Spectral-Analysis
As A Diagnostic Tool
For Birds

by Bradley G. Dalton
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Spectroscopes are nothing really new. They have been in use for years in medical and scientific laboratories. And yet, veterinarians do not seem at all familiar with their use. Aviculturists would do well to learn as much as they can about them for I believe they offer one of the simplest and most meaningful scientific tests that can be done on birds. Unlike most tests that require blood samples — of which birds have precious little — spectral-analysis makes use of that which birds have most of, namely feathers.

Spectral-analysis is simply the process of identifying substances through analysis of the colors or wavelengths emitted when these substances are vaporized by heating. Correctly used, it can analyze quantities too minute to be measured otherwise. Medically it can be used to measure mineral contents of the human body from practically any sample of body tissue. Hair samples are commonly used with spectral-analysis since hair follicle minerals are laid down in the hair shaft in direct proportion to the quantity of minerals absorbed by the body cells that make the hair. If someone is deficient in calcium or suffering from toxic levels of lead, it can be quickly established by analysis of hair samples. Since feathers also reflect the proportion of minerals present in the body cells that manufacture them, they work equally well with spectral-analysis.

Perhaps it would be appropriate at this point if I explained how I came to research spectral-analysis and the uses to which I have applied it. For the past three years, my wife and I have been watching our parakeets and cockatoos closely. One of our cockatoos, a Moluccan, had considerably higher levels than a sulfur crested. Also, Dr. Furman's spectroscopy is connected to a computer that gives an extremely complete printout of human mineral norms. One feather sample was on the same printout which gave an extremely complete printout of human mineral norms. The feather results also came out on the same printout which was somewhat distracting.

The results were rather unexpected. In all 18 mineral levels tested for, the sulfur crested had considerably higher levels than the moluccan. Among toxic minerals tested for, the level of aluminum showed a toxic level was cadmium, although in a much smaller amount.
I traced my bird's source of poisoning to his cage. The interesting point here is that this particular birdcage is not an aluminum cage, it is galvanized steel. Checking with a local plating company I found that aluminum as well as cadmium is often used in the galvanizing process. Needless to say, this cage is no longer used and I now regard all galvanized cages as dangerous. There are also a number of anodized aluminum cages on the market and I would consider these cages to be extremely dangerous, especially for parrots that like to hang and swing from the wire. I do not know if my bird will ever recover his plumage but I will make certain that this never happens to any of my other birds.

In addition to the aluminum toxicity, the analysis showed several other things. The calcium to phosphorus ratio was normal for my moluccan but abnormal for my sulfur crested. Ideally, calcium to phosphorus should be in a 1.4 to 1 ratio. An imbalance can result in any number of critical bone or nervous afflictions, any of which can be fatal. I have since made dietary adjustments but for two birds who have the exact same diet I would have expected more similar results. Perhaps this is a result of the aluminum poisoning, I have no way of knowing at the present time.

But beyond the importance of my own birds, I believe that spectral analysis offers an important tool for understanding nutritional needs of birds and monitoring their diet. Too often we take great care to see to it that our birds get a 'good' diet without having the slightest idea of how that diet is being absorbed and metabolized by individual birds. Obviously, we must begin to establish mineral norms for individual species of birds. Perhaps in the future, some sort of central record keeping could be established. Once norms are established, it might be beneficial to compare mineral levels in wild populations with similar birds in captivity. There may well be certain mineral levels at which birds lay better and achieve better survival rates. Also, I expect that wild populations undergo seasonal changes in mineral levels that might advantageous to duplicate in captive species.

It is no longer necessary to proceed in aviculture on a trial and error basis. Spectral-analysis offers a scientific procedure that can be used to monitor the health of our birds. Rare stocks of birds are simply too important to raise in a haphazard manner. This will become especially important in the future when native stocks of birds become depleted and aviculture becomes even more essential to supply existing species and save threatened ones.

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