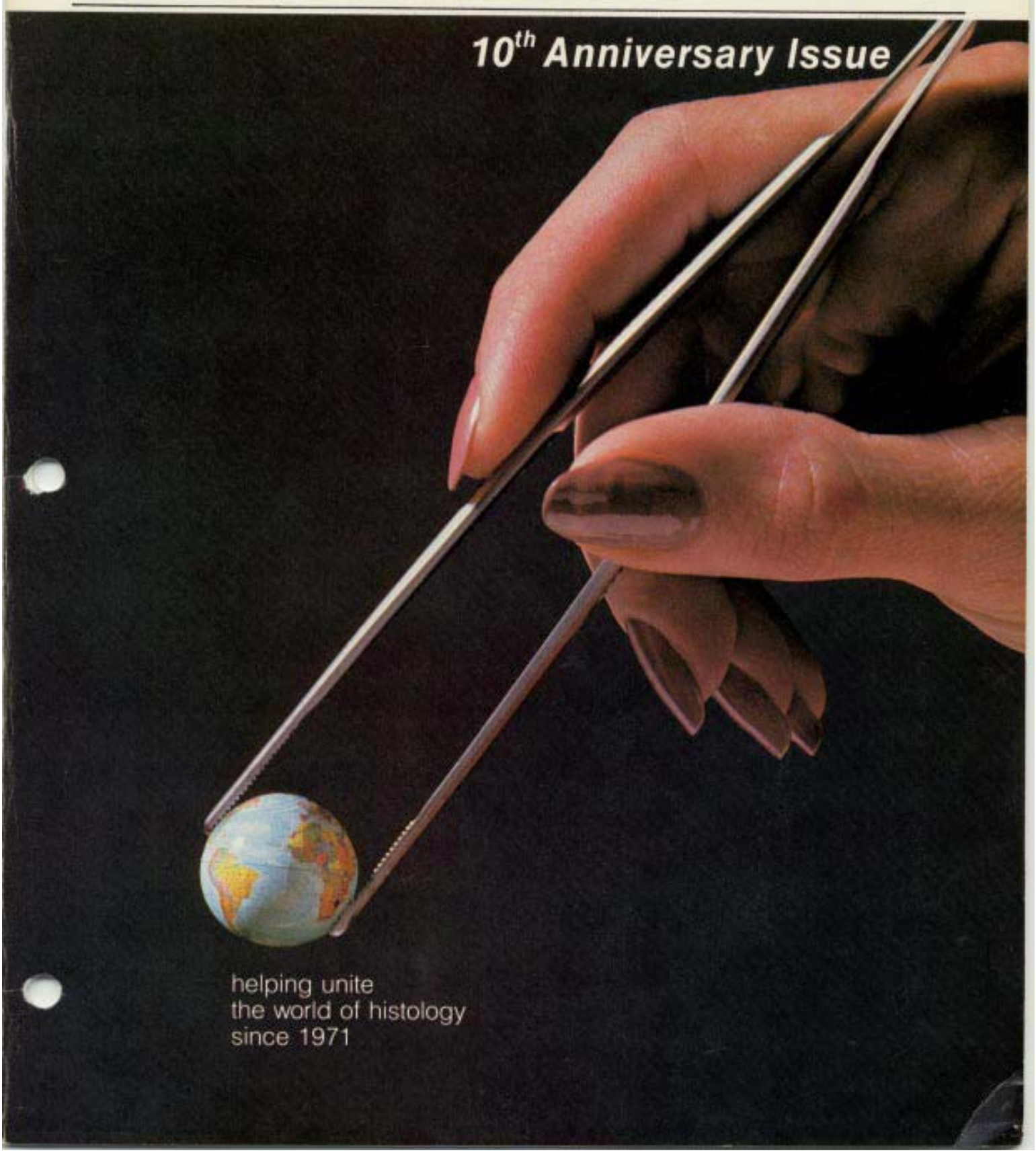
# HISTO-LOGIC®

## 10th Anniversary Issue



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since 1971

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**Histo-Logic** will celebrate its Tenth Anniversary in July, 1981. Much has transpired during this period which I wish to share: (A) To date, 23,000 people receive **Histo-Logic** worldwide. (B) **Histo-Logic** is translated into the Japanese language and distributed to 3,000 paramedical personnel in Japan. (C) It is also printed and inserted into the "South African Journal of Medical Technology." (D) It is translated into the German language and distributed to approximately 500 Pathologists and Histotechnologists in Germany. (E) In addition, **Histo-Logic** is distributed worldwide. Most of the countries receiving issues are listed on this page. (F) A total of 257 articles have been published during the ten-year existence of **Histo-Logic.** (G) The Golden Forceps Award was instituted in 1973 and has been awarded each year since, for the best article printed in **Histo-Logic.** A total of 8 awards have been presented to date (see details elsewhere in this issue). (H) The most important contribution however, is that **Histo-Logic** brought the Histotechnology community together in this country by being the first publication designed specifically for this laboratory discipline. It not only provided technical information, but also served to disseminate a multitude of diverse information regarding the field of Histotechnology.

We can all be proud of the contributions made and accomplishments realized through this newsletter. However, these accomplishments required much work and foresight. This was provided by the LAB-TEK DIVISION, Miles Laboratories, Inc., who saw and met the need of the field by providing total financial support; by the many individuals who have shared their procedures and ideas and allowed them to be published; by Roberta (Bertie) Mosedale who typed an enormous amount of material and provided unselfish support, suggestions and expertise. Yes, **Histo-Logic** is ten years old and successful, but there was a time when some suspected it "would not last a year." Some even referred to it as "**Histo-Illogic.**" These and other similar remarks (most of which occurred in the initial development stages) have been proven wrong by you, the recipient of **Histo-Logic.** You have shown a great interest, and therefore thanks and gratitude also go to you. THANK YOU!

The Editor
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# Predictions of the Decade
## 1970-1980

Lee G. Luna, HT (ASCP)

### INTRODUCTION

The following paper was presented at the Armed Forces Institute of Pathology's "Symposium on Histopathologic Technique," 14-16 October 1970, in Washington, D.C. It is being printed here, in part, to commemorate the "Tenth Anniversary of **Histo-Logic.**" We have also included several articles from foreign contributors to illustrate in small measure, the growth of what is considered to be the *first* national vehicle of communication solely for the field of Histotechnology.

Editor's Note: As previously stated, the following predictions were made in 1970. Following each prediction you will find illustrated by various means, the year they became realities. The predictions are preceded by a short abstract of the birth of Histotechnology as appeared in the original 1970 paper.

One cannot predict the future without bringing memories to the fore. Recollection is necessary to provide one with insight and a gauge which will serve to determine (A) past accomplishments, (B) past failures and (C) past needs never sated. More important, retrospect can provide valuable information for future requirements. It therefore becomes vital to briefly examine the birth of histologic technique.

**Sectioning (1664)[1]. . .** The beginning of histologic technique dates back to 1664 when Robert Hooke first sectioned sections of cork with his *pen knife*. Leeuwenhoek, around 1670, made sections by using a hand-sharpened *shaving razor* to cut cork; white of a writing pen (paring from a quill), bits of bovine optic nerve cut crosswise, and pith of elder (center of dried flowers).

**Fixation and Gross Staining (1685)[1]. . .** In 1685 Raymond Vieusens described ligating carotids in the middle neck, and into one injected repeatedly *"spirits of wine colored with saffron."* Opening the cranium, only the grey substance (cortex) was imbued with the saffron color.

**Staining (1719)[1]. . .** In 1719 Leeuwenhoek was examining muscle fibers of an obese cow for comparison with those of a lean 8 year old. Information of practical importance could have been yielded when he wrote: "Since the said fibrilla, cut into the thinnest possible layers were so transparent that they could hardly be recognized, I have macerated a little *saffron in burnt wine*. To make the fleshy particles more visible to the artist, I have merely moistened them with this wine. Whereupon, they were bright with a yellow color."

**Microtomes (1770)[1]. . .** Cummings' *cutting engine*, 1770, held the specimen within a cylinder and advanced it upward for sectioning by means of a fine *screw*. The knife edge traversed from a fixed pivot. The cutting engine could routinely section at 25 micra and 13 micra with much difficulty.

**Glass Slides (1782)[1]. . .** Johann Hedwig, Hungarian professor of medicine and then botany at Leipzig, included in his fundamental botanical work in 1782, two irrelevant sections of squash stems, cross and longitudinal. He exclaims: "See what is found in the thinnest possible section, cut with the sharpest knife, placed on a *glass slide* and viewed with a high-power lens." He pictured ducts, "some saturated with the decoction, others less red, some dilutely yellowish."

**Hematoxylin (1803)[1]. . .** Thomas Andrew Knight (1803) was the *hematoxylin* pioneer. He reported: "On transecting the 'runner' of a potato plant to a tuber and immersing both cut ends in a decoction of logwood, the color traveled more readily toward and into the tuber than in the reverse direction." Upon sectioning, Knight found that the wood demonstrated bands of "blood-orange groups of fibers, yellow wood and gray parenchyma." Though primitive, it was assuredly a hematoxylin-stained preparation.

**Embedding Media (1873)[2]. . .** In 1873 Flemming reported embedding in soap. In a following report, 1876, he described embedding in turpentine-paraffin. Duval, 1879, introduced celloidin as an embedding matrix. In 1881, the chloroform-paraffin technique commonly used today was publicized.

The history of histologic technique from birth to the present is voluminous and time and space will not permit further discussion. Allow me to traverse from the infancy of histologic technique to the present state of the science.

One must return to the beginning of the last decade (1960) to realize the notable improvements in histologic technique. Consider, briefly, innovations during the last 10 years: Automation of knife sharpening, automated staining, improved microtomes, improvement in cryotomy, i.e., development of cryostats and freon compressor units, better embedding media, i.e., bioloid, paraplast, and many other excellent media. Also, note refinements in tissue processors: Lipshaw's Vacu-Therm, Technicon's Ultra. Recognize advances in embedding with the marketing of units such as Tissue Tek II, Timstation, and Thermolyne systems. Other instrumentation improvements could be cited, but suffice to say that great strides were made during the decade of the 60's.

In stain technology, recall the growth of chemistry, enzyme histochemistry, mucosaccharide histochemistry, and stain technology (special stains). Most literature on histologic technique was published in the last decade. Educational programs on histologic technique did not exist 10 years ago. It was not until 1965, to my knowledge, that the first educational program, exclusively for histology, was conducted. In the autumn of 1965, the AFIP Annual Symposium on Histopathological Technique was born. It was the origin of a significant annual event. The symposia provided a model and impetus for other scientific programs in histologic technique.

There is no doubt that histologic technique advanced more rapidly in the last decade (1960-1970) than in the previous 300 years. This fact is substantiated by recalling the many developments in instrumentation and techniques which have transpired but are not mentioned herein.

What will the fruits of tomorrow's harvest be? I am convinced that the science of Histotechnology is moving forward, thereby vacating the "bottom of the totem pole" status. This trend was evident in the last ten years and will become more obvious as we see predictions become realities.

## EDUCATION

**Prediction:** *Establishment of higher educational prerequisites and better training programs.*

Education is a necessity if the histologic technician is to remain current. More specific and complicated techniques are in the development phase and additional procedures will be initiated and discovered during this decade. Further development of enzyme histochemistry, mucosaccharide histochemistry, lipid histochemistry, protein pigment histochemistry, fluorescent techniques and many others is now reality. One might argue that many developments or the performance of new techniques must be left to the histochemist. But I ask, what are you if not a histochemist, when you perform procedures that involve chemical affinities or reactions? Note the modes of action for the following special stains:

**PAS:**
The chemical basis of the periodic acid Schiff reaction is periodic acid cleaving to the carbon-carbon bonds of carbohydrates when carbon atoms have adjacent hydroxyl (1, 2-glycol), or adjacent hydroxyl and primary ($-NH_2$) or secondary ($-NHR$) amino groups (1, 2 amino-hydroxy groups) thereby yielding aldehydes which react with Schiff's reagent.

**IRON:**[3]
Potassium ferrocyanide forms prussian blue $[Fe_4(Fe(CN)6)3]$ with reactive ferric salts in acid solutions using the ionic form of ferric iron. The reaction is expressed as follows:

$$4\ Fe^{+++} + 3K_4Fe(CN)_6 \xrightarrow{HCl} Fe_4[Fe(CN_6)]_3 + 12K^+$$

Iron — Ferrocyanide — Prussian Blue

The mode of action indicates that histochemistry is involved. Higher education levels will accomplish two things. (1) It will prepare histotechnicians to develop new procedures and provide a better understanding of reactions. The pathologist will benefit because we will be better prepared to correct problems and establish reliable quality controls. Education will also prepare us to have perspective, insight and the mode of action anticipated in a given procedure. A histotechnician with this background would be extremely useful and productive for a pathologist. (2) Qualified histotechnicians can prepare training programs for either in-house training or local and national meetings. Motivation will follow and histologic technique can be investigated scientifically to destroy the often expressed preconceived idea that histologic laboratory disciplines are purely mechanical and that anyone can perform satisfactorily. Histotechnicians who possess a college degree or at least two years of college tend to explore beyond mechanics and into the science of Histotechnology. Very little can be related concerning the present level of histologic technician training programs in this country. We are cognizant of the low status. It is imperative that specific curricula be established immediately to ameliorate this deficiency.

**Reality:** *Board of Registry Certification Examination Eligibility Requirements*

**1949 Histologic Technician, HT (ASCP)** . . . Successful completion of a CAHEA accredited Histotechnology program, OR

Associate degree or at least 60 semester hours (90 quarter hours) of academic credit from a regionally accredited college/university including 6 semester hours (9 quarter hours) in chemistry and 6 semester hours (9 quarter hours) in biology AND one year full time experience in histopathology within the last three years. This year of experience must be under the supervision of a certified pathologist (certified by the American Board of Pathology in Anatomic Pathology, or eligible), or an appropriately certified medical scientist, OR

High school graduation (or equivalent) AND two years full time experience in histopathology within the last five years. These two years of experience must be under the supervision of a certified pathologist (certified by the American Board of Pathology in Anatomic Pathology, or eligible), or an appropriately certified medical scientist.

**1980 Histotechnologist, HTL (ASCP)** . . . Baccalaureate degree from a regionally accredited college/university with 12 (18 quarter hours) in chemistry; 16 semester hours (24 quarter hours) in biology, selected from general biology, histology, zoology, anatomy, or physiology; 4 additional semester hours (6 quarter hours) in other unspecified science courses; 3 semester hours (4 quarter hours) in mathematics, AND one year full time acceptable clinical laboratory experience in a histopathology laboratory. This year of experience must be acquired post baccalaureate degree and must be under the supervision of a certified pathologist (certified by the American Board of Pathology in Anatomic Pathology, or eligible), or an appropriately certified medical scientist. OR

Baccalaureate degree from a regionally accredited college/university including the above course requirements. AND successful completion of a CAHEA accredited Histologic Technician program, OR

LIMITED SPECIAL ELIGIBILITY ROUTE — HT(ASCP) certification with eight years of experience obtained prior to August 1980 in an approved histopathology laboratory, for the first six (6) HTL examinations (ending with the February 1983 examination administration).

**1975 NSH/Thomas A. Edison Associate in Arts Degree Program with Emphasis in Histotechnology . . .**

**1975** Forty-six A.M.A. accredited programs of histotechnology

### Additional Accredited Programs

Aultman Hospital
Canton, OH 44710

Blodgett Memorial Hospital
Grand Rapids, MI 49506

Conemaugh Valley Memorial Hospital
Johnstown, PA 15901

Fergus Falls Community College
Fergus Falls, MN 56537

Harford Community College
Bel Air, MD 21014

Methodist Hospital
Memphis, TN 38104

Shoreline Community College
Seattle, WA 98101

St. Francis Hospital Medical Center
Peoria, IL 61603

St. Vincent Charity Hospital
Cleveland, OH 44115

University of North Dakota
Grand Forks, ND 58201

Veterans Administration Hospital
Long Beach, CA 90822

In addition, the April, July and October 1980 and January 1981 issues of **Histo-Logic** contained lists of more than thirty different training aids, most of which evolved during the decade of the 70's.

Add to this the more than 50 scientific programs (seminars, workshops, etc.) which are being conducted annually by Pathology Societies, State Societies, Universities and National Societies, and you see that much has been accomplished to fulfill this REALITY.

## INSTRUMENTATION

**Prediction:** *Noting past developments in instrumentation, there exists no doubt that the forthcoming decade will yield many advances.*

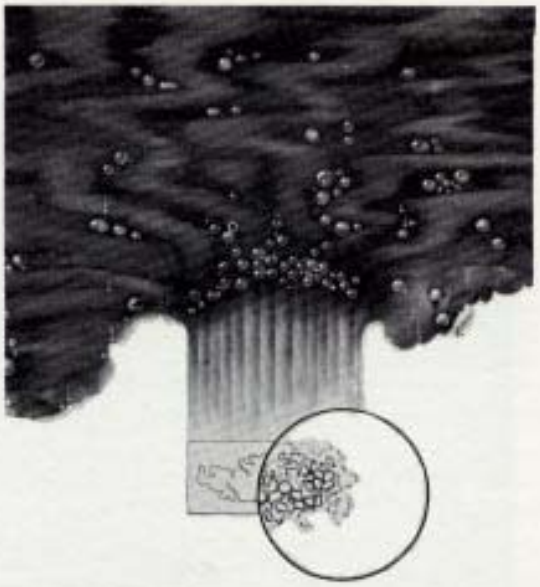
Today the manufacturing industry has a better understanding of our needs and will be more pronounced as requirements continue for more specific demonstration and identification of pathologic entities. Do not be surprised when we see the technology and development of systems to accomplish the following:

A. Automatic systems employing heat, agitation, vacuum, and positive pressure for quick, proper fixation of tissue. Surgical and autopsy material could be adequately fixed in as little as one to one and a half hours. Beside expediency, the system would produce fixation consistency thereby eliminating many varied morphologic changes in tissue observed today primarily due to utilization of different fixatives and fixative ingredients.

**Reality:** *No significant advances made here.*

B. Sophistication of automatic tissue stainers, including variable systems with provisions for progressive special stains; periodic acid Schiff, iron, trichromes, etc.

**Reality:** *The technology for automated special stains became available during this decade with the availability of automatic stainers, but there has been a great deal of hesitancy to employ it. This hesitancy is due to three reasons: (1) Lack of trust in performing procedures automatically, which many of us take pride in performing manually; i.e., we feel that a certain human touch is essential. This is true for many special stains, but not for the progressive-type procedures. (2) The daily slide production requirements are insufficient to warrant utilization of the system. (3) No one has made necessary modifications to established procedures in an effort to incorporate them into automated staining systems.*



C. Advancement will continue in tissue proces[illegible] systems. An excellent beginning has been the Technicon-Ultra and Lipshaw's Vacu-Therm. While the above are great advances, systems will be developed to the degree when it will be possible to combine processing and embedding in one unit. Should you doubt this possibility, consider that histology has portions of the system; the Technicon-Ultra and Lipshaw's Vacu-Therm are designed to accelerate fixation, processing and impregnation of tissue. Fixation is included with dehydration, clearing and impregnation. Tissue Tek II and Tims make it possible to fix, process and embed tissue in the same cassette. Redesigning systems could conceivably produce a totally automated tissue processing-embedding unit.

**Reality:** *V.I.P. Vacuum Infiltration Processor 1979*

D. Few developments will take place in microtome instruments. We have excellent microtomes and the problem in poor sectioning is not due to the instrumentation, but can be attributed to poor technique and poor knife edges. Minor improvements and refinements are anticipated in the present microtome. Microtomy, however, may be improved by the discovery or development of a water miscible plastic-like embedding medium which must form a suitable matrix for cutting and ribboning. A piece of tissue would be placed in the medium following fixation and allowed to remain until completely impregnated. The impregnation medium containing the specimen would be hardened and ready for sectioning. A water soluble plastic-type substance with fast controlled solidification is needed. The product or its precursor may be marketed today, but has not been adapted to histologic technique.

**Reality:** *2-Hydroxyethyl Methacrylate (also known as HEMA glycol methacrylate and GMA). This water miscible plastic is presently being used by some investigators for light microscopy. It is the first step of what could become a universal embedding media which could eliminate paraffin processing as we know it today. Excellent information on the use of this plastic for light microscopy can be found in an article by Bennett, et al, Stain Technology, 51: No. 2, 70-82, March 1976.*

. An automatic slide coverslipper would be a significant step forward by saving the technician work hours which could be devoted to more meaningful and productive laboratory activities. The innovation is not beyond our reach or technology and quite possibly could be introduced in this decade.

**Reality:** *Shandon Autoslip 1979*

. Discovery or development of an all-purpose slide el will be an excellent addition to histologic technique. The time-saving factor is profound if one could apply a label with necessary information to the slide during the cutting phase and process the slide through various facets of conventional and/or special staining without alteration by any stain or chemical. Such a label would require that it be impervious to the dyes and chemicals. Further, the adhesive must also have qualities to prevent it (adhesive) from dissolving in chemicals. Remember the amount of time devoted to marking, labeling and relabeling slides? Again, I assert that this development is within the realm of existing technology and could become tangible before termination of this decade.

**Reality:** *No significant advances here as it relates to slide labels.*

## QUALITY CONTROLS FOR HISTOLOGIC TECHNIQUE

**Prediction:** *Quality control procedures will be initiated and required during this decade as a matter of routine.*

As technology increases there will be additional requirements for exact dye contents, precision hydrogen ion systems for stains and solutions, procedures standardized for uniform fixative chemicals, and acids utilized in various procedures.

**Reality:** *(A) Standards for Accreditation of Medical Laboratories, Commission on Laboratory Inspection and Accreditation, College of American Pathologist.*
*(B) NSH Quality Control Task Force — 1978.*

## NATIONAL HISTOLOGY SOCIETY

**Prediction:** *I believe that establishment of a national histology society in this decade is inevitable. Whether organization will be under the auspices of an established society or affiliated with existing memberships remains to be seen.*

If the field is to advance beyond the "step child" (associate) membership realm, the child must mature and enter adulthood with an erect posture. Regional, state, and city histology societies exist. More are in the process of being organized. Do not disregard the need for this prediction to occur if the forward direction for educational programs continues. It seems inconceivable that any laboratory discipline can be nurtured to full potential while affiliated with an influencing parent organization when limitations on the methods of organization activity are imposed. Specifically, voting restrictions on legislation regarding this paramedical discipline exist. History records that great progress was made by organizations after or due to autonomy. During travels throughout the nation, two factors become quite evident. (1) Histopathology technicians are information hungry; i.e., they are genuinely interested in learning more about their vocation, and (2) most would welcome a national society. A most important aspect which will be a deciding factor may be found within present professional organizations. As organizations enlarge, it soon becomes obvious that personalized contact is diminished and interest fades. Specific areas of interest are favored and time, monies, and energies are exerted in that direction at the expense of ancillary vocations. The area which seems to be the most popular at a particular time, or one which will bring in the most revenues is usually selected. Don't misinterpret me, it is not unethical; but I ponder how much growth potential, from every facet, exists for histologic technique laboratory personnel in this environment? Will those in authority consider programs in histologic technique as important as clinical laboratory technologies? To date, there is no answer. It is my impression little change will occur. Some pathology and laboratory professional societies have demonstrated interest in the past several years. Do professional personnel in other laboratory disciplines know that your laboratory science is significant? From an article in a recent journal the following is suggested: "It may not be necessary to take three to four weeks to teach a course such as histologic technique which can be covered adequately in one or two weeks." So-called authorities with a mental "tunnel vision" syndrome have absolutely no concept of histologic technique. This type of suggestion by "associates" is divorcing your laboratory science from other paramedical laboratory sciences. Therefore, the self-appointed authoritative orators are contributing to the formation of a national histology society. Additional factors accelerating the eventual formation of a national histology society could be cited, but suffice to say that it will not be a surprise if we have an autonomous organization for histologists during this decade. The parent organization may awake one day to discover that the child was "aborted."

**Reality:** *On September 29, 1973, incorporation proceedings began for the National Society for Histotechnology.*

It is one thing to predict the future of histologic technique, but it is something else to see it fulfilled. The predictions have been made and it will require a united, concerted effort to see them come true. To experience fruition we must identify ourselves as a laboratory discipline which is bursting at the seams to grow and upgrade personnel and quality. The first step to identification must be in terminology. Consider the varied job titles:

**Tissue Technician**
A technician who studies a collection of cells or derivatives of cells, forming a definite structure.

**Histology Technician**
One who studies microscopic anatomy, specifically that branch of anatomy dealing with cells and minute structures of the tissue organs.

**Histopathology Technician**
One who studies pathologic histology, specifically the science or study dealing with the cytology and histologic structure of abnormal or diseased tissue.

**Pathology Technician**
One who studies that branch of medicine which treats the essential nature of disease, especially of the structural and functional changes which cause or are caused by disease.

I ask you, are the terms applicable to functions we perform in our laboratories? Are we responsible for studying collections of cells or derivatives of cells? Do we study tissue morphology and report findings? Do we study the nature of disease? If we cannot say yes to one or more, we are not correctly identified by the terms. We require better terminology to accurately identify our job function(s). Terminology is also lacking in every day laboratory activities and job descriptions. For example, why not substitute the following stronger and more meaningful terms:

| | | |
|---|---|---|
| Frozen section | to | Cryotomy |
| Cutting or sectioning | to | Microtomy |
| Special stain | to | Stain Technology |
| Equipment | to | Instrumentation |
| Technic | to | Technique |
| Technics | to | Technologies |

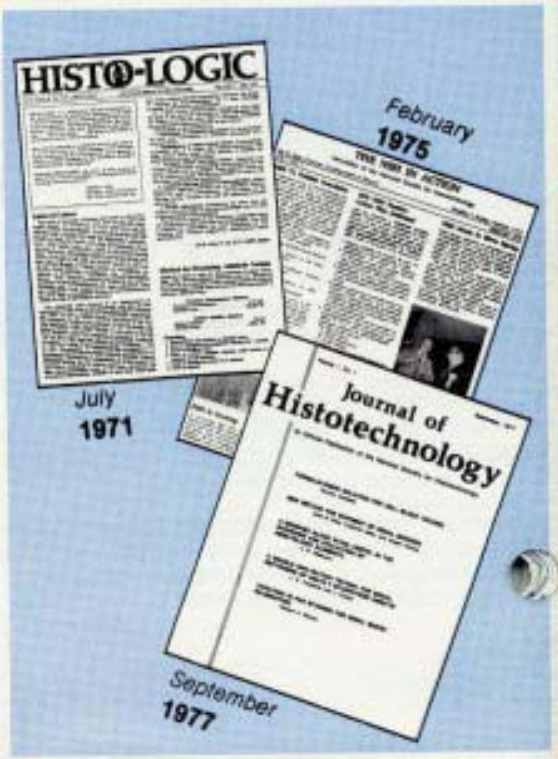
Many more examples of better terminology can be found. Incidentally, do not hesitate to call yourself a TECHNICIAN. Webster's dictionary describes a technician as "a person skilled in the technicalities of some subject; one who has *great technical skill or knowledge.*"

In my opinion the upgrading and identification of terms in this laboratory science will markedly enhance the specialty of histologic technique and the technician performing the functions.

**Reality:** *Many terms have been employed during this decade which have contributed to the overall sophistication of the field of histologic technique. For example, cryotomy and microtomy are terms commonly used today. The Board of Registry's new HTL certification has added the term Histotechnologist to the existing Histologic Technician. Decerate is being used more in place of deparaffinize. Instrumentation terminology is also changing. For example, Vacuum Infiltrator Processor (VIP), and Histomatic, in place of tissue processors. If one stops to make a comparison, you would find additional term changes which have occurred during the last decade.*

**Prediction:** *Increased effective communication is paramount. Direct liaison, rapport and exchange between histologists, pathologists and manufacturers of histologic equipment will benefit histology immensely. The establishment of a communication mode, available to all histology technicians, will greatly improve technologies and elevate this paramedical laboratory science. To this goal, a newsletter-type communication is in its embryonic stage. When a reality, it will serve as a vehicle for answering technical questions of any nature dealing specifically with histologic technique.*

**Reality:** *Communications develop and expand.*



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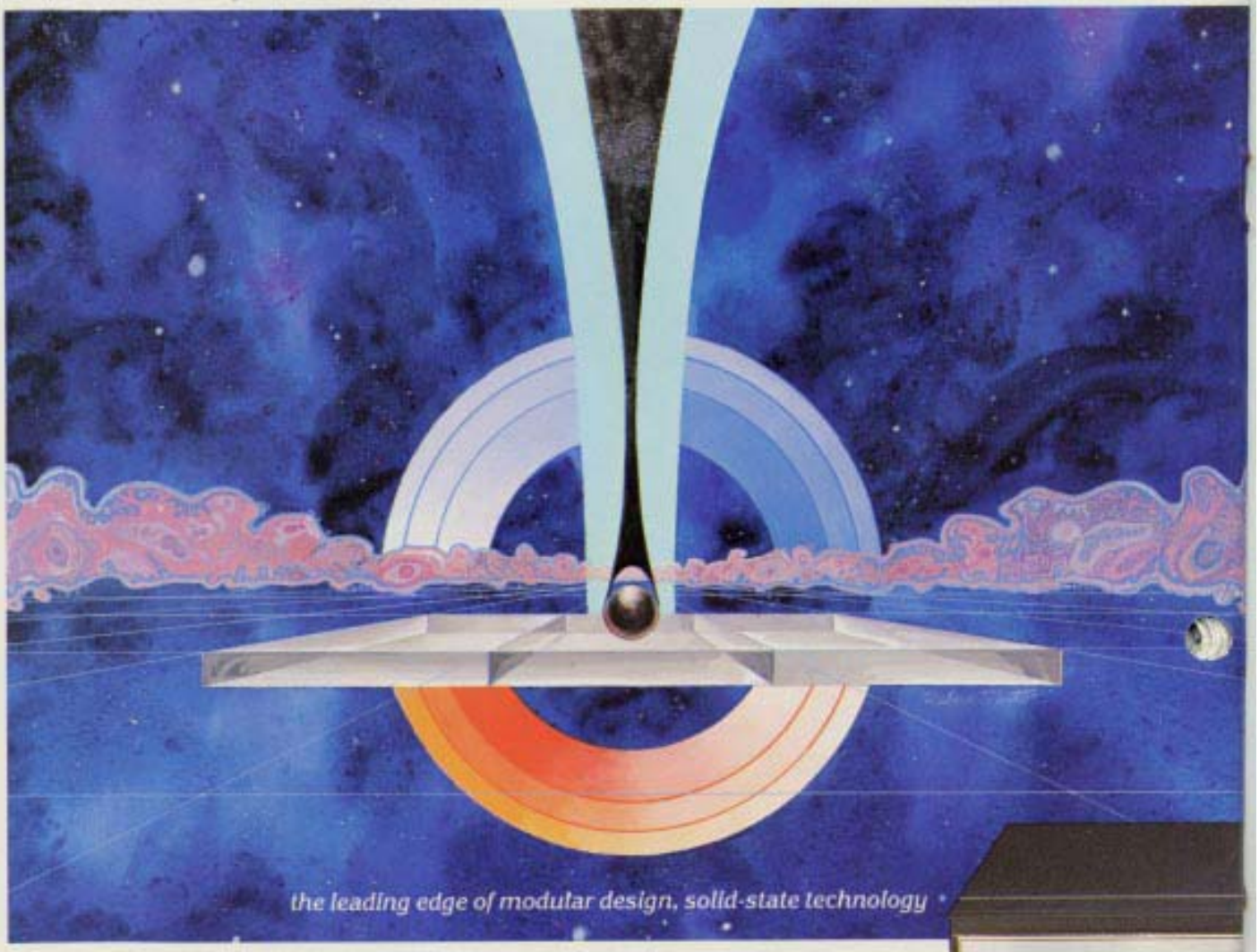
Lab-Tek Division MILES

*The histology systems source*

*Lab-Tek and the art of histology*

"Trimodulation," by artist Ruben Nieto, is an original work in acrylic and watercolor, symbolizing the new levels of technology in the art of tissue positioning and embedment.




New Tissue-Tek® III

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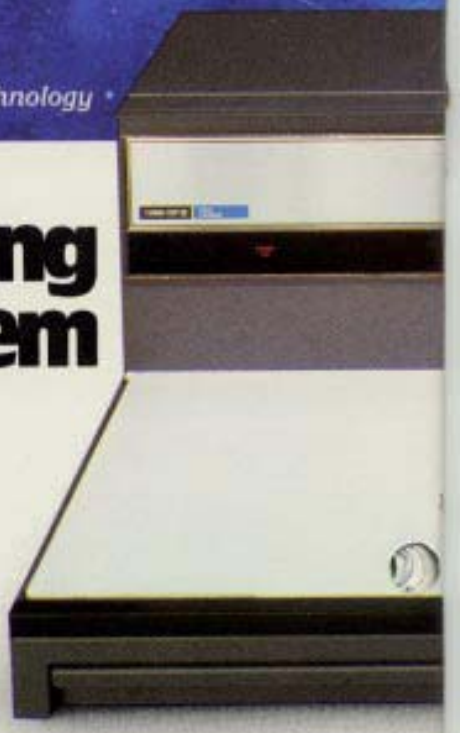

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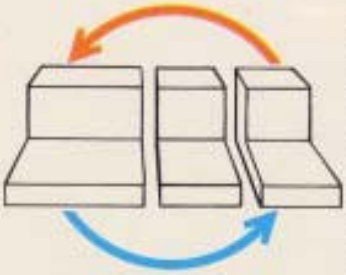

**New uni-plane modular design** lets the operator position the individual consoles for right-to-left *or* left-to-right procedures. Whether right-handed or left-handed, operators can now use a system that works *with* their natural abilities rather than opposing them. Thus the TEC eliminates unnecessary motion, speeds the skills of the operator and helps make the laboratory even more productive.

All TEC consoles have identical working surface heights, allowing the operator to smoothly move from one console to the other. The operator can more closely concentrate on the procedure itself without being distracted by "adjusting" to differing heights of each unit as it is used.

Solid-State Electronics assure years of dependable, consistent service. Each module has an illuminated "power on" indicator; and the Cryo and Dispensing Consoles each have a digital LED readout to verify temperatures in critical areas. There is never any temperature guesswork, and the readouts allow operators to monitor and log temperatures on a daily basis if desired.

And because of the TEC modular design, components can be purchased separately if desired. As needs grow or existing instruments are retired, new TEC consoles can be added at any time to complete the system.

Digital LED display indicates actual temperature in heated paraffin reservoir or with a flip of the switch displays actual temperature of paraffin as it is dispensed

**Tissue-Tek® III Dispensing Console**

- Large orientation platform has generous heated work area for rapid, accurate specimen orientation
- Cold Spot is independently chilled by a separate thermoelectric module
- Heating elements in platform are optimally distributed for uniform temperature over entire heated work area
- Work light on paraffin dispenser illuminates orientation platform making specimen positioning easier and more accurate
- Paraffin dispenser foot pedal leaves both hands free; finger touch plate also operates dispenser

**Tissue-Tek® III Thermal Console**

- Two capacious chambers: *Front* chamber contains a tray which can be partially filled with paraffin, to keep cassettes containing processed specimens at the optimum temperature before the beginning of embedding procedures

  *Rear* chamber holds a large quantity of base molds at proper temperature, has a flip-top cover to keep molds dustfree
- Temperatures for both chambers may be adjusted from approximately 50-70°C

**Tissue-Tek® III Cryo Console**

- Large refrigerated cold plate provides ample chilling area for paraffin embedded specimens
- Constant digital display indicates temperature of cold plate at all times
- Plate cools to −5°C in approximately 20 minutes, at a 25°C ambient room temperature
- Two electrical outlets at rear of console provide connection of Dispensing Console and/or Thermal Console

For further details see your Lab-Tek Distributor: American Scientific Products, Curtin Matheson Scientific or VWR Scientific.

Lab-Tek Division, Miles Laboratories, Inc., 30W475 North Aurora Road, Naperville, IL 60540.

# SHARP

**Tissue-Tek® III Disposable Microtome Blade System puts a fine edge to your skills**

## Accu-Edge™

- Now prepare clean sections consistently, with no worry about scratch marks, compressed sections or chatter marks
- Unique blade dispenser lets you change blades in seconds, holds 50 blades, stores used blades safely
- Eliminates tedious sharpening routines —you're always assured of an ultrasharp edge when you need it
- Precision blade holder fits perfectly on most rotary microtomes
- Quickly and easily cleaned
- Sturdy storage box protects system when not in use

*For further details see your Lab-Tek Distributor: American Scientific Products, Curtin Matheson Scientific or VWR Scientific. Lab-Tek Division, Miles Laboratories, Inc., 30W475 North Aurora Road, Naperville, IL 60540.*

*Ultra-sharp blade sections specimens without striation, distortion or chattering*

*Dispenser delivers a new blade in seconds, automatically ejects used blade*

*Safe convenient disposal niche for used blades*

Lab-Tek Division MILES

*The histology systems source*