

Quality in the artistic field or: Technical achievements and their aesthetic consequences

Lecture by Rolf Coulanges BVK, translated by Herman Verschuur.

Is there a digital look as a new aesthetic value emerging?

I ask myself this question, what recording technique I want to use when I prepare for a new film given the challenges I am facing in this project. I will restrict myself in this lecture to the question of recording techniques. For Postproduction which is by now a full part of the image control I will need another lecture.

Everybody asks himself the question what is the scientific-technical concept for the best reproduction of a scene or an image. I would at the contrary ask myself; how efficient is this reproduction for the composition of our awareness, of our senses. This question has become the big overall issue, because now all steps in the creation of an image or scene has become an inseparable unity between Camera and Postproduction and sometimes even simultaneously. This way every retrospective correction or change gets impossible under specific conditions.

Immanuel Kant, the great thinker of the Enlightenment, to whose heritage we all like to be part of,⁰³ has regarded aesthetics as an elementary component of our perception and his science of the cognitive ability of humanity as a base. He called the Aesthetic „The science of the rules of sensibility in general at all“ and described his extraordinary meaning for the structure of knowledge in the following manner:

„*The Physical Sensation* is the receptivity, our ability to sense objects and receive them as **Perception**.“¹⁾ Objects, that trigger sensations in us are picked up, because they grab and touch us (a film frame is for example such an object). Our senses only react to what is facing us directly. Emotions and feelings are therefore not opposing aesthetics. The senses are the only ones that give us **reflections**, which are the base for our emotions and can justify the findings through which we can come to our ability to judge. **Space** and **time** are for example elementary forms of notion, without it people would not be able to either imagine a three dimensional space nor time in which it exists. Space and time are dimensions in which our awareness and experience happens, and in which images come alive and movies take place. View as base for all knowledge comes directly from our sensuality; aesthetics - The judgement of taste as Kant names it too - describes basically the cohesion of experiences through our senses. **Aesthetics are therefore an experience with matter itself**. It is not a science of beauty or exaltation. Since Kant it is accepted in modern philosophy as a central importance of perception and knowledge of our world.

After Kant's definition my question about the digital look as a new aesthetic value is then also wrongly put. Since the **digital look itself is a medium**. Fully and with all its structures. The aesthetics that create the image originates from the material and cannot be seen apart; both build a harmony in the observation of the eyes and bring us to this level.

My question should be different: Does the digital image in its own form of existence creates a new appearance in the way we create our images, one that will lead to a changed aesthetic in cinematography? Has the digitalization of the image created new styles, or will we see new signatures from cinematographers?

The development of digital cinematography has been focused from the start on technology, which at best shows a preferred realistic illustration. That is more or less the maximum that can be achieved. All technological developments that are created in this context deal with the elimination of artefacts in the

image that could disturb a realistic presentation of the image. From a technical point of view this makes totally sense, this is perhaps even the only comprehensible approach to develop a new technology. Looking at the many problems to be solved – just the transition from 3-chip technology to camera's with a single sensor in Super35 format has risen fully new, till now unknown questions – this has created an enormous competition in research between the different manufacturers of digital camera's.

Which one of these cameras have true colours, most detail and a high image contrast in the transmitted image specifications. In short, a potential equivalent of a realistic image. Since these goals have almost been reached at a number of camera types, the cinematographers start to find and search techniques how this digital near-perfection can be reduced or at least be controlled. Old optics, sometimes without coating and guaranteed with flares and rich chromatic aberrations counteract the whole research effort for the perfect image, just to create in the eyes of the cinematographer a much more perfect image. The appearance of an image plane in which all potential mistakes and disturbances of a real image are eliminated, since they are not allowed by the algorithms of the image calculation program, appears not to have developed its own aesthetic ideal till now. I explicitly don't mean the attempts, with appropriate Look Up Tables (LUT) a correction of colours, contrast or creating the general colour and light mood in the image. For me this is about the general appearance of the digital image, just like we would distinguish the characteristics of the different film emulsions in the produced images. Till now we spoke about this or that camera, who's image is more natural, the skin tones more precise and their possibilities to transfer a true to nature contrast in a better way. We don't speak about camera's who's images creates a special artistic value or makes these possible. Who uses today the special structure of the digital image really as personally signature? I saw the first signs of those images mainly in science-fiction movies – with a futuristic vision – or in historical movies with a view to the past. But today in our time, which highlights the significance of digitalisation in all fields, I have till now found very few images that give the new medium an independent expression. The question of the special aesthetics of the digital image I would like to put in this lecture as a discussion and to stimulate the thoughts I show you some films tills – partly shot digital, partly shot on film. Think about the differences...

1) Immanuel Kant: *Kritik der reinen Vernunft. Transzendente Elementarlehre. Erster Teil: Die transzendente Ästhetik.* Hamburg: Felix Meiner 1956, S. 63ff (*The Critique of Pure Reason, Transcendental Doctrine of Elements, first part: Transcendental Aesthetic*).



1. Sequence MEMENTO [0'50] Christopher Nolan 2000 C: Wally Pfister, Panavision 35mm CS 1 :2.35



2. Sequence LIFE OF PI [1'26] Ang Lee 2012 C: Claudio Miranda, Alexa ARRIRAW, Master 2K

Abstraction as artistic method – does this apply in the digital world?

Digital images have the tendency, much more than classic photography, to become realistic as we capture it. This is because of the technical possibilities of manufacturing and reproducing an error-free image today, which is much more advanced now than for example when colour photography was developed. It obviously does not involve the representation of the features of nature in the most fantastic way. We all know the classic colourful image in the bedroom of our grandparents of an autumn forest with a deer in the foreground. Where the painter has taken an infinite effort to produce a precise and realistic representation of every single detail of nature's depiction. Nevertheless, we find it beautiful, because the image concentrates on details as highest perfection, but for the rest forgets about the goal of its message – if it even had one - .

When you look closer at colourfulness, it is not a standard and no evidence for authenticity of a realistic image. Black and White images – just think about the pictures of wars in the past – are experienced just as real as colour pictures. The horror that they evoke is the same. In both cases, it is about the abstraction of the event through the image, also colour can be misleading and lead to a certain abstraction of the image. The exact colour reproduction is definitely very important for skin tones, but altogether it seems to me that colour with all its complicated reproduction policy today became to obtain an objective of unrealistic expressions in the digital image. Extracting the essence from the visual material, the abstraction of overabundance of details has proved the right way alongside other art forms like painting, to concentrate on the essence of artistic ideas. But the tendency for true-to-nature images is counter-effective to this. Since abstraction is all about artistic principles, it does not evolve out of the characteristic of the medium, but out of the search for simplicity and clarity of expression in its form. We need image technology that visually supports the cinematographers in the abstraction of portrayal. I don't mean that the poor resolution, uncontrolled artefacts, oblique colours or the look of an 8mm film blow-up can support us for this purpose. I don't relish in the out-of-focus of a casual film image, these out-of-focus images are also disturbing me while shooting with bad optics and black and white film, which have not seen any improvement for many years. Perhaps an authentic special-made picture at the illustration can help simplified, abstracted forms and structures. Something totally different is decisive. That the mechanisms that result in the image, together with the algorithms and the executing computing processes

allow possible unstructured, unknown, irregular, structures in the image and not analyse them as alleged errors and eliminate them. And here emerges a new question: How advanced is the delicate calculation process of the digital image – let's take for example the complex process of debayering – by now on the paradigm of **probability** and **renown** of certain pixels and is it influenced by them? The method of abstraction in Art has the goal to allow for unknown, irregular, unsmooth one single creative and distinctive moment or to utilize, create it. That may also be part of the objectives in further development of digital cinematography indeed, but the processing information of the image of a camera points by definition, whose application possibilities should be as widely diverse as possible, on many simultaneously existing options.

With film emulsions you had little possibilities for specific control of the recorded image structure. It was per se consistent and due to the structure of randomly shaped film grain as accidental and physical hard to manipulate. The structure of the image was only controlled by the choice of film stock and some specific laboratory processes like ENR-silver retention, Bleach by-pass, Flashing. On the other hand these film emulsions had the experience of the last 50 years of photography in them; it came to the audience with a specific image structure and colour design on the white screen. Today all of us work mostly with the same camera, and all modifications of the image are executed through parameters of the camera's technical systems and its self imposed limits. What looked at first glance like a limitless variety of options; shows on closer inspection that exactly those functions are subject, with their pre-defined logic in data processing to the transformation that represents the colours and contrast which provide an indeterminate impression of the appearing image.



3. Sequence DAS WEISSE BAND [The White Ribbon, 2'04] Michael Haneke 2009 C: Christian Berger
S35mm 3-perf 1:1.85



4. Sequence L'ANNÉE DERNIÈRE À MARIENBAD 3 [Last Year in Marienbad, 1'30] Alain Resnais 1961
C: Sacha Vierny 35mm CS 1:2.35

More details, higher resolution – is this the road for the development of fine arts?

Is the creation of our images which we want to express ourselves with, helped by enhanced resolution of the sensor and the reproduction of more detail in the resulting image? From the presentation that I showed you it should be clear by now that the increase of this parameter on its own does not give much added value. If you look at it like that then it serves nothing else than an increase of a pseudo realistic impression, which we don't want in most cases anyway. I really think that the increase of picture quality can be an important tool in the hand of the image maker, but only when it's used to translate his/her artistic aims through better control over all image design elements. The focus on their own visual language that is always accompanied with a reduction and selection of the photographic material sets the foundation for a move towards a personal signature as expression of their own purest vision. It is clear that the cinematographers are certainly not helped by a blurred or poorly defined image, and it has to be obvious that the abundance of detail on its self is no value in achieving certain artistic goals. The precept of simplification in the visual concept is taking place for us from painting to photography towards film and has first of all not so much to do with the permanent struggle of the increase of image details. We don't want today, what Lars von Trier once did, to reduce our recording medium to 8mm which then was blown up to Cinemascope. This can lead to a successful abstraction, but won't function anymore today because the process ends in an ample fixed look. Therefore the artistic freedom, the abstraction of the image more restricts then enables. It is not the technical restriction that I want to speak about; it's about the automatism in which the increase of image resolution is seen as the most important improvement for the quality of a camera, that is the subject of a concrete detailed observation.

1. Painting: DER ASTRONOM [The astronomer] Jan Vermeer, Delft 1668



L'Astronome Delft 1668

While the details of the earth globe and the items on the table are painted in all its richness of detail, the body and face of the astronomer look as if slightly abstracted through a diffuser.

Very faint yellow light, that only shows in the highlights on the paper and merges in white.

Interesting desaturation of the warm colours as contrast effect. In the face – on the cheek and next to the nose – there is a rare reddish, as skin tone unnatural light. The same red we will find (weaker) on both back sides of the hands

The painter Johan Vermeer has in his painting THE ASTRONOMER, painted in delft 1668 already used in his age out of focus as part of abstraction in the wealth of detail; something that we have rediscovered in the 20th century through the development of cinematography. This we could use now with Super 35 sensors in digital cine cameras, as an important factor for the film language of movies. Not the astronomer and his face are what matters to Vermeer, but the relation to the earth globe, which embodies the revolutionary vision in this image and does focuses subtle the eye of the viewer. He achieves this through putting the face and arm of the protagonist slight out of focus and position the earth globe in the focus of the picture. For this scene, if you would stage it in a film, you would need the highest resolution in recording technique available but at the same time the out of focus capability to achieve the effect.

2. Painting: SOUVENIR DE MORTEFONTAINE [Recollection of Mortefontaine] Camille Corot 1864



Souvenir de Mortefontaine 1864

The French painter Camille Corot has painted 200 years after Vermeer *SOUVENIR DE MORTEFONTAINE* (1864); his touch seems to anticipate on a method of impressionist painting and has made the retraction of detail his style-forming principle of his work. Especially the most precise representation of details, that in this occasion would mean the death of the artistic vision in this image, shows that guidance in details work. With schemes instead of totality and with a sensitive light mood and little contrast instead of a striking representation of the wonderful, light-filled place. Interestingly enough Corot owned a collection of landscape photographs, with all its technical limitations at that time, these showed a characteristic definition loss for technical reasons, Corot was possibly excited by this in his work. Wherever the vision came from – the softness and abstraction of the detail accuracy are basic elements in these paintings and a starting point of the great effect it had on many other painters.

3. Painting: NIGHTHAWKS Edward Hopper 1942



Nighthawks 1942

Also in modern art we can find this style: Edward Hopper's famous painting *NIGHTHAWKS* from 1942 achieves this particular effect first of all by the abstraction of detail in the chosen lighting and colour distinctions, in favour of almost combined monochrome appearing colour surfaces. He chooses the simplification of details (for instance at the coffee machine) and deduction of nuances in the many surfaces that emerge from varying light to favour a concentration on some highly saturated primary colours. They structure the image graphically and divide them in almost monochrome blocks; this is the road to abstraction that Hopper chooses for his picture. The displayed image is never not defined or even arbitrarily. In contrast of the blind surfaces of the walls and the bar, the painter stays with sensitively emphasized depiction on the faces of the pair, which he achieves through a fine detail rendition. Abstraction, applied for both this painting as for photography, does not imply poor resolution or lack of attention to detail. This is especially visible in the lighting of this image, that Edward Hopper specially emphasized: The faces of the couple come alive through intense sculpted contrasts. And even in the window of the business on the opposite side of the street, the light with its characteristic shadows are still accurately painted. The light plays an important role in the artistic abstraction; we find this significance equally in photography. Therefore we need camera's that are not only able to capture high contrast but also fine details in lighting.

4. Painting: [PORTRAIT VON TITUS, SOHN DES REMBRANDT \[Portrait of Titus\]](#) Rembrandt van Rijn 1662



Portrait de Titus, fils de Rembrandt 1662

As a summary in my chapter about abstraction I would like to show you a picture that has all these elements combined: it's the portrait that Rembrandt van Rijn painted of his son Titus. The hair of his son is painted with only very little detail in his hair; completeness is avoided. It is left to the imagination of the viewer. Rembrandt avoids also the depiction of the surrounded space; it remains suggested, but in such a way that the focus of the viewer is not distracted by the background. The face itself is very softly illustrated. The painter doesn't lose himself in details. The power of the image moves from the angle of lighting, it comes full of power from the side causing a high contrast and sculpts around the face. In the foreground we find Rembrandt's special style of working with light and shadows. The abstraction of details, the simplification of less important parts in the image and the expression of light give the face a great presence and provide the image with a suggestive effect for the viewer. The reproduction of natural light is the decisive element, with which help; the other used techniques by the painter in this image keep their appropriate presence. With these different examples I want to explain that focus and resolution are not every time and everywhere the appropriate criteria for the quality of an image. Because the wealth of detail in an image has only limited meaning for the artistic expression. On the other hand the rendition of light comes for every artistic style as a decisive importance. Also in the last couple of years when probably the most substantial progress has been made, but in case of producing the visual diversity of natural light in the way our eye experiences this, we are still a very long way off.

Digital images and the question of its authenticity.

Digital images are not authentic and cannot be, due to the transformation process that takes place between the physical working of light that hits the sensor and the pattern of photo cells that distribute the colours of the image to the big screen. The algorithms that are used in this process are developed to the highest standard available in science today. But this decision is still based on, with the best knowledge and experience of the engineers, what element from the recording is merged with which pixel and what value is given to it in the constructed image. The quality of the image is therefore highly dependant on the available computing power, which is necessary to be able to include the largest possible parameter around the respective photo cell in the reconstruction of the image together with other pixels. Such an image cannot be, since it is easily influenced, an authentic image. It can have the quality, to get close „to reality“. Higher image detail at best deludes more authenticity – the basic characteristic of the method of image building is not becoming different because of a higher resolution, just more perfect. The wealth of detail boosts the tendency that digital images are believed to be more true to nature.



5. Sequence DIE ANDERE HEIMAT 2 [Home from Home: Chronicle of a Vision, 1'57] Edgar Reitz 2013
C: Gernot Roll Alexa 1:2.39 Hawk V-Lite Anamorphic Lenses

Does the dramaturgy of our images need more technical vision for Cinematography?

Artistic decisions in cinematography are always connected with the control of technical developments. Both have a close interrelation to each other. In the history of cinematography we have learned that not only visual ideas have triggered the search for suitable technologies, but the scientific research reversely has in the area of film technology as well; with its discoveries and developments it also allowed new styles, genres and ideas. A crucial requirement for this correlation is that the camera as a technical device allows the widest possible access and greatest flexibility in the realisation of creative moments. It should give access to relevant parameters for the image and their activity should be as transparent as possible.

Modern camera technology today gives us great diversity in production labour, as long as the time required for creative work, like placing the lights is available; but with the digital camera's we can also

decide more and more in post-production. With camera and optics we look for the best technique to implement a certain idea or signature for a whole movie. But the correct brush is still determined by the right stroke with it, with which the colour is brought to the canvas. The painter finds the right brush among many others, but also the paint just comes out of the tube as a raw material, without skill there is no picture. With these materials the painter makes them his tools, hence the request from camera people for transparency in the controls of the camera. To make faster and more precise artistic decisions when creating images.

Cinematography is translated as: writing of movement – the cinematographer is a movement writer. But cinematography in the Greek origin of the word does not refer to the mechanic of the device but to the holding of an inner motion and write down the emotion or thought. To follow such a motion with the camera and make it visible means, to obtain the expression of the image in the same fashion on the set as well as in Postproduction.

More and more productions will be delivered in the future on RAW, since this working process is a clear quality improvement and above all allows us a detailed access to the digital image. This process that you can compare with the handling of the latent image in the laboratory is chosen because of the enhanced possibilities for creating an image. Assumed that the lighting on set corresponds with the scene that the cinematographer has developed for his visual signature. Even more than in the latent image we desire with this recording technique a real latitude for shaping and saving all photographic components of the image, like focus, the creation of colours, the limits of the contrast range, the spectrum of the image, shadow detail and the lighting of the scene.

In the film negative the essential characteristics of the image, has its colour reproduction and contrast range fixed in it, and when the lab did its work correctly, you would be sure that the „best light“ of the image looked the way the cinematographer intended it on set. This has changed enormously because of the digitalisation. Where the emulsions could fall back entirely on 50 years of experience in colour and sensitivity of photosensitive layers and did so with the development of new materials, the digital image development offers us many individual decisions. In the process of debayering a certain compromise is decided between natural out of focus in the sensor image and electronic necessary processing of bright and dark structures. It is all about producing the most detailed image as possible, with as few distracting artefacts as possible in the electronic reconstruction of the image. Sharpness as result of this compromise is in the digital process changeable with the appropriate settings. This gives us the possibility, to have the transitions between the bright and dark details in the image correspond as good as possible with the quality of observation of the eye. Furthermore this is to translate colour information from the camera to the colour space of the following post production equipment. With what conversion process can I translate the colour information of the sensor to the colour space of the screen or monitor? Here we find the biggest problems when digital images are created. Also when it involves linear transformation features, many other additional surrounding conditions play a role that you have to take into account. All these factors together will decide finally on the quality of the colour.

The decisive process that we talk about here, is the process of debayering. Since this is possibly the most complicated process at the development of Raw data, it gives often varying results when using different post-production facilities. Every studio or manufacturer of relevant software still believes that they themselves have the best solution for debayering. Even when Arri, Sony and other manufacturers of digital cine cameras give the specific software development tools at your disposal, there still will be different results in the image development. To bring the responsibility of cinematographers for their images till the final stage in post production and at the same time improve the image development with raw data as overall workflow. With this in mind I think we require the development of a reference system, that places reference images in the camera in the form of *reference samples* and send together with the RAW image data to the post production facility. The *reference sample* has to be generated based on the settings of the camera together and simultaneously with the image data, so it is readable in the digital

master. This reference image could in an extended version be open for additional modifications by the cinematographer through calibrated specifications in the camera. This way his/her photographic concept is totally clear for the Colorist and stays comprehensible in all further steps in post production up to the completion of the Master. In film production we had this already, when back then the LAD in the roll of negative during development and in positive the printing process documented, you could with integrated reference samples in the data workflow make debayering as part of the image development and mapping as transfer of colour in different colour spaces as a total process understandable. Parallel to this, the camera manufacturers should make the architecture of their camera's more transparent for the cinematographer's and give them the possibilities of image influence, which is very important in the need for a artistic quality of the image (for example the focus control in debayering). In a special user-mode could all changes in the metadata that the user intends for the workflow made in the preset settings be saved, so that errors can be made visible and be reversed. There is a confidentially expressed fear that cinematographers because of undisciplined shifting on sensible settings of the image development and grading could provoke a chaos in the created image. With one glance at the many extraordinary ways that they today have gone successfully in cinematography, this is not a real argument against it anymore. Since a part of the earlier film laboratory is now integrated in the camera, new professions like the DIT (Digital Image Technician) have taken over this task and make competent decisions on the set possible. However pre-grading on set seems to me the proper way for a stronger influence of the cinematographer on the working process, or for the judgement of the artistic quality of its images. Then latest with a 4K resolution image, all decisions of the debayer process and grading have to be made in the calibrated projection of the laboratory. Fine, but unfortunately too small and rarely calibrated monitors on the set can lead to serious wrong decisions.

In the question of quality of artistic conversions in the digital era I certainly see basic social conditions as well, who next to the reflections on improvement of the manufacturing processes maintains to influence the cinematographer on their work:

The quality of today's high resolution images is, when you take the criteria of technical reproduction of our era, that they should always comply with the need of permanent revision of necessity to a partial simplification. To be able to stay compatible with constantly changing systems.

Inevitably this approach always leads to processed surfaces: consistently perfect, amazing in its uniformity and style setting. The clearly appalling looking structure of the flawless electronical image now unmistakably stands on the big screen sometimes. This is actually the new threat of digital cinema and its perception: to create a visual style principle that **only from technical necessities** arises and nevertheless dominates the aesthetic values.

Two years ago I said at this location: Given the attention that those images raise worldwide, you can say today: Yes, there exists a specific digital reception. After my today presented examination of the artistic quality of movie images I would at least don't leave it here for digital cinematography. Camera's and projectors have made considerable steps forward, but what it clearly lacks at the moment is the reliability of the artistic quality in duplication of image development and the individual access to it's design. We need a reference system for all participants in the production process of the image that allows decisions directly related to the work of the cinematographer on the set.



6. Sequence L'ANNÉE DERNIÈRE À MARIENBAD 4 [Last Year in Marienbad, 1'14] Alain Resnais 1961
C: Sacha Vierny 35mm 1:2.35



7. Sequence BARFLY [2'15] Barbet Schroeder 1987 C: Robby Müller 35mm 1 :1.85

The physical energy of designed light – how is the mood in Digital projection?

The quality of an image for cinematographers means most then other named factors the renewed encounter with the power of light, salvaged in digital projection from its initial impact on the photo cells in the camera. How much does the character of light changes and its impact in this new process of technical transformation?

Do the emerged pixels still embody the original energy of light? What does the materiality of light mean in the digital projected image and how does it possibly change the basic mechanisms of our sensory awareness, that we only know as a result, or synthesis of our vision?

With a view, that may touch us, but maybe not?

How do we define this visual matter called light, after the physical reaction of light on film material and its direct visual image in cinema is replaced by a new technology? In physics, light is described on one end as electro magnetic energy, and on the other end as a flow of light quanta, or photons that are the ingredients of this magnetic energy. With the wavelength of radiation that takes place there is a specific stimulation of the eye that leads to the sensation of colours. But what has happened to this energy that has hit the sensor with photon flows and is transformed into an electric energy? Is it lost in the debayering process? Or does it enter the process as an energy? Does it return through calculated pixels back on the screen and into our eyes? The translation of natural light in the projectors could be a crucial topic that decides on the quality of the images.

The emotion of clinical clean images that we often connect to images produced through photo cells seems to come out of a static, non-active structure of light energy in the projected image.

Or reversed: the perceived lively movie image appears to get its power from the unpredictability of light energy in the silver image – it cannot be calculated. The energetic perception of the eye does not let itself calculate as well – we just don't know exactly what the eye brings, since it's mode of operation not exactly corresponds to our RGB model. We only know what originates in the synthesis of our perception from the signals of our sight.

Apparently it is not the computability of the impression that concerns and moves us, but its changes in the structure of time. In short: Light as an element of permanent and unpredictable renewal. But sensors and debayering processes have to be *qua naturam* computable structures – only by their computability they will accomplish their functionality. But don't they eliminate the structure of unpredictability with this necessary characteristic, whilst they are only capable to work within the limits of causality? The unpredictability appears at this moment the antithesis of science, but scientists themselves know, that probability in science as a basic element is inherent.

What I am interested in, is the unplanned change of physics that escapes the scientific calculations, but does determine our attraction. The key question is: how open are digital systems for this and how much prepared to incorporate random and uncalculated colours and movements. Is the digital faster-higher-further perhaps the wrong way, so that our findings for photography can lead to motionlessness, to a digital standstill?

Translation: Herman Verschuur

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