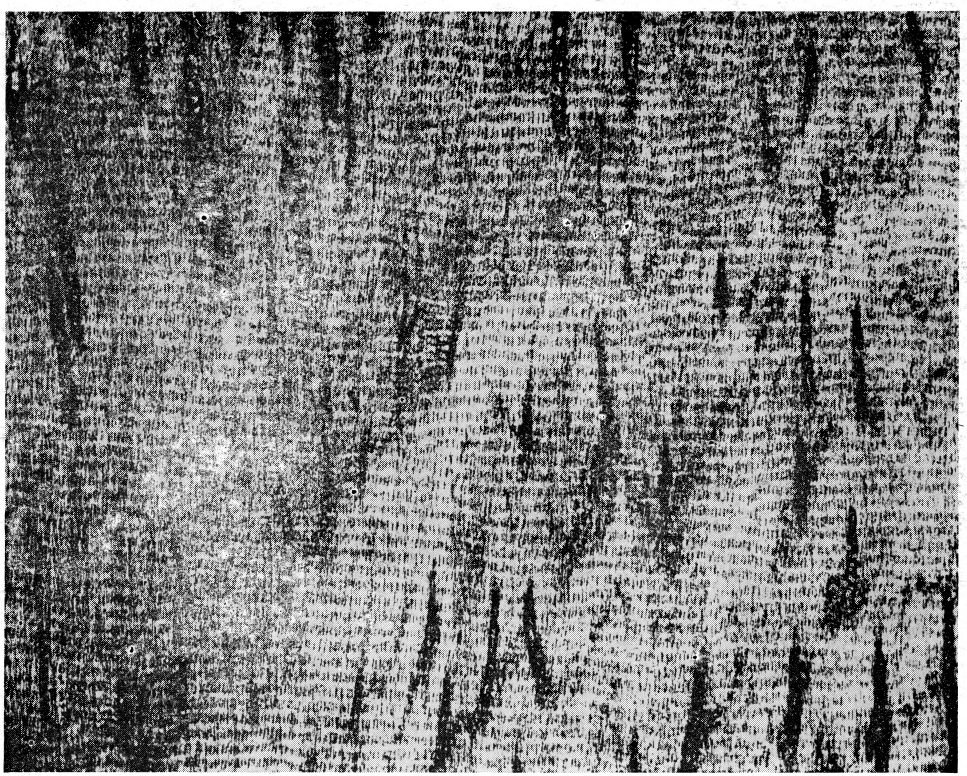
THE TECHNICIAN IN THE POLICE LABORATORY



"Ripple-Marks" on Vermillion Wood

VOL. 1—NO. 12 APRIL, 1944

One year ago the Missouri State Highway Patrol pioneered in an effort to inaugurate a publication written by and for the laboratory technician. Such an undertaking cannot be maintained for a long period or continued indefinitely without the wholehearted cooperation and support of the technicians of other departments. Limited funds, personnel, and materials have plagued the department in this work. This condition applies to other departments as well and may be the reason why relatively few articles have been contributed for publication.

It is with regret that the Missouri State Highway Patrol announces the suspension of this publication for the duration. That the need exists for such information is quite apparant and it is planned to again resume publication after the war when funds and personnel permit. The department feels that the time, effort, and money expended in this work has been amply repaid by the many fine comments received from the subscribers. Articles for publication will still be accepted and if conditions permit issues may be published from time to time. All correspondence should be addressed to the Missouri State Highway Patrol, Jefferson City, Missouri.

A scientific publication, issued monthly by the Laboratory of the Missouri State Highway Patrol, through the interest and cooperation of police laboratory technicians throughout the country. THE TECHNICIAN is a non-profit, and non-copyrighted bulletin, edited by the personnel of the M.S.H.P. Laboratory.

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THE COVER

The cover photograph for this month accompanies the article on wood identification procedures presented in this issue. The illustration is of a tangential section of a wood which shows the "ripple-marks" described in the article. Photograph taken on the Leitz "panphot" with a 10 cm "milar" lens; exposure on contrast process film. Magnification (at 25 cm.) approximately two diameters. Shown at a final enlargement of approximately five diameters in the illustration.

Dark vertical streaks represent longitudinal sections through vessels.

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THE TECHNICIAN will be sent free of charge to individuals or departments upon request. Address all correspondence to THE TECHNICIAN, Missouri State Highway Patrol, Jefferson City, Missouri.

THE TECHNICIAN

Vol. 1, No. 11 - April - 1944

CONTENTS

TO THE READER:

With this eleventh number of volume one, we complete the first year's publication of THE TECHNICIAN.

During this period we have attempted to present material which would be of interest to police laboratory technicians everywhere, and which would be of value both to the experienced, and the relatively inexperienced workers in the various phases of this work. We have tried to offer the police laboratory worker something which was not otherwise obtainable in similar form; to maintain the publication and its contents on a truly technical plane without at the same time permitting them to become so "deep" as not to appeal to the average criminal investigator as well as the technical worker; and to represent the attitude and views of the different men in this particular field, insofar as was possible under the circumstances.

As the Editors of THE TECHNICIAN, we cannot but be a little proud of our efforts. THE TECHNICIAN was initiated on a rather insecure basis and was begun without knowledge on our part as to how it would be accepted.

Now, a year later, we may look back over those first eleven issues and realize that our objectives were -- at least in part -- accomplished. Information has been presented in this publication which should be of value to every police worker. We have obtained and printed, the reaction to our suggestion that an organization or society of police laboratory workers be formed. There has resulted a greater expression of views and opinions, and a more free and friendly exchange of correspondence between the various laboratories generally. Letters have been received in the publishing laboratory which attest to the immediate practical value which various articles have had in assisting other laboratories in their work. These letters have done much toward encouraging continued publication of THE

TECHNICIAN, and we deeply appreciate the interest which prompted those correspondents to write us of that interest.

Without the cooperation of other laboratories, and of other technicians; without their contributions both for publication and in the form of letters; without their suggestions and criticisms; THE TECHNICIAN would not have been possible. It was this cooperation, these contributions, and these criticisms, which justified its existence, which were expressed in its contents, which modified and tempered the entire substance of the publication, and which permitted it to become what it is today.

We are particularly grateful to those laboratory technicians who have made literary contributions to the publication during this first year -- our thanks to,

(1) RALPH F. TURNER, for his "Note on the Use of Infra Red Photography" which appeared in Vol. 1, No. 1, and for the book review and Technical Abstracts presented in the same issue. Also for the technical note on page 23 of Vol. 1, No. 5.

(2) JOSEPH K. BEEMAN, M.D., for his article on the B. & L. Small Littrow Spectrograph (Vol. 1, No. 2); for the article on "Gunshot Wounds" presented in Vol. 1, No. 6.

(3) R. F. BORKENSTEIN for the material on "Criminal Investigation and the Police Laboratory" which appeared in Vol. 1, No. 2.

(4) DAVID Q. BURD, for his discussion of the 3-aminophthalhydrazide test for blood (Vol. 1, No.3); and for his commentary on the identification of seminal stains, which appeared in Vol. 1, No.4.

(5) To the Editors of the Bulletin of the B.C.I., New York State Police; and the Editors of the

Royal Canadian Mounted Police "GAZETTE"; for permission to reprint material from those publications.

(6) And to the many who wrote letters expressing their reaction to, and interest in, the various articles published.

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At the time of this writing, it has not been determined whether we shall continue publication of THE TECHNICIAN for a second year. That there is need for such a bulletin, there can be no doubt. That the material which has been printed is of interest to the readers is obvious from the expressions to that effect in letters received. Yet we have found it difficult to maintain the publication on a secure basis from the standpoint of its literary content. Material published, with the exception of that listed above has come largely from the publishing laboratory, and the burden of writing has rested heavily on the shoulders of this one laboratory. To this we cannot object -- it was to be expected. But there does remain the simple fact that it may not be possible for us to continue longer in devoting such a large amount of time to the preparation of this publication.

In past issues, material coming from this laboratory has been drawn largely from "stores of knowledge" already accumulated, which could be adapted to use in THE TECHNICIAN. Much of the experimental work which served as a basis for these articles had already been performed before the first issue was ever begun. Some of the contributions were "rewrites" of previously prepared, but unpublished, papers. Other material merely represented written reports of information which was felt worthy of publication, but which required little additional research other than a few brief references. Thus, the time consumed in preparing these articles and notes has been kept at a minimum. However, if we are to continue publishing THE TECHNICIAN, and

have at the same time to supply the greater part of its literary content, more and more time will be necessitated, to the extent that it could not be considered justified.

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THE TECHNICIAN will probably be continued into the second year. However, it will be necessary to make some changes in the frequency with which it is issued. Perhaps if it were issued every other month, sufficient material would have been received to permit publication. It might even be advisable to issue copies without any particular reference to time whatsoever, merely preparing an issue when, and only when, a sufficiency of material is received from outside laboratories. This laboratory is willing and ready to offer its printing services to those technicians who wish to submit something for publication. Could we arrange to print an article from this department, for every one submitted from another laboratory; however, it is doubtful that we could continue as in the past, and yet maintain the standards of the publication on the same level.

THE EDITOR

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CORRECTION:

In the first article on "Wood Identification Procedures", there was given an address for the National Lumber Manufacturers Association in Washington. It has been brought to our attention that the correct street address of this association is now: 1319 18th Street, Northwest, Washington, D. C.

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WOOD IDENTIFICATION PROCEDURES IV

By John E. Davis

Technician with the Laboratory of the Missouri
State Highway Patrol

ED. NOTE: This is the fourth in a series of articles on the subject of wood identification, and represents a continuation of that material presented in the February-March issue.

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Wood Tissue

Although the general arrangement, as either vertical or horizontal, of the elements of wood has already been discussed, there remains to be mentioned the more detailed arrangement of the elements with respect to each other, and the effect that such arrangement may have on the macroscopic appearance of the wood --- such effect being one of the main factors in the identification of a wood.

In this particular explanation, reference is made only to the vertical elements of wood, unless otherwise stated, as it is the cross-sectional view of wood which is most significant.

Inasmuch as tracheids constitute the most common element in the softwoods, and fibers the most common in the hardwoods, attention will be centered on the remaining elements, and their arrangement characteristics. Thus, the location and arrangement of parenchyma tissue, and of the vessels, may be most conveniently considered.

Parenchyma Tissue

The term "parenchyma" may be used not only to designate a particular type of cell, but also tissue regions made up of that type of cell. These regions may, by their general position, be classified as (1) Diffuse, (2) Metatracheil, (3) Terminal, and (4) Paratracheil.

Diffuse parenchyma is that parenchyma tissue which is scattered in irregular strands (vertically) at random location, among the other elements of the wood. On cross-section the cells appear as either light or dark cells, varying from few to numerous, and without any particularly definite arrangement with respect to the other elements.

Metatracheil parenchyma is found in concentric laminae, running generally parallel to the growth rings of the wood, and is placed without respect to the vessels, so that in cross-section, it is seen merely as a line or series of lines, and with a generally circular configuration. Such tissue may be seen to best advantage in the woods of the hickory group. The lines of metatracheil parenchyma are usually much closer together (and more noticeable) in the late-wood than in the early-wood.

Terminal parenchyma, as the name implies, is that parenchyma tissue which may be produced by some trees at the end of the growing season. It may be a single layer of cells, or more than one layer, appearing on the cross-section as a light or dark line, separating two growth rings. But for its presence, it might often be difficult to determine the exact line of demarcation between the early and late wood of the growing season.

Paratracheil parenchyma is that parenchyma which is aggregated about the vessels of a hardwood.

There are three main types of paratracheil parenchyma as based on the form which the tissue takes in enclosing

the vessels. They are described as:

(1) Vasicentric
(2) Aliform
(3) Confluent

In the vasicentric type, the tissue as seen on cross-section, appears to surround the vessel in a circular ring or area. It may be from a few to many cells in thickness and is of approximately equal thickness at all points around the vessel.

The aliform type is a modification of the vasicentric type, to the extent that on cross-section the tissue appears thicker in one direction than the other. Thus, it becomes more oval-shaped in formation, or assumes a diamond-like configuration with the longer axis of the diamond parallel to the circumference of the tree. The tissue then, extends laterally in a wing-like formation from its center, and the vessel.

A further modification results in the confluent type of parenchyma tissue. Here, the "wings" of the laterally extending parenchyma, instead of being free from each other, meet and produce a series of contacting tissue areas. Accordingly, although there results a series of lines of parenchyma tissue, unlike the metatracheil parenchyma, it is centered primarily with respect to vessels and the lines are not of even thickness throughout. Nor are the lines of this tissue of so even a distribution and spacing as is metatracheil parenchyma. It may appear to run at diagonals, and to have branching lines due to the continuity of its placement from one vessel to another.

Vessels

Vessels have already been defined and discussed briefly. However, as in the case of parenchyma tissue, a more detailed discussion of the characteristics of them,

and the effect imparted thereby to the macroscopic appearance of wood, is necessary. An excellent discussion of these wood elements appears in the previously noted text by RECORD. The following material is taken directly from that work.* (Pages 41-44).

"A cross-section of a vessel member (and also of a vascular tracheid) is conviently referred to as a pore. If the plane of section is through the overlapping ends of two members, the result will be two tangentially arranged pores of the same vessel. Some times a tangential row of four or five pores may represent only one vessel. The diameter of a vessel may be fairly uniform throughout its course, but if its members taper at the ends, the size and shape of the pores in successive sections will exhibit considerable variation. The thickness of the secondary wall varies greatly in different woods, and sometimes in different parts of a growth ring, or even different facets of the same cell.

The size, form, and relative number of pores, and their arrangement with relation to one another and to the other elements, especially parenchyma, are often highly distinctive. Woods in which the pores are of fairly uniform size and distribution or undergo only gradual changes in these respects during the growth of a season are referred to as "diffuse-porous"; and those in which the pores of the inner part of each growth ring exhibit decided contrast in size or number (or both) to those of the outer part, as "ring-porous". The two types intergrade. Certain woods are normally intermediates, and some kinds are ring-porous when grown in one region, and diffuse-porous when produced in a different environment. In the same specimen, layers with well-developed late wood may be

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* "Reprinted by permission from 'Identification of the Timbers of Temperate North America' by S. J. Record, published by John Wiley & Sons, Inc."

distinctly ring-porous, whereas other layers in which growth was slow may be composed almost entirely of early wood and so appear diffuse-porous. Comparatively few woods are ring-porous and nearly all of them are found in the north temperate zone.

Pores vary from minute and scarcely distinct with a lens, to large and readily visible to the unaided eye. They may be few to numerous, crowded to widely spaced, uniformly to very unevenly distributed. If they are not to numerous and crowded, four fairly distinct types of occurrence are usually recognizable, namely,

(1) Solitary
(2) In multiples
(3) In chains
(4) In clusters

The last three terms are chiefly for convenience in referring to the appearance of the pores to the unaided eye or at low magnifications.

Solitary pores are of common occurrence with other forms, but it is unusual for all the pores in a section to be isolated. They are usually circular or oval, in the latter case with the longest axis normally radial. A pore multiple is a group of pores that are crowded together and so flattened along the lines of contact that they appear as subdivisions of a single pore. The number in a group varies from two to several or many, but the commonest forms, especially when associated with solitary pores, are radial pairs or threes. A pore chain is a series or line of pores that are very close together and when in contact with one another preserve their separate identities. The lines are generally radial, but may be tangential or oblique. A pore cluster is a small to large, rounded or irregular, more or less isolated group of pores, frequently surrounded by parenchyma.

Various combinations and multiplications of the fore-

going types give rise to a great variety of pore patterns. Solitary pores and small multiples may exhibit a fairly definite radial, diagonal, or tangential alignment. Pore chains sometimes occur successively in long radial or oblique series. Pore clusters may be confluent and from short to long oblique or irregular concentric bands that are continuous except for interruption by the rays. The arrangement of pores is often controlled by the rays, particularly when the rays are close together, or very large. Some of the most conspicuous patterns involve a combination of pores and other elements, especially parenchyma. Pore patterns provide one of the most useful features in identifying woods, but allowance should be made for local variations and the effect of rate of growth."

Thus RECORD has expressed the nature and significance of wood vessels, or pores.

The Elements of the Gymnosperms and the Angiosperms

Although reference has frequently been made in the preceding material to the types of wood in which particular elements do or do not appear, it may be well to include them here all at one point, in tabular form.

CELL or ELEMENT	GYMNOSPERMS
(1) Wood Tracheids (vertical)	(1) Present & predominate
(2) Ray Tracheids	(2) Present or absent
(3) Wood Parenchyma	(3) Present or absent
(4) Ray Parenchyma	(4) Present
(5) Vessels	(5) Absent
(6) Fibers	(6) Absent

CELL or ELEMENT		ANGIOSPERMS	
(1)	Wood Tracheids (vertical)	(1)	Present or absent. If present, subordinate.
(2)	Ray Tracheids	(2)	Absent
(3)	Wood Parenchyma	(3)	Present
(4)	Ray Parenchyma	(4)	Present
(5)	Vessels	(5)	Present
(6)	Fibers	(6)	Present

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Other Characteristics of Wood having Identification Value

In addition to the appearance of the cross-sectional cut of a wood, as discussed in the foregoing material, there is an additional group of characteristics imparted to a wood by various other factors which bear mentioning.

The first of these is a characteristic which occurs in many of the angiosperms, notably in the leguminosae (pod-bearing trees). The peculiarity, as seen macroscopically, is designated a "ripple-mark" effect, and is due to the form or arrangement taken by the individual elements or cells of the wood. This arrangement (microscopic feature) is called "storied structure". Although the storied structure is a characteristic of the arrangement of the elements and tissues of the wood (on a microscopic scale) the final effect is often more plainly visible without the use of a microscope than with, and indeed, ripple marks may appear more distinct to the unaided eye than with the aid of a hand magnifier.

By "storied structure" as might well be judged from the name, is meant the arrangement of the elements of wood into tiers. By this is meant that instead of the endings of the various elements (especially the fibers, and the

upper and lower extremities of the rays) being randomly disposed as is often the case, they are all in parallel order, having their terminations along a more or less definite and distinct line or plane which is parallel to a square cross-section of the tree. The rays sometimes occupy only a median position within the storied fibers and tracheids -- in other woods may of themselves produce the main-rippling effect. There may be various degrees of storied structure, either all of the elements storied, or only a part so arranged, in which cases there will be differences in the appearance of the ripple mark as finally viewed, and in the ease with which they may be seen.

Ripple marks are seen on a tangential section of wood such as mahogany, basswood, buckeye, and numerous tropical woods. They are seen as very minute and fine lines extending at right angles to the axis of the tree. These marks are not the same as "wavy grain" or "fiddle back grain", being quite a different thing. Also, they should not be confused with the minute dips or depressions produced on some woods by a mechanical planer. Examination of a split tangential section, or of a hand planed area will permit their being viewed to best advantage.

At times it will appear macroscopically that ripple marks are present in woods not ordinarily considered to be characterized by them, due to the presence of numerous uniformly arranged rays, or to rays of uniform height at various places within the wood. Magnolia, yellow poplar, Philippine Mahogany, and others -- even walnut at times -- may so appear to be marked with ripple marks. A closer observation of a larger area will generally indicate the true nature more accurately.

Presence of ripple marks in a wood frequently serves as a most valuable identification characteristic.

Some of the other factors which may be characteristic of a wood, are texture, grain, figure, odor, color, density, etc.

Texture, grain, and figure, are often used interchangeably (as descriptive terms) by many persons -- the particular usage often depending upon the interest which the particular individual has in the wood or lumber.

Actually, texture should denote the relative size or quality of the elements of the wood specimen. Grain refers to their structural arrangement, and figure to the pattern or design visible on a given surface of the lumber -- the latter often being a combination of color and cellular configurations.

Texture is generally referred to as fine, medium, coarse; uniform or uneven; smooth, harsh, etc. If the elements are quite large, the wood will be coarse in texture. If they are fine, the wood is fine textured. A wood such as aspen, in which all elements are about the same size, would be described as even textured, whereas in oak, for example, where there are two markedly different types of wood within each annual growth ring, an uneven texture obtains.

Grain may be described in a number of different ways, depending on its character. It may be straight, wavy, bird's eye, curly, etc., and may be described further as fine or coarse, depending on the width of the growth rings. Grain may be interlocked -- that is, a part of the elements slant in one direction, adjacent to a layer of elements slanting in the opposite direction giving a cross-grain wood, sometimes described (by its visual effect and appearance) as "ribbon grain". When such a wood is split, a radial section of the wood will have sharp projections and indentations in alternating layers, due to this slanting grain effect. This is well seen in the mahoganies, lignum vitae, etc.

The wood technologist generally uses the term "figure" to include all pattern-like arrangements of the tissues of a wood. The ribbon grain referred to above, "fiddle-back" grain, etc. are figures, resulting from the

arrangement of the elements, and the consequent effect upon the light being reflected from their surfaces.

Color, luster, scent, and taste are also utilized to advantage in identifications of wood.

There exist woods of almost any and every color, and such color may be a most valuable aid to the identification of the wood. Since, as previously explained, it is the heartwood which is colored and which constitutes the bulk of the mature tree trunk, one finds that there is usually some part of the heartwood on most wood specimens, so that color may be used to best advantage in the examination. In fact, it sometimes becomes difficult to identify a specimen of the sapwood (only) of a tree which normally has a prominently colored heartwood. The color of wood may be changed somewhat by exposure to light, heat, water, etc., although this is generally only a surface change. By cutting deeper into the wood the original color and character is revealed.

The luster of a wood depends upon the manner in which light is reflected from its surface by the elements and their contents, or arrangement. Luster is characteristic in having "depth" as contrasted with "gloss" which results merely from a polishing, and is superficial. Generally speaking, the harder woods are more lustrous, and may vary in the appearance given from that of a hard "flinty" or vitreous luster to a soft satin-like one.

The odor of wood, and the taste may be highly characteristic. Impossible of description, one cannot express the nature of this particular peculiarity in a verbal treatment. In order that the factor may be utilized in the identification procedure, the technician must be familiar with the scent of various woods, or have a standard collection of woods for comparison. The odor of many woods is sufficiently characteristic to permit an identification on that basis alone. Woods of the "cedar" group are particularly noted for their scent.

Taste, like the scent, of a wood may be characteristic. However, this is likewise impossible of accurate description, is related to the odor of the wood, and generally requires experience for recognition. Some persons find this characteristic more easily detected and identified than do others.

The density of woods may also give evidence of their identity. This, however, varies sufficiently in different specimens of the same species as to be of a secondary importance in making an identification. The density and hardness, however, may be judged rather roughly, and sometimes serves to distinguish two similar appearing woods almost of itself. Moisture content will affect the apparent density of a wood, as will the proportions of spring and summer wood. The actual density of woods from around three pounds per cubic foot in some types, to nearly ninety pounds per cubic foot in others.

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Thus far we have covered the main points upon which wood identification procedures are based. An understanding of the material which has already been presented should enable the reader to satisfactorily follow through a wood identification procedure by use of the key. As to the key which is used, it is suggested that one or both of those mentioned previously, be utilized. Either RECORD, or BROWN and PANSHIN may be followed. A key will not be presented in this treatment of the subject, it becomes necessary for the reader to obtain for reference one of those texts if he desires to follow through a wood identification procedure.

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In making macroscopic examinations of wood, one generally requires nothing more than a sharp pocket knife, and a small hand lens. As to lenses, a 10 or 14 power "Coddington", or a "Hastings Triple" are suggested. A 20

power hand lens may be used to advantage at times, but generally speaking the higher magnification is not needed, and the restricted view becomes an uncomfortable disadvantage. The 14 power is recommended. Bausch & Lomb, and Spencer both manufacture such lenses.

In preparing the wood for examination it is merely necessary to smooth off a small area (1 sq. cm.) on the cross-sectional surface, and examine it with and without the lens, noting the presence or absence of the various characteristics previously mentioned, as listed in the keys. A tangential and a radial section should also be smoothed off; at times such surfaces exposed by splitting the wood in the proper direction, may reveal the characteristics even better. If the cross-section is slightly moistened, the contrasting cellular elements and colors often become more prominent. The knife used must be sharp. A razor blade is better than a knife, but naturally more difficult and inconvenient to use, as well as being less permanent. Generally speaking, the softer woods require a sharper cutting instrument in order to avoid tearing of the wood elements. In some instances a wood may be identified without use of either a knife or the lens, but this is only after some experience has been gained, and a greater knowledge of woods obtained through previous examinations.

Naturally, there are a great many woods in existence which will not be identifiable by the wood expert. Numerous woods are not used commercially, many are used only for novelties and other items of little practical value. However, the texts generally list all commercially important woods, and it is primarily these in which an investigator would be interested. With a reasonable amount of practice and experience, however, a large number of woods may be most readily identified. Many of these have characteristics which permit identification almost at a glance. In fact, the average individual is able to identify many woods on the basis of these very characteristics. One has no difficulty in recognizing oak, maple, yellow

pine, red cedar, walnut, etc., and this list can be enlarged upon immensely.

The identification of woods is a matter which, like all identification work, requires practice, and a definite knowledge of the correctness of ones' conclusions during the learning stage. A written key is limited by the inadequacy of language to convey a writers thoughts, and the necessity for limiting the details included to a reasonably small group. Too, in some instances there are slight differences in woods which one acquainted with them through study may see, but which cannot be described in a practically satisfactory manner. This is borne out by the fact that the beginner often has difficulty in differentiating two woods (even by use of the key) where to the expert they are "totally" dissimilar.

It should be mentioned that while the genus of woods can almost always be distinguished, in some cases one cannot differentiate species on the basis of wood characteristics alone. Thus it is not possible to distinguish the various woods of the "red oak" group; Eastern White Pine from Western White Pine, etc. However, this does not appreciably decrease the value of the key, nor the work of the wood technologist in his task of identifying specimens. Other factors may be known which would indicate the species, or it may be of no great importance to make so fine a distinction.

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THE KEY

The key is generally divided, either directly or indirectly, into two primary divisions. These are (1) the Gymnosperms, conifers, or softwoods; and (2) the Dicotyledons, (Angiosperms), or hardwoods.

Under the Gymnosperms, the first classification will be in reference to the presence or absence of resin ducts. Following this, there appears a description of the relative size of the ducts (when present) as "large", "small" etc. Presence or absence of parenchyma tissue may be considered next; odor, color, and other factors being included at various points, depending on the manner in which the key is arranged.

Under the Dicotyledons, the first distinction is made on the basis of the pore arrangement -- two primary divisions being the "ring-porous" woods, and the "diffuse-porous" woods. Then, consideration of the character (size, number, etc.) of the rays. Presence or absence of lines of parenchyma, relative size and number of the pores, and other factors then considered.

Keys accompanied by magnified photographs are of especial value to the beginner. With them, the worker may compare not only the written description, but his actual specimen as well.

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It is suggested that the reader, interested in wood identification procedures, or in learning how to identify them for the first time, obtain a standard text such as those previously mentioned, and a set of known woods for examination and comparison.

In future issues of THE TECHNICIAN, there will appear discussions of individual wood specimens, including descriptions of their more important characteristics, plus notation of their commercial use, importance, etc. In them it will be assumed that the reader has understood that material presented so far, and that he is undertaking the study of known specimens in a systematic manner. A key will not be presented here.

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OF INTEREST:

The frequency with which viscera, removed from an already-embalmed body, are received in the police laboratory is such as to lead one to the conclusion that something should be done which would assure a fewer number of such occurrences. Bodily organs, if they are to be completely and satisfactorily analyzed for poisonous substances, should be taken as soon as possible after death, and certainly before the body is embalmed. Chemical tests for certain of the common poisons are vitiated by the embalming process, and the problems of the analyst increased considerably in others due to the presence of embalming fluid and its constituents. It has been reported by various workers that cyanides are destroyed by the formaldohyde embalming fluid, and may not be detectable although originally the cause of death. And certainly the rather common request that one check for methyl alcohol poisoning in such viscera is a most discouraging challenge. Traces of alcohols are difficult to identify at best; what chance has one to identify a relatively "trace" amount of one in the presence of a superabundance of another alcohol, of formaldehyde, and other volatile organics?

By instructing the investigating officer in the importance of securing unembalmed specimens, a greater degree of control over this situation is possible. Nevertheless there are instances in which the body is embalmed before an investigator has even the opportunity to obtain viscera even if he had reason to believe it necessary in the first place. And in some instances, suspicion of poisoning is not aroused for some little time after death.

It has seemed to the writer that possibly something besides educational matters could be used to help prevent this situation. Education of the county coroners is advisable, but at the same time not overly satisfactory considering the fact that in many states no particular qualifications are demanded of the men who fill that position,

and the fact that the term of office varies such that a relatively frequent turnover obtains.

Possibly a law could be enacted which would prevent embalming for so many hours after the death of an individual, or until certain definite steps had been taken to ascertain the cause of death beyond the ordinary coroner's inquest.

With this in mind, the editor wrote to one of the readers of THE TECHNICIAN, who is presently employed in a state police laboratory as a technician, and who was formerly a mortician himself. Feeling that such an individual would appreciate both sides to this question, the matter was brought to his attention for consideration. His reply, while not intended as the "last and final word" on the subject, should be of interest. Perhaps others would care to offer additional comment.

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Editor THE TECHNICIAN
Missouri State Highway Patrol
Jefferson City, Missouri

Dear Sir:

You have brought up an interesting subject when you speak of a law concerning the length of time which must elapse before the embalming procedure. This is a subject which covers a wide area as you are dealing with religion and with an object which is dear to the survivors of the deceased. Speaking from the embalmer's point of view there are certain post mortem changes which occur in a body which regulate the success of the embalming procedure especially from a cosmetic point of view. If rigor mortis has developed and subsided the embalming fluid has practically no effect toward rigidity. A long elapse of time will also present post mortem staining, especially in the cases of sudden death e.g. cardiac diseases or accidental

death, This staining cannot be eliminated in the embalming process. If no method of preservation is attained soon after death, gases due to bacillus will develop and might finally evolve into tissue gas, which is the horror of all embalmers, as it cannot be completely eliminated. This, of course, does not occur if the body is kept in a place where the temperature ranges around 40°F. Again if a long time elapses between death and embalming the blood has a tendency to coagulate forming clots which prevent proper circulation of the embalming process, this, naturally, necessitates a long and laborious procedure.

The human body is usually held dear to the next of kin and any law that would prohibit the burial of that body or prevent the family from having access to it for a long period of time would have great repercussion among the laymen, especially among certain religious sects which practice the burial of their dead before the second sundown and whose belief prohibits the embalming of their bodies. This, understand, is the viewpoint of the embalmer. I agree that the common practices sometime interfere with the police analyses, but I lay the blame on a probable misunderstanding by the local officers of our type of work and the necessity of the time element. I have always advocated that the coroner of the county should be qualified for his office by being a licensed M. D. or should have accessible a medical examiner to appear on each case for advice, this would eliminate all of the last minute arrangements on autopsies and examinations. My personal experience has taught me that the majority of coroners in our respective counties do not know the difference between the metatarsus and the palmer arch and these are the men who are to decide the cause of death. I believe that a great deal of this delay in investigations and analyses could be eliminated by a better understanding between the laboratory's investigating officers and local officials. This could only be done by an educational program. The only practical method that I can see in delaying the embalming would be for each locality or each funeral home to install a cooled morgue or recesses where

the body could be maintained around 40°F, as once putrefaction begins it is practically impossible to stop especially if tissue gas forms.

I have given this great consideration during the past nine years and have discussed this matter with various pathologists as well as some of the leading instructors in embalming in the United States and they all concurred with me in the above. I realize that there are many who will not agree with me and I assure you that I am open to criticism and as a practicing technician in a police laboratory I realize the obstacles we must all overcome in our analyses and work.

Hoping this answers your inquiries and assuring you any comment you care to make will be greatly appreciated, I remain,

Sincerely

(Signed)

LETTER TO THE EDITOR:

The Technician
Missouri State Highway Patrol
Jefferson City, Missouri

Gentlemen:

I have received several copies of THE TECHNICIAN and sincerely believe that it has a very important place in the development of a real "Police Science". Your suggestion of a society of police laboratory technicians strikes me as something which all the men in our field should welcome and support. In these unsettled times it will be difficult to organize but a proper nucleus could be formed and the plans laid for post war expansion. In my own case I am betwixt and between going or staying. However if I do go I would be pleased to know that things are being done to further such an association during my absence.

I am a graduate of John Carroll University, Ph.B. with sciences (1931) and the Cleveland Law School L.L.B. (1941) and a member of the State Bar (1941); a member of the Cleveland Police Department since 1935 and assigned to the Scientific Identification Bureau since 1940 as a chemist and ballistician. This bureau has tried to keep up with the latest developments in Police Science and I can truthfully say that our standards, methods and variety of services will compare favorably with the best police laboratories. Still we realize the necessity for some method of exchanging information on new ideas and methods with other laboratories.

In view of this I am passing on to you, for publication if you see fit, a procedure for recovering serial numbers of tires which have been ground or cut off. This is a timely subject and I have been unable to locate any published matter on a similar procedure.

Two tires were submitted to this laboratory by the Automobile Bureau requesting that I attempt to recover the serial numbers which had been filed off. Several such cases had gone through our courts and the guilty parties acquitted because ownership of the tires could not be proven beyond a doubt. After considerable research and applying all suggested methods to no avail, tho numbers being very deeply ground off, I arrived at the following procedure:

A Procedure for Recovering Serial Numbers Ground or Cut off of Tires or Rubber Articles.

Take a cotton swab soaked in Carbon Disulphide and apply to the place the serial numbers should be. If the grinding has left the surface very rough it may be smoothed with fine emery paper, but only to take the loose particles of rubber. The Carbon Disulphide does not erode the rubber, as in the case or recovering numbers from metals, but merely forms a gelatinous coating of rubber which must be rubbed off with the cotton swab. Carbon Disulphide is highly volatile and if permitted to evaporate the rubber percipitates out in its original form. The rubber also percipitates out on the swab, which therefore must be changed frequently. For this reason it is necessary to firmly rub the area with the soaked swab.

The numbers come up slowly, even slower than with metal and I find it a great help to work with a daylight lamp casting an oblique light across the numbers. Once the numbers are recovered they usually become clearer after the tire has set and the rubber has had a chance to reharden. Apparently no permanent damage is done the tire.

In some cases different numbers may be at their best when others are not so clear and may fade before the others are recovered. Therefore I make a box chart separating the space for each figure and mark in each numeral as it becomes most distinguishable. This is good practice

with metals also as this same difficulty is encountered with metals.

PERCAUTIONS:--Carbon is very poisonous, volatile and inflammable. Therefore the work must be carried on in a well ventilated place and away from sparks or flame. Also the technician should not continue its use for too long at a time but should switch back and forth with other work.

Very truly yours

Bernard J. Conley
Chemist & Ballistician
Cleveland Police Dept.
Cleveland, Ohio