscope that the deep long lines shown on each were first put on clear across the top of the primer, and that on the two left hand shells shown on p. 2 the small cross on one and the two short lines on the other were subsequently added. This is apparent from an observation of the effect of the push on the metal by the instrument with which the marks were made.

Any of these marks made on the three Ripley shells are sufficient to distinguish and do distinguish said shells from any and all of the five Vanzetti shells, which have no such marks either upon shell or primer, so that there is no difficulty in separating the eight shells if they are mixed together for purposes of comparison.

A comparison of the three Ripley cartridges with the five Vanzetti cartridges discloses to observation unaided by the microscope the following elements of similarity:

First: The element already mentioned of a discoloration of the brass substantially the same in all eight cartridges, except the middle Ripley cartridge, which is somewhat more discolored than any of the other seven.

Second: A comparison of the beveled base of all three Ripley shells with the beveled base of the two "Rem.-U.M.C." Vanzetti shells shows a close similarity of form as being products of the same factory.

Third: The general contour and shape of the bullets in all eight cartridges is the same.

Fourth: A comparison of the wide zone of metal at the crimping on the Ripley bullet at the left on p. 1, with the wide zone of metal at the crimping on the Vanzetti bullet on the extreme right of the same photographic page, said two cartridges being shown side by side on p. 3 of the photographic album, shows a similarity amounting to identity not only between these two cartridges, but between these two and the middle Ripley cartridge on p. 1 in this respect.

Fifth: The narrow lead zone at the point of crimping on the bullet of the Ripley cartridge at the right on p. 1 of the album, compared with the narrow lead zone at the same place on the fourth from the left of the Vanzetti bullets shown on the same page, and on p. 3 where the two cartridges are placed side by side, shows also an element of striking similarity.

The Ripley cartridges used in the fourth and fifth comparisons above referred to can be identified by the supplementary markings hereinbefore referred to made upon the primers in addition to the straight heavy line scratched across the primers.

X There is no question that a comparison of the three Ripley cartridges with the five Vanzetti cartridges, if made without the aid of a microscope, and simply with the unaided eye, would lead to the conclusion that they were all of substantially the same age, and that they had all been taken from the original packages at substantially the same time, namely, a time not less than seven or eight years from the present time. X

I further observed under the microscope on each of the three Ripley bullets and on the ~~two~~ three right hand Vanzetti bullets shown on p. 1 of the album, what appear to be fingernail scratches such as would be made for the purpose of testing the hardness of the lead.

X In conclusion I desire to repeat again what I have already stated in the earlier part of this affidavit, that if we pass from a comparison of the Vanzetti and Ripley cartridges unaided by the microscope to a microscopic comparison, it is entirely clear that the Vanzetti cartridges were taken from the original package at a much later date than the three Ripley cartridges, and also that they were not manufactured at the same time or by the same tools. X The distinctions about to be referred to are indicated by pen and ink arrows shown in connection with the two right hand Vanzetti cartridges and all three Ripley cartridges on p. 1 of the photographic album. Without going into detail it is sufficient to say that the swedging on the right hand Vanzetti bullet was made with a different die, resulting in a concave swedging, from the swedging on the left hand Ripley bullet, which is convex. Similar differences occur in the crimping and swedging of the

other Ripley and Vanzetti cartridges, the fact being that it is possible to determine what machines were used in the crimping and swedging of all these cartridges, and that it is a fact that the three Ripley cartridges were manufactured earlier than any of the five Vanzetti cartridges. This is the certain result of ascertainable mechanical differences which I can explain in detail if required.

Albert H. Hamilton

COMMONWEALTH OF MASSACHUSETTS.

Suffolk, ss.

Subscribed and sworn to this 14th day of April, 1923, before me,

Wm G Thompson

Justice of the Peace.

My Commission Expires
March 2, 1927.

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COMMONWEALTH OF MASSACHUSETTS

NORFOLK, ss. SUPERIOR COURT

No. Criminal Session

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v.

NICOLA SACCO and BARTHOLOMEO VANZETTI.

AFFIDAVIT OF ALBERT H. HAMILTON.

1923 April 16.
Filed in Court
Att: R V Worthington Clerk

WILLIAM G. THOMPSON
ROMNEY SPRING
1133-1139 TREMONT BUILDING
BOSTON, MASS.

COMMONWEALTH OF MASSACHUSETTS

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I regard it as of extreme importance to discriminate between the conclusion which an expert would draw from an examination of the Vanzetti cartridges as to their probable age, and the conclusion that would be drawn by a non-expert comparing the Vanzetti cartridges with other cartridges of a known age.

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two at the right hand by what is now known as the Remington-Union Metallic Cartridge Company of Bridgeport, Conn., which I know to be a consolidation of the Remington Arms Company of Ilion, N.Y., and the Union Metallic Cartridge Company of Bridgeport, Conn. This consolidation was made about ten years ago.

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other hand, the discoloration of the brass on all five Vanzetti cartridges, not only of the primers but of the shells themselves, would lead the ujaided eye to the contrary conclusion, namely, that all of said shells were of considerable age.

Applying the same tests to determine the actual age of the three Ripley cartridges, we find the same discoloration of the metal, and I also found under the microscope a well-defined corrosion of the metal in the lettering which was consistent with and confirmed the appearance of age indicated by the discoloration of the end of the shell itself. The three Ripley shells cannot, in my judgment, have left the original factory package less than fifteen or at least ten years ago. The middle one of the three Ripley cartridges shown on p.1 of the photographic album is the oldest of the three, having a bullet of soft lead (a "soft head"), and being more discolored on the three sides of the brass than the other two.

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the bullet did not correspond, so that I am able positively to a affirm that this bullet was not pressed into the muzzle of the Ripley revolver.

I further observed three markings, each different from the other, scratched upon the primers of the Ripley shells. They are shown in the photographs of the base of the three Ripley cartridges on p.2 of the photographic album. Beginning at the fight the photograph shows a primer with a straight scratch across it. This cartridge is the cartridge shown on p.1 as at the left of the lower three. The middle shell on p. 2 is also marked with a straight scratch and two scratches projecting from the same not at the same point. This is the middle cartridge shown in the row of theee on p.1 of the album. The third, at the left of the three shown on p.2 of the album, being the one shown on the extreme right of the three on p.1 of the album, is marked with a heavy line through the middle and a small cross at the right of the heavy line.

On each of the three primers of the three Ripley shells it is apparent on an examination through the compound microscope that the deep long lines shown on each were first put on clear across the top of the primer, and that on the two left hand shells shown on p.2 the small cross on one and the two short lines on the other were subsequently added. This is apparent from an observation of the effect of the push on the metal by the instrument with which the marks were made. Any of these marks made on the three Ripley shells are sufficient to distinguish and do distinguish said shells from any and all of the five Vanzetti shells, which have no such marks either upon shells or primer, so that there is no difficulty in separating the eight shells if they are mixed together for purposes of comparison.

A comparison of the three Ripley cartridges with the five

Vanzetti cartridges discloses to observation unaided by the microscope the following elements of similarity:

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Second: A comparison of the beveled base of all three Ripley shells with the beveled base of the two "Rem.-UMC" Vanzetti shells shows a close similarity of form as being products of the same factory.

Third: The general contour and shape of the bullets in all eight cartridges is the same.

Fourth: A comparison of the wide zone of metal at the crimping on the Ripley bullet at the left on p.1, with the wide zone of metal at the crimping on the Vanzetti bullet on the extreme right of the same photographic page, said twomcartridges being shown side by side on p.3 of the photographic album, shows a similarity amounting to identity not only between these two cartridges, but between these two and the middle Ripley cartridge on p.1 in this respect.

Fifth: The narrow lead zone at the point of crimping on the bullet of the Ripley cartridge at the right on p.1 of the album, compared with the narrow lead zone at the same place on the fourth from the left of the Vanzetti bullets shown on the same page, and on p.3 where the two cartridges are placed side by side, shows also an element of striking similarity.

The Ripley cartridges used in the fourth and fifth comparisons above referred to can be identified by the supplementary markings hereinbefore referred to made upon the primers in addition to the straight heavy line scratched across the primers.

There is no question that a comparison of the three Ripley cartridges with the five Vanzetti cartridges, if made without the aid of a microscope, and simply with the unaided

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I annex to this affidavit and make a part hereof and mark Exhibit A, an album containing three phto-micrographs, pages 1-3 inclusive, of the Ripley and Vanzetti cartridges magnified to about two and one half diameters. In making my microscopic investigations, however, I used powers running as high as fifty diameters. My photography was confined to the court room and it was impracticable to photograph more than two and one-half diameters in the court room. In a laboratory I could have photographed much higher degrees of magnification. There is one important purpose for which a photograph of a higher degree of magnification would be very important to exhibit a fact which I have observed and which is not shown on the three photographs contained in the album, namely, the land and groove markins on the ~~Vanzetti~~ Ripley bullet shown at the extreme right hand of the ~~five~~ three cartridges on the ~~top~~ bottom of the photograph p.1. I will explain further in a moment the significance of these markings. I was not permitted to take the cartridge out of the court room to the laboratory for the purpose of making this photograph.

I regard it as of extreme importance to discriminate between the conclusion which an expert would draw from an examination of the Vanzetti cartridges as to their probable age, and the conclusion that would be drawn by a non-expert comparing the Vanzetti cartridges with other cartridges of a known age.

Three of the five Vanzetti cartridges are of one make and two of another. The three at the left hand of the picture on p.1 are made by the U.S.Cartridge Company of Lowell, Mass., and the

two at the right hand by what is now known as the Remington-Union Metallic Cartridge Company of Bridgeport, Conn., which I know to be a consolidation of the Remington Arms Company of Ilion, N.Y., and the Union Metallic Cartridge Company of Bridgeport, Conn. This consolidation was made about ten years ago.

A casual or even a careful comparison of the color of the metal of the primers of the three Ripley cartridges and of the five Vanzetti cartridges shows that the color is substantially the same, and is inffact a discoloration of the copper which is the result of time, andmay occur with greater or less rapidity depending upon the conditions to which the cartridges have been exposed. But the three primers marked "U.S." among the five Vanzetti cartridges shown on p.2 of the photographic album contain evidence plain to an expert, but not obvious to an ordinary observer, that the shells containing the letters "U.S." were only recently taken from the original package. In other words, the appearance of the lettering on the three "U.S." Vanzetti cartridges offsets the inference that would otherwise be drawn from the general discoloration of the metal of the primers on all five of the Vanzetti cartridges. My confident belief is that all five of the Vanzetti cartridges were taken from the original packages to which they respectively belonged within less than four years of the present time; but I am equally confident of the opinion that that conclusion would not be drawn by anyone who limited his observation to the coloring of the metal of the primers alone. The force of the evidence drawn from the lettering is only apparent under the compound microscope, and cannot be observed by the unaided eye. Under a compound microscope such as the one I used, the appearance of the lettering not only upon the primers of the three "U.S." Vanzetti cartridges, but also the appearance of the lettering upon the shell itself of those three cartridges and upon the shells of the two "Rem.-U.M.C." cartridges, confirms the conclusion just above stated. On the

other hand, the discoloration of the brass on all five Vanzetti cartridges, not only of the primers but of the shells themselves, would lead the unaided eye to the contrary conclusion, namely, that all of said shells were of considerable age.

Applying the same tests to determine the actual age of the three Ripley cartridges, we find the same discoloration of the metal, and I also found under the microscope a well-defined corrosion of the metal in the lettering which was consistent with and confirmed the appearance of age indicated by the discoloration of the end of the shell itself. The three Ripley shells cannot, in my judgment, have left the original factory package less than fifteen or at least ten years ago. The middle one of the three Ripley cartridges shown on p.1 of the photographic album is the oldest of the three, having a bullet of soft lead (a "soft head"), and being more discolored on the ~~three~~ sides of the brass than the other two.

Further referring to the three Ripley shells, I observed first under the microscope plain and unmistakable signs that the Ripley cartridge of which theprimer is marked with an X, being the cartridge shown on the extreme left of the three on p.2 of the album, and the one shown upright at the extreme right of the lower row of three on p.1 of the album, had been pressed into the muzzle of a thirty-eight calibre revolver; and after putting the rim of the muzzle of the Vanzetti revolver under the microscope, using a magnification of only five diameters, I found an exact correspondence shown by micrometer measurements between the marks on the bullet of said last mentioned cartridge and the widths of the lands in the Vanzetti revolver, showing that this bullet had been pressed by someone into the muzzle of a thirty-eight calibre Harrington & Richardson revolver having the exact muzzle measurements of the Vanzetti revolver. Upon making a comparison between the marks on this bullet and the muzzle measurements of the Ripley revolver I found that the marks on

the bullet did not correspond, so that I am able positively to a affirm that this bullet was not pressed into the muzzle of the Ripley revolver.

I further observed three markings, each different from the other, scratched upon the primers of the Ripley shells. They are shown in the photographs of the base of the three Ripley cartridges on p.2 of the photographic album. Beginning at the fight the photograph shows a primer with a straight scratch across it. This cartridge is the cartridge shown on p.1 as at the left of the lower three. The middle shell on p. 2 is also marked with a straight scratch and two scratches projecting from the same not at the same point. This is the middle cartridge shown in the row of theee on p.1 of the album. The third, at the left of the three shown on p.2 of the album, being the one shown on the extreme right of the three on p.1 of the album, is marked with a heavy line through the middle and a small cross at the right of the heavy line.

On each of the three primers of the three Ripley shells it is apparent on an examination through the compound microscope that the deep long lines shown on each were first put on clear across the top of the primer, and that on the two left hand shells shown on p.2 the small cross on one and the two short lines on the other were subsequently added. This is apparent from an observation of the effect of the push on the metal by the instrument with which the marks were made. Any of these marks made on the three Ripley shells are sufficient to distinguish and do distinguish said shells from any and all of the five Vanzetti shells, which have no such marks either upon shells or primer, so that there is no difficulty in separating the eight shells if they are mixed together for purposes of comparison.

A comparison of the three Ripley cartridges with the five

Vanzetti cartridges discloses to observation unaided by the microscope the following elements of similarity:

First: The element already mentioned of a discoloration of the brass substantially the same in all eight cartridges, except the middle Ripley cartridge, which is somewhat more discolored than any of the other seven.

Second: A comparison of the beveled base of all three Ripley shells with the beveled base of the two "Rem.-UMC" Vanzetti shells shows a close similarity of form as being products of the same factory.

Third: The general contour and shape of the bullets in all eight cartridges is the same.

Fourth: A comparison of the wide zone of metal at the crimping on the Ripley bullet at the left on p.1, with the wide zone of metal at the crimping on the Vanzetti bullet on the extreme right of the same photographic page, said twomcartridges being shown side by side on p.3 of the photographic album, shows a similarity amounting to identity not only between these two cartridges, but between these two and the middle Ripley cartridge on p.1 in this respect.

Fifth: The narrow lead zone at the point of crimping on the bullet of the Ripley cartridge at the right on p.1 of the album, compared with the narrow lead zone at the same place on the fourth from the left of the Vanzetti bullets shown on the same page, and on p.3 where the two cartridges are placed side by side, shows also an element of striking similarity.

The Ripley cartridges used in the fourth and fifth comparisons above referred to can be identified by the supplementary markings hereinbefore referred to made upon the primers in addition to the straight heavy line scratched across the primers.

There is no question that a comparison of the three Ripley cartridges with the five Vanzetti cartridges, if made without the aid of a microscope, and simply with the unaided

eye, would lead to the conclusion that they were all of substantially the same age, and that they had all been taken from the original packages at substantially the same time, namely, a time not less than seven or eight years from the present time.

I further observed under the microscope on each of the three Ripley bullets and on the three right hand Vanzetti bullets shown on p.1 of the album, what appear to be finger-nail scratches such as would be made for the purpose of testing the hardness of the lead.

In conclusion I desire to repeat again what I have already stated in the earlier part of this affidavit, that if we pass from a comparison of the Vanzetti and Ripley cartridges unaided by the microscope to a microscopic comparison, it is entirely clear that the Vanzetti cartridges were taken from the original package at a much later date than the three Ripley cartridges, and also that they were not manufactured at the same time or by the same tools. The distinctions about to be referred to are indicated by pen and ink arrows shown in connection with the two right hand Vanzetti cartridges and all three Ripley cartridges on p.1 of the photographic album. Without going into detail it is sufficient to say that the swedging on the right hand Vanzetti bullet was made with a different die, resulting in a concave swedging, from the swedging on the left hand Ripley bullet, which is convex. Similar differences occur in the crimping and swedging of the other Ripley and Vanzetti cartridges, the fact being that it is possible to determine what machines were used in the crimping and swedging of all ~~three~~ five cartridges, and that it is a fact that the three Ripley cartridges were manufactured earlier than any of the five Vanzetti cartridges. This is the certain result of ascertainable mechanical differences which I can explain in detail if required.

COMMONWEALTH OF MASSACHUSETTS.

Suffolk, ss.

Subscribed and sworn to this 14th day of April, 1923, before me,

Justice of the Peace.

COMMONWEALTH OF MASSACHUSETTS

Norfolk, ss.
No.

In The Superior Court,
Criminal Session.

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Commonwealth of Massachusetts

vs.

Nicola Sacco and Bartolomeo Vanzetti

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AFFIDAVIT OF
ALBERT H. HAMILTON

Cases 5515-6

ALBERT H. HAMILTON, being duly sworn, deposes and says:

My name is Albert H. Hamilton. I reside in Auburn, New York. I am sixty-two years old. By profession I am a micro-chemical investigator and criminologist. I have been engaged in this work thirty-seven years. In the course of my experience I have been employed in one hundred and sixty-four homicide cases throughout the United States; and in about ninety per cent of these cases I was employed by the prosecuting officers, that is, on behalf of the Government. I have also been employed in a number of cases by the United States Postal Department, and by Attorneys General of the State of New York on various occasions.

I am a graduate of the then New York College of Pharmacy, Chemistry, and microscopy, now a department of Columbia University.

In connection with my work I have repeatedly visited all the leading American cartridge, revolver, and pistol factories, and have inspected critically the machines, used, their products, the working of their machine tools, and the peculiarities of manufacture that give individuality to a firearm or to cartridges used therein. I have also fired many thousands

of cartridges of various calibers in revolvers, pistols, rifles, and shotguns, and have examined critically the products and results of these test shots.

In a great many of the homicide cases in which I have been engaged one of the important questions of fact has been, Did the fatal bullet pass through the disputed weapon?

My attention was first attracted to the Sacco - Vanzetti case by reading a short press article in an Auburn, New York newspaper sometime in 1921 or 1922, after the trial, and while some form of motion was being made for a new trial. The article referred to a conflict in the testimony of the gun experts.

On March 20, 1923, I was asked by Fred H. Moore, Esq., one of the counsel for the defendants, to come to Boston and examine the exhibits and review the expert testimony. I made it a condition of employment as an expert for the defense that I should first, before making any engagement, be permitted to examine the pistols, cartridges, and other similar exhibits in the case falling within the scope of my profession so that I might impartially and independently reach a conclusion as to what may be called the expert facts, and also the facts patent to intelligent lay observation. I was permitted to make this examination, which lasted the entire afternoon of April 6, 1923, and the entire forenoon of April 7 from 9.30 a.m. to 1.30 p.m., in one of the court rooms at the court house in Dedham. In making my examination of the exhibits I first used a pocket simple microscope, and afterwards a Bausch & Lomb professional compound microscope equipped with their Filar micrometer, an instrument that can measure to one one-hundred-thousandth of an inch.

The result of my examination satisfied me that I was entirely justified in furnishing my services to the defense, both on the general motion of both defendants for a

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new trial, and on the particular motion of both defendants for a new trial on the ground of alleged misconduct of the juror Ripley. My present affidavit is confined to the facts which I observed bearing upon what may be called the Ripley motion last above mentioned.

I made a careful comparison and miscroscopical examination of the three Ripley cartridges and of the five Vanzetti cartridges (Exhibit 32) taken from Vanzetti's Harrington & Richardson revolver (Exhibit 27). Incidentally I may say that I found the manufacturer's number of Vanzetti's revolver to be G82581. That number was not testified to by any witness in the case.

I annex to this affidavit and made a part hereof and mark Exhibit A, an album containing three photo-micrographs, pages 1-3 inclusive, of the Ripley and Vanzetti cartridges magnified to about two and one-half diameters. In making my microscopic investigations, however, I used powers running as high as fifty diameters. My photography was confined to the court room and it was impracticable to photograph more than two and one-half diameters in the court room. In a laboratory I could have photographed much higher degrees of magnification. There is one important purpose for which a photograph of a higher degree of magnification would be very important to exhibit a fact which I have observed and which is not shown on the three photographs contained in the album, namely, the land and groove markings on the Ripley bullet shown at the extreme right hand of the three cartridges on the bottom of the photograph p. 1. I will explain further in a moment the significance of these markings. I was not permitted to take the cartridge out of the court room to the laboratory for the purpose of making this photograph.

I regard it as of extreme importance to discriminate between the conclusion which an expert would draw from an ex-

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amination of the Vanzetti cartridges as to their probable age, and the conclusion that would be drawn by a non-expert comparing the Vanzetti cartridges with other cartridges of a known age.

Three of the five Vanzetti cartridges are of one make and two of another. The Three at the left hand of the picture on p. 1 are made by the U.S. Cartridge Company of Lowell, Mass., and the two at the right hand by what is now known as the Remington-Union Metallic Cartridge Company of Bridgeport, Conn., which I know to be a consolidation of the Remington Arms Company of Ilion, N.Y., and the Union Metallic Cartridge Company of Bridgeport, Conn. This consolidation was made about ten years ago.

A casual or even a careful comparison of the color of the metal of the primers of the three Ripley cartridges and of the five Vanzetti cartridges shows that the color is substantially the same, and is in fact a discoloration of the copper which is the result of time, and may occur with greater or less rapidity depending upon the conditions to which the cartridges have been exposed. But the three primers marked "U.S." among the five Vanzetti cartridges shown on p. 2 of the photographic album contain evidence plain to an expert, but no obvious to an ordinary observer, that the shells containing the letters "U.S." were only recently taken from the original package. In other words, the appearance of the lettering on the three "U.S.". Vanzetti cartridges offsets the inference that would otherwise be drawn from the general discoloration of the metal of the primers on all five of the Vanzetti cartridges. My confident belief is that all five of the Vanzetti cartridges were taken from the original packages to which they respectively belonged within less than four years of the present time; but I am equally confident of the opinion that that conclusion would not be drawn by anyone who limited his observation to

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the coloring of the metal of the primers alone. The force of the evidence drawn from the lettering is only apparent under the compound microscope, and cannot be observed by the unaided eye. Under a compound microscope such as the one I used, the appearance of the lettering not only upon the primers of the three "U.S.". Vanzetti cartridges, but also the appearance of the lettering upon the shell itself of those three cartridges and upon the shellsof the two-"Rem.-U.M.C." cartridges, confirms the conclusion just above stated. On the other hand, the discoloration of the brass on all five Vanzetti cartridges, not only of the primers but of the shells themselves, would lead the unaided eye to the contrary conclusion, namely, that all of said shells were of considerable age.

Applying the same tests to determine the actual age of the three Ripley cartridges, we find the same discoloration of the metal, and also found under the microscope a well-defined corrosion of the metal in the lettering which was consistent with and confirmed the appearance of age indicated by the discoloration of the end of the shell itself. The three Ripley shells cannot, in my judgment, have left the original factory package less than fifteen or at least tne years ago. The middle one of the three Ripley cartridges shown on p. 1 of the photographic album is the oldest of the three, having a bullet of soft lead (a "soft head"), and being more discolored on the sides of the brass than the other two.

Further referring to the three Ripley shells, I observed first under the microscope plain and unmistakable signs that the Ripley cartridge of which the primer is marked with an X, being the cartridge shown on the extreme left of the three on p. 2 of the album, and the one shown upright at the extreme right of the lower row of three on p. 1 of the album, had been pressed into the muzzle of a thirty-eight calibre revolver; and after putting the rim of the ~~miz~~ muzzle of

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the Vanzetti revolver under the microscope, using a magnification of only five diameters, I found an exact correspondence shown by micrometer measurements between the marks on the bullet of said last mentioned cartridge and the width of the lands in the Vanzetti revolver, showing that this bullet had been pressed by someone into the muzzle of a thirty-eight calibre Harrington & Richardson revolver having the exact muzzle measurements of the Vanzetti revolver. Upon making a comparison between the marks on this bullet and the muzzle measurements of the Ripley revolver I found that the marks on the bullet did not correspond, so that I am able positively to affirm that this bullet was not pressed into the muzzle of the Ripley revolver.

I further observed three markings, each different from the other, scratched upon the primers of the Ripley shells. They are shown in the photographs of the base of the three Ripley cartridges on p. 2 of the photographic album. Beginning at the right the photograph shows a primer with a straight scratch across it. This cartridge is the cartridge shown on p. 1 as at the left of the lower three. The middle shell on p. 2 is also marked with a straight scratch and two scratches projecting from the same not at the same point. This is the middle cartridge shown in the row of three on p. 1 of the album. The third, at the left of the three ~~shwn~~ shown on p. 2. of the album, being the one shown on the extreme right of the three on p. 1 of the album, is marked with a heavy line through the middle and a small cross at the right of the heavy line.

On each of the three primers of the three Ripley shells it is apparent on an examination through the compound microscope that the deep long lines shown on each were first put on clear across the top of the primer, and that on the two left hand shells shown on p. 2 the small cross on one and the two short lines on the other were subsequently added. This is apparent from an observation of the effect of the push on

the metal by the instrument with which the marks were made. Any of these marks made on the three Ripley shells are sufficient to distinguish said shells from anyand all of the five Vanzetti shells, which have no such marks either upon shell or primer, so that there is no difficulty in separating the/ei/ght shells if they are mixed together for purposes of comparison.

A comparison of the three Ripley cartridges with the five Vanzetti cartridges discloses to observation unaided by the microscope the following elements of similarity:

First: The element already mentioned of a discoloration of the brass substantially the same in all eight cartridges, except the middle Ripley cartridge, which is somewhat more discolored than any of the other seven.

Second: A comparison of the beveled base of all three Ripley shells with the beveled base of the two "Rem.-U.M.C." Vanzetti shells shows a close similarity of form as being products of the same factory.

Third: The general contour and shape of the bullets in all eight cartridges is the same.

Fourth: A comparison of the wide zone of metal at the crimping on the Ripley bullet at the left on p. 1, with the wide zone of metal at the crimping on the Vanzetti bullet on the extreme right of the same photographic page, said two cartridges being shown side by side on p. 3 of the photographic album, shows a similarity amounting to identity not only between these two cartridges, but between these two and the middle Ripley cartridge on p. 1 in this respect.

Fifth: The narrow lead zone at the point of crimping on the bullet of the Ripley cartridge at the right on p. 1 of the album, compared with the narrow lead zone at the same place on the fourth from the left of the Vanzetti bullets shown on the same page, and on p. 3 where the two cartridges are placed side by side, shows also an element of striking similarity.

The Ripley cartridges used in the fourth and fifth comparisons above referred to can be identified by the supplementary markings hereinbefore referred to made upon the primers in addition to the straight heavy line scratched across the primers.

There is no question that a comparison of the three Ripley cartridges with the five Vanzetti cartridges, if made without the aid of a microscope, and simply with the unaided eye, would lead to the conclusion that they were all of substantially the same age, and that they had all been taken from the original packages at substantially the same time, namely, a time not less than seven or eight years from the present time.

I further observed under the microscope on each of the three Ripley bullets and on the three right hand Vanzetti bullets shown on p. 1 of the album, what appear to be fingernail scratches such as would be made for the purpose of testing the hardness of the lead.

In conclusion I desire to repeat again what I have already stated in the earlier part of this affidavit, that if we pass from a comparison of the Vanzetti and Ripley cartridges unaided by the microscope to a microscopic comparison, it is entirely clear that the Vanzetti cartridges were taken from the original package at a much later date than the three Ripley cartridges, and also that they were not manufactured at the same time or by the same tools. The distinctions about to be referred to are indicated by pen and ink arrows shown in connection with the two right hand Vanzetti cartridges and all three Ripley cartridges on p. 1 of the photographic album. Without going into detail it is sufficient to say that the swedging on the right hand Vanzetti bullet was made with a different die, resulting in a concave swedging, from the swedging on the left hand Ripley bullet, which is convex. Similar differences occur in the crimping and sweding of the

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other Ripley and Vanzetti cartridges, the fact being that it is possible to determine what machines were used in the crimping and swedging of all these cartridges, and that it is a fact that the three Ripley cartridges were manufactured earlier than any of the five Vanzetti cartridges. This is the certain result of ascertainable mechanical differences which I can explain in detail if required.

COMMONWEALTH OF MASSACHUSETTS

Suffolk, ss.

Subscribed and sworn to before me, this 14th day of April, 1923.

Justice of the Peace

COMMONWEALTH OF MASSACHUSETTS

Norfolk,ss. Criminal Session

Case No. 5545-6

Commonwealth of Mass.

vs.

Nicola Sacco and Bartolomeo Vanzetti

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Affidavit of ALBERT H. HAMILTON

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