In 1964 (Solar Cycle 20; SC 20), Patrick McIntosh began creating hand-drawn synoptic maps of solar magnetic features, tracing magnetic polarity inversion lines and connecting widely separated filaments, fibril patterns, and plage corridors to reveal the large-scale organization of the solar magnetic field. The maps were based on Hα daily images, and, from 1981 onwards, included coronal holes as a standard feature, primarily based upon ground-based He-I 10830 Angstrom images from NSO-Kitt Peak. Magnetograms were used, when available, to determine the overall dominant polarity of each region. In all 574 solar Carrington rotations (CROTs) were mapped between 1964 and 2009, beginning in CROT 1487 and continuing to CROT 2086, minus a gap between July 1974 - June 1976 (CROT 1617-1642). The result was a record of ~45 years, or nearly four complete solar cycles of synoptic maps, forming a uniquely consistent set of global solar magnetic field data.

Pat recently passed away, and his archive was in danger of being lost. Although versions of the maps were archived in scanned format at the NOAA National Center for Environmental Information (NCEI), many maps only existed in hard-copy format in boxes, and none of the scanned maps possessed metadata allowing digital search and analysis.

The intent of the McIntosh Archive (McA) project (a Boston College/NOAA/NCAR collaboration, funded by the NSF) has been first and foremost to preserve the archive in its entirety, by completing the scanning of all of the maps; this has been achieved. Beyond this, a procedure has been designed and implemented to standardize and colorize the maps so that each magnetic feature is uniquely searchable.

The processing of the McA maps consists of the following steps:

1. Graphic processing software (Adobe Photoshop) is used with IDL codes to center, rotate (if necessary), and standardize the map size in width (heliolongitude) and height (heliolatitude).

2. The programs are then used to remove any unnecessary notes, marks, or symbols, and to colorize the maps, with a specific color representing each type of feature.

3. These processed maps are converted to FITS format as 2-D images, which reproduce color-coded solar features for each rotation and from which custom GIF images can be created using an IDL code, *plotfinal.pro*.

5. The metadata spreadsheet is updated as each new digitized map is completed.

6. The final archive, consisting of the FITS and GIF files for each CR map and the metadata spreadsheet, is made publically available.

To date, full processing of solar cycle 23 (SC23; 1995-2009) has been achieved, and the team continues to work backwards through the earlier maps. All maps -- both original, and where available, processed -- are archived at NOAA/NCEI.

The unique power of the McIntosh archive is its capability for simultaneously representing closed and open magnetic structures over a range of time scales. Closed-field regions include sunspots, plage, and, if magnetic shear/twist is concentrated at the polarity inversion line (PIL), filaments. Of particular note on a global scale are polar crown filaments, which at times extend nearly 360 degrees around the sun at high latitudes. Open-field regions manifest as unipolar coronal holes, which, depending on solar-cycle phase, may appear predominantly at the poles or as isolated structures at lower latitudes.

The completion of the full McA digitization will provide the community with a comprehensive resource for addressing key questions including: How do active longitudes vary within and between solar cycles, for both closed and open magnetic features? Where are closed and open magnetic features rooted (as evidenced by rotation rate), and how does this depend on solar cycle phase, feature lifetime, and latitude? How does the evolution of open and closed magnetic features relate to surface flows on solar-cycle time scales? Answering any or all of these questions has important implications for our understanding of the solar dynamo, and for our interpretation of periodic variations of Earth's space environment and upper atmosphere.