

# the afa. WATCHBIRD

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## COVER PHOTOS

**FRONT COVER** — Tardigrade Hornbill hen in nest with young. Photo taken by James Jennings, courtesy of the Los Angeles Zoo.

**BACK COVER** — Ocellated Turkey, Male. Photo by Jerry Jennings, taken in Dave Shupert's aviary.

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# the Vet's Corner

by Dr. Raymond Kray

## THE BLOOD STORY

A few drops of blood in a glass tube and a blood smear on a glass slide can begin to unfold the hidden mysteries of the body.

Blood is actually moving tissue, and as such, it touches all parts of the body. As it reaches these areas it becomes modified by them. Its composition includes living cells, the red blood cells and the white blood cells, which reflect what is happening to the body, or somatic, cells they contact as they act out their role in blood function. The plasma fluid that bathes and transports them becomes altered in specific gravity, chemical composition, and even appearance as it interacts with the fluid that surrounds and is inside the various body cells such as brain or bone cells.

The normal red blood cells (RBC's) of birds are more similar to those of reptiles and amphibians than to mammal RBC's. This is presumptive evidence that birds branched off the reptile evolutionary tree back in the days of the primitive Archaeopteryx. I am referring here to the presence of a nucleus in the mature RBC's of birds and reptiles in contrast to the absence of a nucleus in the mature RBC's of mammals. The nucleus of a cell is a visible, dark staining mass that can divide and therefore reproduce itself. It can easily be stained by appropriate dyes and thus distinguished from the rest of the cell. An animal's sex can be determined by appropriate staining of the nucleus of its cells. If certain blood parasites such as malaria or certain viruses are present they can be selectively stained and their presence detected either in or on the individual blood cell.

The staining of the red blood cell can thus be directed toward providing a medical diagnosis. If one is looking for cancer cells, the presence of fat or cholesterol, or an iron deficiency, one should be able to use the appropriate stain and obtain the desired results. The same approach can be used with white blood cells (WBC's) whether they be lymphocytes, basophils, eosinophils, heterophils, or monocytes. These last named WBC's appear in a particular ratio and total number in a healthy individual.

When a blood smear on a glass slide is stained and examined under a micro-

scope, a total of one hundred white blood cells are counted and the percentage of each type of WBC is determined. The preponderance of one cell type over another can give evidence of a bacterial infection, a viral infection, body cancer, blood cancer, allergic reaction, parasitic infestation, poisoning, starvation, poor nutrition, etc. It is also possible to determine whether the individual is winning or losing its battle against the invader by the presence of certain cells in appropriate numbers.

Chemical composition of the plasma and serum can now be determined by sophisticated blood analysis equipment. The quantitative presence of certain enzymes in the blood is indirect evidence of normal or abnormal function of organs like the liver, kidney, pancreas, thyroid, and even the heart.

This kind of information then directs the veterinarian to what organ system he should be treating. A follow-up blood test a week later can verify his earlier diagnosis and demonstrate the success or failure of that treatment. It would thus indicate whether the drug being used is effective and should be continued or is of no value and should be changed. To put things in their proper perspective, I should point out that this technique for determining the prognosis of treatment in birds is limited to the larger species such as parrots and doves. This is due to the amount of blood required, the rapid course of disease in small birds, and the high cost of running these tests. Unfortunately, as medical science has advanced so has the cost of labor and equipment.

However, not all blood tests are expensive and time consuming. There are some "quickies" which can be run in a few minutes with a minimum of equipment and at a practical cost to the owner. These are as follows:

1. Microhematocrit — 5-10 drops of blood obtained from a nail clipped short. This blood is centrifuged and the red blood cells, white blood cells and serum are separated. With experience, total numbers of these cells can be approximated, which permits detection of dehydration, severe viral infection, and anemia. The presence of fat in the blood can be evaluated and

the color of the serum can be used to diagnose certain liver ailments.

2. Microscope slide of blood smear — 1 drop of blood is used to determine the proportion of various types of white blood cells and red blood cells. This can indicate cancer, leukemia, poisoning, and malnutrition and can be used in making a prognosis.
3. Blood urea nitrogen — 1 drop of blood provides a screening aid to determine the presence of nitrogenous material in the blood and possible malfunction of the kidney.
4. Serum protein — 5 to 10 drops of blood are needed to determine whether an individual is producing antibodies to fight off a disease.
5. Serum glucose — 5 to 10 drops of blood allow determination of possible sugar diabetes, especially in budgerigars.

With the knowledge gained from these tests we can direct our effort towards treatment.

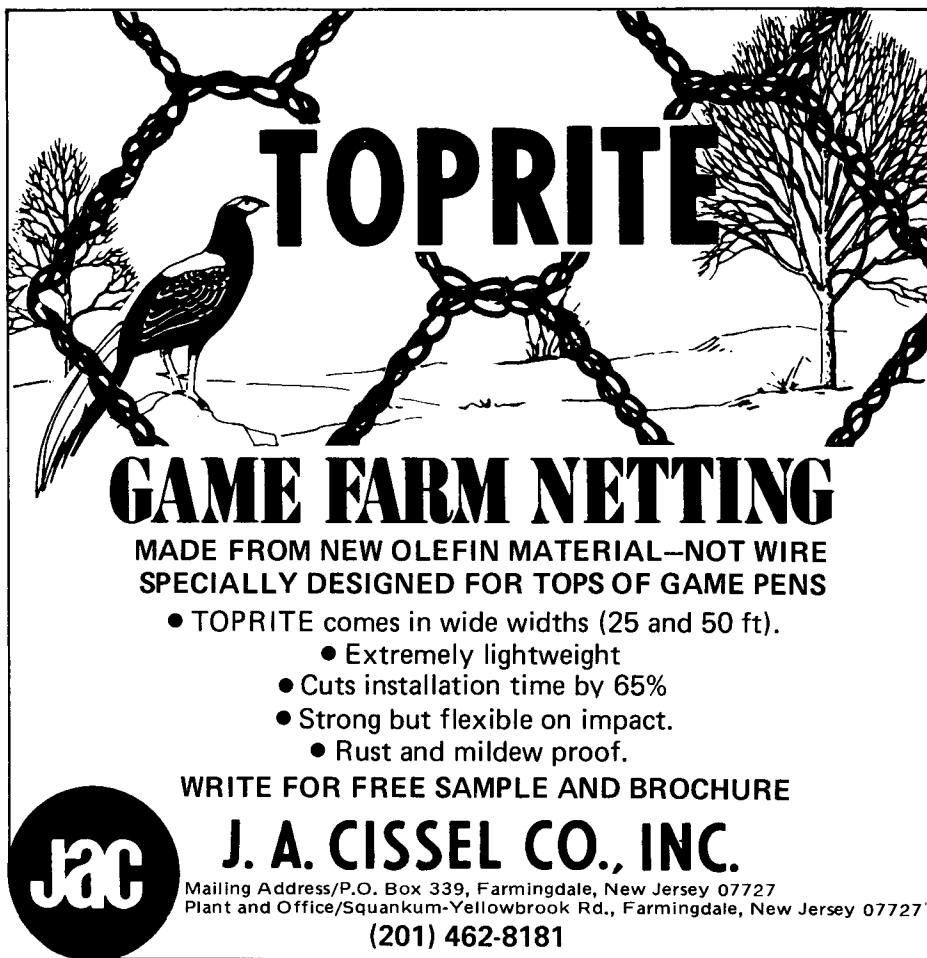
If dehydration is a problem, appropriate fluids containing chemical ions of sodium, chlorine, and potassium are given, either directly into a vein or under the skin. If there is a low sugar level, glucose is added to the fluids. If vascular shock is present adrenalin is added. If the serum shows a liver condition multiple B vitamins are included in the fluid infusion.

If anemia is present, blood building essentials such as thiamine, B<sub>12</sub>, iron and cobalt are given and if an appropriate blood donor is available even whole blood has been transfused.

In acute bacterial infections with greatly elevated white cell counts antibiotics are given intravenously in large doses to effect rapid destruction of the bacteria.

Should a blood test show defective kidneys, antibiotics effective against urinary system infections are used and the amount and type of protein the bird eats are controlled by force feeding.

The above treatments are, of course, only a few of those available to the veterinarian. However, they illustrate what is possible once a proper diagnosis has been made. ■



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