

grams (~9 lbs.). The skeleton, however, only weighs 272 grams (just over 1/2 lb.), or 7% of its mass — less than half of the weight of the feathers.

To look casually at a bird, it is easy to assume that the feathers grow uniformly over the body but, in fact, feathers grow only in distinct regions called **pterylae** or feather tracts. There are eight or nine major tracts which are further subdivided. The precise arrangement of these tracts and sub-tracts is one of many criteria used to distinguish and classify different species of birds. Between the pterylae are areas of bare skin known as **apteria**. (Fig. 1-1). The apteria may assist with wing and leg movement, provide spaces for tucking legs and heads into the plumage, and they may facilitate heat loss (although this has not been fully established). Part of the evidence for assisting with heat loss comes from penguins, which have no apteria and a strong need to conserve heat.

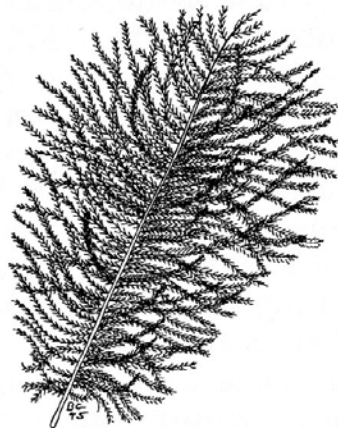


Figure 1-5. Semiplume feather

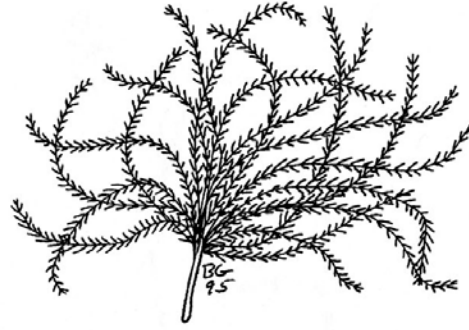


Figure 1-6. Down feather

Vaned feathers - Contour (body) feathers, flight feathers

These are the most obvious feathers of a bird. All of the flight feathers of the wing and tail and most body feathers are vaned feathers. Vaned feathers have a long central shaft, called a **rachis**, with a vane consisting of many barbs on either side of it. (Fig. 1-2). In flight feathers, this shaft divides the feather into two asymmetrical vanes. The narrow vane is on the leading edge of the feather and the broad vane is on the trailing edge.

Barbs on the vanes of these feathers are divided into **barbules**. The barbules which point toward the tip of the feather have tiny hooks which clasp the barbules pointing toward the base of the feather (Fig. 1-3). These hooks keep the barbs of the feather in a tightly interlocked condition, or **pennaceous** much like Velcro™. The barbs near the base are without hooks, soft and downy, termed **plumulaceous**, to help trap air and provide insulation.