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Finding the Elusive Key to Motivation*

Gloria Bencivenne, HT (ASCP)
Histology Section Chief
Mountainside Hospital
Montclair, New Jersey 07042

Management training programs tell us we cannot be effective as supervisors unless we motivate our employees. But do we know how to inspire motivation in others and to control it? That problem haunted me, and to complicate matters I broadened the question to include the specific problems I face not only with employees, but with students. Eventually, as it turned out, it was my experience with students that gave me a better understanding of motivation techniques.

At the 550-bed hospital where I am section chief of histology, there are training programs both in medical technology and histology. To some extent, the med tech students have their motivation literally built in. Completing their fourth year of college while in training, they'll soon be qualified to take the ASCP registry exam. Good jobs with hospitals, research and educational institutions, and pharmaceutical companies await them. They can specialize in hematology, chemistry, bacteriology, or blood banking. They may go on to advanced degrees and move into supervisory positions. Motivated by the vision of a bright future, all they need is a reminder of better days to come when the going gets rough.

In contrast, consider the lot of the histology student. Although plans call for an upgrading of entrance requirements, histotechs come to us directly from high school. On the whole, they're a pretty enthusiastic bunch. Young and eager, they are grateful for the opportunity of getting into the medical field without the time and expense of a college education. We try to select the best of these applicants — those who are truly interested in the field but who, because of immediate personal or financial problems, can't attend college. Histotech students spend a year training in the lab. Then they face the prospect of continuing in the same department indefinitely. If one of them is lucky, the section chief will retire and possibly that histotech may advance into that position . . . in 10 or 20 years.

Don't get me wrong. I am not knocking histology. I did general lab work for 13 years before accepting a post in histology and, believe me, I don't regret it for a minute. The importance of our work is never so dramatic as when we are doing a frozen section. Caught up in the excitement of the operating room, we know that as a result of the tissue slides we prepare, the pathologist can tell the surgeon if the patient on the table has a malignancy or not. But because histology has always been considered a restricted field, problems in motivation occasionally develop.

I recall two young students. One was so eager to learn and do everything all at once that I literally had to hold her back. During the time she was with us, she was nicknamed "Puppy". Whatever I did, wherever I went, Puppy was breathing down my neck and watching every move I made. She bombarded me with an endless stream of chatter, mostly questions, until I began to dread facing her. Clearly, Puppy presented a case of unbridled motivation.

Unfortunately, Puppy's bubbling enthusiasm wasn't contagious. It terrified and intimidated her companion student, who happened to be Puppy's opposite in both appearance and personality. Naturally, we nicknamed her "Kitten". Kitten was positive that the work was too much for her. She was sure she wasn't qualified and that she had no future. Her depression deepened after she attended lectures with the med tech students and found that the subject matter was on a level far beyond her comprehension. I had to do something quickly or I would have lost Kitten. I knew she'd be a tremendous loss to us because she had the intellect and interest so vital to any aspect of medical work.

It was then I realized how little I knew about motivation. On the one hand I was continually telling the irrepressible Puppy how important the histotech's job is. I was frequently reminding this bubbly student how serious the consequences would be for the patient if tissue specimens were not properly and precisely labeled. On the other hand, I was desperately trying to convince Kitten that she mustn't be frightened while attempting a special stain or cutting a little deeper into a block of tissue. How was I to transfer some of Puppy's surplus of incentive and confidence to Kitten?

I reviewed everything I'd learned, hoping to get a better grasp on how to handle these two problems in motivation. I pored over several books on psychology. I even consulted the dictionary. But definitions didn't solve my problem.

As I studied, I asked myself: What doesn't motivate? I rediscovered that physical comfort and money, by themselves, have no lasting effect upon motivation. The person who feels overworked and underpaid won't permanently change his attitude, even if given a raise. Physical comforts such as adequate space, cheerful surroundings, controlled temperature and humidity are certainly necessary. By themselves, however, these comforts won't resolve basic dissatisfaction.

Next I rediscovered the management truth that forcing a person to do something isn't supplying motivation. You can make someone perform a task if you threaten him, but that isn't motivating him. You are the one who is motivated. He is just intimidated.

I read all I could digest about hunger, thirst, sleep, sex, and shelter. Each of us is automatically driven to satisfy these basic needs. But there are subtle needs that must be satisfied too; the need for security, the need for dependency. These needs are the hardest needs to attain by yourself.

Finally, I learned about emotions, an extremely important factor, when dealing with people. Each person reacts with others in a way dictated by the sum total of his life experiences. Most of our motives are deeply rooted in our past. A person's behavior results from many motives working together on both the conscious and unconscious levels.

After pondering all this, I decided that Kitten, because she was timid and unsure of herself and lacked a specific goal, would need some very special attention plus a change in atmosphere. I separated her from Puppy, except when we had to attend formal lectures and demonstrations.

Puppy was an entirely different matter. A histotech I'll call Bob had seemed vaguely disgruntled and out of sorts. I thought I recognized the symptoms of boredom and restlessness in Bob's behavior. By assigning Puppy to work with him, I hoped the added responsibility of a student, plus Puppy's good natured animation, would snap him out of his depressed mood.

I personally took on the task of motivating Kitten. I spoke to her gently and quietly. When she made a mistake I didn't scold her, but rather told her what she had done wrong and showed her how to correct her error. I took pains to assure her that I had complete confidence in her ability. Away from Puppy's devastating aura of confidence and exuberance, Kitten began to feel more secure.

As Kitten developed confidence, Puppy began to calm down. Indeed, by solving her problem of unlimited motivation, I also solved Bob's problem of mid-career doldrums. He'd been in a slump because of a lack of opportunity for advancement. Puppy reawakened his interest in histology, and Bob became an active mem-

ber of our state and national societies. His depression vanished when Puppy forced him to become involved in the broader aspects of our work.

In the process of motivating my two students, I motivated all of us. I had encouraged Puppy and Kitten to attend seminars and meetings held by histology groups. Here, they learned something about electron microscopy, microphotography, and other bright vistas opening up for histotechs. Inspired by what they'd heard, my two students carried an infectious degree of motivation back to us.

All of us in the department ended up by joining our state society for histotechnology, which recently arranged, for members, a correspondence course leading to an associate's degree with a histology major. We also learned of the activities of other state histology societies, as well as the work of a national society. In the process, we discovered plans for continuing education programs and the exchange of technical data. In fact, we learned that our future is brighter and more exciting than ever. My students and my co-workers now have enough motivation to last them for a long, long time.

How would I sum up what I have learned? First, that a supervisor's primary motivating tools are a sincere interest in your own work, your department, and your career; an interest that can inspire pride of accomplishment in technologist and student alike. Second, a personal interest in the people you teach and supervise. Out of this interest will come the skills necessary to treat each tech and student according to the needs of his own personality.

Third, keep yourself and your people up to date on new methods, growth, and expansion within your own field. Let your people know about those bright new vistas just as fast as they open up. Fourth, give your fellow workers added responsibilities. Not only will they learn something about the problems of leadership, but as in Bob's case, they may find renewed motivation in the process.

Last, and above all, take an active role in your professional organizations. Without that, the rest is nearly impossible.

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Flow Sheet for the Warthin-Starry Stain

Jacob Lundy
Biomedical Laboratory
Edgewood Arsenal
Aberdeen Proving Ground, Maryland 21010

Since the Warthin-Starry stain for spirochetes calls for warm reagents and a slow-dissolving ingredient, time can be saved, and the chances for success increased, if the steps of the procedure, including the preparation of solutions, are performed in an orderly succession. As error, mishap, or miscalculation may disrupt a lengthy schedule of operations, it is highly desirable to know the permissible variations in the demands of a technique.

The usual form of presenting a staining method is first to list the required reagents and quantities, and secondly the steps of the staining schedule, by number, in the order of performance. Directions or supplementary information regarding the technique is placed variably in the text, wherever the author sees fit.

The present procedure is based mainly on two sources: "Kerr's Improved Warthin-Starry Technic,"[1] a study of the permissible variations; and the version of the Warthin-Starry procedure in the A.F.I.P. Manual.[2] It attempts to organize the preparation of solutions, directions for their use, the staining schedule, and the permissible variations into a continuous, step-by-step procedure.

Materials — All solutions are made in 100 ml beakers except 1% silver nitrate, which requires a coplin jar, and acid water, which requires a 500 ml beaker. Glassware may be cleaned with hydrochloric acid and alcohol, brushed with household bleach cleanser, washed in detergent water, and rinsed with distilled water. Any distilled water may be used that remains clear for several hours after silver nitrate is dissolved in it. Up to five slides may be stained simultaneously, using paraffin-coated forceps for slides in silver nitrate solutions.

Steps and Solutions:

1. Prepare 2 water baths, one about 43°C (37°-50°C is acceptable); the other about 54°C (52°-56°C). Also, place a 100 ml beaker to warm in the 54°C bath and ready 3 pipettes for making warm developer.
   a. Distilled water — 500 ml
   b. 1.0% citric acid — 100 ml
      Add 1% citric acid drop by drop to 500 ml distilled water to make pH 3.8-4.4. The lower pH allows a longer development time. The succeeding solutions are made with the acid water.
   c. 5.0% gelatin (sheet or high grade granulated) — 100 ml
      Place in 60°C oven 60 minutes or until dissolved. For use in developer.
   d. 2.0% silver nitrate — 75 ml
      Transfer 25 ml to a coplin jar. Place remainder in 54°C bath for use in developer. Add 25 ml acid water to the 2% silver nitrate in the coplin jar and mix to make the impregnation solution (e).
   e. 1.0% silver nitrate (impregnation solution) — 50 ml
      Place in 43°C bath. Begin to deparaffinize sections. While deparaffinizing, make the final solution (f) for use in developer.
   f. 0.15% hydroquinone — 100 ml
      Place in 54°C bath.
2. Carry slides through alcohol series to distilled water.
3. Impregnate sections in 1% silver nitrate in 43°C water bath for a minimum of 30, to a maximum of 60, minutes.
4. Lay slides on glass staining rods and cover sections with warm 1% silver nitrate from coplin jar.
5. Place a beaker of approximately 56°C tap water near staining rods.
6. Prepare the developer in the following order. (Quantities are for five slides.)
   a. Pipette 7.5 ml warm 5% gelatin into the pre-warmed beaker. Keep in 54°C bath.
   b. Pipette 3.0 ml warm 2% silver nitrate into gelatin. Mix and replace in bath.
   c. Pipette 4.0 ml warm 0.15% hydroquinone into gelatin silver nitrate and mix briefly.
7. Immediately after mixing developer, pour off silver nitrate from sections and flood with developer. Development time may be as quick as 1 minute or up to 12 minutes. Look for a pale yellow to light brown color in tissue sections to determine end point.
8. Wash slides with 56°C tap water.
9. Rinse in distilled water, carry to xylene and mount in mounting media.

If understained, rehydrate within 1 or 2 hours and restain with developer. If overstained, decolorize with iodine and "hypo," reimpregnate and redevelop to pale yellow or light brown tissue color.[3]

References:

1. Bridges, C.R. and Luna, L: Kerr's Improved Warthin-Starry Technic. Lab. Invest., 4:357-367, 1957.
2. Luna, L: *Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology*, 3rd ed., New York, McGraw-Hill Book Co., Blakiston Division, 1968.
3. Parker, A.J.: The Warthin-Starry Re-examined. Armed Forces Institute of Pathology Symposium on Histopathologic Technique, 1970.

Tissue-Talk

XYLENE
(A Warning on its Use in the Histology and Cytology Laboratory)

Conrad L. Bush, CAPT, USAF, BSC
Chief of Laboratory Service
Patrick Air Force Base, Florida
and
George E. Nelson, CAPT, USAF, BSC
Chief of Environmental Health
Patrick Air Force Base, Florida

OSHA, the Occupational Safety and Health Administration, has set forth safety standards for all types of industries, including hospitals. Especially important to the histology and cytology technologists is the requirement to have a hood or some type of exhaust system over the area where staining is performed.

The primary reason for this requirement is the use of the aromatic hydrocarbon we call xylene, $C_6H_4(CH_3)_2$, in the final processing step prior to coverslipping. Xylene exists in three isomeric forms, o-, m-, and p-, di-methylbenzenes. All three forms are found in commercial xylene.

The toxicological studies conducted on the xylenes are far fewer in number and less complete than the work reported on benzene and toluene. There is evidence to suggest that the acute toxicity of the xylenes is greater than the acute toxicity of toluene or benzene.

Chronic poisoning, brought about by daily contact with vapors of xylene, may produce headache, dizziness, malaise, loss of appetite, ready fatigue, shortness of breath, irritability, nausea, and burning of the eyes, throat and respiratory membranes. Although an increase in white blood cells is often reported, the overall blood picture does not indicate any marked trend of alteration. There have been reports of gastrointestinal and neurological disturbances, as well as injury to heart, liver, and kidneys among workers exposed to xylene. There have also been a number of blood dyscrasias, some fatal, associated with xylene exposure. We might point out that contamination of the xylene by benzene cannot be ruled out and may have been a contributing factor. Absorption of xylene takes place chiefly through the lungs even though it has a relatively low vapor pressure.

Xylene may cause skin defatting with erythema, dry scaling, and even secondary infections. Skin irritation is more serious than from benzene or toluene.

In the publication, "Documentation of the Threshold Limit Values for Substances in Workroom Air, American Conference of Governmental Industrial Hygienists", it has been concluded that 100 ppm be established as the maximum allowable concentration (MAC) in the air.

It must be pointed out that this value is for a normal, healthy male and that anyone suffering from respiratory problems could not tolerate that high a concentration. It is interesting to note that the Russian standards set a MAC of only 11 ppm. In most new hospitals, and even in some older ones, we find that the staining procedure is set up under a hood or close to an exhaust system venting to the outside. We also find in these laboratories, and we dare say better than 90% of other laboratories, that the system of venting the xylene fumes is circumvented when the technologist removes the xylene dish, containing the slides to be coverslipped, to another area of the laboratory where he or she can sit down and complete the processing leisurely. In this instance, the purpose of the exhaust hood becomes null and void since the technologist will sit there breathing in the toxic fumes for the rest of the processing time.

Tests were conducted in our laboratory, using MSA Detector Tubes No. 93074, for aromatic hydrocarbons which have the ability to measure xylene in concentrations of 10-8000 ppm. With one staining dish of xylene at desk height left open for 3 minutes (time enough to coverslip 6 slides) the concentration at nose level was just over 100 ppm.

In order to conform to the OSHA standards and protect yourself, the final step in the processing (coverslipping) must be carried out under the hood. Either that, or an auxiliary exhaust system must be placed close enough to the xylene dish to draw off, and dispose to the outside, all harmful vapors. Circumventing this vital step in your H&E or Pap staining will not alter the quality of your slides, but could surely compromise your health.

HELPFUL HINTS

Frozen Sections

Reba Peddle, HT (ASCP)
North Carolina Baptist Hospital
Winston Salem, North Carolina 27103

1. Use of correct cryostat temperature for the tissue being sectioned is an absolute must. If tissue shatters, the temperature is too cold. If it piles up on the knife, it is too warm.
2. The washing-off of sections from the slide during staining will be reduced considerably if one uses the following solution. This also applies to specimens that have been fixed in formalin prior to cryostat sectioning.

Section Adhesive Solution

Gelatin	0.5 gm
5% potassium dichromate	1.0 ml
Distilled water	200.0 ml

Clean slides are dipped in above solution (to produce a coated surface) and allowed to dry. The slides, which have been prepared in advance, are then used for picking up the section. Slides containing the section are then allowed to dry before staining.

3. A small amount of absolute alcohol poured onto the cryostat sliding glass door will prevent the top from freezing tight. Alternatively, one can sponge the edges of the cryostat door with absolute alcohol and achieve the same effect.

Coverslipping and Xylene-Dried Hands

Bonnie M. Cohen
Bayside, New York 11361

Xylene-dried hands are a constant problem in our laboratory. Along with the dryness and discomfort comes irritations of varying sorts. Cuts and scratches seem to take longer to heal than normal, and if maximum care isn't taken, they can become infected.

After reading Jacob Lundy's article in Histo-Logic,[1] we immediately began using his procedure, modified slightly to fit our daily routine. However, after a few months, our hands began to dry and crack again.

We recently found what we feel to be the solution to this problem. With the advice of the mechanic who works on my car, we started using DuPont's "Pro-tek".[2] It is simply a cream which is rubbed into the hands until it vanishes. Cream is applied prior to hand contact with xylene. The cream is easily removed with water.

A dual system of hand protection for coverslipping has been devised: Pro-tek, which keeps xylene off our hands, and gloves to keep water and stains from our hands. Our present procedure for hand care is as follows:

1. Pro-tek rubbed on clean hands.
2. Powder, to take up moisture under gloves.
3. Finger cots on the most abused fingers.
4. Gloves made of polyvinyl chloride (PVC).

If this procedure seems like a lengthy one, your hands aren't in bad shape yet. Don't wait until they are.

References:

1. Lundy, J.: Finger Cots for Protection in Histology Laboratory. Histo-Logic, Vol. III, No. 4, page 40, October, 1973.
2. "Pro-tek" made by Du Pont, Wilmington, Delaware 19898.

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Precautions in Using Osmium Tetroxide

James V. Robinson, B.S.
Mercy Center for Health Care Services
Aurora, Illinois 60506

The following information has been abstracted from a letter which was sent with comments concerning an article published in Histo-Logic, Vol. IV, No. 1, January, 1974. The title and authors of the article were: "Demonstration of Lipids in Paraffin-Embedded Tissue Sections", by Louis W. Chang, Joseph Lalich, and Alden Dudley, Jr. It is reprinted in part here, because it does provide some useful and valid information. (Editor)

This letter is twofold in purpose. First, I would like to say that your osmium tetroxide technique for lipid demonstration in tissue sections is far superior to any technique I have used so far for lipid demonstration.

The second purpose of this letter is to say that in reading your technique, I found what I consider to be a very serious omission. Osmium tetroxide is used mostly in electron microscopy. Therefore, histotechnologists, working solely in light microscopy, would not be aware of the extremely toxic and hazardous properties of osmium tetroxide.

With these properties in mind, we have instituted the following directives to be followed when using osmium tetroxide (OsO_4).

1. OsO_4 is to be stored in the refrigerator in a bottle within a bottle when not in use.
2. OsO_4 is to be used and worked with only under an exhaust hood.
3. Gloves are to be worn at all times when working with OsO_4.
4. All materials used in OsO_4 work are to be placed in a properly labelled bag and disposed of immediately upon completion of the procedure.

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The editor wishes to solicit information, questions, and articles relating to histotechnology. Submit these to: Lee G. Luna, Editor, Histo-Logic, P.O. Box 36, Lanham, Maryland 20801. Articles, photographs, etc., will not be returned unless requested in writing when they are submitted.