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Are the Conventional Techniques in Histopathology in Need of Improvement???

Ernesto O. Hoffmann, M.D.
Teresa R. Flores, HT (ASCP)

Veterans Administration Medical Center
Laboratory Service
Electron Microscopy Unit
New Orleans, Louisiana 70112-1393

Louisiana State University Medical Center
Department of Pathology
Diagnostic Consulting Center
New Orleans, Louisiana 70112-1393

During the last decades most of the efforts of the morphologists and histotechnologists have been directed toward the development or improvement of ancillary methodology, and only a few changes have been introduced in the 120-year-old, routine, basic histology technique, the paraffin-embedding method. There is little argument concerning the usefulness of immunohistology, transmission electron microscopy (TEM), histochemistry, morphometric analysis, DNA quantitation, in situ hibridization, and other specialized methods in the study of tissue sections. However, the users of these methods must also be aware of the potentially correctable deficiencies of "routine" conventional histotechnology, since expensive, time-consuming ancillary techniques should not be used in poorly preserved tissues or to compensate for the inadequacies of the basic method. It has been said that paraffin sections obtained "often reveal precarious tissue fixation, mechanical distortion, and derangement of normal architecture. Moreover, they are frequently too thick to allow resolution of cytologic details. These factors may impair adequate evaluation of histologic or cytologic lesions, resulting in lack of diagnostic precision" (Zamboni, 1972). For those familiar with ultrastructural morphology and "thick sections," it is well known that formalin-fixed, paraffin-embedded tissues are subject to a substantial loss of nuclear and cytoplasmic substances during handling and processing (Figs. 1-4). In conventional histopathology techniques, proteins are usually well preserved but lipids and carbohydrates are largely removed during preparation of tissues, and these tissues shrink by some 33% or more. In addition, conventional fixatives, dehydrating substances and heat are denaturing agents; they may destroy or change the antigenicity and chemical nature of tissues and cells (Bancroft, 1982; Hayat, 1986). However, most of the emptiness of the nucleus and cytoplasm in the paraffin sections is perhaps due to autolysis. The ideal of immediate fixation of thin sections (2 mm or less in thickness) is seldom achieved in

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histopathology. The delay in fixation is usually due to surgical procedures, pathology procedures, and penetration of the fixatives. The routine pathology procedure of gross descriptions "when all surgicals are in" subjects the large samples to anoxia for several hours. The coefficient of diffusibility for the most commonly used fixatives is below 1.0. This means that the fixatives penetrate into the tissues less than 1 millimeter in one hour. Therefore, the central part of thick specimens (more than 2 mm in thickness) obtained for fixation from large specimens (organs, tumors) is usually poorly fixed. With the postfixation trimming, this central, autolyzed part is what is being processed for light microscopy. In addition to the disadvantages mentioned above, there are other disadvantages inherent to the paraffin itself: "The crystalline structure of the wax block makes it difficult to obtain sections below 3 micrometers. Paraffin is a poor embedding medium when used with most noncoagulant fixatives, and unfortunately these are the best fixatives.... Paraffin penetrates tissue properly only if the proteins of the cells have been coagulated into a mess" (Lindner, 1978). These depleted, denaturalized, shrunken paraffin sections are being used in pathology for routine morphologic diagnosis, immunohistology, histochemistry, morphometric analysis, DNA quantitation, in situ hybridization, and other specialized procedures.

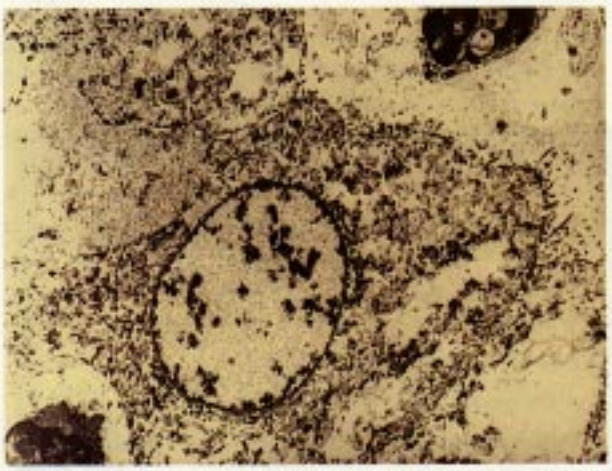

Figure 1: Formalin-fixed, paraffin-embedded adenocarcinoma. Tissue recovered from a paraffin block and processed for TEM. Notice the depletion of the nucleus and cytoplasm. TEM X6000.

With all this evidence, the answer to our question in the title appears to be YES!!! However, the problem on how to improve the basic histology method is complicated.

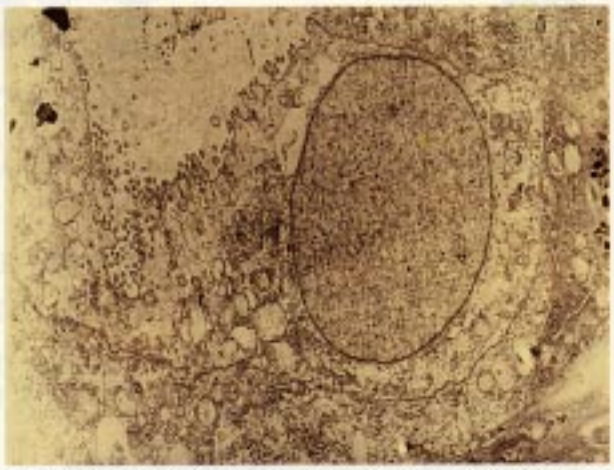

Figure 2: Paraformaldehyde*-fixed, OsO_4-postfixed, Spurr epoxy-embedded adenocarcinoma. Specimen processed directly for TEM studies. Preservation of nucleus and cytoplasm is obviously better. TEM X6000.

*Paraformaldehyde = formaldehyde without additives.

We need to improve not only the morphologic appearance in our sections but we also need to preserve and retain the biologic nature of antigens, enzymes, DNA, RNA, and other cell and tissue components useful in diagnostic pathology. In addition, "the tradition of 120 years of wax embedding cannot and should not be thrown aside too hastily....most present-day histologic knowledge has been obtained by the examination of material which was sectioned in wax" (Lindner, 1978). However, to see more in one section does not signify the learning of new morphology; it means better utilization of the light microscope and ancillary methodology, and more accurate, faster, and cost-effective morphologic diagnosis.

In the experience of the senior author, 80% to 90% of the diagnoses in anatomic pathology is based on morphologic parameters alone, and few of these routine specimens (10% to 20%) need additional ancillary methods to solve diagnostic problems. It appears, therefore, that improving the preservation of the morphology and preventing tissue and cell depletion are the first priorities. The accomplishment of these would probably facilitate morphologic diagnosis and would better (and less) utilize ancillary methods.

The optics of most of the present light microscopes are capable of resolving structures of 0.1 to 0.2 micrometers. These are difficult to see in the paraffin sections (Fig. 3).

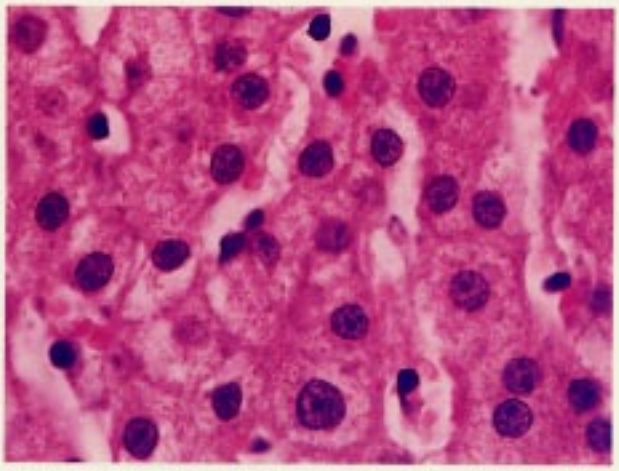

Figure 3: Formalin-fixed, paraffin-embedded, H&E stained liver. Notice the depletion and lack of cellular detail in this section as compared with Figure 4. Paraffin X400.

We should be able to view mitochondria, microbodies, desmosomes, secretory granules, lipid droplets, glycogen accumulation, proteinaceous deposits, basal membranes, collagen and elastic fibers, lysosomes, myelinosomes, parasites, bacteria, fungi, etc., in the light microscope with better preservation and preventing depletion of substances from the tissues and cells. This is exactly the case when tissue sections for light microscopy are processed using TEM techniques (Figs. 4-6). This High Resolution Light Microscopy (HRLM) is obtained by primary fixation with noncoagulant fixatives (aldehydes without additives) and postfixation in osmium trioxide (OsO_4). It is obvious that good fixatives are useless unless specimens are handled appropriately. Immediate immersion and thin samples (2 mm or less) are indispensable for good fixation. Mincing of tissues is detrimental for morphologic diagnosis and it is not necessary for good preservation of tissues. The size of the sample is limited only by the type of the microtome being used and by the dexterity and experience of the histotechnologist, provided these samples are no thicker than 2 mm. Excellent preservation of structures, substances, and biologic activity is today possible for larger specimens by the use of microwave energy (Login, 1988). Embedding materials with smaller molecules obviate the need of coagulating fixatives. The best fixatives (noncoagulating fixatives) are not a problem with resin (plastic) embedding. There are three types of embedding resins (Hayat, 1986), the methacrylates, the epoxies and the polyesters: a) The main advantage of the methacrylates is their polarity (hydropic), which is favorable for immunohistology and histochemistry. However, shrinkage (15%) and depletion still occur unless the tissues are osmicated. Osmication of tissues is apparently detrimental for immunohistology and histochemistry. In addition, the darkness of the tissues due to osmication impedes polymerization by cool ultraviolet light. Furthermore, methacrylates are highly allergenic (Kilburn, 1987), and their polarity makes storage very difficult. These resins are not popular for TEM studies due to poor resistance to TEM bombardment. b) Most of the epoxies are nonpolar, and storage is not a problem. Shrinkage is about 2% and they are ideal for TEM studies. Although immunohistology and histochemistry are possible with the epoxies, the osmication and use of heat for polymerization are limiting factors. c) The polyesters are not very popular and our experience is limited.

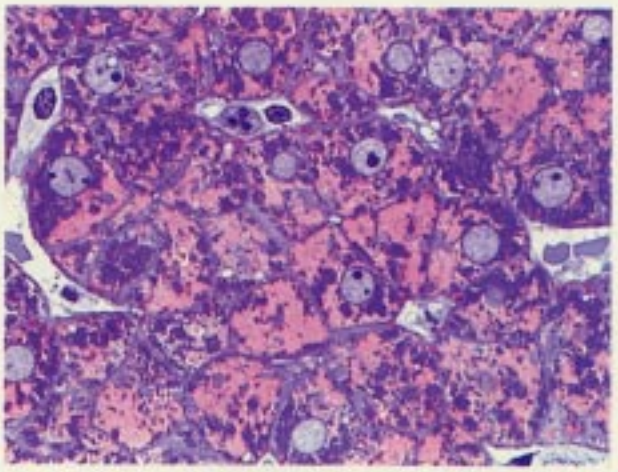

Figure 4: Paraformaldehyde-fixed, OsO_4 -postfixed, Spurr epoxy-embedded liver. Notice the uniform distribution of the chromatin and the clear contrast of the nucleolus. The cytoplasm of the hepatocytes is rich in glycogen (red); the dense blue granules are mitochondria and perosisomes. The faint gray granules are minuscule lipid droplets. Sinusoids and bile canaliculi are clearly identified. The red dots in the space of Disse are collagen fibers (reticulum). HRLM TB+BF** X400.

**TB+BF = toluidine blue and basic fuchsin.

Sectioning the resins requires microtomes capable of sectioning 0.1 to 3.0 micrometers. Otherwise this step has only one additional problem—skill and experience of the histotechnologist. Sectioning thin (0.1 to 3.0 micrometers) requires training and skills, especially with large tissue blocks (Hoffmann, 1983). Slightly modified method for H&E staining and other routine special stains are available for the different resins. However, "Routine hematoxylin and eosin staining emphasizes nuclear detail at the expense of other tissue elements, which are muted in shades of red and pink. A second routine stain is urgently

required to fill in the fuzzy areas of the hematoxylin and eosin section. Just as in black and white movies, the viewer does not realize anything is missing until he or she has experienced the richness and subtlety of full color" (Shoobridge, 1983). Metachromatic stains are excellent for epoxy-embedded tissues and obviously can fulfill the fuzzy areas of the H&E stain (Figs. 3-4). The variety of structures visible in epoxy sections stained with toluidine blue + basic fuchsin (Figs. 4-6) or other polychromatic stains makes the use of hematoxylin and eosin and conventional special stains (PAS, trichrome, silver, others) a rare necessity (Hoffmann, 1983).

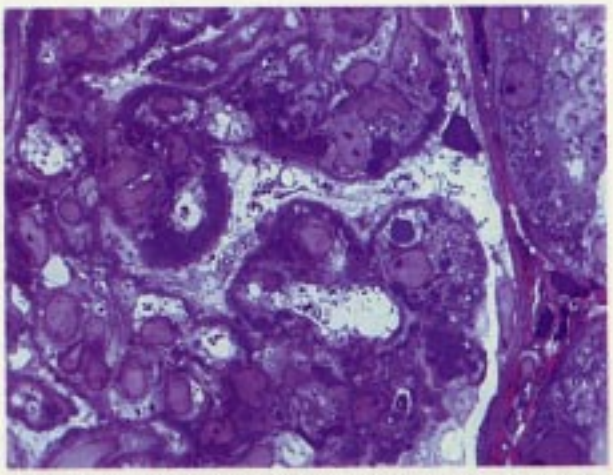

Figure 5: Paraformaldehyde-fixed, OsO_4-postfixed, Spurr epoxy-embedded kidney with proliferative Lupus Nephritis. Notice the clear delineation of the glomerulus basement membrane (GBM), the subepithelial, subendothelial and mesangial proteinaceous deposits in the glomerulus. The capsule of Bowman and intertubular tissues have interstitial collagen (red) clearly different from the GBM and tubular basement membrane. The tubular cells depict numerous mitochondria. The brush-border of the tubular cells is partially denuded. HRLM TB + BF X1000.

Improving morphology does not necessarily mean hampering the chance for ancillary methods when necessary. With HRLM methodology for light microscopy, TEM is one hour away and with excellent tissue preservation (Hoffmann, 1983). The choice of the areas for TEM is specific and not hazardous as when the samples are obtained from the fresh material. Epoxies and methacrylates can be used for immunohistology and histochemistry (Mason, 1986). Morphometric analysis is much more accurate since depletion and shrinkage are minimal. In-situ hybridization and DNA-RNA quantitative analysis should be more productive but wide experience is not yet available.

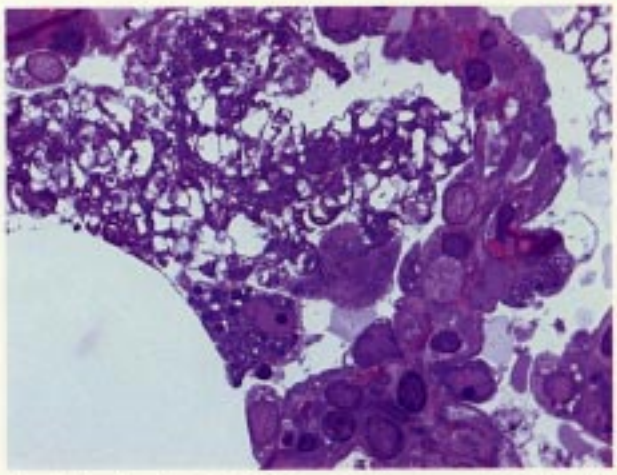

Figure 6: Paraformaldehyde-fixed, OsO_4-postfixed, Spurr epoxy-embedded lung. The alveolar lumen contains a foamy material with typical *Pneumocystis carinii* organisms; pneumocytes type II (blue cytoplasmic myelinosomes) and few red cells (gray-blue). Pneumocytes type II and pneumocytes type I are lining the alveolus. The alveolar septum has interstitial collagen (red) and inflammatory cells. HRLM TB + BF X1000.

The biggest limitation of HRLM methods is that the pathologist and histotechnologist are not familiar with the colors of the polychromatic stains and the morphologic detail of the cells and tissue. This limitation is difficult to overcome because most of the pathologists and histotechnologists have been trained with paraffin histopathology and most present-day histologic knowledge has been obtained by material embedded in wax. However, HRLM does not give "new morphologic patterns;" it just makes most of the known normal and abnormal stuctures and substances visible in one section. To learn to recognize these substances and structures is a minor problem for the pathologist and histotechnologist who know their morphology. Improved tissue and cellular preservation with intracellular detail and better utilization of the light microscope and ancillary methodology will obviously improve the capabilities of the morphologist as diagnostician, investigator, and teacher.

Epoxy embedding is now being selectively used in surgical pathology (Hoffmann, 1981; Hoffmann, 1982; Di Sant' Agnese, 1984; Pedraza, 1984). Whether paraffin embedding will be replaced by epoxy embedding or just modified to obtain better preservation of morphology and tissue and cell components is difficult to predict. However, we believe the need for improvement of the present conventional paraffin technique in histopathology is obvious. Microwave energy has added a new dimension to

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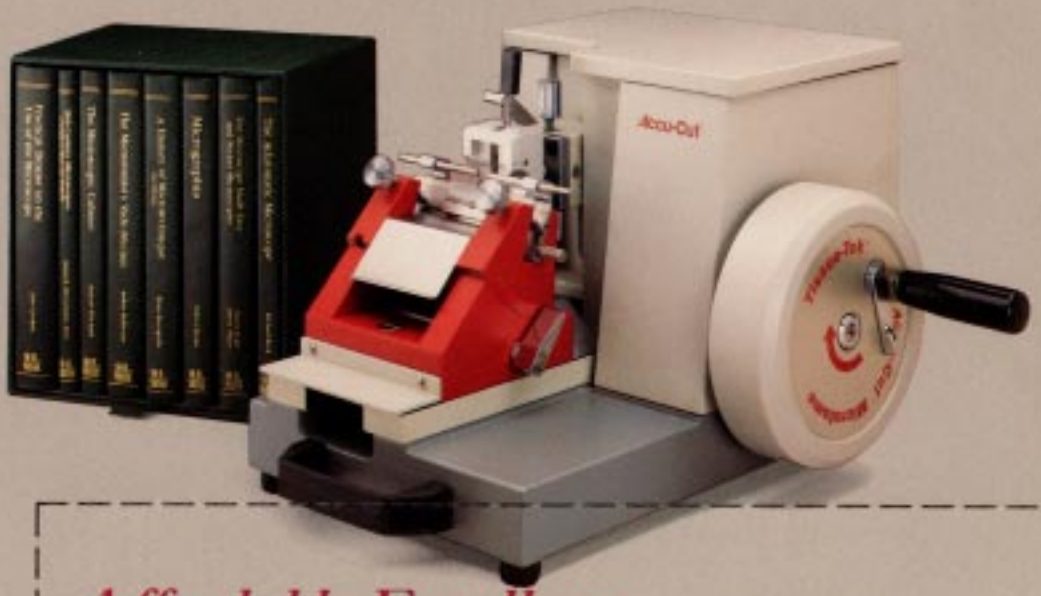

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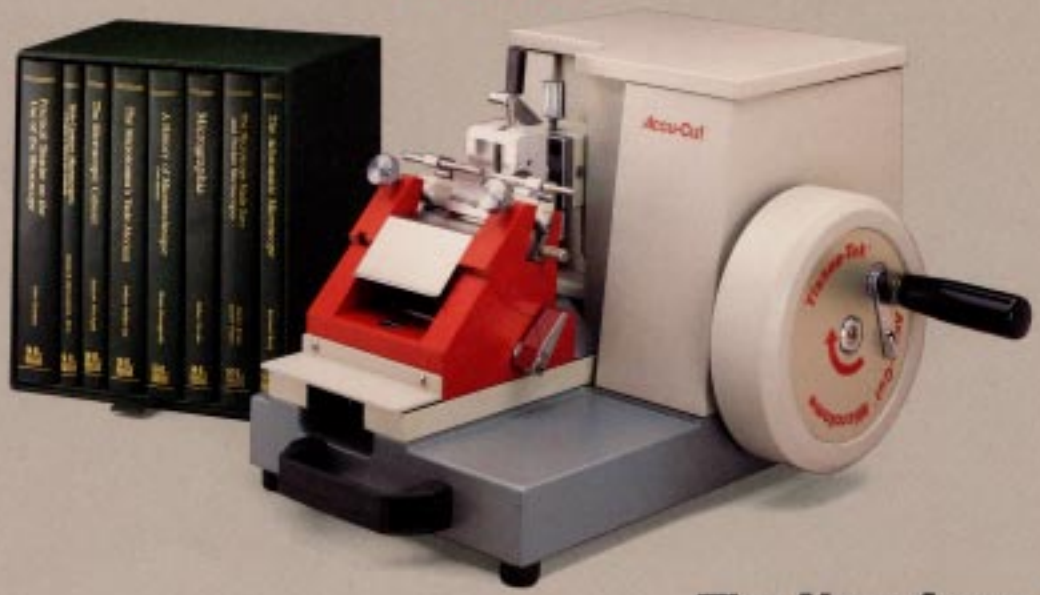

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histoprocessing. Better and faster processing of larger specimens is possible with this new device. Microwave processing provides excellent preservation of morphology, components, and chemical nature of tissue and cells (Applications of Microwaves, 1988).

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The Seed that Started It All: the Founding of the NSH

This year, we celebrate the fifteenth anniversary of incorporation for the National Society for Histotechnology. But the society's actual origin—the idea that led to its founding—dates back a few more years.

Nobody really knows who conceived the idea first. But Lee G. Luna had been quietly planning for a national society for some five years before its foundation was laid. Thus, it is safe to say that the idea of a national society began to take shape in the mid-1960s.

The idea was a popular topic of conversation between Luna and others at the Annual Symposium on Histopathologic Technique sponsored by the Armed Forces Institute of Pathology (AFIP). Ken Urban remembers talking with Luna in 1965 about forming a national society. He was an officer in the Illinois society, which was the first state society for histotechnology.

Through these informal discussions, the ideas began to crystallize. By 1973, with encouragement from the late Barbara Spillan, Luna decided it was time to act. On July 28, he sent a letter to those who were the most enthusiastic about a national society: Dominic Europa of New York; John Koski of Michigan; Ken Urban of Illinois; Don Hammer of Minnesota; and Barbara Spillan of Florida. This group was known as The Committee to Form The National Society of Histotechnologists.

The first formal meeting was held on August 27, 1973, at the Palmer House hotel in Chicago. Four of the committee members attended (Luna, Urban, Europa, and Koski), as well as five other people who were interested in helping to form the national society (John Budinger, M.D., of New York; Jerry Fredenburgh of Michigan; Jerry Meade of Michigan; Richard Slocum of Michigan; and Rosemarie Winkler of Texas). The meeting was held in conjunction with an ASCP workshop being conducted by Luna.

According to Luna's letter of invitation, the purpose of the meeting was to "establish a working framework which can later be disseminated to all of the presently organized or incorporated state or regional histology societies for their comments and/or recommendations."

And that is exactly what they did. Jerry Meade recalls: "We looked at the goals and objectives as to what needed to be done for the field of histology."

These goals and objectives were later written into the articles of incorporation:

1) To provide an interchange of ideas pertinent to histotechnology
2) To advance professional growth, standards, knowledge, and performance in histotechnology through continuing and formal educational programs, and
3) To create mutual understanding and cooperation between the Society and other allied professions.

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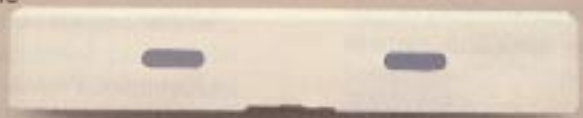

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Solutions to Your Dilutions

Mae Kelm Lopez, HT/HTL(ASCP)
Department of Veterinary Pathology
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The field of histotechnology has been evolving into a pre-made and pre-diluted reagent system for convenience and economic reasons over the past several years. In most laboratory situations, convenience and/or economics play a very important part in the way technologists order their reagents. Do you have the time to make up your reagents? Is it more cost efficient to order your reagents already made or prepare them yourself? Do you know how to make reagents from scratch? There is nothing wrong with utilizing commercially prepared reagents in your laboratory. However, today many histotechnologists, relying on pre-diluted reagents, have forgotten or are a little rusty in preparing reagents from scratch.

The calculations involved in preparing solutions for the histology laboratory are easy and straightforward, provided the technologist has some basic chemistry and mathematics. A few histotechnologists become terrified when a solution needs to be prepared. Do not allow the words "chemistry" and "mathematics" to frighten you. In the following text, percent concentration, dilutions, hydrated chemicals, total dye content, molarity, and normality will be discussed.

Before getting involved in calculations, several chemistry terms need to be defined. A *solute* is a substance that is dissolved in a solvent. Generally, the solute is a lesser amount than the solvent. A *solvent* is a substance that contains the dissolved solute. A *solution* is a mixture of two or more substances. Types of solutions:

1. Unsaturated solution—contains a solute dissolved in a given quantity of solvent.
   (a) dilute—contains a little solute in relation to solvent.
   (b) concentrated—contains a large amount of solute in relation to solvent.
2. Saturated solution—contains all the solute that will dissolve in the solvent under given conditions.
3. Supersaturated solution—contains more solute than will dissolve in the solvent (in normal situations).

PERCENT CONCENTRATION:
The *percent concentration* of a solution is a simple proportion given in terms of weight, weight and volume, or volume.

1. **Weight percent**—Generally used to express the concentration of commercial aqueous reagents.

$$\text{weight percent (w/w)} = \left(\frac{\text{weight of solute}}{\text{weight of solution}}\right) \times 100$$

Example: Nitric acid is sold as a 70% (w/w) solution; therefore, the nitric acid reagent contains 70 grams of nitric acid per 100 grams of solution.

2. **Volume percent**—Used to express the concentration of the volume of a liquid solute that is added to a liquid solvent.

$$\text{volume percent (v/v)} = \left(\frac{\text{volume of solute}}{\text{volume of solution}}\right) \times 100$$

Example: Prepare 250 ml(s) of 30% (v/v) aqueous ethanol.

$$30\%\ \text{(v/v)} = \left(\frac{\text{"?" ml(s)}}{250\ \text{ml(s)}}\right) \times 100$$

75 ml(s) = "?" ml(s)
Add 75 ml(s) of ethanol to 175 ml(s) of distilled water.

3. **Weight-Volume percent**—Used to express the concentration of solid reagents dissolved in an appropriate solvent.

$$\text{weight-volume percent (w/v)} = \left(\frac{\text{weight of solute} - \text{gm}}{\text{volume of solution} - \text{ml(s)}}\right) \times 100$$

Example: Prepare 300 ml(s) of 5% (w/v) aqueous silver nitrate.

$$5\%\ \text{(w/v)} = \left(\frac{\text{"?" gm}}{300\ \text{ml(s)}}\right) \times 100$$

15 gm = "?" gm
Dissolve 15 gm of silver nitrate in 300 ml(s) of distilled water.

DILUTIONS:
A dilution is solution of a known concentration that needs to be diluted to a weaker concentration. There are two ways of calculating how to make a dilution.

1. Diluting a percent, molar, or normal solution.
   The product of the volume (V_1) and concentration (C_1) of the known solution is equal to the product of the volume (V_2) and concentration (C_2) of the weaker solution.

   $V_1 \times C_1 = V_2 \times C_2$

   Example: Prepare 50 ml(s) of 2% ferric chloride from 29% ferric chloride.
   $V_1 \times C_1 = V_2 \times C_2$
   ("?" ml(s)) (29%) = (50 ml(s)) (2%)
   "?" ml(s) = 3.45 ml(s)
   Add 3.45 ml(s) of 29% ferric chloride to 46.55 ml(s) of distilled water.

2. Diluting a ratio.
   A ratio is a proportion that is made between the solute and solvent. One part of the original solution (or solute) is diluted with a specified part of the solvent to give the total volume. A 1:4 dilution means that one part of the original solution (solute) is diluted with three parts of the solvent to give a total volume of four.

Example: Prepare normal goat serum diluted 1:100 in phosphate buffered saline. Combine one part of normal goat serum and 99 parts of phosphate buffered saline for a total volume of 100 parts.

HYDRATED AND ANHYDROUS CHEMICALS:
Briefly, we will discuss hydrated and anhydrous chemicals. A *hydrated chemical* has attached water molecules that need to be taken into account. An *anhydrous chemical* has no water molecules. Back in the lab, a procedure may call for the anhydrous form of a chemical. You only have the hydrated chemical on your shelf and your pathologist needs the stain done today. What do you do? It is very easy to solve. You need to find the formula weight of both anhydrous and hydrated forms of the chemical. Then, a ratio/equation is developed:

$$\left(\frac{\text{anhydrous formula weight}}{\text{hydrated formula weight}}\right) = \left(\frac{\text{weight of anhydrous reagent needed}}{\text{weight of hydrated reagent needed}}\right)$$

Example: Prepare 500 ml(s) of a 1.5% solution of magnesium chloride. The stain procedure you are following states to use 7.5 gm of $MgCl_2$ (FW = 95.22) in 500 ml(s) of water. You find only the hydrated magnesium chloride on your shelf. $MgCl_2 \times 6H_20$ (FW = 203.31).

$$\left(\frac{\text{FW of } MgCl_2}{\text{FW of } MgCl_2 \times 6H_2O}\right) = \left(\frac{\text{weight of } MgCl_2 \text{ needed}}{\text{weight of } MgCl_2 \times 6H_2O \text{ needed}}\right)$$

$$\left(\frac{95.22}{203.31}\right) = \left(\frac{7.5 \text{ gm}}{\text{"?" gm}}\right)$$

Add 16.01 gms of $MgCl_2 \times 6H_2O$ to 500 ml(s) of distilled water.

TOTAL DYE CONTENT:
On occasion the *total dye content* of a particular dye may need to be worked with. This happens rarely; however, it does happen. A ratio is also set up in order to obtain the correct amount of dye needed to prepare the solution.

$$\left(\frac{\text{total dye content}}{100}\right) = \left(\frac{\text{amount "pure" dye needed}}{\text{amount to weight}}\right)$$

Example: Prepare 400 ml(s) of 1% toluidine blue solution (the total dye content of the toluidine blue is 60%).

$$1\% = \left(\frac{\text{"?" gm}}{400 \text{ ml(s)}}\right) \times 100$$

Need 4 gm of toluidine blue. Therefore,

$$\left(\frac{60\%}{100}\right) = \left(\frac{4 \text{ gm}}{\text{"?"}}\right)$$

Add 6.67 gm of toluidine blue (60% dye content) to 400 ml(s) of distilled water.
Now on to bigger and better things!

MOLARITY:
The *molar concentration* of a solution defines the number of moles of solute per liter of solution.

that one change to a different alcohol if one is experiencing cracking of GMA-embedded sections after staining. *Both myself and the editor of* Histo-Logic *would be interested in receiving information on this cracking problem from anyone who may have a different solution than that stated above.*

James H. Maynard
Department of Pathology
Division of Surgical Pathology
The University of Alabama at Birmingham
Birmingham, AL 35233

2. The horizontal lines (microvibrations) seen in Figures 1 and 2 represent a very common microtomy artifact. I believe that as many as 90% of the slides produced in a given day in your laboratory will contain this problem. The problem can be serious (Fig. 1), or subtle (Fig. 2). Regardless of the extent, it is a problem that needs correcting. The corrective action to this artifact will be presented in the next issue of *Histo-Logic. For this issue we would like to hear from many of you who feel you have an answer.* It should be pointed out that the artifact is not produced by a dull knife or an acute knife angle. See *Histo-Logic* Vol. XVIII, No. 3, page 16, July/August 1988, for instructions for submitting a response to Questions in Search of an Answer.

Lee G. Luna
American HistoLabs, Inc.
Gaithersburg, Maryland

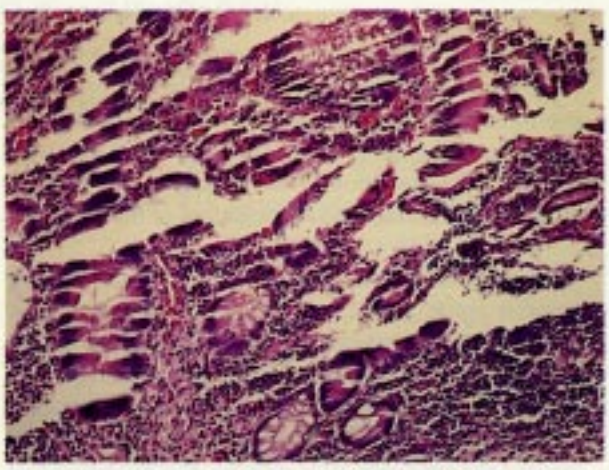


Figure 1: Photograph illustrates a serious problem of horizontal lines (microvibrations). There is no doubt the extent of microvibrations in this slide would pose a problem to the pathologist as he attempted to make a diagnosis. H&E, X40.

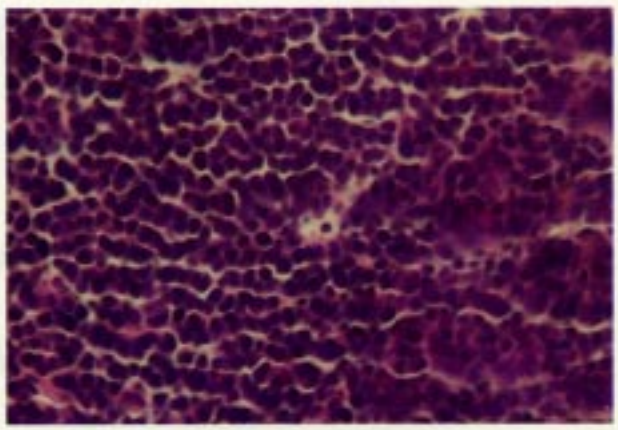


Figure 2: A more subtle microvibration can be seen in this photograph. The extent of microvibration here makes the section appear more dense due to compression of cells. H&E, X400.

For Ernestene Sims the Third Time Was the Charm

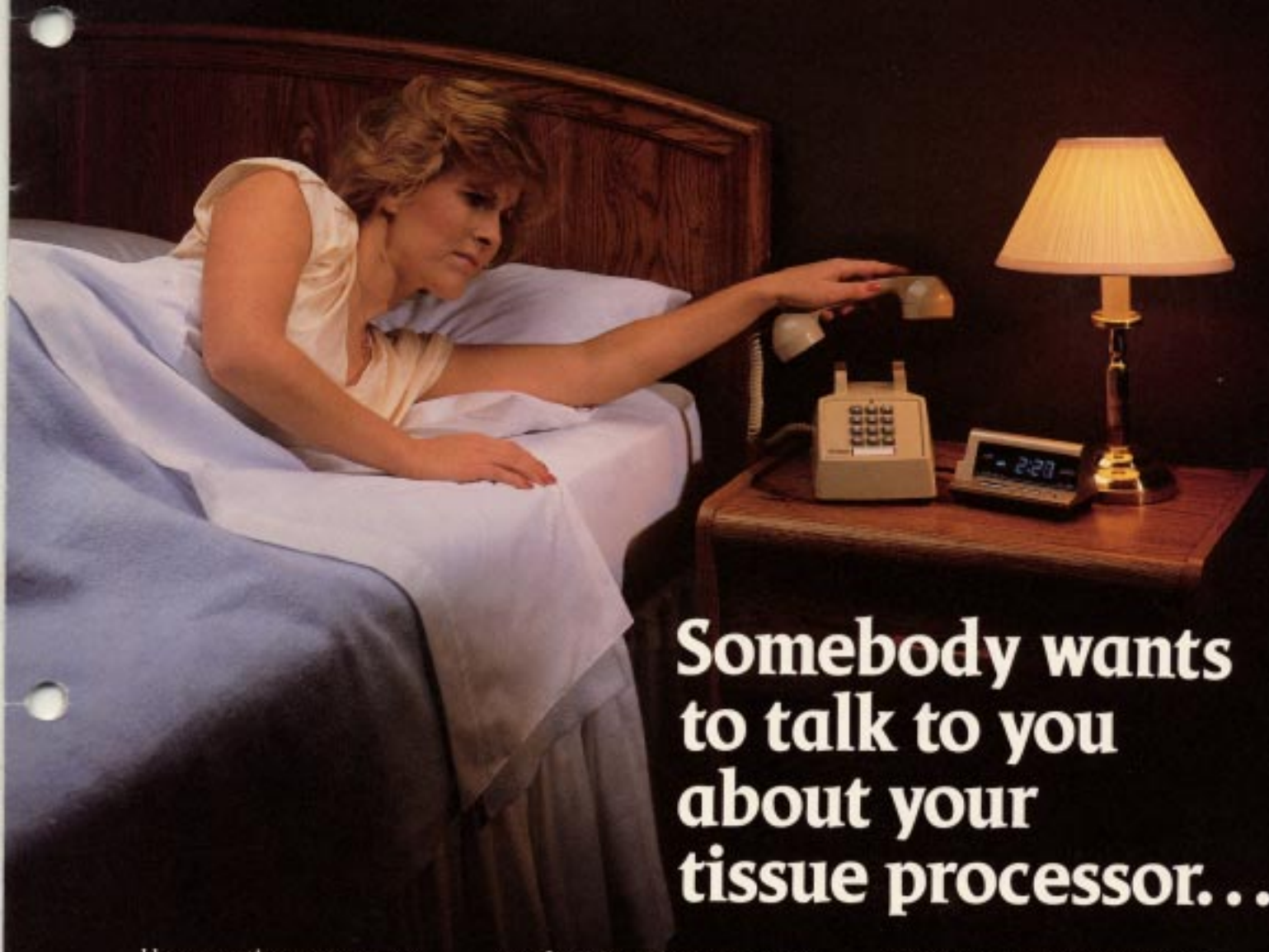
Histotechnology was Ernestene Sims' third career. She had already been a machinist, and she also had worked in a telephone office. But she has devoted most of her life to histotechnology.

She was introduced to histology through a friend of a friend. It seems that Sims was on vacation with a friend, and they stopped to visit a woman who happened to be a histotechnologist. When Sims saw a microslide lying on the table, her curiosity was aroused and she started asking questions. "How did you get it so thin?" "How did you get the color in it?" "How do they read it?" When the histotechnologist grew tired of answering questions, she suggested that Sims find out for herself by going into a training program.

About one year later, in 1959, Sims did exactly what her friend's friend had suggested. She entered a training program at the University of Texas M. D. Anderson Cancer Center. After training, she worked at the center for two years, then went to work for the Harris County medical examiner in Houston where she worked for eight years as the chief histotechnologist.

Sims had always been very concerned about the lack of training facilities and programs for histotechnologists.

(continued on page 82)



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"When I came in," she said, "I realized that the training to become a histotech was really not satisfactory." So, in about 1970, she went to work for St. Luke's Episcopal Hospital as a supervisor of histology. St. Luke's, in conjunction with Dr. Carl Lind, gave her an opportunity to help develop a formal training program with an established curriculum and scheduled classes in histology.

There were no approved programs at the time. But when the ASCP began to set curriculum standards and approve programs, St. Luke's immediately applied for approval. The program was approved in 1974, and while it limited enrollment to six new students each year, Sims estimates that she trained more than 60 students. About fifty of her students are still working as histotechnologists.

"I feel good about it," she explains, "because I look back at some of the people I've had in training and how successful they've been, and I hope I had something to do with it."

Sims also realized that histology societies could do a lot to further the educational opportunities of histotechnologists. And her contributions to the local, state, and national societies have certainly helped further those goals.

Sims helped found the Houston-Gulf Coast Histology Society, which eventually merged with two other Texas societies to form the Texas Society for Histotechnology. That also makes her a founding member of the Texas society.

Before the NSH was formed, Sims attended the AFIP Symposiums. She then became a charter member of the NSH and attended every national Symposium/Convention until her retirement in 1988.

Her involvement with the national society was exemplary. She has served on the membership, judicial, and educational committees. In 1983, she won the Golden Forceps Award for a paper she had written on whole organ preparation with the Tissue-Tek® V.I.P.™ Tissue Processor. She was also named Histotechnologist of the Year at the 1987 NSH Symposium/Convention.

At NSH meetings, Sims has conducted many workshops on topics ranging from maintenance of laboratory equipment, to knife sharpening with application in microtomy, to evaluating H&E stains, to frozen section preparations. She has also lectured on microwave staining at district and state society meetings.

Sims was the first appointed parliamentarian for the NSH and has also been parliamentarian for her state society. She served two terms as Regional Director for Region 6. And she has held many offices in the Texas state society, including chairman of the board of directors for six years. She has also served on the state society membership committee and was president of the Houston-Gulf Coast Society.

What motivated her to become so active? "The lack of recognition of histotechs and the responsibility they have," she explained. "I guess I'm sort of a flag waver. I got very concerned because histotechs were a very important part of the diagnostic team, yet they didn't seem to be recognized."

Through the efforts of Sims and others like her, a lot of progress has been made in achieving more recognition for the histotechnologist. "I'm just like everybody else," she said. "I went to work every day and I tried to make a contribution—not just to the patient, but also to the new people coming into the field. I hope I helped somebody."

Although Ernestene Sims retired in 1988, she continued to work on special research projects until recently. She even has her own small lab at home. But now she has decided to take retirement more seriously. In fact, she's on the road right now in her 30-foot motorhome. She plans to spend a few months traveling with camping groups and seeing the country—very slowly.

Did You Know?

That Bouin's fixative has an adverse staining effect on hyaluronic acid and it cannot be demonstrated successfully. It is not known if other mucosubstances are adversely affected. Buffered neutral formalin does not produce any alterations affecting the staining properties of hyaluronic acid.

(Submitted by: Lee G. Luna, American HistoLabs, Gaithersburg, MD 20879)

Kerry Crabb 1988 Histotechnologist of the Year

It was the first award ever presented by the NSH. Created to recognize an outstanding individual in the field of histotechnology, winners of the award are nominated by their peers and then selected by an NSH committee, also made up of their peers.

Ken Alexander received the first Histotechnologist of the Year Award at the 1975 Symposium/Convention in Silver Spring, Maryland. In the 14 years since, the award has gained a reputation as one of the most prestigious presented to a histotechnologist. And certainly the latest winner demonstrates the caliber of individual it takes to be named Histotechnologist of the Year.

While Kerry Crabb never expected to win such an honor, it's easy to see why he did. For the past 20 years, Crabb has devoted a great deal of his time to the field of histology, both at work and outside of work.

Crabb was first introduced to histology when he started college at Missouri Southern in Joplin, Missouri. To help pay his way through school, he began working part time for a pathologist at a reference lab. While his job mostly involved running errands, he took an interest in the procedures that were used at the lab.

(continued on page 84)

Application for NSH Membership

Editor's Note: The National Society for Histotechnology is a professional society representing all of those involved in histology. We at Miles Inc. encourage all histotechnologists to consider joining this highly respected and worthwhile organization.

If you are interested in becoming a member of the NSH, please fill out this application and return it to:

National Society for Histotechnology
5900 Princess Garden Parkway
Suite 805
Lanham, MD 20706

Name

Date of Birth

Address

Telephone No.

Social Security No.

Place of Employment

Address

Telephone No.

Signature Date

PLEASE CHECK ALL APPLICABLE BOXES:

☐ HT (ASCP)	☐ AA	☐ University
☐ HTL (ASCP)	☐ BA/BS	☐ Hospital
☐ MT (ASCP)	☐ MA/MS	☐ Private Lab
☐ CT (ASCP)	☐ PhD	☐ Veterinary
☐ RT (CSLT)	☐ MD	☐ Marine
☐ ART (CSLT)	☐ DVM	☐ Botany
☐ Other_____	☐ Other_____	☐ EM
☐ Not Certified		☐ Research
		☐ Industrial

Annual dues $30.00 United States funds.
$10 of dues applied to ***Journal of Histotechnology*** subscription.
PROFESSIONAL SOCIETY DUES ARE TAX DEDUCTIBLE.

After receiving his degree in education in 1973, Crabb decided to pursue a career in histotechnology. So he entered a one-year, AMA-approved training program at St. Mary's Hospital in Kansas City. He also kept his part-time job at Upsher Laboratories. It was the same company he had worked for all through college, but now he was at the main lab in Kansas City.

Soon after completing the training program, Crabb passed the HT exam in 1975 and went to work as a histotechnologist at Bnorah Medical Center. Two years later, he moved to the Midwest Research Center where he worked with animal tissue while doing pharmacology research.

In 1980, Crabb went to work for Mobay Corporation at its Stanley, Kansas, research facility. Today he is the histology coordinator at Mobay, supervising four other histotechnologists doing toxicology research. Much of his work involves neurotoxicity studies of various agricultural chemicals.

Crabb joined the NSH in 1975 and has been very active ever since. He attended his first national symposium in Oklahoma City in 1978. He missed the 1979 meeting but has attended every one since.

Crabb was Regional Director for two terms (1981-1984) in Region 5. He also served as Treasurer from 1985-1986, and Speaker of the House of Delegates from 1987-1988. And he has served on many committees, including education, bylaws, and convention. He is starting his second term as Vice Chairman of the convention committee. He also coordinated the 1984 national symposium in Kansas City.

Crabb has also been heavily involved in his local and state societies. In fact, he is one of the founders of the Missouri Society for Histotechnology. He is secretary of the Kansas City Histology Society and has also been secretary and president of the state society.

Crabb has devoted a lot of time to the education of histotechnologists. He has coordinated a number of state conferences and has been a guest grader for the HT exam. He has given lectures at state and regional meetings on industrial toxicology and assisted with a veterinary histology workshop at the 1987 national symposium.

It is obvious that the time and effort Crabb has devoted to the field of histotechnology has contributed greatly to the advancement of the profession. And while a lot of histotechnologists are deserving of the award, it isn't surprising that the awards committee chose Kerry Crabb as the Histotechnologist of the Year.

Editor's Note.
In future issues of *Histo-Logic*, we intend to look back at all the previous winners of the Histotechnologist of the Year Award. We'll try to find out what they are doing now and what they have accomplished since winning the award. In this issue, you'll find a special article about Ernestene Sims, the 1987 winner.

To receive your own copy of *Histo-Logic*® or to have someone added to the mailing list, submit home address to: Miles Inc., Diagnostics Division, P.O. Box 70, Elkhart, Indiana 46515.

The editor wishes to solicit information, questions, and articles relating to histotechnology. Submit these to: Lee G. Luna, *Histo-Logic* Editor, P.O. Box 36, Lanham, Maryland 20706. Articles, photographs, etc., will not be returned unless requested in writing when they are submitted.

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