

# *The Microscope* *and* *Today's Dogman*

Most dogmen don't consider themselves to be scientists or researchers. At best they enjoy the dogs and feed their dogs, but when things go wrong, they delegate the search for "why" things went wrong to their local vet. Which is fine. Veterinarians are paid professionals, who have gained much knowledge in the field of pinpointing problems that arise in animals. So it makes sense to delegate the task of identifying these kinds of problems to a vet.

However, as dogmen, we all realize how too few vets are truly concerned with meeting our needs. Most vets are concerned with exacting their fees. Further, because we own so many dogs, we dogmen have to utilize the services of veterinarians to a much greater degree than your average pet owner, and these services are neither cheap nor convenient. If your dog needs a tick titer to be run, you you have to fork out about \$100 for this, plus a fee for the initial exam. Need a fecal float too? Fork out another \$10-\$20. Need a skin scraping for mange? Cough up another \$30. How about running a simple Packed Cell Volume during a conditioning period? Another \$30 goes from your wallet to your vet's wallet. Multiply these things by several times a year, and by several dogs a year, and you can see how these costs will add up. Factor in the gas to get to your vet, plus all of the waiting involved with each visit, and you can begin to see how much *power* we give our vets over us as dogmen, both in controlling our wallets and in our dependence upon them to keep us knowing what the heck is going on with our animals.

Have you ever stopped to consider that all vets have really done is read books on what to do for dogs, and then they simply practiced doing it? Have you ever considered that those books they read are available for *our* use too? Have you ever considered that you could read those books yourself, and teach yourself these same skills, and that you would therefore not need your vet as much ... because you would be giving yourself more and more power over your own situation? Well these thoughts have been occurring to me, and they are what have prompted me to write this article.

I remember having these same thoughts many years ago, when I first wanted to have someone build me a webpage and a computer. I was going to pay this person \$50/hr. to do these things, but every time he was supposed to show he failed to show. After about the fifth time of flaking out, I was livid, and I decided "To hell with him!", I would do it all myself. I realized that I was totally under this person's power. I had to wait for him to show, like a lost puppy, and I couldn't do anything computer-related unless "he" fixed it so I could. Disgusted, I said "No more!" I was going to do it myself.

I figured if somebody invented "a computer" out of thin air, that I ought to at least be bright enough to follow the construction ... and I figured there had to be books in this regard showing me how ... as well as magazines that would be the most current on such matters. And I was right, there were, and I bought them and I read them. I also figured if somebody invented "HTML Language" out of thin air, then I ought to at least be bright enough to follow the logic as to how it works ... and I figured there had to be books in this regard showing me how ... as well as magazines that would be the most current on such matters. And I was right, there were, and I bought them and I read them. And after a few days of confusion, it all gradually began to make sense to me ... and it actually turned out to be a lot simpler to master than I thought it was going to be. What I had done was I gave myself *The Power of Knowledge*, and I have built my own computers and designed my own webpages ever since. I do not have to rely on anyone for this any longer.

Well, these same thoughts have dawned on me about researching my own dogs for disease, parasites, and problems. I figure if some genius was able to figure out how to make a microscope in the first place, then I ought to at least be bright enough to learn how to use one. And I figure if some scientific pioneer figured out how to stain slides, and identify microscopic buggers in the blood and stool and skin, that I ought to at least be able to follow the method. You too should think these things -- because it's true! If somebody is bright enough, and dedicated enough, to invent all of this stuff out of thin air ... and if researchers and scientists have been refining the techniques ... *and writing down the methods* all the while ... then pretty much anyone with an IQ over 100 should be able to follow these things and master them. I mean it is all right there for us, written down in textbooks and in magazines. All we have to do is read it and apply it.

The trouble is, we have improper paradigms. A paradigm is a frame of reference or the way we "see" the world. Our paradigms are in essence a pair of "glasses" that affect the way we see the world and see ourselves. Most people have the paradigm that "vets" are some higher species of human being, but they are not. Most vets are incompetent fools, quite frankly, and the only difference between them and ourselves is they have educated themselves in certain matters. Yet all they have really done is read books and practiced what they have learned. That's it! They simply become competent enough to receive test scores high enough to have graduated. They then receive a piece of paper that allows them to charge people money for continuing to practice what they have learned. That is all they have done. That is all a vet is.

Did you ever stop to think that you can read those same books, and practice these same methods, yourself, on your own dogs? You sure can! Self-education is a reality of this world, and one of the most powerful realities you can possibly internalize: the power to teach yourself almost anything you wish to learn. This "paradigm shift" of viewing *yourself* as the one to turn to for knowledge is perhaps the most liberating phenomenon you will ever experience. If you have half a brain about you, and the drive and will to learn, you can educate yourself on just about any subject you can choose, and thus you can learn everything your vet knows. All the knowledge your vet has read is right there for you to read too.

One major difference, though, is you will not have a knowledgeable instructor by your side at all times to "catch you when you fall." Don't be discouraged by this though. The people who invented this out of thin air didn't even have a book to read, let alone the crutch of instructorship! Be patient, keep reading and keep trying, and you will master any skill you set out to master.

Another impediment to your learning veterinary medicine on your own is the simple fact that in all probability you will not be able to afford an x-ray machine, or a laser-surgery machine, or incredibly expensive equipment of this nature. These devices would be easy to self-master as well, if you had them and the right texts to read on how to use them. However the simple fact is you will not have a university to provide these kinds of devices for you. As such, you must resign yourself to learning about matters for which you can afford the equipment on which to practice.

Don't be discouraged though, for one of the most powerful research tools money can buy ... if not *the* most powerful single tool ... is the microscope. And a microscope you most assuredly *can* afford. Yes, a good microscope is expensive, but it is still affordable for anyone truly interested in empowering himself in his veterinary capabilities. Another set of objects you can afford would be all of the slides and dyes, cytometers, etc., that are necessary to run many of the tests for which you would use a microscope.

I am sure some people have dropped off by now and lost interest. Such people have convinced themselves, "I could never do this myself," and you know what? They're right. As the late, great Henry Ford once said, "Whether you think you can, or can't, you're right." This article is for those readers with a superior mentality. A mentality that says, "I can!" A mentality that is eager to learn and confident in its ability to learn. So if this is you, let's go a little deeper.

What kind of microscope should you get? This is an important question. The reader must keep in mind the fact I am no expert (yet) and that this article is really my own attempt at "thinking out loud" and not years of experience. Nonetheless, the research is out there, and I have been reading it, and the same recommendations continually stand out, and so I will share what I have found.

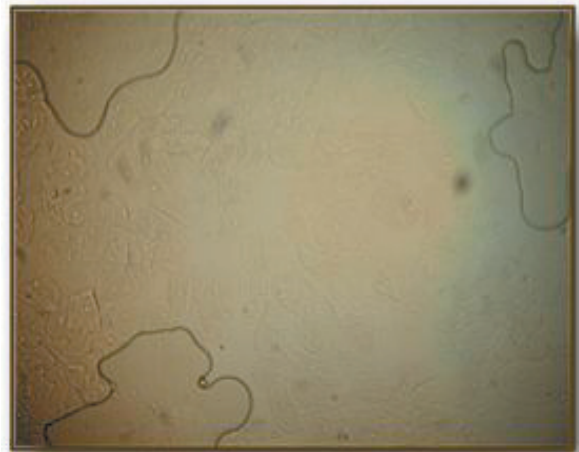
As simple as this may sound, the most important quality of any microscope is OPTICS. That through which you will be gazing. Your microscope can be a beautiful piece of equipment, but if the optics are insufficient for viewing that which you want to view, you will not be able to accomplish your goals. Therefore, as you shop for a microscope, realize that what you are looking for is the best set of optics you can that will accomplish most of the goals

you will probably have. Here are some of these projected goals that you might want to consider: (1) bloodwork, (2) parasite identification, (3) vaginal cytology, (4) sperm motility, (5) sperm count, (6) sperm morphology, (7) cell analysis, (8) skin scrapings, etc.

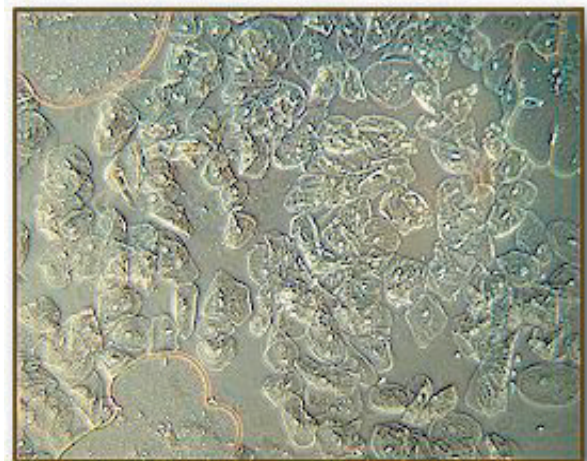
Some of these require more specialized optics than others. Some require entirely different kinds optics than others. For instance, identifying sperm morphology (which means whether they are shaped normally or not) requires either phase optics (Phase) or differential interference contrast optics (DIC). Yet when you view bloodwork you need bright field or plan optics. It is important to keep these things in mind as you shop for your microscope.

## Phase Contrast

Phase contrast objectives (lenses) are something any serious researcher should consider implementing into his intended microscope. Rather than "tell you" how much better they are for critical cell analysis, let me simply show you the difference:



*A cheek cell slide viewed under standard Bright Field Optics.*



*The same cheek cell slide viewed under Phase Optics.*

As you can see, the difference in detail is literally night and day. You are "in the dark" examining certain kinds of cells with Bright Field Optics, whereas with Phase Optics you can see what you are looking at, clear as day. I hope this drastic difference is enough to get you to appreciate and invest in the best optics you can afford - or to save up until you can afford the best - or close to it.



## What is Phase Contrast?

(taken from *Microscope World*)

"Phase contrast is a method developed in the early 20th century by Frits Zernike. Zernike discovered that if you can speed up the direct light path, you can cause destructive interference patterns in the viewed image. These patterns create details in the image to appear darker against a light background. To cause these interference patterns, Zernike developed a system of rings located both in the objective lens and in the condenser system. When aligned properly, light waves emitted from the illuminator arrive at your eye  $1/2$  wavelength out of phase. The image of the specimen then becomes greatly enhanced. Phase is only useful on specimens that do not absorb light (they are called "phase objects") but it is very useful in showing details in certain specimens, such as cell parts in protozoans, bacteria, sperm tails, and other types of unstained cells. This technique proved to be such an advancement in microscopy that Zernike was awarded the Nobel prize (physics) in 1953."

For further reading on Phase Contrast go see *Microscope World* ([microscopeworld.com/high/phase-contrast2.htm](http://microscopeworld.com/high/phase-contrast2.htm)).

Notice the key to Phase efficacy: it is "**only useful on specimens that do not absorb light.**" Therefore Phase, while useful in some applications, is not useful in others. However, in the areas in which Phase is useful, these optics are indispensable. Without Phase, you cannot see the details enough in certain cells to understand if they are normal or not, for instance when evaluating semen. Another great plus with a Phase microscope is that, when you do not need the Phase Optics (as for instance with red blood cells), you can turn the "Phase" property off and still utilize the Bright Field Optics. Therefore, I would strongly recommend that you invest in a Phase Microscope. So let us take a look at a Phase Microscope that is offered by *Microscope World* ([www.microscopeworld.com](http://www.microscopeworld.com)):



Model 163-PH Retail: \$1,569.00

This model is manufactured by National Optics, and again it is distributed by *Microscope World*. Be careful if you order though: the Model 163 comes standard with achromatic lenses (\$850), and also comes with plan (\$1045), semi-plan (\$979), and high-contrast (\$929) ... but you want none of these ... you want the Phase Contrast Objectives (\$1,569).

With your purchase of the microscope also comes either a video or a DVD (your choice) called "Adventures Program Super Slide Kit," which shows you how to set up slides, etc., which naturally is a nice thing to have as you learn to walk with your new microscope.

But in addition to the microscope, it would be wise to purchase the accessory item of a top-quality microscope case to protect your investment. The large aluminum case offered by *Microscope World* is the one to order, and is an additional \$86.00, but again it is worth the investment. Here is what it looks like:



As you can see, it has accessory pouches to put in extra slides, dyes, and cytometers (to be discussed later), it is padded on the inside, but is made of metal on the outside. The case also has a sturdy and convenient handle on top to make carrying a cinch.

## Differential Interference Contrast

"Transmitted light Differential Interference Contrast (DIC) is an illumination technique which, like Phase Contrast, enables specimens that have a refractive index similar to their surroundings to be visually differentiated. This is an interference technique which relies on Polarized illumination. Wollaston prisms placed in the condenser and in the back focal plane of the objective modify the normal extinction resulting from the crossed polarizers to create a 3D effect of the specimen's surface. A DIC Turret condenser will usually have a Brightfield position as well as DIC positions to match each objective."



Differential Interference Contrast Microscope  
(\$16,000 used)

According to the Olympus website, "Living cells and other transparent, unstained specimens are often difficult

Order Yours Today!