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BCG Trip – USA: February 17th -24th 2003

AMNH Frozen Tissue Facilities

Mary Spencer Jones: Department of Zoology, The Natural History Museum

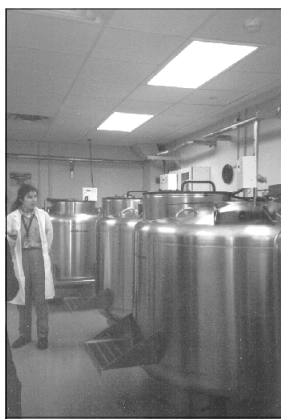
The American Museum of Natural History frozen tissue facility, which opened in May 2001, was funded by a NASA grant and cost approximately 1 million dollars to construct. It is housed in a 2,000-square-foot laboratory in the basement of the Museum and already has some 20,000 samples. The locked facility, which has dedicated staff, comprises of three rooms, an entry laboratory, a wet laboratory and the cryogenic room. Outside the facility is a liquid nitrogen bulk tank, which holds 3,000 gallons. This liquid nitrogen is piped into the Frozen Tissue Lab and keeps the cryo-vats cold. This large bulk tank also gives the facility over three months of freezer time, between fills from a delivery truck, without power or anything else

AMNH scientists need to give the staff a day's notice to get into the Entry Laboratory and a week's notice if they are bringing in a lot of samples. The facility contains a biological safety cabinet, which is to protect the specimen from being contaminated as well as to protect the staff from anything that the specimen is carrying. These cabinets can be cleaned with ultra violet at the end of the day for safety.

Samples are inventoried with the scientist if possible or with the data sheets. The staff prefer to have the data as an Excel file as this can be downloaded straightaway into the database to prevent corruption of the information. Labels are also written and bar-coded straight from the database to avoid errors. The database used is "Freezer Works", a commercially available programme, of which the most recent version has been developed in conjunction with the AMNH. The database manages the space in the cryogenic vats and can tell the user where there is free space. It also tracks each bar-coded vial, noting where the specimen was collected, by whom, and how many times it has been thawed and refrozen (each defrosting slightly degrades the tissue). Each incoming sample is given an ID number and an aliquot number.



Entry Laboratory



Cryogenic room

The Wet Laboratory is where the DNA is extracted and buffers are prepared for the tissue samples. 1.8 ml vials are used. Specific treatments are required for different groups and sometimes up to 1000 vials can be taken for each sample.

The Cryogenic Room has a safety device that detects leaks or how much oxygen is present inside. If the oxygen level falls below 19.5% then the alarm is triggered. 6 large vats which were design for medical use, are maintained at -155°C with liquid nitrogen to prevent the tissue from degrading. Liquid nitrogen is pumped into the tanks from a feeder tank outside the facility and the vapour circulates around a central chamber in each vat. Each vat can operate on its own for one month without electricity or liquid nitrogen and it would probably take about two months before it reached room temperature. Triangular containers hold metal columns and each column has thirteen boxes holding roughly 100 vials per box. This means that each vat can hold approximately 70,000 samples.

In the future, the unit is planning to preserve viable embryos and the frozen tissue collection will support a broad range of research. The Museum of Natural History, which is part of the Smithsonian Institution, has no dedicated frozen tissue facility. Cryogenic vats, similar to those used at the AMNH, are kept within the molecular facility based out at their off-site store.

AMNH & Smithsonian Fish Collections

James Maclaine: Department of Zoology, The Natural History Museum

One of the first things that caught my eye upon entering the fish collections of the AMNH was the aquarium room bubbling away on our left. During my time in the BCG I have seen a few spirit stores come and go and it was nice to see some live animals in fluid for a change. Our guide Barbara Brown kindly allowed us a quick look inside and it was especially pleasant to see amongst the obligatory cichlids, tanks containing *Malapterurus*, the electric catfish. Dr Peter Moller, one of the resident researchers is a keen adherent of these sturdy little fish and their electrical abilities. "Their discharges are beautiful to me!" he exclaimed as we passed his door later on. Beside the catfish was another tank containing a shoal of small goldfish, which Barbara informed us, served primarily as dinner for their whiskery neighbours.

The main spirit collection filled three largish rooms. The jars were kept in wooden boxes, which were ordered systematically upon grey metal racking. The specimens were stored in 75% IMS after the cheaper preservative isopropyl alcohol was found to be dehydrating. We were told that in total the AMNH fish holdings comprised of two million spirit specimens, twenty thousand alizarins, twenty thousand skeletons and contained many important collections from Congo, Gabon and Vietnam. There was also an impressive tally of eight coelacanths, including the specimen that, after dissection, confirmed that these strange fish give birth to live young.

The jars themselves were primarily of the polypropylene plastic top variety which allegedly performed well as long as the store was kept constantly cool, no mean feat in New York where the temperature and humidity undergo massive fluctuations throughout the year.

The collections at the Smithsonian were stored in two main areas, some at the museum itself and many more at a large storage facility offsite. Their fish holdings are ostensibly the largest in the world and comprise of some three and half million specimens, over 8000 of which are types. These incidentally were arranged in an attractive colour scheme with holotypes being painted red and paratypes being white.

Our host this time was Susan Jewett who kindly showed us round the museum store and detailed to us the saga of their glassware problems. It seems the Smithsonian curators are not the greatest fans of ground glass breed of container, even going so far as to throw quantities of them away, a fact that raised a few eyebrows amongst our group. Instead the preferred jars were of the screwtop and Le Parfait variety, and it was interesting to hear about the various gasket trials they had been through before selecting an attractive rubber white variety.

We visited the offsite store the following day, a short bus journey outside of Washington. This was an entirely different proposition to the main museum and basically resembled a huge gloomy warehouse. As our guide on this day was an invertebrate person (as in she worked with them, NOT that she was devoid of a spine) I wasn't able to glean much information about the fish collections stored therein, but it was nonetheless an enjoyable and fascinating experience.