What an honor to be asked to write something for a time capsule. A little history! My first day in the histology lab, was November 7, 1960. I was so enamored with the science and the manual methods that I could not wait to return to the lab each and every day. Surgical specimens and autopsies were embedded in pans, paraffin was cooled in the freezer, paraffin and specimens, were cut apart and placed on metal object holders by heating a spatula over the flame of a Bunsen burner, melting the paraffin on the back of the tissue block and pressing the heated block to the object holder. Paraffin was melted in a pitcher with cotton balls in the spout to filter the dirty paraffin. The paraffin was full of dust, black specks, fibers, and had to be filtered prior to use.

Eventually lead ‘L’s were used for embedding on surgical specimens. This was much safer to maintain patient identity because the block numbers, hand printed on strips of paper using India ink, could be better attached to the paraffin block than when embedding in large pans.

The microtomes I used were referred to as the black box. I was told all made by the same individual. Maintaining the proper cutting angle for microtomy, was often challenging.

The water bath by today’s standard, was a crude metal ring, with an electric socket that held a lightbulb, to heat the Pyrex or Corning pie plate that we painted black annually. The heat was controlled by turning the light on and off.

When I started my training, all specimens large enough were dissected, were fixed in test tubes of: 10% formalin, Bouin’s, 100% alcohol, Helly’s, Zenker’s, Carnoy’s, as well as several other fixatives I do not recall but can still see the lineup of test tubes in the racks. Each specimen was appropriately washed where needed, and placed in metal cassettes, processed, embedded and sectioned. The pathologist compared the various fixatives and ultimately diagnosed the specimens.

All solutions, formalin, Bouin’s, Zenker’s, Helly’s, Carnoy’s, hemotoxylins, eosins, special stains, trichrome, were made by hand, checking the color index, the dye content, and calculating the differences to make up the solutions. It wasn’t until we had a fire making 8 liters of hematoxylin that we were able to purchase a Corning hot plate and an embedding center. The tech forgot to turn off the Bunsen burner when adding the alcoholic hematoxylin.

All waste, including formalin, xylenes, acetones, alcohols, acids, potassium ferrocyanide, and special stain solutions, were poured down the drain.

The tissue processor was referred to as the ‘black spider’. It held glass beakers for the formalin, acetone (or graded alcohols) and xylenes and heated vessels for the paraffin. The dial was tricky as it would slip and often the tissues would not stop in the paraffin but advance into the formalin next to the paraffin. Then we would have to open each cassette, dry the formalin off the tissues, if soggy, reprocess. This always took at least a day.

Eventually the tissue processor was replaced by the dual Auto Technicon. We had two levels of beakers so we could process all the surgical and autopsy tissues making the turn-around-time speedier.

I was training at a hospital lab that was without a histotechnologist for a time. When I went there, we found over 300 brains and autopsies in arrears. I was taught to hand process, embed and cut many of these. This taught me to recognize all the stages of dehydration, clearing and infiltration. Each specimen had to be embedded in its own block and only one
tissue on a slide. The H&E stained slides had to be organized in a folder in order; lung, heart, kidney and so on. I learned quickly how to recognize each tissue without a microscope. I also hand sharpened the knives using a 3 stones, course, medium and fine, drenched in pike oil, for my instructor, another tech and myself and to hand strop using a leather strop and diamond dust.

Peel-A-Way molds replaced the leaky embedding ‘L’s until we could actually purchase processing and embedding cassettes. These techniques had the advantage of making one always improvise and think outside the box.

The H&E staining tables consisted of glass staining dishes without fume hoods, much like the pictures in the 3rd edition AFIP staining manual. One could find a histology lab when you walked into the hospital by just following the fumes of alcohols/xylenes/formalins. Some labs used chloroform for clearing and were in very small rooms with no ventilation. Several labs in this country caught on fire because of sparks, used of alcohol burners, Bunsen burners, and the fumes or direct contact of fire and chemicals.

Mouth pipetting was in; acids, poisons, etc. One was told if you could not mouth pipet without getting a chemical in your mouth, get another profession.

Very slowly, automation started creeping into the histology lab. Vendors began offering hematoxylins as a ready to use dye, then eosins, finally various special stain reagents. Eventually an automated H&E stainer was introduced. Tissue processors that offered vacuum so porous tissues could more easily be infiltrated and section better. It wasn’t until about 1988 that the first automated IHC stainer was introduced. Antigen retrieval followed in 1991 and went thru lots of testing prior to becoming the gold standard for a high variety of IHC.

Using the technology first published, about 2012, from Advanced Cell Diagnostics, a single viral transcript can be detected in a head and neck tumor. This allows the patient to be treated and not have to succumb to disfiguring radical surgeries.

The long range future of histology will surely include actual testing on the DNA/RNA/organelles/molecular properties, and other to be able to treat diseases prior to the patient becoming debilitated from the disease (cancers, Parkinson’s, Alzheimer’s, other). Biopsies and Fine Needle Aspirations under full body scans in color, body fluids (tumors and serums) floated over micro arrays of target DNA/RNA/molecules/chromosomes/genes, viewed under a fluorescent scope and rendering an instant diagnosis.

I think computers will be programed with high power microscopes and detection systems to be able to render a diagnosis much more accurately and speedy than today.

The techs of today will be programing, troubleshooting, and aiding in the process instead of hands on embedding, etc. My goal is to see my visions in my lifetime.