PAPERING LEPIDOPTERA IN GLASSINE ENVELOPES

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In several previous volumes of the *Journal*, especially in the late fifties and early sixties, there appeared articles on papering Lepidoptera. Many of these recommended using paper triangles instead of glassines because of certain defects in usage of glassines. It is my purpose in this short note to describe my usage of glassine envelopes and to give a few tips on how to avoid some of the difficulties mentioned by others.

I use glassine envelopes exclusively in papering all Lepidoptera captured by me, for the following reasons: ease of use and visibility.

Ease of use. I find it difficult, when trying to use triangles, to get the flaps to stay down. I also dislike to have to prepare triangles. I have also found that in certain small, fat bodied skippers and in many sphingid and arctiid moths the trouble getting them to stay in place while folding the flaps over can cause the specimens to become rubbed or to slide out of place. With glassines there are no such problems. The glassines I use have only one flap (along the top edge), and with my usual size glassines (see below), I have only to fold the flap over and make a good stiff crease. The flap stays folded. Also, the pressure that is applied to the specimen by the front and back of the envelope, sealed as it is on three sides, holds the specimen in place without slippage.

Visibility. This is the most important quality the glassine envelope has over the triangle for most collectors. It allows you to see exactly how the specimen is placed in the envelope and also allows you to determine the condition of the specimen without having to handle it more than necessary.

How to select the proper glassine to use. First, use only glassines *without* gummed flaps. Many collectors prefer to use glassines *with* gummed flaps because they can be licked shut. Unfortunately, they can also be "licked shut" by humidity in the atmosphere. I have found that if after papering a specimen in a glassine that has no gum on the flap, I fold the flap over, lay it on a piece of pasteboard or other firm, flat surface, and run a curved, smooth surface over the crease of the flap that the resulting stiff crease will not unfold. Secondly, use the smallest size of glassine that the specimen will fit into without touching either of the two sides and without coming into contact with the crease of the flap (remember that you will be applying pressure to the flap crease). For

most lycaenids, pierids, geometrids, and hesperids, as well as other Lepidoptera of this approximate size I prefer the standard two inch by two inch glassine coin envelope. These come with the flap uncreased and should cost four to five dollars per thousand at the most. For larger specimens such as *Danaus plexippus* (Linnaeus) or *Limenitis archippus* (Cramer), or for *Papilio* I use the various standard size postage stamp envelopes. The sizes to use will depend on the size of the specimen. The amount to buy will depend on which butterflies and moths you are collecting, or which are commonest in your area and are collected most. I suggest that you purchase a selection of sizes ranging from number ones (one and three-quarters by two and seven-eighths inches), to number fours (three and one-quarter by four and seven-eighths inches). If you need larger sizes they are available. Try out the different sizes and see which you use most. Once you know which size or sizes you use the most, buy these by the thousand. They are much cheaper this way.

How to use your glassines. This will vary with individual preference. I use my glassines as follows. When I go out collecting, I carry in an upper shirt pocket about one hundred number four glassines. In front and in back of this pile of glassines are pasteboard separators from the boxes of one thousand that I have bought. The separator closest to me prevents perspiration from coming in contact with the glassines. This is important since glassines will wrinkle when wet. The front separator, the one furthest away from me, is used to divide the empty glassines from those containing specimens. Having caught a specimen in my net, I "pinch" it and then remove it from the net with my forceps. Holding the forceps in one hand, I reach into my pocket and between the two separators with the other and remove an empty glassine, opening it one-handed as I remove it; this takes practice, but not much. I then insert the specimen into the envelope with the forceps, put away the forceps, spread the separator and the pocket front apart with two fingers of one hand and *carefully* insert the glassine containing the specimen with the other hand. Once you have practiced this technique a few times it will become almost automatic. Take care, however, never to "cram full" the pocket. If it becomes a tight fit and a glassine does not go in smoothly simply transfer some of the full glassines elsewhere.

Having collected enough specimens to make a good day, I return home and, removing the glassines, place them in piles according to species. I then prepare the permanent storage glassines.

Preparing permanent storage glassines. Having removed the specimens I wish to discard or spread, I then separate each pile, one pile at

a time, by sex. I now take my two by twos and put the appropriate data on the back flap of each envelope. I use a nylon tipped pen with a quick, surface-drying ink. You may, if you wish, use a typewriter or rubber stamp, but since glassines are not porous you will have to wait some time for the ink to dry. With a surface-drying ink such as is used in felt-tipped marking pens you eliminate the waiting. By the time you finish the last envelope in the species from one pile, the first will be well dried.

Putting the specimen in the glassine. Using my forceps I remove the specimen from the number four envelope and place it in the prepared two by two with the antennae in the usual "down between the wings" position. Carefully removing the forceps I adjust the flap to the proper height and put a light crease on the edge with the forceps. I then, as described above, put a permanent stiff crease on the edge. The specimen is then entered into the record book and placed in permanent or temporary storage.

Storing specimens. Many people use cigar boxes or other containers for storing papered Lepidoptera. With my system of two by twos however, I can use plastic coin storage boxes with tight fitting lids. These boxes, approximately two and one-quarter by two and one-quarter by nine inches are made specifically to hold two by two inch coin envelopes. It is possible to arrange the specimens in any order I wish, add an insecticide, put the top on and tape the box shut, and put the sealed box away in storage for years without the necessity of further care. Labels are available to go on the ends of the storage boxes, thus the contents are recorded and the proper box can be retrieved with little effort.

Warnings. Never use an insecticide in a plastic box that will react chemically with the plastic. Paradichlorobenzene and other oil based insect killers are *verboten*! I use a powdered insecticide and fungicide combination such as is used in many museums. This works just fine. Another precaution is to allow all specimens two to three weeks to dry out thoroughly before sealing the box and to make sure that as much moisture as possible is excluded from the box. I suggest sealing boxes on the second of two dry days or in winter when the moisture content of the air is low. In the tropic and humid regions I recommend the use of warm air to dry out the box before filling. Use your own judgment on how to go about it, but *never* heat the box in a drying oven. At best it will probably warp and at worst it will melt.

Relaxing specimens in glassine envelopes. As stated above, glassine envelopes are non-porous. They cannot, therefore, be just placed in a relaxing box like triangles can. A simple method of relaxing such glas-

sined specimens is as follows. Take the envelope, and with a pair of good straight scissors cut off the smallest bit you can manage all along both sides and also along the top. Cut as close to the specimen as possible, leaving extra glassine above the specimen. Taking the extra glassine in the forceps, thus keeping the specimen immovable between the remaining part of the glassines back and front, place the specimen and remains of the envelope in the relaxing box. The glassine will curl from the humidity and expose the specimen on three sides to the atmosphere in the box. The specimen will not be "soaked" if the glassine is placed directly on the wet sand or sponge you use to hold the moisture since water will not penetrate the non-porous glassine.

If you have used a waterproof ink, and have put the data on the front of the envelope you can make sure that the data is included on the glassine that goes into the box with the specimen. If the data is on the flap (which you cut off along the top to open the envelope), you may put the flap in with the specimen or put it under the relaxing box, as I do. Choose the method that best suits you.

When the specimen has relaxed, remove it using the extra glassine again, and go to work.

The above are the techniques I use to get excellent results with glassine envelopes, at the lowest expenditure of time, effort, and cash. Please remember that circumstances vary and that modifications or substitutes should be used to suit the individual collector.

HYBRIDS AMONG SPECIES OF *HYALOPHORA*

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Although hybrids between species of *Hyalophora* are well known and the triple hybrid (*H. gloveri* ♂ × *H. rubra* ♀) ♂ × *H. cecropia* ♀ has been described (Collins and Weast, 1961), there does not appear to be any description of the triple hybrid (*H. cecropia* ♂ × *H. gloveri* ♀) ♂ × *H. rubra* ♀ or of a hybrid which combines all four species. The object of this investigation was to raise the quadruple hybrid [(*H. cecropia* ♂ × *H. gloveri* ♀) ♂ × *H. rubra* ♀] ♂ × *H. columbia* ♀ and to study the effects of foodplants on the rate of growth and the size of cocoons and adults.