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Agricultural
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Service

Beltsville Area
Beltsville Agricultural
Research Center

Beltsville, Maryland
20705

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SUBJECT: USDA Records For Deposit at NAL: 36 "Active Books" on USDA/NCI
Collections of Antitumor Active or Cytotoxic Plants

To: Allan Fusone
National Agricultural Library

From: Richard Spjut
Plant Science Institute
Systematic Botany & Mycology Laboratory

I obtained subject materials from storage at a NCI repository in Frederick, Maryland on December 10 (1991) in regard a request by Edward Croom (Professor, University of Mississippi) for information on the ARS procurement of yews for antitumor screening. As previously discussed with you and Dr. Gordon Cragg, separately, these records would go to NAL with the understanding that they would be available for research purposes. The information in these records could be made more useful if entry into the AGRICOLA database could be keyed by the plant name and geographical area. The rest of this memorandum explains the organization of this file, and its relationship to other files that may or may not exist.

An "active book" is a three-ring binder containing individual "active sheets"-forms that were used for recording collection and antitumor activity data on species, or related species, within a geographic area of concentrated procurement activity.

Thirty-six active books were found at the NCI repository; however, from what I recall ten years ago, many books were not present, for example, books titled special action, Maryland-Virginia-Deleware-New York-New Jersey, India (A-G), Ethiopia, Kenya, Tanzania, Uganda, and other African countries.

The species names and their activity data were recorded from coded information in progress reports received from chemists at universities or from computer printouts routinely (monthly, quarterly, and annually) sent by the National Cancer Institute (NCI). The form, or activity-record (active sheet), was apparently designed by Robert E. Perdue, Jr., leader of the USDA the procurement program [Medicinal Plant Resources Laboratory (Economic Botany Laboratory)] for approximately 18 yr of the 22-yr program. Robert Perdue would funnel all procurement information through Mae Hatcher (procurement technician, now passed away). For each new confirmed active species of plant, Mae Hatcher (MSH), or one of her assistants, Bea Lubis or Sharon Troiano, typed in the cumulative activity data on the active sheet for the original collection and then inserted the active sheet in the appropriate "active book". This active sheet then became a reference point for all procurement activities such as additional plant collections (recollections), or to phone calls and correspondence regarding procurement orders or availability, or subsequent antitumor activity. The person's name and date of request or call were usually noted.

The purpose of the active records (active sheets) in the "active books" was not to record data on antitumor activity, but to maintain a procurement status file on plants collected in approximately 40+ selected geographic areas; the 36 active books retrieved from the NCI repository were organized as follows: Africa divided into (1) South Africa, (2) Ghana-Nigeria; Mediterranean-Europe divided into (3) Israel-Turkey-Yugoslavia, (4) Spain (-Uruguay?); Asia divided into (5) India H-Z, (6) Sri Lanka, (7) Thailand, (8) Korea-Pakistan, (9) Taiwan, (10) Philippines, (11) New Guinea-Papua, (12) Fiji, (13) Australia-Tasmania, (14) New Zealand-Samoa; Latin America divided into (15) Puerto Rico, (16) Mexico A-C and (17) D-Z, (18) British Honduras-Panama, (19) Costa Rica, (20) Colombia, (21) Brazil A-L and (22) M-Z, (23) Peru A-D and (24) E-O and (25) P-Z, and the United States divided into (26) USA A-G and (27) H-Z, (28) California-Nevada-Oregon-Washington A-E and 29 (F-Z), (30) Arizona-Colorado-New Mexico-Utah, (31) Oklahoma-Texas, (32) Florida, (33) Arkansas-Louisiana, (34) Alabama-Georgia-North & South Carolina, (35) Michigan (36) Herbst Penick Van Bourgondien. Active sheets were filed alphabetically by genus/species name within the geographic book, and color-coded tabs were used to indicate the status of activity and positioned on each sheet in such a way as to indicate whether a recollection was needed (out from right margin) or not needed (up from the top margin). When many tabs pointed outward in an active book, it would signal a need for USDA botanists to conduct plant exploration for recollections--species that were collected again because of a previous collection that was active.

Early in the program, recollections were routinely made for all actives that reconfirmed. These were given priority for recollection according to tumor system of activity; LE being the highest priority. Later (1976-1982), recollections of species were rated according to novelty and score of activity in P-388--Low Priority ("L"), Medium Priority ("M") and High Priority for recollection ("H"), by either John Douros or Matthew Suffness, Chiefs of the Natural Products Program in NCI.

These records are unique for the recollection data on plants with known activity prior to 1983, but they are also only part of a complex cross-reference filing system; these data were not filed at NCI. Each sample was assigned a "PR" number and a separate file of records for PR-numbers was maintained, in numerical order in 3-ringed binders, 1,000 accessions per binder, a total of 57 binders. The PR-books included all plant samples collected for the NCI program, not just recollections, or plants of special interest; each accession record (PR-number) summarized data on the collector (an abbreviation), collector's number, plant parts, date of the collection, country or state of origin, weight of the sample, and distribution of the sample (usually the fractionating chemist). Most collections, including those

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of miscellaneous collectors, have voucher specimens deposited at the National Arboretum (NA). The collectors and their abbreviation are explained below, but this listing is not complete. Also, The B-number for the NCI extracts should not be confused with the initials of the collector, Arthur Barclay (B).

The collector's number on the active sheet is the link between the collection data on the herbarium label of a voucher specimen at NA and the PR-number in the PR-books, and the PR-number is a link between the collector's number and the extract (B-) number that leads to data on antitumor activity in NCI computer files, and/or active compounds reported in scientific journals, or in progress reports.

The fractionating chemists are indicated at the end of a PR listing, sometimes under extractor. The original extractor was normally WARF (Wisconsin Alumni Research Foundataion), later RALTECH. The extractors and fractionating chemists had contracts with the NCI, and were primarily at universities; the more familiar ones were: Monroe Wall (Research Triangle); David G. I. Kingston (Virginia Polytechnic Institute & State University); John Cassady (formerly at Purdue University); Ching-jer Chang (Prudeu University), Jerry McLaughlin (Purdue University), Morris Kupchan, Jack Cole (University of Arizona), Norman Farnsworth (University of Illinois at Chicago. Some samples were also sent to a USDA chemist in Beltsville for study on plant extracts that might inhibit insect growth, or production of hormones (Jacobson), or to USDA chemists in Paeria for isolation of antitumor active agents (Powell). The M-books and PR-books were not at the NCI repository.

Plants that showed L-1210 (LE) activity, or yielded compounds that were considered for preclinical evaluation, were candidates for special study, referred to as "POSI" (Plants of Special Interest), which may also be included in FOSI's (Families of Special Interest). Copies of correspondence and other activity data were filed under POSI or FOSI as well as alphabetically under the person's name in a folder organized geographically, or in a correspondence procurement file. A special action book was also created for collections obtained from cultivated and other obscure sources which may include *Taxus*, *Cephalotaxus*, and *Camptotheca*. The special-action books were not among the active books, and correspondence in POSI or FOSI plants may have been refiled elsewhere.

A program guide was prepared and updated by Robert Perdue to explain and document the intricate nature of his filing system and procurement policies.

Abbreviations and Names of Collectors with Notes on Their Collections

A. Abraham. PL 480 samples from Israel. Information about where these

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plants originated within Israel was in Barclay's 4x6 card file, or in a file "Special Sources--Non-Commercial.

- ARG. Arguelles, J. Howard Gentry's field assistant in Mexico; recollections from Mexico.
- B. Barclay, Arthur S. ARS plant explorer, cancer collections, general samples and recollections primarily from Colombia, general samples from Mexico, western United States: California, Oregon, Washington, Nevada; recollections from California; large-scale procurement of *Bouvardia* in Mexico and *Thalictrum dasycarpum* in Minnesota; made the initial collection of *Taxus brevifolia* (1962 in Washington) that led to the discovery of taxol; leader of the cancer project from 1978-1980.
- BCS. Shah, Bogalah C. Long time supplier of Indian plants including various subcontractors. He always sent vouchers, but with handwritten labels. Information on labels was minimal. Some of his vouchers may never have been mounted because of his labels.
- BE. Ertter, Barbara. Contractor under the name of Jim Strachan, selected general samples and recollections from Nevada and southern California (1980's).
- BK. Uruguay-PL-480.
- CE. Edson, Charles. Contractor for Oregon and California recollections; also survey report on *Taxus brevifolia*.
- CG. Gunn, Charles. ARS Seed Taxonomist; recollections from southeastern United States.
- CS. Smith, Cecil. ARS collector. Recollections with Terrell from Virginia and North Carolina (1962), California (1965-1968); general samples from Mexico (1966).
- CSP. Payne, Cynthia, S. Recollections from Puerto Rico.
- D. Stone, Richard (Dick). Miami, arrangements made through Julia Morton; all Stone collections were of poisonous plants in Florida.
- ES. Sallee, Edward. Contractor who resided in Louisiana but was major supplier of recollections from Mexico during the 1970's; also supplied 5 tons of *Bouvardia* with assistance from Barclay and Spjut.

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- EU. USDA plant exploration for cortisone samples, but extracts were also submitted to NCI for antitumor screening.
- F. Freeland, John. ARS plant collector, and later contractor; general samples from Arkansas; recollections from Mexico.
- FM. Fred G. Meyer. National Arboretum, plant explorer; cancer collections primarily general samples from Ethiopia (1961-1962).
- G. Gentry, Howard S. ARS plant explorer; cancer collections were primarily general samples from Mexico (1963), with Barclay as a field assistant; also collected general samples in Texas, New Mexico, California.
- GMC. Christenson, Gudrun. ARS plant collector, Brazil, southeast (recollections); Venezuela, Amazon (general samples); also participated on survey of large-scale sample of *Baccharis* in Brazil.
- H. Hatschbach, G. ARS contractor for many years; general samples and recollections from southeastern Brazil.
- J. Jones, Quentin. ARS, New Crops Research Branch. Cancer collections from Ethiopia.
- JAD. Duke, James A. ARS plant explorer. 1-2 week trips to Panama and China, general samples; leader of the cancer project 1980-1982.
- JDC. Colon, Juan Diaz. Puerto Rico. No other information.
- K. Godfrey. Florida, university; no voucher specimens.
- KR. Korea-PL-480.
- LS. Spetzman, Lloyd A (LAS). ARS plant explorer; primarily general samples, Mexico, Puerto Rico, Florida, Missouri, Arkansas, Texas, North Carolina, and Alaska, the latter collections included many lichen and moss samples; general samples of medicinal ferns from Wisconsin and Michigan; recollections from US--New Mexico, Texas, Utah, Michigan; also specialized in the procurement of many conifer samples from arboreta and the wild; participated on large-scale collections of *Thalictrum dasycarpum* from Minnesota, *Holacantha* from Arizona and California, *Acer negundo* from Wisconsin, *Cephalotaxus* from Puerto Rico and Florida, *Heliotropium indicum* from Puerto Rico.

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- LBM. Mwasumbi, Leonard. Contractor at University of Dar-es-Salem, Tanzania; recollections from Tanzania.
- M. Miscellaneous Collectors. Collectors were assigned an "M" number if they were not a routine contractor, or USDA plant collector; their collection data were also kept in a government-standard 3 x 4 field notebook, organized in numerical sequence, more than 4,400 entries. Several other notable sources were included here: *Brown Bulb Ranch Samples, Glen Dale samples, Greer Drug Company samples, Herbst seed samples, Hong Kong samples (PR-1782-1817), Miami-PIS samples, Pakistan PL-480, Schumacher seed samples, Spain Pl-480 samples, Stone samples.*
- MR. One of McDaniel assistants for plant collections from the Amazon of Peru.
- P. Perdue, Robert. ARS leader of the cancer project from 1960-1978; cancer collections include general samples and recollections, largely from Africa: Ethiopia, Kenya, Uganda, Tanzania, but also from the United States: Utah, New Mexico, North Carolina, Georgia, Florida. Travelled extensively to procure samples via contractual agreements.
- POM. Pompa, Arturo. Mexico City. No other information.
- R. Reed, Clyde. ARS Contractor, primarily general samples and recollections from the eastern United States.
- RAM. Marin, Richard Allan. Long time contractor to NCI for marine organisms and plant samples from Mexico; recollections for USDA in late 1970's and early 1980's, primarily from Mexico and Panama.
- RL. Lazor, R. Contractor, general samples and recollections from Panama.
- RM. Miller, R. H. General samples from California and Washington (1965); recollections from North Carolina (1966). No other information.
- S. Schubert, Bernice. New Crops Research Branch; Arnold Arboretum. No information.
- SM. McDaniels, Sidney. Long time supplier of Peruvian plants from the Amazon Region, with several assistants; thousands of general samples and hundreds of recollections were made from that region.
- SMM. Muchai, Steven Mbocha. Assistant who worked separately with Perdue,

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Higgins, Spjut and Saufferer in Kenya and Tanzania; supplied primarily recollections from near Nairobi, Kenya.

- SPJ. Spjut, Richard, ARS plant contractor prior to May 1972, ARS plant explorer from 1972-1982; general samples and recollections of vascular plants from Arizona, California, Oregon, Nevada, Utah, western Texas, North Carolina, Maryland; recollections of vascular plants from Kenya, Tanzania, Tasmania; general samples of vascular plants from Western Australia, Baja California (Mexico); general samples and recollections of bryophytes primarily from California, Smoky Mountains National Park, White Mountains-New England, West Virginia; participated on large-scale surveys and recollections of: *Maytenus buchananii* in Zambia and Kenya, *Thalictrum dasyacarpum* in Wisconsin, *Bouvardia ternifolia* in Mexico (Chihuahua), *Gnidia subcordata* in Kenya, *Colubrina* in Texas and California.
- SS Saufferer, Sandra. ARS plant explorer; general samples and recollections from Puerto Rico, coastal Kenya, Southern Highlands of Tanzania; recollections from New Mexico; conducted survey and participated on large-scale recollection of *Maytenus buchananii* in Kenya.
- T. Terrell, Edward E., ARS Agrostologist and General Taxonomist. Collections entirely from the United States, mostly recollections from California, but also from New England and the southeastern United States, and other western states (Oregon, Colorado, Utah, New Mexico); some general samples from New England and Rocky Mountain states.
- TO. Tosum. Contractor, Turkey, general samples, some recollections.
- TY. Tyson. Long time supplier of general samples and recollections from Panama.
- U. Uhe, George. Contractor. New Zealand and Tasmania. General samples, mostly in quantities of 100 g.
- VKM. Moriarity, V. K. Contractor, supplier of general samples and recollections from Queensland, Australia.
- Y. Yugoslavia PL-480. No other information.
- ZP. Pakistan PL-480. No other information.

cc:

G. Cragg