that in procaryotes related proteins are often encoded in a row without interspacing terminators. Thus, transcription from a single promoter may result in a *polygenic* message. *Polygenic* indicates many genes; *each single gene encodes a separate protein*. Thus, the regulation of transcription from a single promoter can provide efficient regulation of functionally related proteins; such a strategy is particularly important for relatively small and simple cells. On the other hand, eucaryotic cells do not produce polygenic messages.

In procaryotic cells, there is no physical separation of the chromosome from the cytoplasma and ribosomes. Often an *m*-RNA will bind to a ribosome and begin translation immediately, even while part of it is still being transcribed! However, in eucaryotes, where the nuclear membrane separates chromosomes and ribosomes, the *m*-RNA is often subject to processing before translation (see Fig. 4.5). The DNA can encode for a transcript with an intervening sequence (called an *intron*) in the middle of the transcript. This intron is then cut out of the transcript at two specific sites. The ends of the remaining fragments are joined by a process called *m-RNA splicing*. The spliced message can then be translated into an actual protein. The part of the transcript forming the intron is degraded and the monomers recycled. When *m*-RNA is recovered from the cytosol it will be in the mature form, while *m*-RNA within the nucleus has introns. Many eucaryotic genes contain "nonsense DNA," which encodes for the intronic part of the transcript. The word "nonsense" denotes that that particular sequence of DNA does not encode for amino

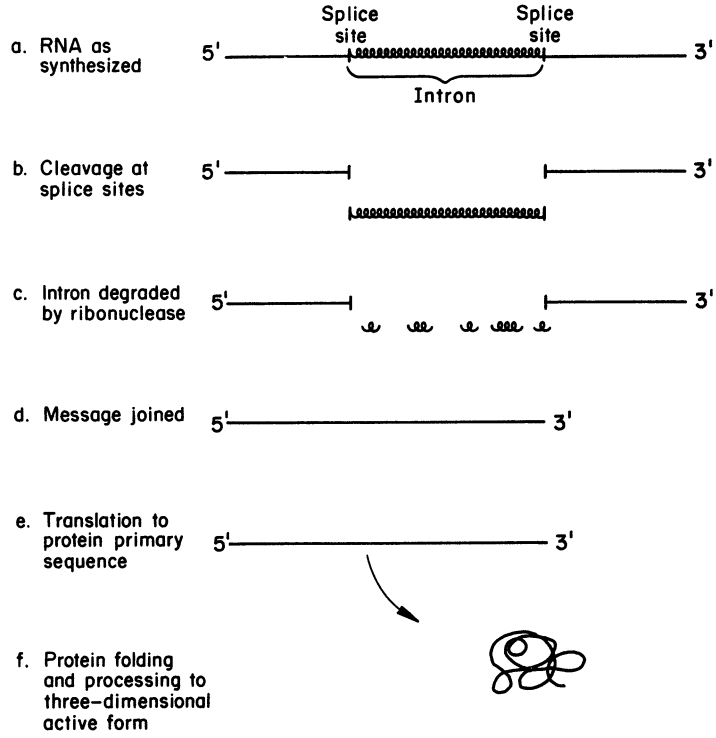

Figure 4.5. In eucaryotes, RNA splicing is important. The presence of introns is a complication in cloning genes from eucaryotes to procaryotes.