

Research Notebook Guidelines

Invention rights can easily be lost without a good research notebook. The following article offers excellent suggestions for developing and maintaining a notebook. It is reprinted from Business-Industry Touchstones, August 1990.

Common-Sense Rules for Research Record Keeping

by Jean Lang

A researcher's success in obtaining a patent these days may depend as much on how carefully he or she has kept a research notebook as on how original and patentable the discovery is. "The race to get new products into circulation is intense," says David J. Houser, patent attorney for the Wisconsin Alumni Research Foundation (WARF). "In the United States, being able to prove when you made an invention may be vital to getting a patent. In addition, patent claims are increasingly challenged by competitors." In such situations inventors may have to present their notebooks for inspection. Any irregularities in recordkeeping become red flags to an opponent's attorney.

University researchers generally do not feel the need to follow the strict notebook-keeping rules of their industrial colleagues. They should, nevertheless, take a few common-sense steps to protect themselves and their work. These practices can not only back up patent claims, but also insure against loss of valuable data, provide proof of fulfillment of contracts, and protect against allegations of conflict of interest or research fraud.

Standard Practice

The basic mechanics of keeping a notebook are familiar but bear repeating, says Houser:

- Research should be recorded in a bound notebook so that it is easy to show that pages have not been added, subtracted, or substituted.
- There should be no blank spaces on a finished page; an "X" should be drawn through any unused portion of a page. This prevents later entries on that page.
- Use pen, not pencil, and if possible, use the same pen throughout the day. This helps to support the case that an entry was made all at the same time and not altered later.
- If there is need to correct an old data entry, you may return to a previous page, but the change must be easily identified as separate from the original and must be dated, initialed, and witnessed as described below. The preferable and simpler solution is to enter the correction on the current day's page, citing the earlier page and noting why the original record needed correction.
- Notebooks represent months of work. If for no other reason, they should be locked up at the end of the day in a fireproof cabinet.
- Graduate students or short-term workers should leave their original notebooks with their supervisor. They may take photocopies with them, however.

A Record of Thoughts and Data

A good research notebook is a diary, not a memoir, stresses Houser. It reports things as they happen, not as they are recalled. "It is also like a diary in that it reports what you are thinking in addition to what you are doing. This means writing out an easy-to-read

summary of your ideas, why you are planning a particular experiment, what materials and processes you will use, and what you hope to find out."

Too many notebooks, he says, are simply static data repositories with no hint of the evolving thoughts that are driving the research. "A researcher can spend months on experiments that have the makings of a new discovery, or that reduce a concept to practice. But if that researcher's notebook fails to indicate any awareness of the potential, that person may have a hard time later answering challenges to the ownership of the ultimate discovery. If you don't state your mental constructs as you go along, the supporting evidence may not be there," says Houser.

He adds that the theoretical description can be as simple as writing, "I think factor X is controlling response of Y by blocking position Z on the enzyme. I will begin testing that today with the following series of experiments."

A week later, an entry might read, "Today I've had second thoughts about this theory for these reasons," and list them.

Says Houser, "The point is to state your ideas clearly enough that someone can pick up your notebook years later and understand what you were thinking as well as doing on a particular date."

Scientists who learn to regularly summarize their findings in words as well as numbers generally find that their notebooks become more useful to them as references. An articulate notebook helps to maintain workplace continuity when a long-term project is passed from one laboratory assistant to another, and it also makes the process of witnessing and archiving data much more efficient.

Reviewing and Archiving

Houser says that to verify the legitimacy of data, especially for patent purposes, notebooks should be witnessed on a regular basis by an impartial party. "The ideal arrangement occurs when two colleagues who understand, but do not participate in, each other's work, can review each other's work in confidence."

Houser recommends meeting with a colleague once a week - more often if research is fast-breaking. Together reviewers go through their respective notebooks and discuss the recent work. "If your reviewer finds a section unclear, you make an entry to that effect on the current day's page and proceed to clarify it in writing to the reviewer's satisfaction," says Houser.

Then the reviewer writes that he or she has read and discussed in confidence the work of pages X to Y on Z date, and signs off. If there are loose data, such as photos or computer graphics, the reviewer notes and describes them in the signed statement.

"Reviewers should then be given photocopies of the pages they have examined to file sequentially in a place not accessible to the other party. If desired, copies can also be made of loose data at this time.

"This kind of review can easily be done once a week over a bag lunch," says Houser. He adds that if a reviewer begins contributing major ideas to a colleague's work, he or she must give up the role of disinterested reviewer.

"You must be pragmatic in selecting a reviewer," he says, "You want someone who will be a good witness and will be around when you need them. You probably shouldn't select someone who is ill or frail or who will be moving to a distant country."

Reviewers, he says, are not expected to memorize the research, but to attest to the corroboration and archiving procedure followed during the period that they reviewed a notebook.

Graduate students working on research with patent potential should also have their work witnessed and archived, preferably by someone other than their professor, who is likely to be a co-inventor. Students engaged in different projects in the same laboratory can review one another, or several professors can match up their respective students. Houser notes that this is good training for all students, but especially for those who will be moving into industry or starting their own businesses.

In cases where researchers cannot arrange for meetings with weekly reviewers, they should at least regularly archive their work by having it photocopied, stamped "received" with a date, and locked in a departmental file cabinet not accessible to them, or send the photocopied material to an attorney to date-stamp and archive.

Electronic Notebooks

Houser notes that some scientists today keep their research records on computer. These records may be validly archived by copying them onto a disc or tape that is then held in a location inaccessible to the researcher. Houser, however, still recommends preparing a hard copy of the week's work, which can be reviewed, signed, and archived in the usual fashion by a colleague.

If electronic records are to be the only record, then it is advisable to have a "time stamping" program that automatically dates an entry into the system and would detect any late entries into already completed work. "The ideal," says Scott Swanson, a PhD student in computer sciences, "would be to have researchers' computers linked to a central archiving system that would once or twice a day transfer all data onto a 'write-once' laser disc. Once on the disc, the data cannot be revised, though it can be erased."

Whether in notebooks or on computer, records should be kept for as long as the researcher wants to be able to verify the legitimacy of his or her work, says Houser. If the scientist has applied for a patent, the records should be kept for the 17-year life of the patent plus an additional 10 years. [WiSys update: Since June 8, 1995, U.S. patents have a life of 20 years from the date of application.]

In summary, Houser urges researchers to make their notebooks into real diaries of their thinking processes. "This is the greatest failing of most notebooks. Many scientists don't realize the importance of recording their speculations and daydreams or of noting down where they got an idea," he says.

The other major failing is that notebooks are not understandable to others. "To determine whether your current system of note-taking is okay, try to review one of your ten-year-old notebooks," Houser urges scientists. "If you have trouble reading your own material, then you'd better change your approach."

Finally, he stresses the importance of having a disinterested party review and archive sequential copies of data.

An excellent review of research notebook practices and of methods for training students to keep notebooks can be found in *Writing the Laboratory Notebook* by Howard M. Kanare, American Chemical Society, 1155 16th St., NW, Washington, DC 20036.