

Specimen Management System for California Herbaria (SMASCH): Accession Data Entry

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Documentation of policies, procedures, and conventions associated with data entry in the SMASCH project, modified from the version of 9 February 1996 (...data.entry.new), for the purpose of meeting production goals set forth in the NSF Site Review and Program Summary of DEB 94-00665, both based on the Site Visit of 12-14 February 1996, by replacing "C. Annotation History Window" and from "...Procedures Excluding Accession Data Entry", "III. Annotations" and "IV. Annotation Label Printing" with "H. Folder Name Window" and "V. Folder Label Printing" in the appropriate documents.

`/home/quercus/users/rosatti/smasch.acc.data.entry.web`

A. INTRODUCTION	---	p. 1
B. ACCESSION, OBJECT, INSTITUTION, COLLECTING EVENT Window	---	p. 5
C. ANNOTATION HISTORY Window	---	p. 14
D. ACCESSION VOUCHERS Window	---	p. 20
E. COMMITTEES Window	---	p. 25
F. PERSONAL NAMES Window	---	p. 27
G. GENERAL CONVENTIONS	---	p. 30
H. FOLDER NAME Window	---	p. 32

A. INTRODUCTION

What we are calling accession data comprises all of the information we are entering from accessions into the SMASCH database via the keyboard, whether standardized or partially standardized and entered from tables or not standardized and entered directly from the sheets. We are entering accession data through three separate windows.

Through the Accession Object, Institution, Collecting Event window we are entering information about the manner in which the plant material is preserved and stored (e.g., mounted on paper, stored in a box or bag, preserved in liquid, etc.); the name of the institution in which the plant material is housed (e.g., Jepson Herbarium); and information about who collected the plant material, who assigned what collection number to it, and when and where it was collected.

Through the Accession Annotation History window we used to enter data related to taxonomic determinations: date of the annotation, name of the annotator, determined taxonomic name, and any pertinent notes about the determination. Instead of Annotation History, we now enter only the name under which an accession is filed (Folder Name), updated nomenclaturally and taxonomically, where possible, to conform with *The Jepson Manual* (see end of this section and Folder Name window).

Accessions often have other kinds of data as well, such as chromosome numbers, accounts of various anatomical and morphological features, and descriptions of the environmental conditions from which the collections were made; with the exception of data about plant or plant part color and habitat (see below), these will not be entered via the keyboard, primarily because there has been little consistency in the ways they have been recorded on accessions and very little if any progress in establishing standards by which they might be entered into a database and usefully retrieved thereafter. Instead, we will treat each accession as a voucher for such data, entering through the Accession Vouchers window the various classes of data, or voucher kinds (e.g., cytology, anatomy, micromorphology, macromorphology, color, habitat, etc.) that are represented on it. For each accession, then, we indicate which kinds of voucher data are represented and provide the facility to enter, as free text in the Additional Descriptive Information field, the actual data themselves. Our data entry personnel are completing this field only for the voucher kinds “color” (e.g., petals blue, fruits purple, leaves grayish green), “habitat” (e.g., bog, meadow, forest), “type”, “Vegetative Type Map Project” (numbers), and “other label numbers” (numbers); we are leaving the job of entering text for the other voucher kinds to those who have the interest, time, and knowledge necessary to do so.

Data from an accession that are entered through these three windows are connected to the underlying file for that accession through the barcode number for that accession; the connection is established by reading the barcode label into the Accession Number or Accession ID field (with the caret cursor in the appropriate field, read the barcode label with the barcode reader, making sure that the line of red light coming from the barcode reader intersects all of the bars comprising the barcode) and then, after all other fields have been completed, appending the record (single-clicking select on the Append button or depressing the F3 key).

Attempts to implement data entry with respect to annotators, collectors, and annotation history resulted in some rather significant modifications of the data model. Although it had been envisioned that the form (abbreviation) of the names of annotators and collectors would be standardized and would comprise part of an overall authority file for personal names (“we will assign abbreviations for these names as necessary and in conformance with those used for the authors of scientific names,” from ACH Working Paper No. 2, p. 7), it was soon discovered during implementation that to do so would place too great a burden of interpretation and investigation on the data entry staff.

The problems of interpretation that we encountered mostly involved the fact that a given annotator or collector often is represented on accessions in a variety of ways. For example, Willis Linn Jepson has appeared as W.L.J., W.L. Jepson, Willis L. Jepson, and Willis Linn Jepson. Although in this particular case there is little need for interpretation, since Jepson is so well known to us, in many cases the opposite is true; many people are not nearly this well-known to us and yet the forms in which their names appear often are just as diverse if not more so. Thus, the first problem in many cases involved the association of a form (abbreviation) of a name with the correct full name.

Even after it was decided which person is represented by a given abbreviation, it was then necessary to select a single abbreviation for that person. So as to minimize confusion within the database, this involved, in each case, checking the person against our standard for plant name author abbreviations (*Authors of Plant Names*) and either using the abbreviation for that person if it exists there or selecting one for that person that does not conflict with one that is already there for someone else. We finally decided, after attempting to enter the pertinent data for about 300 accessions, that it was simply too cumbersome to deal with this issue in this way; instead, we decided to enter annotators and collectors exactly as they are encountered on the sheet, and associate these forms to a single individual (the chair of the annotator or collector committee) when it is possible to do so with some certainty but without too much additional effort.

We also had planned to construct a single authority file that would “serve as the source of all scientific plant names used for any purpose in the SMASCH project” (ACH Working Paper No. 2, p. 6), but significantly modified this idea too, again because of prohibitive levels of interpretation and investigation required of data entry staff in implementation. In particular, it was too difficult to decide which deviations from our existing authority file were intentional, and therefore possibly significant, and which were unintentional, and therefore not significant, in attempting to enter data about the annotation history of an accession; that is, different spellings of plant names and different or missing author(s) all could be intentional or not, and therefore meaningful or not. In view of these difficulties, we reconsidered our goals in this area and realized that what we really want is to capture the actual annotation history, excluding obvious errors, of a sheet rather than our interpretation of that history, which in

fact is better and more efficiently left to experts in the various groups. Thus, we decided to enter plant names for the most part just as they appear on the sheet, creating a table for more or less unverified names (the Unverified Taxonomic Name table, which provides data to the Annotated Taxonomic Name (Unverified) field in the Accession Annotation History window), the entries of which either will be moved to or tied to a name in our authority file of more verified taxonomic names (the Verified Taxonomic Name table, which provides data to the Annotated Taxonomic Name (Verified) field in the Accession Annotation History window), if appropriate after future review by individual experts. Even for unverified taxonomic names, we used the abbreviations in *Authors of Plant Names* (APN) in cases where the identity of the author is fairly certain.

In July of 1995, after adhering to procedures detailed in various documents essentially since the beginning of data entry (about July of 1993), we identified bottlenecks and other impediments to progress and adopted modifications that we thought would increase significantly rates of data entry without seriously diminishing the value of the database.

Among other changes, we decided to stop making the effort to determine the county in which a collection locality exists if that information is not present on the accession, because such efforts often were time-consuming and/or inconclusive, and because we expect that in many cases such information will emerge during application of Geographic Information Systems (GIS's) in the process of determining geographic coordinates for each accession.

We also decided not to capture as part of Annotation History any annotation for which an annotator is not indicated, unless that annotation is the one on the original collection label or is the only one on the sheet. In addition, although we had originally decided simply to enter annotator names in the form in which they were encountered, so as to minimize interpretive activities on the part of data entry staff, it actually became cumbersome to do so in cases where the identity of the annotator is known and that person has provided several annotations on a single accession and/or on a set of accessions, using several different forms of her or his name. Data entry staff now may either use the form of the annotator's name as it appears on the sheet, or use the APN abbreviation if that allows for more efficient data entry. For, example, if there are several annotations by the same person on an accession or set of accessions, and that person has indicated her or his name in more than one form, it is now permissible to use the one, standardized (APN) form for each annotation and forego the extra effort needed to change what is in the Annotator field for each annotation.

We also determined that an inordinate amount of time and energy had been spent by data entry staff in standardizing abbreviations of the authors of plant names to conform with APN. While we still think it is important to use this standard, we now see that it is more efficient for someone with more botanical

training and/or familiarity with the plant groups involved to make this evaluation. Thus, data entry staff now simply are using the plant and author names as they already exist in the case of Verified Taxonomic Names, and are entering author names as they are encountered in the case of Unverified Taxonomic Names. Committee Abbreviations for which the function is Nomenclature will be updated, if necessary and according to procedures detailed under “Annotations”, to conform to APN by those providing the so-called “SMASCH determination” (“Annotations” as opposed to “Annotation History”), either SMASCH personnel (the Project Coordinator) or SMASCH-sanctioned personnel (usually, those providing annotations for SMASCH in connection with their treatments for *The Jepson Manual*).

A Site Visit of the SMASCH project was conducted 12-14 February, 1996, involving four officials from NSF and four other individuals with experience in herbarium management and computer science, including database development and Internet access. The visit resulted in a Site Review and a Program Summary, in which recommendations were made and goals were set for the remainder of the project. Most important, from the standpoint of data entry procedures, was the goal that 80,000 records be entered into the database in each remaining year, in order for the project to qualify for funding for the following year.

Based on suggestions and recommendations made by NSF, and on our own experience, we determined that the production goals set forth could be accomplished by eliminating Annotation History capture by Data Entry Assistants as well as Annotations of the material by the Project Coordinator, capturing instead what we have called Folder Name, which is the name on the species folder in which an accession is filed, updated to conform, where possible, nomenclaturally and taxonomically with *The Jepson Manual*. Although NSF had suggested that we capture the most recent annotation on each sheet, we concluded that those names would not necessarily be any more reliable than the names under which the accessions were filed, which often or usually corresponds to the most recent annotation anyhow, and that the latter could be entered more quickly because Data Entry Assistants would have to enter only one name per folder, instead of one or, more likely, more than one (and, possibly, many) per folder.

As a partial replacement for Annotation History, we now are indicating the total number of annotations on a sheet, along with the total number of different plant names involved, as Additional Descriptive Information under a newly established Voucher Kind, Annotation History.

B. ACCESSION OBJECT, INSTITUTION, COLLECTING EVENT Window

Information about the manner in which the plant material is preserved and stored, as well as information about who collected the plant material, who

assigned what collection number to it, and when and where it was collected is entered through the Accession Object, Institution, Collecting Event window.

1. Selecting the Accession Object, Institution, Collecting Event window and entering the barcode number

- a. On the main SMASCH menu window, place the arrow cursor on the Accessions, Specimens, and Collections button and hold down the menu button on the mouse. While still holding down the menu button on the mouse, move the arrow cursor to the Accession Object/Institution/Collecting Event button on the menu that appears below. After the Accession Object/Institution/Collecting Event button is highlighted, release the menu button on the mouse, thus selecting the Accession Object, Institution, Collecting Event window.
- b. After a short time (usually right away), the Accession Object, Institution, Collecting Event window will appear with a caret cursor (upside down “v”) in the Accession Number field.
- c. With the arrow cursor anywhere in the Accession Object, Institution, Collecting Event window, read the barcode on the accession with the barcode reader, making sure that the line of red light coming from the barcode reader intersects all of the bars comprising the barcode. The herbarium abbreviation and accession number then will appear in the Accession Number field.

2. Object Type

Bring up the Object Kinds window from the Accessions, Specimens, and Collections button on the main SMASCH menu window. In order to view all of the possible alternatives and their forms, enter a wildcard (%) in the Kind field and query. Single-clicking select on the appropriate entry in the list that appears at the bottom of this window in response to this query will cause that entry to appear in the Kind field, from which it may be copied to the Object Type field of the Accession Object, Institution, Collecting Event window (triple-click select on the entry in the Kind field, thus highlighting it and copying it to the clipboard; with the mouse cursor in the Object Type field, single-click select to place the carot cursor there; single-click adjust--the middle button on the mouse--to copy the Object Type from the clipboard to the Object Type field). If an appropriate entry does not exist, one may be appended to the underlying table through the Object Kinds window after careful discussion with and consensus among the SMASCH staff.

Once familiarity with the contents of the Object Kind table is attained, the appropriate kind may be entered directly into the Object Type field by typing the first few letters and a wildcard (i.e., this field is controlled by the Object Kind table); later, when an attempt is made to append the entire record, the system will complete the field if the first few letters and the wildcard define only a single kind, or a pop-up list from which to choose will appear if it defined more than

one kind. Mounted on Paper, the most commonly used Object Kind, is the default value, so that it will be entered automatically if the field is left empty (i.e., not changed to something else) and the record is appended.

3. Institution

If the object is housed at an institution other than the one indicated by the herbarium abbreviation in the Accession Number field (comprising, with the actual accession number, the Accession ID), the *Index Herbariorum* abbreviation for that institution is entered into this field. If the object is housed at the same institution that accessioned it, nothing is entered into this field.

4. Collecting Event

The Collector(s) and the Collection Number Assignor fields are controlled by the Committee table, so only names already present there may be entered; the messages “Unknown Collector(s)” or “Unknown Collection Number Assignor” will appear under the Append button in response to an attempt to append the Accession Object, Institution, Collecting Event window with values in these fields that are not in the Committee table. In order to add names to the Committee table, see “E. Committees window”.

A. *Collector(s) field*

Names of collectors should be entered into the Collector(s) field (via the Committee table) in exactly the form in which they appear on the sheet (see “A. Introduction”), except that obvious misspellings may be corrected without note.

1. For lists of names that appear with neither punctuation nor connectives, such as:

Peter Raven

E. R. Blakley

Robert Ornduff

enter "Peter Raven, E. R. Blakley, and Robert Ornduff".

2. Enter lists of names that appear with punctuation and connectives in exactly the form in which they are encountered, (e.g., “Rimo Bacigalupi, with L. R. Heckard and J.C. Hickman; Rimo Bacigalupi with L.R Heckard and T.I. Chuang; Rimo Bacigalupi, and L.R. Heckard), except that an ampersand (&) may and should be replaced with the word “and” because the latter is easier to type.

3. Of course, the instructions under items 1 and 2 above will not work unless the appropriate entry already exists in the Committee table, and in practice the entire name or list of names of collectors are not actually typed into the Collector(s) field. Instead, if the committee involved already is present in the Committee table, only a few letters of one of the names involved and a wildcard (or wildcards, depending on the situation) need to be entered. In response to an attempt to update the record, then, the desired committee automatically will be inserted in the Collector(s) field if the letters and wildcard(s) defined only one committee, or a pop-up window with a list of choices from which to choose will appear if the letters and wildcard(s) defined more than one committee. For instance, if one were to enter %Raven% for the example under “a.”, the following choices (at least at the time of this writing) would appear in a pop-up window in response to an attempt the update the record:

G. Thomas Robbins and Peter H. Raven

Peter H. Raven

Peter H. Raven and David Verity

Peter Raven

Peter Raven, E. R. Blakley, and Robert Ornduff

Placing the cursor on the entry desired and single-clicking select will highlight that entry, which then will be placed in the Collector(s) field upon single-clicking select on the Accept button at the top of the pop-up window. Had “Peter Raven” been the only entry in the Committee table to include the word “Raven” and the only entry there for which the function is “coll”, an attempt to update with “%Raven” (or, as in the example above, “%Raven%”) in the Collector(s) field would have resulted in the automatic insertion of “Peter Raven” into that field. Entering data in this fashion is one of the salient features of relational data models; production level data entry is not possible without the speed, accuracy, and control this kind of structure allows.

4. Names or forms of names of collectors that do not exist already in the Committee table must be appended to it, by entering a committee for which the function is “coll”. The only collector indicated or the first person in a list of collectors indicated on a label is designated arbitrarily as the chair for that collecting committee, unless it is not possible to make such a determination. For example, if the collector were indicated to be W.L.J., and if the identity of W.L.J. were not known, the committee would be entered as “W.L.J.” (in the committee abbreviation field) and “unknown, very” would be entered into the Chair (Abbreviating) field (thus, since this field also is controlled by another table, the Personal Names table, an entry of “unknown, very” would be necessary there). In fact, the actual ways in which a collector of known identity is encountered are related to one another in the Committee table: to repeat an example used above,

the collecting committees W.L.J., W.L. Jepson, Willis L. Jepson, and Willis Linn Jepson are all tied together by virtue of the fact that the chair for each is Willis Linn Jepson; a query for committees for which the function is “coll” and the chair is “Jepson%” will retrieve as records all of these forms. For more detailed information, see “E. Committees window” and “F. Personal Names window”.

B. Collection Number Assignor field

We have assumed that the Collection Number Assignor field should have the same value as the Collector(s) field in cases where the collecting committee comprises only a single member. In cases involving collecting committees of more than one member, it is sometimes possible to determine with some certainty who assigned the number, although just as often if not more so the situation is insufficiently clear or uncertain.

1. For labels on which one main collector is indicated and other collectors are attached by the connective "with", such as "L. R. Heckard, with J. Hickman", the first name, L. R. Heckard, is assumed to be the collection number assignor.
2. For labels on which a collection number has been placed clearly nearest one particular member, such as:

Liz Neese

Liza Lewis 3452

Courtney Terry

Liza Lewis is assumed to be the collection number assignor.

3. For labels on which one or more names are preprinted and one or more other names are later typed or hand-written, the collection number assignor is considered to be represented by the preprinted name or names, regardless of where the collection number appears, unless it is clearly associated with one or more of the typed or hand-written names. In the latter case, the collection number assignor is considered to be represented by the typed or hand-written name or names with which the collection number is clearly associated.
4. For labels on which there is a collection number but no collector, “unknown” is entered in the Collection Number Assignor field, as well as in the Collector(s) field (since this field is controlled by another table, the Committee table, an entry of “unknown” is necessary and therefore exists there).
5. For labels on which there is a collection number but the collection number assignor is either unknown or uncertain to the data entry personnel, “unknown” is entered in the Collection Number Assignor field.
6. For labels on which there is no collection number, a collection number assignor cannot be indicated and a value of “none” is entered in the Collection

Number Assignor field automatically when the record is appended (i.e., “none” is the default value); the Collection Number fields are left empty.

C. Collection Number fields

The collection number is divided into three fields: Collection Number Prefix, Collection Number, and Collection Number Suffix. The Collection Number field accepts only numerical values whereas the other two accept letters, numbers, and punctuation. The following chart illustrates how each of a sampling of encountered collection numbers was entered: Note that in the first example the comma was dropped, while in the third and fifth all marks were retained, in the appropriate field, for possible reconstruction of the number from the database later.

collection # as written on accession	Collection Number Prefix	Collection Number	Collection Number Suffix
16,125		16125	
A6	A	6	
H-123	H-	123	
3636e		3636	e
5Iny-536-280c	5 Iny-	536	-280c

D. Collection Date fields

Two uncontrolled fields cover the collection date information on accessions: Beginning Collection Date and Ending Collection Date. For sheets with only one collection date, that date is entered into the Beginning Collection Date field and the Ending Collection Date field is left empty. For sheets on which a range of dates is given, presumably within which the collection actually was made, the earlier date is entered into to the Beginning Collection Date field and the later date is entered into the Ending Collection Date field. These dates are entered in the form “dd mmm yyyy”; the number of digits or letters and the sequence day-month-year must be as given, except that the program will accept month and year only or year only. If a date that is incomplete in any way appears on the label, verification of that fact is given in the Notes field. As one example, if the label reads “2 July” (i.e., no year is given), the note “date given is 2 July” is entered into the Notes field; as another example, if the label reads “July 1905” (i.e., no day of the month is given), the note “date given is July

1905” is entered into the Notes field. If collection dates are not given, the fields may be left empty.

E. County field

The County field is a controlled field, so that the county cited on the accession may be entered by typing in the first few letters of the county name and a wildcard (a pop-up window with choices from which to choose will appear if the first few letters and a wildcard define more than one county). If the county is not indicated on the sheet, the field is left blank and “unknown” is entered automatically when the record is appended (i.e., “unknown” is the default value).

F. All Other Named Areas That Include Locality field

Entered into this field are those named areas or features on an accession that include the actual collection locality (e.g., San Joaquin Valley, White Mountains, Klamath National Park, Barstow) or that exert some significant influence on it even though the locality is not actually in it (e.g., the Sacramento River, if the locality is in the floodplain of that river or close enough to the river to be otherwise affected by it). A general rule of thumb regarding this field is to include an area or feature if interest in a list of species from it is anticipated. For example, since the recent toxic spill into the upper Sacramento River, there is greatly increased interest in knowing which species have ever been collected along it or near it, for comparison to current and future surveys of the area. When practical, these areas should be listed largest to smallest; they should be separated by commas, and periods for abbreviations of proper names, such as Mt. Diablo, are to be used. This field also includes localities such as towns or railroad stations, which sometimes are treated as the actual localities as well. Place names should be transcribed verbatim from the sheet, except for obvious orthographic errors and diacritical marks. In the latter case, the word should be entered as it appears on the sheet, minus any diacritical marks, unless an acceptable alternative spelling is available (e.g., canyon instead of canon with a tilde over the first “n”). Some examples from the database are:

All Other Named Areas That Include Locality
San Joaquin Valley, Diablo Range, Panoche Hills
Sierra Nevada, Kern Plateau, Cannell Meadow
White Mountains, Black Canyon
Sonora Quad., Hog Mtn.
Klamath Natl. Park, Indian Creek

G. Referenced Place field

The Referenced Place is the name of the place from which detailed distance and/or direction are given to the actual collection locality (the collection locality being the place at or from which the plant was actually yanked from terra firma or otherwise gathered).

H. Locality: Dist./Direct. from Referenced Place; other data field

All data that describe the distance and/or direction from the Referenced Place to the actual collection locality are entered in the Locality: Dist./Direct. from Referenced Place; other data field, without repeating the Referenced Place. Distance and direction from the Referenced Place are separated from other data about that place by a semicolon. Five encountered examples are:

Distance/Direction from Referenced Place
4.8 mi n; along Atlas Peak Road
3 mi e; along bank of North Fork Webber Creek
2 mi above
ca 1/2 mi s; gully, near Midland, along Rice to Blythe Rd
near

If the locality data on the collection label is of the form “between x and y,” “y” is entered as the Referenced Place and Distance/Direction is entered as “between x and.”

I. Elevation field

Enter elevation in the units that actually appear on the sheet, using "m" for meters and "ft" for feet, without periods: very simply, 550 feet would be entered as "550 ft", 230 meters as "230 m", and the range 10,800-11,000 feet as "10800-11000 ft". Qualifiers such as ca, about, or approximately are not entered because all values for this field are considered to be approximations (although they will be increasingly less so as use of Geographic Positioning Systems becomes more common). Elevations in feet will be converted automatically to meters by the system later. In cases where a unit of measurement is not specified, and either feet or meters seems reasonable, “<ft>” or “<m>” is used, respectively.

J. TRS Coordinates field

Enter township/range/section information into this field, in the form of two digits for township (single digits preceded by a “0”), followed by a

capital N or S (as appropriate), followed by two digits for range (single digits preceded by a “0”), followed by a E or W (as appropriate), followed by two digits for section (single digits preceded by a “0”), without spaces; for example, 10N08W12. Information can only be appended if values are entered for both township and range; if no section number is given, enter “00” in the appropriate place (i.e., in place of “12” in the example).

K. TRS Median field

Enter into this field the name of the meridian on which the TRS coordinates are based, if known and/or applicable.

L. Latitude (Degrees) field

Enter into this field latitude degrees as an integer between 0 and 90, followed by minutes as an integer between 0 and 60, and seconds as an integer between 0 and 60, with each element separated by a space; enter either N or S immediately (i.e., without a space) thereafter (e.g., 45 30 15N).

M. Longitude (Degrees) field

Enter into this field longitude degrees as an integer between 0 and 180, followed by minutes as an integer between 0 and 60, and seconds as an integer between 0 and 60, with each element separated by a space; enter either E or W immediately (i.e., without a space) thereafter (e.g., 160 40 20E).

N. Latitude (Decimal) field

Appearing in this field is latitude expressed as degrees (i.e., as an integer between 0 and 90) followed by a decimal expression, carried out to six places, of minutes and seconds; either no sign (for north latitudes) or “-” (for south latitudes) immediately (i.e., without a space) precedes the value (e.g. -70.000050), which is generated by the system and is not entered by data entry staff.

O. Longitude (Decimal) field

Appearing in this field is longitude expressed as degrees (i.e., as an integer between 0 and 180) followed by a decimal expression, carried out to six places, of minutes and seconds; either no sign (for east longitudes) or “-” (for west longitudes) immediately (i.e., without a space) precedes the value (e.g., -175.005000), which is generated by the system and is not entered by data entry staff.

P. Notes field

For some accessions it is desirable to enter data that are not accommodated by the existing fields or to enter additional comments or clarifications that might be required for data that has actually been entered. Such information is entered into the Notes field as free text, according to the following guidelines.

1. Information written on the sheet is entered *verbatim* (e.g.: “grown from collected seed”; “now within boundaries of Joshua Tree Nat’l Monument”; “variant form of *A. rosea*”) to avoid inaccuracies that might result from incorrect interpretation or rewriting.
2. Any explanatory information or qualifiers deemed necessary are placed in front of quoted information (e.g.: annot. name followed by “?”; pencilled on sheet, “San Mateo? Plumas Co?”).
3. Collection dates for which the year is missing must be entered entirely as a note because if day and month only are entered for either Beginning Collect Date or Ending Collect Date, a value of “2000” is automatically entered by the system for the year. Such notes are entered in the forms: date given is “June 189_”; or date given is “April 17”.
4. Data that may be entered with some but not complete certainty are accompanied by a note of the general form: somewhat illegible, preceded by the name of the field written fully as it appears in the window (e.g., Referenced Place somewhat illegible). Uncertainties about individual words or parts of words are denoted by replacing the questionable information with <?> in the field of entry (e.g., S<?>loaf Mt. for what might have been Sugar Loaf Mt.).
5. Data that are completely illegible obviously cannot be entered at all, and require the entry of a note of the general form: illegible, preceded by the name of the field written fully as it appears in the window (e.g., Referenced Place illegible).
6. If “State Survey”, “Orcutt Collection”, “Mus. Vert. Zool.”, or any similar (e.g., non-personal) designation appears on a label in a blank for collector and no person or persons are indicated, it is entered as such in the Collector field (and exist as such as committees for which the function is collector). If “State Survey” appears in the collection label title but a collector is not specifically indicated, “unknown” is given as the collector and “State Survey” is entered as a note.
7. If a label or stamp on an accession sheet indicates it is from a particular herbarium, such as So-n-So Herbarium (e.g., Lemmon Herbarium, Brandegee Herbarium) or Ex Herbario So-n-So (e.g., Ex Herbario J. W. Congdon), but a collector is not explicitly indicated, “unknown” is entered as the collector (unless a collection number is also given, see below), with a note of the form: from So-n-So Herbarium, probably collected by So-n-So. If a collection number

is given, then the collector is assumed to be the person for whom the herbarium is named, and old So-n-So is entered as the collector.

8. Numbers that are suspected but not known to be collection numbers are entered in one of two ways. Those entered in the Collection Number fields are accompanied by a note such as: RSA Herbarium no. 2132, entered as coll. no. Those that are not treated in this way are entered in the Additional Descriptive Information field for the voucher kind “other label numbers” (e.g., Forest Service 51978), through the Accession Vouchers window.

9. Records for material indicated to have been grown in cultivation should include in the Notes field on the Accession, Object, Institution, Collecting Event window the statement “see image for data about seed and parent”, if appropriate.

10. Records for material indicated to have been the source of seeds for growth in cultivation should include in the Notes field on the Accession, Object, Institution, Collecting Event window the statement “see image for data about progeny”.

Q. Country field

The default value for this field is “US”, which is entered automatically, without typing anything into the field, when the record is appended.

R. State field

Enter the postal code abbreviation for your state (or other appropriate designation) into this field.

S. Reprod. State field

Enter the reproductive state of the plant material, using “fl” if flowers are present, “fr” if fruits are present, “co” if cones are present, “sp” if spores are present, or “veg” if no reproductive structures are present. If both flowers and fruits are present, or if the situation is unclear in this respect (as, for example, is often the case in Asteraceae), “fl/fr” is entered. The default value for this field is “fl/fr”, which appears automatically when the window is opened and is entered when the record is appended if the field is not changed to something else.

T. Verbatim Locality field

Information in this field has been bulk-loaded from pre-existing databases; nothing is entered into this field by data entry staff.

U. Verbatim Coordinates field

Information in this field has been bulk-loaded from pre-existing databases; nothing is entered into this field by data entry staff.

V. Coordinate Data from Sheet field

In this field, an indication of form in which coordinate data were entered originally from the sheets is given by the system (e.g., TRS, Degrees, Decimal, TRS/Deg, None), before automatic transformation into other forms; nothing is entered into this field by data entry staff.

C. ANNOTATION HISTORY Window

All data that are associated with various, attributed, taxonomic annotations (also known as determinations or identifications) made by people other than SMASCH personnel are entered through the Annotation History window; if no such annotation is present, “none” (with an initial letter in lower case, since None is entered, automatically, for records in which a Verified Taxonomic Name is used) is entered in the Annotated Taxonomic Name (Unverified) field, “nocl; no name on label” is entered in the Note field, and an append is invoked. Each taxonomic name, in whatever form, that appears on a sheet and is clearly associated with an annotator, along with the author and date of the annotation, if known, and any pertinent notes regarding the annotation, is appended as a separate value for a given record.

Only annotations for which there is an indicated annotator are entered, with the exception that the annotation on the original collection label is entered even if the annotator is not specified; in such cases, “unknown” is entered into the Annotator field and “nocl” is placed in the Notes field.

Annotations to genus only are not entered, unless such an annotation is the only one present on a sheet. Annotations that began as genus only but to which specific, subspecific, and/or varietal epithets have been added, with or without the authors involved, will be entered in the most complete form. For example, if the genus name “Plantago” was typed on a label, the epithet “lanceolata” was written in later, and “L.” was added even later, the annotation would be entered as *Plantago lanceolata* L. If an annotator name is indicated for the addition of the epithet, that name will be entered as the annotator. Otherwise “unknown” is entered in the Annotator field.

1. On the main SMASCH menu window, place the arrow cursor on the Annotations Information button and hold down the menu button on the mouse. While still holding down the menu button on the mouse, move the arrow cursor to the Annotation History button on the menu that appears below. After the Annotation History button is highlighted, release the menu button on the mouse, thus selecting the Annotation History window.
2. After a short time (usually right away), the Annotation window will appear with a caret cursor (upside down “v”) in the Accession Number field.

3. With the arrow cursor anywhere in the Annotation History window, read the barcode on the accession with the barcode reader, making sure that the line of red light coming from the barcode reader intersects all of the bars comprising the barcode. The herbarium abbreviation and accession number then will appear in the Accession Number field, and the cursor will automatically advance to the Annotation Date field.

4. In the Annotation Date field, enter the date of the annotation in the form “dd mmm yyyy”; the number of digits or letters and the sequence day-month-year must be as given, except that the program will accept month and year only or year only. If a date is not given, leave the field blank and advance to the next one; a default value of “2000” will be entered when the record is appended.

5. In the Annotator field, enter the name of the annotator in exactly the form in which it is encountered on the sheet (see “A. Introduction”), except that obvious misspellings may be corrected, or, if the identity of the person is known, the name of that person as abbreviated in *Authors of Plant Names* (APN) may be used instead of the encountered form, if such an abbreviation exists and if so standardizing improves efficiency. An annotator name may occur formally on a printed annotation label or informally, in some cases as barely legible initials. If the annotator is not indicated, as is usually the case for the original collection label determinations, leave the field blank and advance to the next one; a default value of “unknown” will be entered when the record is appended. Although an assumption that the collector provided the original collection label determination may be correct in some or even most cases, we see no need to make such an assumption, especially since annotation history records for names on original labels are accompanied by the note “nocl” (name on collection label), allowing the user to make the assumption if he or she so desires (see also item 7 below). If “det. by So-n-So”, “identified by So-n-So”, or any similar attribution is given on the original collection label, old “So-n-So” is entered as annotator. However, if “dupl. det. by So-n-So” appears on the label, “unknown” is entered as the annotator and “annotation followed by ‘dubl. det. by So-n-So’” is entered in the Note field. After the Annotator field is complete, depress the Return key to advance the cursor to the Annotated Taxonomic Name field.

- a. Of course, the instructions under item 5 above will not work unless the appropriate entry already exists in the Committee table, and in practice the entire name or abbreviation of it is not actually typed into the Annotator field. Instead, if the committee involved already is present in the Committee table, only a few letters of the name or abbreviation involved and a wildcard (or wildcards, depending on the situation) need to be entered. In response to an attempt to append the record, then, the desired committee automatically will be inserted in the Annotator field if the letters and wildcard(s) defined only one committee, or a pop-up window with a list of choices from which to choose will appear if the letters and wildcard(s) defined more than one committee. Placing the cursor on the entry desired and single-clicking select will highlight that entry, which

then will be placed in the Annotator field upon single-clicking select on the Accept button at the top of the pop-up window.

- b. Names or forms of names of annotators that do not exist already in the Committee table must be appended to it, by entering a committee for which the function is “annot”. If the annotator were indicated to be W.L.J., and if the identity of W.L.J. were not known, the committee would be entered as “W.L.J.” (in the committee abbreviation field) and “unknown, very” would be entered (by typing “u%”) into the Chair (Personal Name) field (thus, since this field also is controlled by another table, the Personal Names table, an entry also would be necessary there). In fact, the actual ways in which an annotator of known identity is encountered are related to one another in the Committee table by the committee chair: to repeat an example used above, the annotator committees W.L.J., W.L. Jepson, Willis L. Jepson, and Willis Linn Jepson are all tied together by virtue of the fact that the chair for each is Willis Linn Jepson; a query for committees for which the function is “annot” and the chair is “Jepson%” will retrieve as records all of these forms. For more detailed information, see “E. Committees window” and “F. Personal Names window”.

6. In one of the Annotated Taxonomic Name fields (Verified or Unverified, depending on the name, see below), enter the plant name exactly as it appears on the sheet. For Verified Taxonomic Names, enter the abbreviation of the author’s name as it already exists in our authority file for taxonomic names (the Verified Taxonomic Names table). For Unverified Taxonomic Names, enter the author’s name exactly as it appears on the sheet.

- a. Of course, the instructions under item 6 above will not work unless the appropriate entry already exists in either the Verified Taxonomic Name table or the Unverified Taxonomic Name table, and in practice the entire plant name and author abbreviation are not actually typed into one of the Annotated Taxonomic Name fields. Instead, if the plant name and author abbreviation already are present in one of the two appropriate tables, only a few letters and a wildcard (or wildcards, depending on the situation) need to be entered. In response to an attempt to append the record, then, the desired plant name and author abbreviation automatically will be inserted into one of the Annotated Taxonomic Name fields if the letters and wildcard(s) defined only one possibility, or a pop-up window with a list of choices from which to choose will appear if the letters and wildcard(s) defined more than one possibility. Placing the cursor on the entry desired and single-clicking select will highlight that entry, which then will be placed in one of the Annotated Taxonomic Name fields upon single-clicking select on the Accept button at the top of the pop-up window.
- b. A plant name and author abbreviation not already present in the Taxonomic Name tables for verified and unverified names (as indicated by the error message “Unknown (Un)Verified taxonomic name...” in response to an

attempt to append the record) must be appended to one, usually to the latter since the former is quite thorough (i.e., if the name is not in the former, it is probably some unverified variant). To append a new entry, bring up the Unverified Taxonomic Names window (using the Unverified Taxonomic Names button on the menu that appears after the Nomenclatural Information button on the main SMASCH menu window is invoked), complete the Annotated Taxonomic Name (Unverified) field by entering the plant name and the author name exactly as they appear on the sheet. A trigger will insure that the same exact entry will exist no more than once. The procedures we have adopted will allow a particular variant to be associated with a published name after future review by an appropriate expert.

- c. Forms do not appear in the Verified Taxonomic Name table, and instead are entered, with the rank designation “f.”, in the Unverified Taxonomic Names table. Names of subspecies and varieties that do not appear in the Verified Taxonomic Name table must be added to the Unverified Taxonomic Name table, with the rank designations “subsp.” and “var.”, respectively.
- d. A hybrid name of the form Plant Name A x Plant Name B is to be entered into the Annotated Taxonomic Name (Unverified) field in the Annotation History window. If the entire entry is too large for the field (which may often be the case), a separate record is to be made for each Plant Name, with an appropriate cross-reference to the other Plant Name in the notes field. For example:

Planta thingamabob Greene subsp. nauseosus B. Manilow x Herba doohickey Snerd subsp. depressus Morrissey

is to be entered as two records:

Record 1.

Annotated Taxonomic Name (Unverified): Planta thingamabob Greene subsp. nauseosus B. Manilow

Note: Annotation followed by “x Herba doohickey Snerd subsp. depressus Morrissey”

Record 2.

Annotated Taxonomic Name (Unverified): Herba doohickey Snerd subsp. depressus Morrissey

Note: Annotation preceded by “Planta thingamabob Greene subsp. nauseosus B. Manilow x”

e. A hybrid name of the form Plant Name A x Plant Name B x Plant Name C will undoubtedly require more than one record.

1. If the entire hybrid name can be divided so that only two records are needed, such records would take either one of the following two forms (in Form 1, the Hybrid Name is broken between Plant Name B and Plant Name C, in Form 2, the Hybrid Name is broken between Plant Name A and Plant Name B; the appropriate form may be arbitrary or dependent upon the lengths of the individual Plant Names relative to one another):

Form 1, Record 1.

Annotated Taxonomic Name (Unverified): Plant Name A x Plant Name B

Note: Annotation followed by “x Plant Name C”

Form 1, Record 2.

Annotated Taxonomic Name (Unverified): Plant Name C

Note: Annotation preceded by “Plant Name A x Plant Name B x”

or, Form 2, Record 1.

Annotated Taxonomic Name (Unverified): Plant Name A

Note: Annotation followed by “x Plant Name B x Plant Name C”

and, Form 2, Record 2.

Annotated Taxonomic Name (Unverified): Plant Name B x Plant Name C

Note: Annotation preceded by “Plant Name A x”

2. If the entire Hybrid Name cannot be divided so that only two records are needed, each of the three component Plant Names is to be entered as a separate record, with appropriate cross-referencing in the note field.

Record 1.

Annotated Taxonomic Name (Unverified): Plant Name A

Note: Annotation followed by “x Plant Name B x Plant Name C”

Record 2.

Annotated Taxonomic Name (Unverified): Plant Name B

Note: Annotation preceded by “Plant Name A x” and followed by “x Plant Name C”

Record 3.

Annotated Taxonomic Name (Unverified): Plant Name C

Note: Annotation preceded by “Plant Name A x Plant Name B x”

f. The procedures regarding hybrid names outlined under items “d” and “e” will ensure that each name appearing on an accession sheet will reside in an annotated taxonomic name field, and that each record, with an appropriate note, will represent accurately what appeared on the sheet. The examples cited illustrate the following rules:

1. The order of the Plant Names in the Hybrid Name is to be preserved.
2. Plant Names are not to be divided.

7. In the Note field, enter any notes or qualifiers indicated on the accession or annotation label by the annotator; for example, “‘cf.’ written before specific epithet”, “‘near’ typed before name”, “‘intermediate to *Aster breweri*’ written on label”. For plant names that appear on the collection label, “nocl” (for “name on collection label” is entered into this field for the first or original name, while “additional nocl” is entered for those added later; if no plant name appears on the collection label, “none” is entered in the Annotated Taxonomic Name (Unverified) field and “nocl” is placed in the note field (“none” is entered with a small initial “n” to distinguish such records from those for which a Verified Taxonomic Name has been entered, which will have the default value of “None” in the Annotated Taxonomic Name (Unverified) field). The designation “dip” (for “data in packet”) is entered for names that appear inside packets or envelopes. Any other clarification, elaboration, or explanation provided by the data enterer is simply typed into the field, or bracketed between < and > if placed within quoted text in the field. If a note precedes the Taxonomic Name, the note is of the form: preceded by “whatever precedes the name.” If the note follows the Taxonomic Name, the note is of the form: followed by “whatever follows the name.” Annotations that are simply expressed as agreements with previous annotations (e.g., as by use of an exclamation point) are entered according to the procedures described herein, with an indication of that fact in the Note field. For example, the annotation “!D.D.K. 1941” written over *Achyrachaena mollis* is entered with a note such as “written as “!D.D.K. 1941”” or, simply, “annotation consists of ‘!’” (since the annotator and date are entered in their respective fields). Annotations merely expressing disagreement with existing annotations are handled by entering the name involved and the other usual data, along with a note such as “annot. consists of ‘not’”.

8. Once the window is completed, append the record by single-clicking select with the arrow cursor on the Append button or by depressing the F3 key. The append button will remain highlighted until the record is appended, at which time the words “Append complete” will appear near the top of the window; if the append fails, “unknown annotator” or “unknown taxonomic name” will appear instead, if the annotator or taxonomic name are not present in the appropriate table (see items 5 and 6 above, respectively).

9. If additional annotations are to be entered from the same accession (i.e., if additional values are to be entered for the same record), clear the fields by single-clicking select on the Clear button (NOT the Delete button) or depressing the F9 key (NOT the F7 key) and repeating items 3-8 above. If data in some of the fields may be used for the next annotation, it may be more efficient to clear individual fields, which may be accomplished by placing the cursor in the appropriate field(s) and depressing the Delete key.

D. ACCESSION VOUCHERS Window

The Accession Vouchers window is used to enter data that indicates the presence on an accession of various kinds of data not otherwise entered into the SMASCH database (see “A. Introduction”). The underlying table has information only about the presence of these various kinds of data; access to the actual data is obtained only by viewing the image of the accession or, of course, the accession itself (with the exceptions noted in the Introduction). The Voucher Kind field in the Accession Vouchers window is controlled by the Voucher Kinds table, to which voucher kinds are added by entry through the Voucher Kinds window.

1. Voucher Kinds and Selected Examples

a. On the main SMASCH menu window, place the cursor on the Accessions, Specimens, and Collections button and hold down the menu button on the mouse. While still holding down the menu button on the mouse, move the arrow cursor to the Voucher Kinds button on the menu that appears below. After the Voucher Kinds button is highlighted, release the menu button on the mouse, thus selecting the Voucher Kinds window.

b. After a short time (usually right away), the Voucher Kinds window will appear with a caret cursor (upside down “v”) in the Kind field.

c. Type a wildcard (%) in the Kind field. Single-click select with the arrow cursor on the Query button or depress F1 key. A list of the 34 voucher kinds entered to date will appear toward the bottom of the window. By stretching the Voucher Kinds window from the corner handles, all of the voucher kinds can be viewed at once. At least until sufficient familiarity with the contents of this table is attained, it is useful to keep this list of voucher kinds up on the screen during data entry, or to simply refer to the table below.

d. The following table includes the 33 voucher kinds entered to date, in alphabetical order instead of the order in which they actually appear after a query (which is the order in which they were entered), as well as selected examples. For the most part these examples actually have been encountered on sheets to date; that which is enclosed by parentheses are either clarifications or examples we expect to encounter in the future. Voucher Kinds for which we make entries in the Additional Descriptive Information field are indicated with asterisks.

Voucher Kind	Selected Example(s)
anatomy	(drawings or photographs of leaf or stem cross-sections; descriptive information about the vascular tissue)
annotation history	(total number of annotations on a sheet as the numerator, total number of different plant names involved as the denominator; see G. Folder Name window, item 10 for details)
associated species	(any plant names, scientific or common, used to indicate associated species)
biotic environment	amongst <i>Quercus</i> ; open grassland (also physical environment); in woods; dense growth of annuals; transition zone; ceased using approximately 27 June 1993, in favor of more general category "habitat" with associated text
biotic interactions	plant chewed on by cow; Host Plants of Lepidoptera; smut-infected
chloroplast DNA	
color*	flowers yellow; leaves dark green; phyllaries brownish; stems gray -- text entered in Additional Descriptive Information field
common name	desert fivespot; coast redwood; baby blue-eyes; California poppy
cytology	2n=26; chromosome voucher
data in packet	(information contained in a paper packet that is not duplicated on a visible part of an accession)
embryology	(descriptions, illustrations, photographs of the contents of a seed; statements about development of the embryo)

Voucher Kind	Selected Example(s)
ethnobotany	medicinal plants of the Hopi; used in the early days instead of Duraflame; eaten by Yuppies
habitat*	steep rocky slope in chaparral scrub -- text entered in Additional Descriptive Information field
horticulture	cultivated native plant; escaped; cultivated; seedling grown in garden
illustration	(any drawing on an accession, such as of a flower, leaf cross-section, pollen grain, plant habit, etc.)
macromorphology	(descriptive notes about or illustrations of external or non-anatomical parts or surfaces of the plant visible to the unaided eye, such as erect, tall, herb, stems cylindrical, leafy, anthers exserted, leaves reduced)
map	(any map on an accession)
micromorphology	(descriptive notes about or illustrations of external or non-anatomical parts or surfaces of the plant that require magnification to be seen, such as pollen grains barbed, phyllary hairs stellate, leaf pores square)
nomenclature	(statements about the application of names, exclusive of type designations)
none	(no voucher information on the accession; used to indicate that the accession has been addressed with respect to voucher data and that none is represented by it)
nucleic acids other than chloroplast DNA	
odor	smells like wet dog; strongly scented; odoriferous; fragrant; malodorous
other label numbers*	(other herbarium numbers, distribution numbers, garden numbers, including those preceded by USDA, USDAFS, USFS, FS, etc.) -- numbers entered in Additional Descriptive Information field
phenology	flowers yellow turning brown; just past flowering; changing with age; changing from

Voucher Kind	Selected Example(s)
photograph	(any photograph on an accession)
physical environment	shady; hills about headwaters; flat; hillside; open grassland (also biotic environment); in deep clay soil (also biotic environment); broad valley; swampy ground; creek bed; in sun; in woods; transition zone; ceased using approximately 27 June 1993, in favor of more general category “habitat” with associated text
population biology	scattered; common; rare; occasional; only one plant in area; abundant; unusual; disjunct population; out of range
publication	cited in; voucher for journal article; Monograph of the Madiinae; Examined for The Jepson Manual
reference used for determination	according to Munz, identified using Jepson Manual
reproductive biology	flowers yellow (also color); annual; anthers hooded (also macromorphology); pollinated by bees; nectar glands strongly scented (also odor); flowers showy; flowers cleistogamous
secondary product chemistry	(e.g., flavonoides, terpenes)
type	(used for any indication of type status) -- holotype, lectotype, paratype, topotype, etc.
Vegetation Type Map Project*	(as indicated on an accession for collections made for the Vegetative Type Map Project) -- project number entered in Additional Descriptive Information field

e. In general, it is better to err on the side of inclusion when trying to decide which voucher kind is represented by any particular item on an accession, at least in part to cover alternate interpretations by users in the future. Thus, a photograph of a leaf-cross section is entered as both “photograph” and “anatomy”; an indication that the plant material was obtained from an open grassland was, until approximately 27 June 1993, entered as both “biotic environment” (for the associated grassland species) and “physical environment” (for the lack of shading), although now it is entered merely as “habitat”; and an indication that nectar glands are strongly scented is entered as both “reproductive biology” and “odor”.

2. Voucher Kind Data Entry

- a. On the main SMASCH menu window, place the cursor on the Accessions, Specimens, and Collections button and hold down the menu button on the mouse. While still holding down the menu button on the mouse, move the arrow cursor to the Accession Vouchers button on the menu that appears below. After the Accession Vouchers button is highlighted, release the menu button on the mouse, thus selecting the Accession Vouchers window.
- b. After a short time (usually right away), the Accession Vouchers window will appear with a caret cursor (upside down “v”) in the first field (Accession ID).
- c. With the arrow cursor anywhere in the Accession Vouchers window, read the barcode on the accession with the barcode reader, making sure that the line of red light coming from the barcode reader intersects all of the bars comprising the barcode. The herbarium abbreviation and accession number then will appear in the Accession ID field, and the caret cursor will automatically advance to the Voucher Kind field.
- d. In the Voucher Kind field, type the first three letters of the voucher kind to be entered, followed by a wildcard (%); for example, “hab%” for habitat, “dat%” for data in packet. Press return, and in the Additional Descriptive Information field type any text associated with the voucher kinds “color” (e.g., petals blue, fruits purple, leaves grayish green), “habitat” (e.g., bog, meadow, forest), “Vegetative Type Map Project” (numbers), and “other label numbers” (numbers). Once this is completed, or if there is no pertinent text to enter, single-click select with the arrow cursor on the Append button or depress the F3 key. After the record has been appended, there will be a message to that effect toward the top of the Accession Vouchers window and the voucher kind selected will appear in full in the Voucher Kind field.
- e. To append an additional voucher kind for the same accession, remove the contents of the Voucher Kind field (after step 3, the caret cursor remains in the Voucher Kind field, so that its contents may be cleared by depressing the Delete key, which deletes the contents of the field in which the caret cursor is located; the F7 key is not used because it deletes the contents of all fields), leaving the contents of the Accession ID field intact. Once the Voucher Kind field is cleared, repeat step 4. Repeat steps 4 and 5 as many times as is necessary to enter all of the voucher kinds represented on a particular accession.
- f. If voucher kinds are not represented on an accession, execute step 4 using “non%” or “none” to indicate that the accession has been addressed with respect to voucher data and that none is represented by it.
- g. When all of the voucher kinds have been appended for a given accession, single-click select on the clear button or depress the F9 key to clear the window and begin to enter data for another accession.

E. COMMITTEES Window

People associated in any way with accessions are assigned individually or in groups of two or more to committees, which are then used in other places within the database in various ways, according to the function assigned to them in the Committees window (see “C. Committee Function field”, below). A committee may not be appended without a value for the committee chair (in the absence of evidence to the contrary and arbitrarily, the first person listed in the committee). In turn, the Chair (Personal Name) field is controlled by the Personal Names table, so that a values for the committee chair cannot be entered unless the name involved already exists in the Personal Names table. Eventually, a Committee Membership table will be completed, in which each member of the committee will be entered, also from the Personal Names table.

On the main SMASCH menu window, place the arrow cursor on the People, Publications, and Institutions button and hold down the menu button on the mouse. While still holding down the menu button on the mouse, move the arrow cursor to the Committees button on the menu that appears below. After the Committees button is highlighted, release the menu button on the mouse, thus selecting the Committees window.

1. Entering data into fields in the Committees window

A. Committee Name field

This field has not yet but will soon be deleted from this window.

B. Committee Abbreviation field

Enter the name or names exactly as they appear on the accession for the function being addressed. For example, entries involving the name Peter H. Raven as a collector might occur as “Peter Raven, E. R. Blakley and Robert Ornduff”; “P. Raven”; “Peter Raven”; or “G. Thomas Robbins and Peter H. Raven”.

C. Committee Function field

Enter the function of the committee being entered as appropriate: “coll” for collector(s), “annot” for annotator(s), “nomen” for author(s) of scientific names, or “bib” for author(s) of literature other than that involving the publication of scientific names. Committees for which the function is nomen have been previously entered, either during SMASCH annotation of the accessions or from the Kartesz or Gray Card databases.

D. Data Source field

Enter “acc%” if the source of the committee being appended is an accession. If the source is the Harvard University Index to Collectors, enter HUIC.

E. Chair (Personal Name) field

Type the first few letters of the last name of either the only or the first member of the committee, followed by a wildcard (%).

F. Comments field

Enter any qualifying data present on the accession relevant to the committee, or any clarifying comments deemed necessary (such commentary by data entry personnel is enclosed in triangular brackets, < and >). In cases where the data source for a committee with the function “nomen” is Kartesz or Gray Card and the Committee Abbreviation is determined to conform to our standard, *Authors of Plant Names*, “= APN” is entered to indicate that such checking has occurred.

2. Appending a record

a. Append the record to the Committees table by single-clicking on the Append button or by pressing F3. The append button will be highlighted while the record is being appended. If only one entry in the Personal Names table satisfies the search defined by the first few letters of the last names of the committee chair and a wildcard, it will be inserted automatically into the Chair (Personal Name) field. If more than one entry is involved, a list of possibilities will appear, from which the desired one may be selected by placing the arrow cursor on any part of the line involved and single-clicking the select button on the mouse. The words “Append complete” will appear next to the University of California logo at the top left of the screen or, if the desired name is not in the Personal Names table, the words “Unknown Chair (Personal Name)” will appear instead.

b. If the chair is unknown to the database, the name must be added to the Personal Names table, after which the new Committee can be appended. See “F. Personal Names window”.

c. After the new committee is successfully appended, clear the window (using the F9 key or the Clear button) before entering data for another committee or conducting a query.

F. PERSONAL NAMES Window

Before a person can be used as a committee chair in the Committees table (or, in the future, before a person can be used as a member of a committee in the Committee Membership table), her or his name must exist already in the Personal Names table. Thus, this table includes the names of people associated with accessions or with the database in any way, whether as collectors, annotators, database workers, or authors of plants names or other relevant literature.

On the main SMASCH menu window, place the arrow cursor on the People, Publications, and Institutions button and hold down the menu button on the mouse. While still holding down the menu button on the mouse, move the arrow cursor to the Personal Names button on the menu that appears below. After the Personal Names button is highlighted, release the menu button on the mouse, thus selecting the Committees window. After a short time the window will appear. There are six, uncontrolled fields in the Personal Names window into which free text may be entered. The first three accommodate the person's names, the last three biographical data.

1. Names

Only the names of people whose identities are known with some degree of certainty are entered into the Personal Names table. If the identity of the person(s) is unknown, because for example the name consists of initials only or is too abbreviated otherwise, the name is entered as a committee abbreviation in the Committees table, with "unknown, very" as the Chair. Names that consist of initials only are not entered into the Personal Names table, even if the identity of the person involved is known.

A. *Standard Names*

Most names conform to a standard format: first or given name, middle name, and last name or surname. In such cases data entry is straightforward; last name or surname is entered into the Last Name field, the first or given name into the First Name field, and the middle name into the Rest of Name field. For example, the name Daisy Bird Achey would be entered as follows: Last Name, Achey; First Name, Daisy; Rest of Name, Bird.

B. *Problematic Names*

Titles that precede a name (e.g., Dr., Mrs., Mr., Col.) are entered in the First Name field, before the first or given name. For example, the name *Mrs. Isabel Post* is entered as follows:

Last Name	<input type="text" value="Post"/>
First Name	<input type="text" value="Mrs. Isabel"/>
Rest of Name	<input type="text"/>

If there is a title but no first or given name, the title only is entered into the First Name field. For example, *Mrs. Peckinpah* is entered as follows:

Last Name	<input type="text" value="Peckinpah"/>
First Name	<input type="text" value="Mrs."/>
Rest of Name	<input type="text"/>

Titles that follow a name and other suffixes (e.g., Jr., M.D., III) are entered after the last name or surname in the Last Name field. For example, the name *Paul D. Hurd, Jr.* is entered as follows:

Last Name	<input type="text" value="Hurd, Jr."/>
First Name	<input type="text" value="Paul"/>
Rest of Name	<input type="text" value="D."/>

Multiple middle names are entered into the Rest of Name field; hyphenated last names or surnames, with hyphens, into the Last Name field. For example, the name *Joseph Franz Maria Antoin Hubert Ignaz Salm-Reifferscheid-Dyck* is entered as follows:

Last Name	<input type="text" value="Salm-Reifferscheid-Dyck"/>
First Name	<input type="text" value="Joseph"/>
Rest of Name	<input type="text" value="Franz Maria Antoin Hubert Ignaz"/>

Names that have been reduced in part to initials are treated just as names written in full, provided the identity of the person is known. For example, an annotation attributed to *B. F. Goodrich* is entered in the Personal Names window as follows:

Last Name	Goodrich
First Name	B.
Rest of Name	F.

2. Biographical Information

A. *Year of Birth and Year of Death fields*

If known, years of birth and death are entered into the Year of Birth and Year of Death fields; *Authors of Plant Names* has been the primary source of such information. If one or both dates are unknown, simply leave the field(s) blank; a default setting of the current year will be assigned to the record. If the dates of birth and death are unknown, "fl." (for "flourished") may be entered in the Biographical Notes field, followed by year(s) in which collections, annotations, and/or publications are known to have been provided by the person in question.

C. *Biographical Notes field*

If known, enter in order profession, specialty, location of collections and collecting activity, home city and/or country, family relationships, and publications.

D. *Exceptions to Standards (Bulk-loaded Names)*

Many names already in the Personal Names file were bulkloaded using data from Kartesz and Keck in Munz. These names do not conform to our data-entry protocol in several significant ways. First, for names where the given or middle name was unknown, "unk." was entered. Thus, there are names such as "unk. Jones" in the database. These files should not be updated using proper first names. For unk. Jones it cannot be assumed that Brady Jones or Henrietta Jones was intended when the record was first appended. An update in Personal Names will have a ripple effect, causing all committees constructed using that name to also be updated. Second, if dates of birth and death were unknown "0" was entered. Most of the bulk loaded names have associated biographical data. If they do not, "fl." was not used. Anything Else?

G. GENERAL CONVENTIONS

1. If information on an accession is unclear, illegible, or of questionable veracity, it or the problematic part is bracketed between < and >, with question marks placed appropriately. For example, "Sali Creek" is entered "Sal<i?> Creek" because of the probability that it is actually Salt Creek (there are 19

records for Salt Creek in the Jepson Place Index and none for Sali Creek) and the problematic part is the letter “i”. For one record in the database, “Creston <illegible, may read breston>” was entered as the Referenced Place.

2. For cases in which information on accessions is more thoroughly problematic, a note such as “illegible, see image” is entered.

3. For Jepson Herbarium accessions of material gathered outside of California, which are interfiled with those obtained within the state, a black dot is attached to the bottom-left of the sheet, half on the front and half on the back (by folding the dot), to facilitate its retrieval at that time in the future when the SMASCH project moves to data entry for non-Californian material.

4. University Herbarium accessions gathered outside of California are supposed to be filed separately, but occasionally they are found in California folders. When such an accession is encountered, the SMASCH annotation label is to be removed and the corresponding record in the Annotations table deleted, if they exist, and the sheet is to be filed in the appropriate non-Californian folder.

5. Rules for filing accessions and associated notes in the Annotations table. (A “SMASCH determination” is one that appears on the SMASCH annotation label, as determined by SMASCH personnel or SMASCH-sanctioned personnel.)

a. Sheets are filed according to taxonomic names comprising SMASCH determinations.

b. Sheets with more than one accession number are filed according to the SMASCH determination corresponding to the lowest (blue-dotted) of these numbers. If more than one SMASCH determination corresponds to the lowest accession number, the accession is filed according to the corresponding name that comes earliest in the alphabet.

c. For a sheet on which there is more than one accession number, the Annotations window for those accessions that are not blue-dotted should include the note “On sheet with [e.g.] JEPS71593”, so as to enable the finding of the sheet after refileing, regardless of whether all determinations are to the same taxon or not. For example, JEPS71593 (*Aster ledophyllus* A. Gray), JEPS72168 (*Aster ledophyllus* A. Gray) and JEPS72169 (*Arnica diversifolia* Greene) are all mounted on the same sheet. The annotations for JEPS72168 and JEPS72169 both include the note “On sheet with JEPS71593”, because JEPS71593 is the lowest and therefore the blue-dotted accession; JEPS71593 itself gets no such note. If a user wants to find JEPS72168 or JEPS72169, he or she queries the Annotation window for JEPS71593, which will yield *Aster ledophyllus* (or whatever subsequent SMASCH determination is applied to the material); the sheet is filed with *Aster ledophyllus*.

6. Accessions that are xerox copies of other sheets in JEPS or UC are not barcoded; when they are encountered they are simply ignored, although they are to be retained in the folders in which they are found. Photographs of sheets from other herbaria should be accessioned, barcoded, and otherwise subjected to the data entry procedures presented herein.

G. FOLDER NAME Window

For the purpose of meeting production goals set forth in the NSF Site Review and Program Summary of February 1996, we decided to eliminate from our procedures both capture of Annotation History by Data Entry Assistants as well as Annotations (i.e., identifications of the plant material) by the Project Coordinator, opting instead to capture merely the plant name under which each accession is filed. Thus, Annotation History (this document) and Annotations (“...Procedures Excluding Accession Data Entry”) are replaced by Folder Name (this document), and Annotation Label Printing (“...Procedures Excluding Accession Data Entry”) is replaced by Folder Name Printing (“...Procedures Excluding Accession Data Entry”).

The name on the species folder in which an accession is filed, as updated by the Project Coordinator for conformance, where possible, with the nomenclature and taxonomy of *The Jepson Manual*, is entered through the Folder Name window. The name to be used for the contents of a species folder appears on a label printed by the Project Coordinator (according to procedures described in “...Procedures Excluding Accession Data Entry”), and placed by him in the lower left corner of the outside of the species folder, sometimes below but usually above the plant name already on the folder. Under the plant name and author abbreviation (conforming to APN) on this label are the words “contents of this folder entered 199_ into SMASCH as above”.

1. On the main SMASCH menu window, place the arrow cursor on the Annotations Information button and hold down the menu button on the mouse. While still holding down the menu button on the mouse, move the arrow cursor to the Folder Name button on the menu that appears below. After the Folder Name button is highlighted, release the menu button on the mouse, thus selecting the Folder Name window.
2. After a short time (usually right away), the Folder Name window will appear with a caret cursor (upside down “v”) in the Accession Number field.
3. With the arrow cursor anywhere in the Folder Name window, read the barcode on the accession with the barcode reader, making sure that the line of red light coming from the barcode reader intersects all of the bars comprising the barcode. The herbarium abbreviation and accession number then will appear in the “Accession Number” field, and the cursor will automatically advance to the “Annotation Date” field.

4. Do not enter anything into the “Annotation Date” Field. Instead, press Return and the caret cursor will advance to the “Filed in Folder for (Verified)” field; the date of entry of the folder name for an accession will automatically be entered here upon saving the record (i.e., the current date is the default value).

5. In the “Filed in Folder for (Verified)” field, enter the plant name exactly as it appears on the label in the lower left corner of the outside of the species folder. This usually may be accomplished most efficiently by entering the first few letters of the genus name, followed by a wildcard, and then the first few letters of the epithet(s), followed again by a wild card.

6. Press Return and the caret cursor will advance to the “Filed in Cabinet for” field. Do not enter anything into this field unless there are instructions from the Project Coordinator to do so. Instead, press Return and the caret cursor will advance to the “Other Taxa present on Accession (Verified)” field; the genus name from whatever name was entered into the “Filed in Folder for (Verified)” field will automatically be entered here upon saving the record (i.e., the genus name is the default value). Sometimes, taxa are transferred from one genus to another and there is no room for the corresponding accessions in the herbarium case where the new genus would be placed, so the accessions are placed in species folders with the newer, correct name on the cover, yet left in the case for the older genus. In such instances, the older genus is entered into the “Filed in Cabinet for” field, so that users will be able to find the accessions involved even though they are not actually filed under the newer genus in the herbarium.

7. After Return is pressed, the caret cursor will advance to the “Other Taxa Present on Accession (Verified)” field. If taxa in addition to that corresponding to the Folder Name are present on the accession, as indicated by use of letters or numbers and more than one plant name by the same annotator, their names may be entered into the “Other Taxa Present on Accession (Verified)” field in the same manner as described under Item 5, above. No effort should be made by Data Entry Assistants to make abbreviation of the author(s) name(s) conform to APN.

8. After Return is pressed, the caret cursor will advance to the “Notes” field, which is used primarily to indicate hybrids and morphological intermediates, as indicated by previous annotations. If the label on the species folder says “infrageneric hybrids” or “infrageneric intermediates”, the names of the parental taxa or the taxa between which the accession is intermediate are entered here. Although this is a free-text field, the names may be brought up elsewhere (e.g., Verified Taxonomic Names table) and copied into this field, for convenience. All names entered into this field should appear exactly as they do on the accession, except that generic names should be spelled-out in all cases and authors should not be included unless they are indicated on the accession.

Records with names of taxa in the “Filed in Folder for (Verified)” field that do not appear to correspond, either nomenclaturally or taxonomically, to anything

in *The Jepson Manual*, include a note such as “Taxon evidently not treated in Jepson Man., possible addition to flora” or something similar.

9. Once the window is completed, append the record by single-clicking select with the arrow cursor on the Append button or by depressing the F3 key. The append button will remain highlighted until the record is appended, at which time the words “Append complete” will appear near the top of the window.

10. If Folder Name data are entered, Annotation History is treated as voucher data.

a. In the text field for the voucher kind Annotation History, enter the total number of annotations on a sheet as the numerator, and the total number of different plant names involved as the denominator. E.g., 5/2 means there are five total annotations on a sheet (including the original collection label), and that among these five annotations, there are two different names involved. It is not absolutely critical that these numbers are exactly correct, we merely want to give an idea about how extensive and complex the annotation history is.

b. Plant names missing authors but otherwise matching another name should not be counted as names in addition to another one for which the author(s) is (are) indicated; however, the same plant name with different authors should be counted as an additional name.