

HANDS up! Who remembers Fry's Five Boys Chocolate? You know. The one with the picture of the five expressions on a boy's face as he anticipated, enjoyed, then reminisced about the pleasure of the chocolate bar. I often see a photographic four face equivalent.

I stand there in front of a new group of keen monochrome photographers. The place is packed. The first audience at the beginning of the day is full of vim and vigour, keen to be out and round the NEC hall for the Focus on Imaging exhibition after this Ilford Masterclass. By the end of the day, for my final class, they come in very glad to be able to rest their weary feet after a day around the hall.

But all audiences, fresh or tired, young or old, North or South, display the same four reactions at the same point fairly early on in the class. It comes when I make the point that you can't make a fine print from a coarse negative. Most of the negatives that come through the door of my professional printing service are still pretty coarse - underexposed and overdeveloped, burned out highlights and empty shadows with harsh graduation, graininess and poor sharpness.

There are many people who believe that if they can just learn the magic secret, as alchemists strove for the spell that would turn base metals into gold, they will be able to turn out prints with deep luminous detailed shadows, gleaming graduated highlights, and a full rich palette of well separated tones between; that there is some mysterious black art in my darkroom that I hide away from innocent eyes. If only they can learn it, they will suddenly be able to turn their negatives into the glowing prints they envisaged at the moment of making the camera exposure.

Sorry. The answer's in the negative. Literally. An improperly exposed and developed negative will never make a true fine print. Acceptable, even good, yes. Fine, no. Of course there are those who would like to con us into thinking that there are such black darkroom arts, because it justifies a 'guru' position. The current alchemist's spell is split grading. People are using this convinced that they are uncovering print tones with it that unachievable by simple straight print exposure methods. Wrong. It just takes longer to achieve exactly the same result. But the self-delusion makes it feel good as we wrap ourselves in the emperor's new clothes.

Sorry, we can perform rescue jobs on inadequate negatives by devices like extreme dodging and burning, condenser and semi-point source illumination, multiple grade printing, preflashing, controlled fogging, latent image pre-bleaching, selective toning and post bleaching to get some kind of result. But the fine negative prints like a dream without all this hocus pocus, and if we care to apply judiciously a few special techniques to it, the re-

sulting print will shine on the wall as if back-illuminated. We won't need any of the so-called 'creative' tarting up against which I had my rant in Ag magazine.

As I look around I see the four reactions writ large on the faces. Not the Fry's Five Boys, but the Photo Four Boys.

The first, a tiny minority, look comfortable. They know the system and feel at ease with it.

The second, another minority, are those who prefer to rubbish and dismiss what they don't understand or can't do. It's a sort of photographic xenophobia. 'Let's pretend I am superior, then I won't have to admit my ignorance'. Like xenophobes, they tend to be loudly outspoken and overbearing. We saw a good deal of the same thing among many senior business executives who insisted that their staff use PCs, indeed used IT efficiency to cut staff numbers, yet never had a VDU on their own desk and insisted on shorthand dictation to a secretary for frequently revised drafts.

With the photographic zone system xenophobe, expect to hear him speak disparagingly of zone system users as 'technical nerds', 'zone system techies', 'anoraks' or similar patronising clichés. The only trouble with these people suffering from a superiority complex is that when you actually see their pictures, you realise that they don't have the right to be patronising about anyone!

The third group of faces is another minority. On these shine disdain. "I am an artist", the faces silently shout, "and deigning to admit that craft skills can have any place in art would instantly destroy my psued status. Just let me find a new gimmick to cause shock, and I will be ecstatic".

Then there's the rest, the majority. The expressions on their faces hover somewhere between total bafflement, blind panic, and utter boredom.

When I ask, by a show of hands, how they decide what film speed to set on their camera when loading a film, the great majority of the group always let the cassette bar code set it for them on electronically controlled cameras, or they set it from the speed printed on the film box with older cameras. a few don't. They seem to uprate the speed. It seems macho somehow to do that. When I ask the group what negative development time they use, they say "what the maker prints in the instructions". When pressed, most admit to giving 'a little bit extra, just to be safe', which actually means, of course, giving 'a little bit extra just to make things worse'.

Most of the people in the Masterclass room, other than the few committed zone system users, it transpires, have no understanding at all of the link between subject brightness range, film speed, exposure, and development time, and that all these are variables. Many have spent

big money on the latest camera systems with 'deadly accurate' microchip controlled exposure systems (steadily more sophisticated ways of getting the exposure precisely wrong it seems sometimes).

The message comes back to me along these lines:

- I spent a lot of money on a camera that takes all the responsibility for exposure and focussing to leave me free to be more 'creative'.
- The Zone system was used 50 years ago by people like Ansel Adams, and he's dead now.
- It's old fashioned now that we are in the computer age – it's past its sell-by date – and we can do things better with new technology.

In fact, the zone system needn't be complicated at all to give a simple practical working method, but I can well understand people being either baffled by it or simply not wanting to pursue their photography through the precise measurements and tables of the more extreme zone system experts, no matter how exact they are.

Even so, the reality is that we can't choose to work without the zone system. It is simply what actually happens. The only questions are: 1. "Do I understand what is happening?" and 2. "Can I control what is happening to achieve the result I want?" Trying to pretend that it isn't happening is a little like a chef saying "I'm going to prepare a great dish, but I don't know how to cook and I can't be bothered to learn". Or perhaps a better comparison might be "I am going to prepare a gourmet meal, but I can't be bothered to learn how to cook it – I'll just pop a ready-made meal in the microwave".

Nevertheless, the reality is that, but for the tiny minority who love, understand and apply the whole zone system approach that puts them in control, the vast majority of monochrome photographers just don't want to struggle through the learning process. It's a turn off.

Yet how do we square that with the necessity to have a fine negative for a fine print. This letter came through my Workshop door in January.

"Dear Mr. Thornton, I went to my copy of 'Elements' and read the Technical Preface. I have listened to speakers on the zone system, and have read about it over the years and it is becoming more inaccessible with each attempt to understand it. Yet I know I need better negs." As the lady said in the letter "being a lady of mature years (old in years but very young at heart as it transpired) I feel time is at a premium, so I either give up photography or think laterally... what I need is a short cut".

That made a lot of sense to me. And if I could work out a practical short cut for her, it seemed to me that

there would be a lot more photographers out there who would value the method of avoiding all the zone system hassle, yet still get fine negatives.

When I thought about it, the answer was simple, and it is something I use daily as a monitoring device for my own and my clients' work without another thought. Yet instructing seminars and workshops with many participants constantly shows me how unaware photographers are of this powerful tool to achieve negatives that print like a dream. Indeed, the tool is routinely abused by those who should know much better.

What is this magic short cut tool?

The contact sheet.

"The contact sheet", I hear you respond. "I thought you were going to come up with something new and exciting". Actually, it's something old and exciting. The excitement comes from seeing for the first time in positive form whether the pictures we visualised at the time we pressed the button actually materialised. And that's just the problem. We become so involved with the subject matter of the pictures in each frame that we completely miss all the other priceless information the contact sheet contains, and the simple clear answers it provides to our problems without the hassle of zone system testing.

What normally happens when we get a contact sheet from 35 mm or medium format made at a commercial processor, or even when we print our own? There will often be different shots made at different exposures in different lighting conditions on the same roll. So that we can see the image content on as many frames as possible, we use the softest grade of paper, give it plenty of exposure, and we maybe pull the print a little if it starts to 'overcook'. Sure this sloppy method is economic for a commercial lab just wanting to push out as many contacts as it can in a day, and it makes it easier to see what's in each picture. But it completely loses vital information that would turn 'microwave man' into master chef.

Done correctly, what is known as a proper proof contact sheet will give us all the information we need, within the passage of a few films through the camera, to turn out delicious negatives virtually to the standards of the most obsessed zone system freak. Print quality will be transformed for many people.

So how does the contact sheet do this? We start from the simple basic fact that an area of any negative that is clear film base should print as black on paper. In other words, a part of a negative which received so little light through the lens during the exposure of the picture on this frame that, after film development, it shows no silver image at all we expect to be a black area in the resulting print. Note that we don't say it had no exposure to light, just so little that it did not result in any developed silver density at that point.

Even with no such silver density, the film base will have some small density – nothing is perfectly clear (even, or especially, when a politician claims to make it so!), and the process of film development additionally puts a very thin layer of fog unavoidably over the whole film surface. Therefore even the ‘clear’ area of a negative will have some density *i. e.* it will slightly reduce the intensity of a beam of light projected through it. That density is not surprisingly known as film base plus fog, and it varies between films and with different developers.

It’s a big thing for zone system workers because, whatever that density turns out to be with a film/developer combination, a figure of 0.1 log density more than film base plus fog is deemed in the zone system to equate to zone 1. Now, don’t get turned off because we have mentioned a number and the word ‘log’, because we don’t need to use these with our contact sheet system. Let’s just understand the importance of zone 1.

The literal foundation to a deep rich satisfying monochrome print with a sense of three dimensional depth, except one intentionally composed of high key light greys, is that it should have the mythical shadow detail. Note that it does not depend on having a ‘good black’ if that black is an unremitting area of unbroken smooth black – this destroys a three dimensional impression. The human eye finds it very difficult to discriminate differences between very dark greys compared to mid and light greys.

When we talk of shadow detail, what this means in a print is that areas in the shadow areas of the original scene that our eyes can see as different shades should be represented in the print as different very dark greys just discernibly different from black. For zone system workers, the first dark area of a scene to be visible in the print as a grey discernible from black is zone 1.

For such an area to print as a grey slightly but discernibly off black, it must have enough silver density in that part of the negative after development. How much is ‘enough’ density? The zone system, as I have said, arbitrarily sets this at a log figure of 0.1. But this is arbitrary. The actual figure will actually vary from user to user according to their camera and enlarging equipment, and their eyes’ sensitivity to subtle changes of near-black greys.

In any case, when we are making a print, and produce a test strip, we don’t read the blacks and greys with a densitometer. We eyeball it. Where it looks right, that’s the exposure we give. And that’s exactly how we use a proper proof contact sheet as practical tool. In fact, while it may seem less ‘scientific’ than densitometer readings, it is actually more so because the densitometer lulls us into a false sense of security that such precise numbers are correct, when we later ignore that numerical basis

by making prints by simple eyeballing.

So here’s what we do. If we give just enough exposure through the film base plus fog in contact with the actual make and grade of paper which we plan to use as standard that the paper, after a standard development time in our standard print developer, looks black to our eye, then we have given the ‘minimum time for maximum black’. In other words, if we give any less exposure, the blacks in the print will look visibly grey to our eye.

Note that though the phrase talks of ‘maximum black’, it will in fact be nowhere near any paper’s true maximum black. To achieve the absolute maximum black requires such overexposure that any negative would have its mid and light tones unacceptably darkened, and would have to be developed for so long – perhaps 8 minutes – that fog would begin to lower contrast and quality. No, when we use ‘maximum black’ in this catch phrase, we actually mean the first dark shade that your eyes accept as black.

If we give the whole of a roll of negatives in contact with our standard paper this minimum time for maximum black, then theoretically, in any picture on the roll, any area that we wanted to show as the very first hint of shadow detail should show as a dark grey that your eyes can see is different from the black. If you can’t see it as different, then the negative had too little exposure to give that dark area of the subject enough density after development to print as different from black. Most people are surprised at just how much density it takes in the negative before it will print as non-black. Just because you can see the image in the shadow parts of a negative on the light box, don’t just assume that it will print!

How do we find the minimum time for maximum black for our set up? Set up the contact frame on the enlarger base board, and adjust the enlarger head and focussing bellows so that the pool of projected light covers about four times the area of the frame. Put the frame in the centre of this pool of light. Stop down a couple of stops to get the most even lighting you can over the frame area.

Insert the film and paper in the frame, and make a test strip on your standard grade of paper. (That might be grade 2 for graded or 2½ for VC. Some people find thinner negatives and grade 3 better for 35 mm). But don’t make a test strip of the images themselves, use the clear film base plus fog of the film rebates. With 120, it is usually easy to place your test strip across the divisions between frames. With 35 mm, use the sprocketed edge. Sheet film users can use the edge too. Be careful with the ubiquitous and excellent Paterson contact frames – the transparent plastic overlay on the glass that grips the film edges has density and will result in a false test strip reading if you don’t move one strip of 35 mm

film out from under this plastic overlay so that it lies on the paper under clear glass only. Once the correct exposure is found, you will slot it back under the plastic for making the full contact sheet.

Choose a suitable time, perhaps two seconds, to use as test strip steps, or you can use f stop fractional divisions for constant density changes if your timer has the facility. Make the test strip of the clear film base plus fog. Develop, stop, fix, and wash in a completely standardised way that matches your normal working routine. With RC papers, and working at the shadow end, dry down isn't an issue, but it is easier to view and judge a dry test strip, so you might want to do that for this exercise.

Now examine the test strip under the same viewing light you would use for assessing the test strips of actual prints (which should, incidentally, match the light under which they will be displayed). You are looking for the first step in the test strip which appears black *i. e.* you will not be able to discern the next step as different from it.

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The first step which reaches black may not be easily apparent, especially if your test strip steps were fairly finely spaced in exposure time terms. You have to train yourself not to look at the pictures next to the clear film. The test strip step lines which run across the picture frames can be translated by the eye into a line across the edge black area which is not actually there. The ability to see or not see the sprocket holes helps with 35 mm, but with all formats covering the picture areas with a couple of sheets of white paper helps to clarify the decision about the correct minimum time for maximum black. I also find it helps sometimes to view the test strip with transmitted light for a few moments on top of a light box, then switch off and decide under normal reflected light. However, make your decision with your own eyes.

Once you have decided what this is, you have a standard time which you can apply with this film/developer/paper set up. Mark the enlarger column/ focusing bellows position so you can return to it. Note that if you ever change anything in this standard line-up (*e. g.* a new box of paper) you will need to do a new test strip.

Now using this minimum time for maximum black exposure, make your full contact sheet processed in the standard way. Be careful how you give the exposure. If,

say, you found the time on the test strip to be 5 two second steps, do not give a ten second contact sheet exposure. This will give significantly greater exposure. Give the same 5 two second bursts of light. Process as standard. When the contact sheet is washed and dried, examine it under the same viewing light.

Let's first look at the overall sheet rather than individual pictures. What we are looking for first is the shadow detail *i. e.* are the darkest areas in the pictures generally where we wanted to see some detail just discernibly different from black? School yourself - ignore the middle and high tones at this stage.

If the shadows are mainly all black when there should be some detail, you have generally underexposed the negatives. This means the film speed is wrong for your technique and equipment. If the shadows are very dark you may be using a film speed double or even more what it should be *i. e.* 1 to $1\frac{1}{2}$ stops out. This means that a film nominally of EI 400 should actually be re-rated at 200 or 160. If the shadow darkness is less marked, your true film speed may be only 50% = $\frac{1}{2}$ stop out, say EI 250.

If generally the shadow detail is too light, you would need to make the opposite corrections. This would be extremely rare in my experience. Most people carrying out this test for the first time find they need to drop their film speed rating by about 1 stop.

If the shadow detail is generally OK, but there are just a few shots where it is low or missing, this means that your film speed rating is actually OK, but that your metering technique is letting you down in the particular circumstances of the defective pictures. Often this will be down to including a lot of sky in the metered area of the picture, or to a scene with an exceptionally high subject brightness range – that's one where the difference between the brightest part of the scene and darkest part of the scene pictured are especially great. This might be with harsh directional sunlight and deep shadows outside, or an interior scene with an external window in shot for instance. Just by looking at the 'failed' exposure pictures you very easily and quickly learn the type of scene where you will need to intervene and correct metered exposure, and by how much. Usually that means taking an exposure reading of the darkest area in which we want to see full textured detail – for instance the grass in the sharp-edged shadow cast obliquely by a rock or tree – then stopping down 2 stops from the reading given. Zone system aficionados would tell you that's the equivalent of placing that area of the scene on zone III.

Now let's ignore the shadows and look at the highlights. There's an old photographic catch phrase 'expose for the shadows and develop for the highlights'. Most people have heard it but many don't know what it actu-

ally means. The following is an over-simplification, but it will serve for the sake of clarity. The film density that was needed to show that shadow detail as just different from black is purely the function of the amount of exposure given to the negative, and is virtually unaffected by film development time. The highlight density of the negative, *i. e.* the darkest heaviest parts of the negative, are controlled almost solely by the development time.

Imagine that you were hanging a curtain on a rail. Getting the first hook on to the first fixed ring at the start of the rail is the equivalent of exposing enough to place the shadow detail just above black. Now all the other hooks are placed into the rings lined up next to the first fixed ring. These are all the other greys from dark, through mid, to light in sequence. This is what happens at the very start of development. As development proceeds, the curtain gets drawn along the rail gradually spreading out the rings until the furthest hook and ring, the equivalent of the negatives densest highlight, reaches the end of the rail.

This is the equivalent of the negative's brightest highlight becoming so dense that if it were given the same minimum time for maximum black exposure to paper on our contact sheet, it would print as pure paper base white – just. Any less development would allow it to pass just enough light to show on the print as a light grey only just discernible from white.

Of course if we were to continue drawing the curtain further, that is to continue developing the negatives, more and more of the hooks/rings would stack up at the white end of the rail. Effectively, this would mean that areas in the pictures that we expected to see as different light greys – clouds in a landscape for instance – would all get bunched up with the furthest white hook/ring, and thus simply print as the same blank white. We term this 'burned out' highlights.

If we try to rectify this by burning in the area in the subsequent print, or by switching to a lower contrast paper, the highlights will print, but the hooks/rings are still all pressed together resulting in a virtually flat light grey area with virtually no separation between the light grey tones as we saw them in the original scene. Additionally, such areas are inevitably mottled and over-grainy in comparison with a negative where the curtain was drawn – the negative was developed – just enough to place the very brightest highlight on white while leaving the other rings/hooks spaced out along the rail. If we for some reason underdevelop – don't draw the curtain far enough for the furthest hook/ring to reach white – the problem is much less. By stepping up contrast grade of paper, we can make that furthest hook/ring reach white, but the other light grey hooks/rings will still all be spread out. So when printed they will still show

separation and smooth graduation. Grain will be less, even on the harder paper, and sharpness will be higher.

As I said this is an over simplification for clarity's sake, but it is essentially what happens.

As we look at the contact sheet generally now examining the highlights, we look to see if the areas that we expected to see as light greys just different from white do in fact show like that. If, generally, they are actually pure white, it meant we developed the film too much. If, generally, there aren't pure whites where there should be – the brightest highlights are too dark a grey – it means we underdeveloped.

Underdevelopment can be apparent in, for instance, studio portraits with soft box and reflector lighting. But my experience with thousands of customer orders for prints is that the vast majority of negatives have been over developed quite significantly. When contacted, the clients tell me that they have simply followed the manufacturer's development times. It is almost universal that times need to be cut back, and substantially. There could be many reasons for this. One of them is that photographers like to take pictures of scenes that exhibit a far greater subject brightness range than the film/developer maker sets as normal.

So let's look again at our contact sheet's highlight regions. It may be that generally the highlights are not burned out, but that they are on just a few frames. If we look at these frames, we can soon see what sort of lighting conditions gave the over-wide subject brightness range where we need to reduce development. It is surprisingly easy to begin to recognise these subjects automatically and instinctively when in the field with the camera.

So what do we do when we know that we have just a few such high contrast frames on a roll when the rest are of normal contrast? The rule is to reduce development to match the most contrasty shot on the roll (use of two bath and tanning/staining developers such as my own DiXactolTM help too). Remember, once the highlight curtain rings/hooks are squashed together, they stay like that. If they aren't drawn far enough on some frames, we can always step up the paper's contrast to push them up to the end of the rail = proper brightness in the print.

Remember earlier I mentioned "expose for the shadows, develop for the highlights", and said that exposure solely controlled the shadows, while development solely controlled the highlights? Well, I told lies. But they were white lies. The claim is basically true, but it needs to be a little flexible. Development time has a much greater effect on the highlights than the shadows, but it does have some effect on the shadows.

Most people using this contact sheet control system

will find initially that they need to cut their development times. You do this by a simple trial and error system. For all films other than T-Max, start with a 20% development time cut (10% for T-Max), but reduce your film speed from your normal rating by 1/2 stop for each 20% (10% T-Max) development cut you make. Within 2 or 3 films with your contact sheet monitoring you will have homed in on the right speed rating and development time for your film with your technique and equipment.

Note that as you reduce the development time, you may find that the film base plus fog density may reduce, and you may need to retest to find a new minimum time for maximum black contact exposure, but this should only occur if you are making large development time reductions. Don't be afraid though if you do find yourself making big development time reductions. It is not uncommon to find 30–40% reductions for some people.

That's it really. That's all you need to do to obviate all this zone system stuff. It's a lot quicker to do than describe. Setting it up in the first place is simple and quick. After that, since we all make contact sheets, or should, there is no extra work involved. Any unannounced changes to film, developer, paper etc. by manufacturers (no, they wouldn't do that would they!) are immediately apparent. Bracketing, beloved of both camera and film manufacturers, who see us wear out our camera three times faster, and use three times as much film, is a thing of the past. We feel in control and know what we are doing and why. The confidence shows in our pictures, and the negatives print like a dream without the over-hyped black arts of the printer. We emerge from our dark room satisfied and inspired instead of frustrated.

It can't really be that easy, can it?

Well, no actually.

At this very moment, zone system zealots are preparing to plunge their knives, edges glinting with zone XII specular highlights into this contact sheet system triumphant at discovering its key flaw. It's quite simply that it is a contact, not a projection print. You see once we put a negative in the carrier and project it through the enlarger lens it gains contrast compared to a contact sheet by the so called Callier effect – right?

Er, no.

In fact, with today's preponderance of colour and VC enlarger heads using a light mixing box and diffusion, the difference in contrast between the contact and the projection print is insignificant. You can safely ignore it. Any tiny differences can swiftly and easily be corrected by a tiny tweak of the contrast grade of paper.

With the few condenser heads in use today, it is true to say that there is a big contrast difference between contact and projection print – typically one paper contrast grade. Still, that's not much of a problem. We simply

allow for it in contacting. If our normal grade for actual printing is, say, 2 we simply contact at grade 3. It won't be exact, but it will be that close that the difference won't matter. If in doubt always reduce development a little, remember. Within 2 or 3 films contacted then printed, you will be able to tweak the grade at which you contact, or simply get to know the kind of look a contact has on grade 3 that will projection print well on grade 2.

Of course, all this imprecision will be anathema to zone system zealots who insist on the exactitude of densitometer readings. They fool themselves. There is an inherent imprecision in selection of areas to meter in an original scene; in the necessity to work in, usually, 1/2 stop steps; processing temperature control and water quality variations, among a host of other variables.

I use and value the zone system, but am not blind to its limitations. In practice, for the average photographer, the contact system works really well. Try it.

by Barry Thornton¹ (†2003)

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