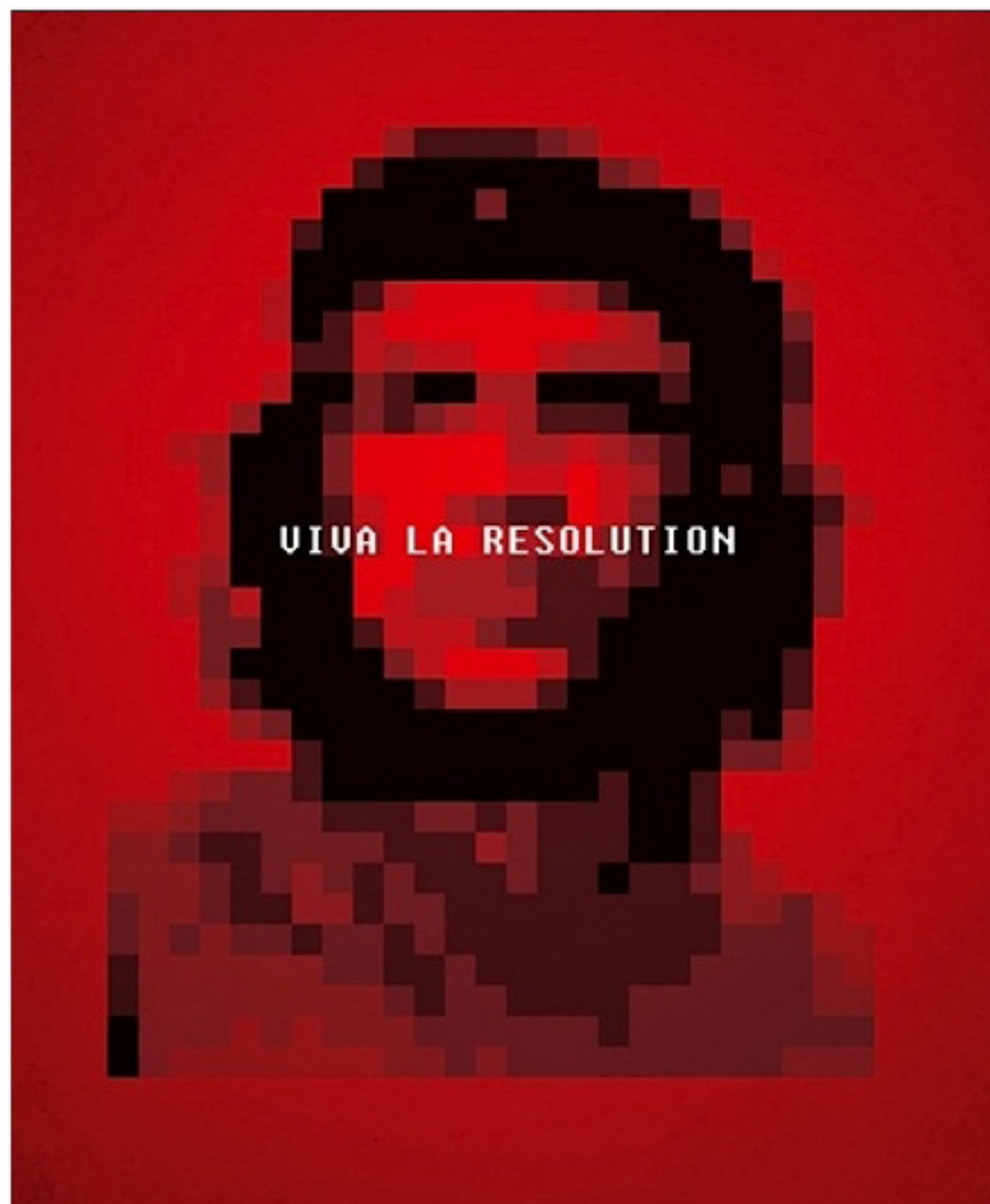
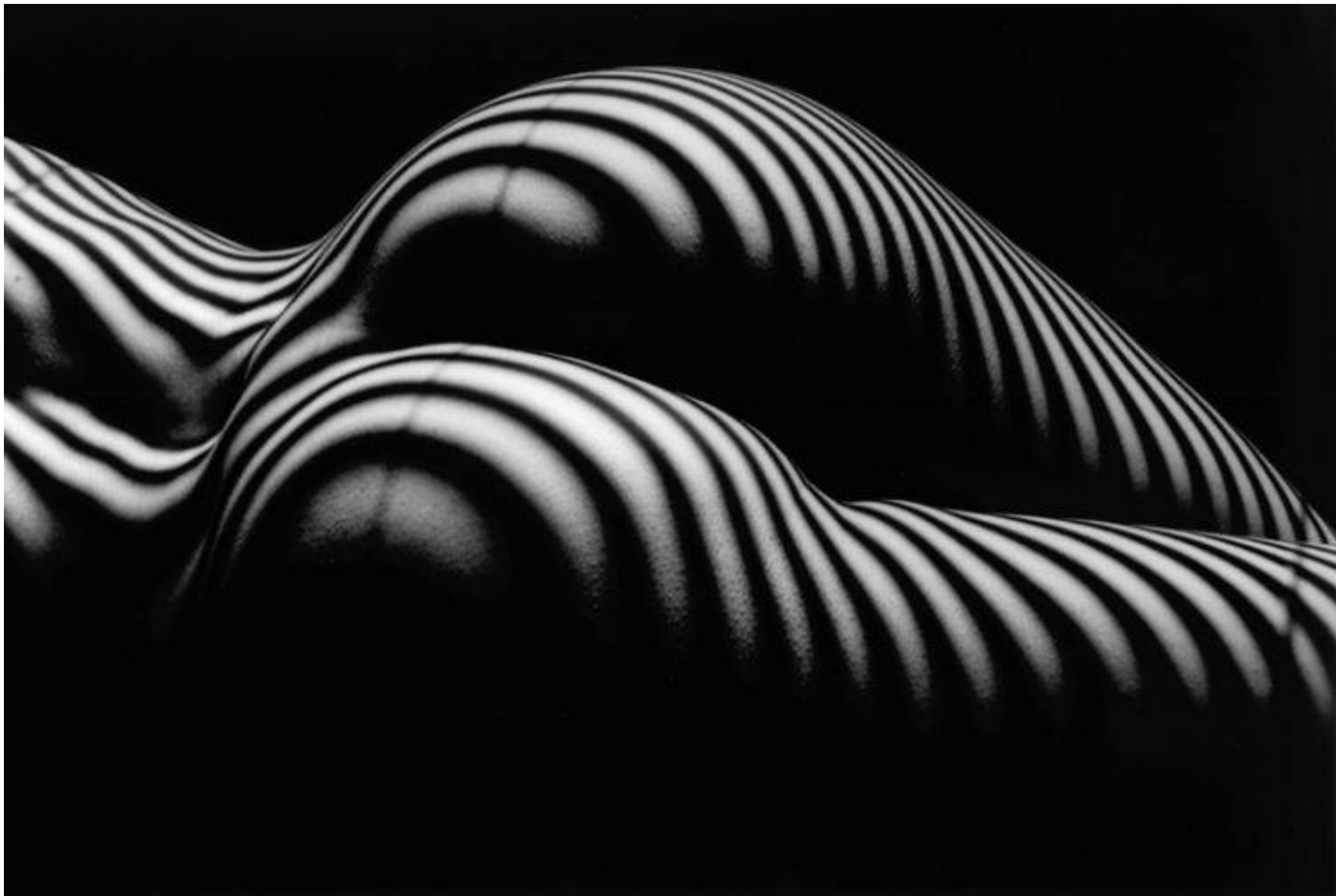


Mires & Courbes

décembre 2014









**L'idée est simple, tout le monde connaît les courbes caractéristiques
des films et des capteurs.
Mais il ne s'agit que d'une courbe de rendu, la fameuse courbe
H&D.**

Courbe de Hurter-Driffield en 1890

Here successive doubling of the exposure does not give a constant increase in the density; that is, the opacity is not proportional to the exposure. The graph of this table is shown in Fig. 6. This curve giving the relation between density and exposure is known as the "characteristic curve" of the plate. It is also called the "H & D" curve after Hurter and Driffield,³ who were the first to state the relation between density and exposure. The underexposure part (below $\log E = 8.9$) is called the "toe." The overexposure region (above $\log E = 1.1$) is sometimes referred to as the "shoulder."

Since, in the correct representation of the light and shade of the subject photographed, the opacity of the negative should be proportional to the quantity of light coming from the subject, it

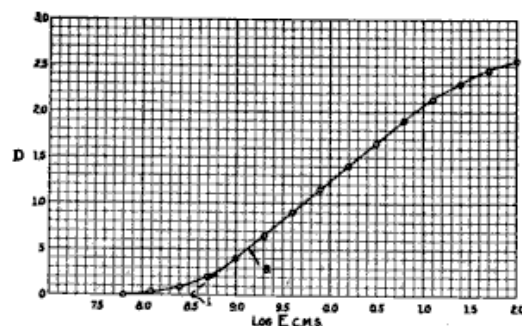


FIG. 6—Density-exposure curve showing toe, straightline, and shoulder

follows that the time of exposure should be such as to give densities on the plate which lie on the straight-line portion of the density-exposure curve. It is found that if the exposure is too short, there is no detail in the shadows, although there may be a slight deposit of silver all over the plate, or if the development has been such that detail does show, the representation of light and dark in the picture does not correspond to the light and dark of the subject.

When the exposure is too long, there is not sufficient difference in density to give detail in the portions of the negative which represent the brightness parts of the subject.

Hurter and Driffield, who were the first to express the relation between the darkening of the negative and the light coming from the subject, in terms of density and exposure, have expressed this fundamental law of photography as follows:

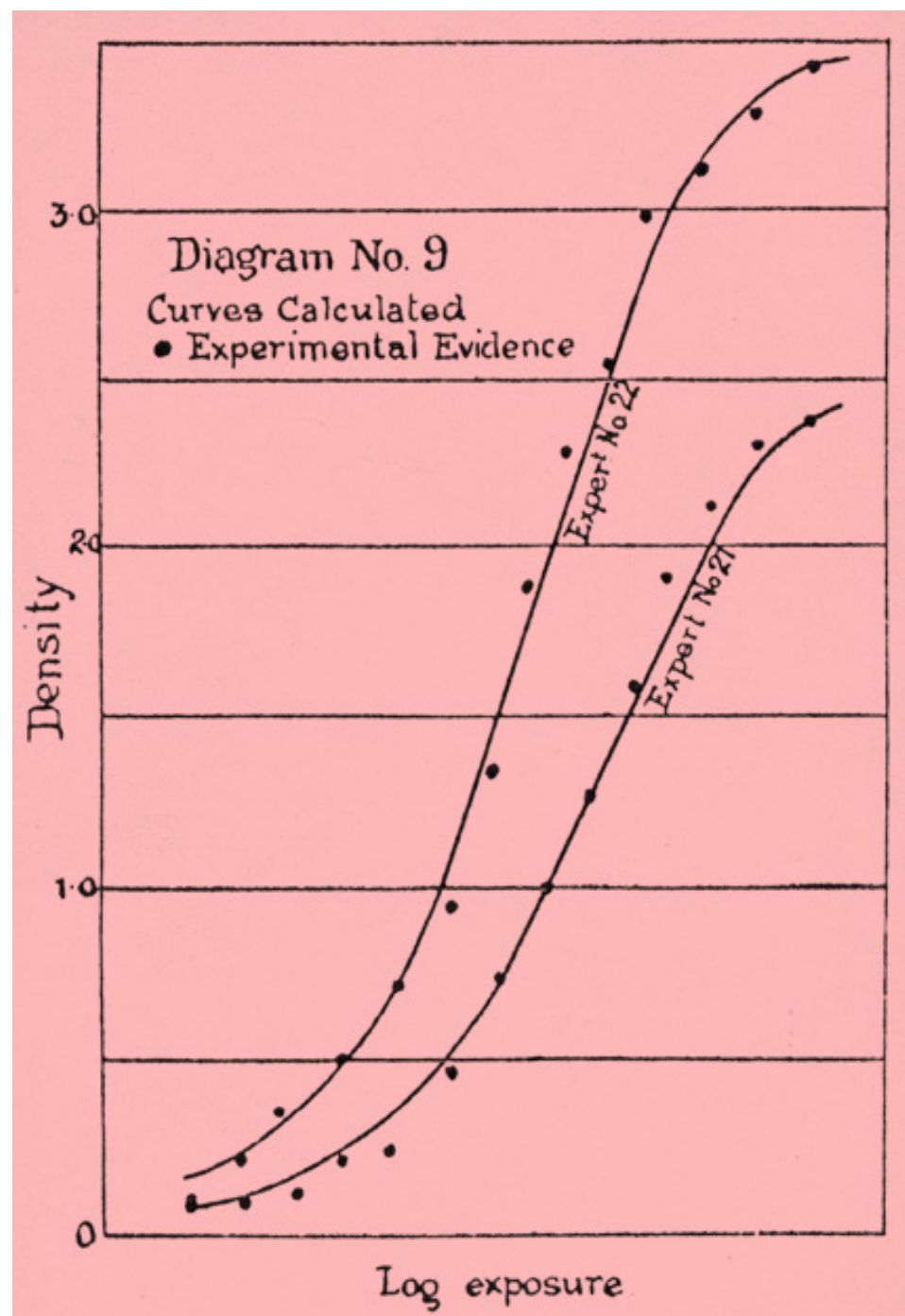
³ Journal of the Society of Chem. Ind., May, 1890.

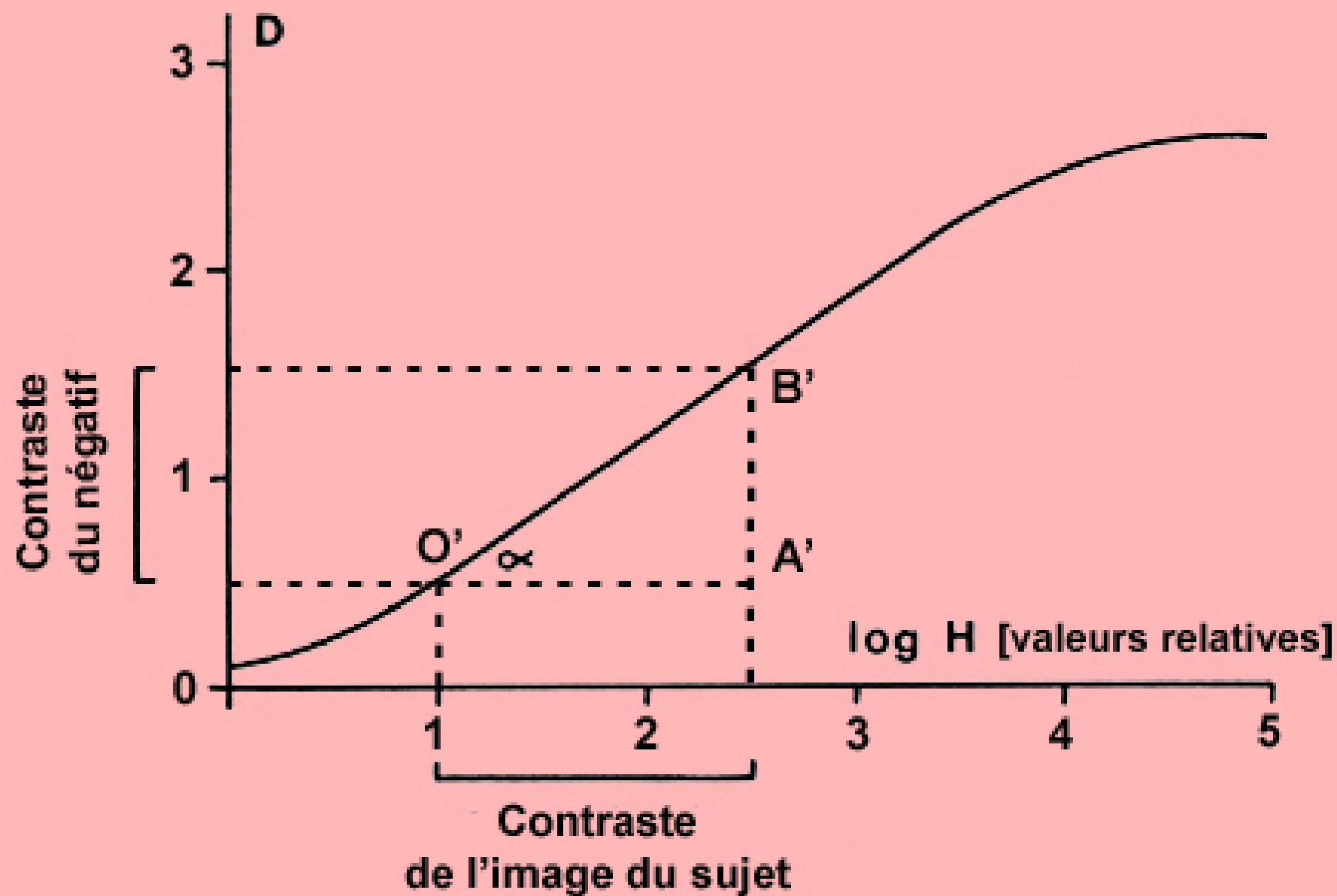
Courbe de Hurter-Driffield

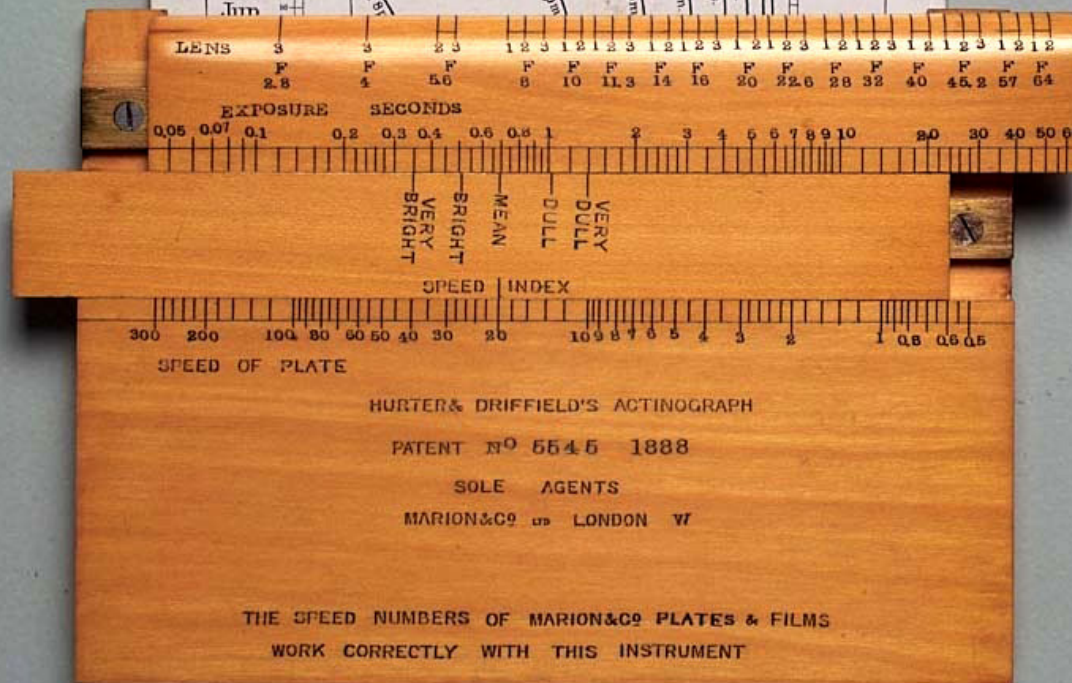
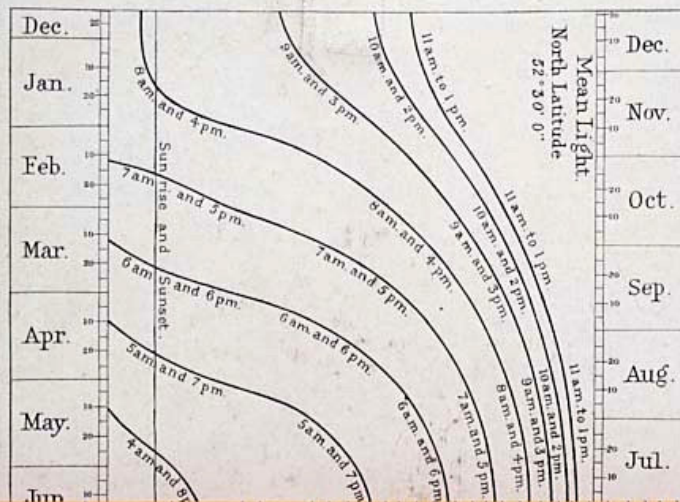
La sensitométrie est l'étude des surfaces sensibles. C'est une discipline technique liée à la photographie.

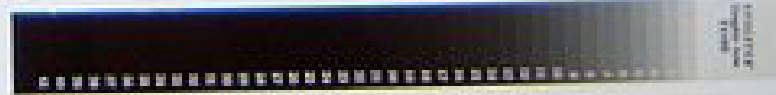
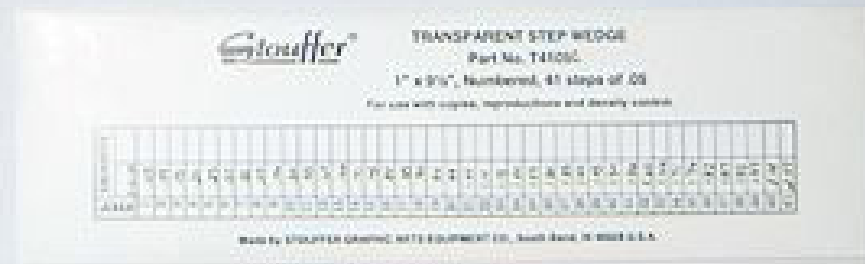
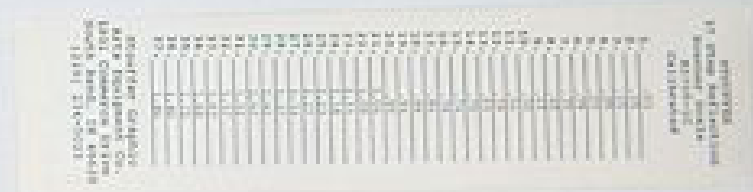
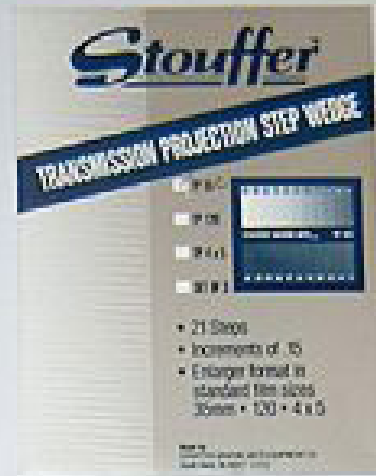
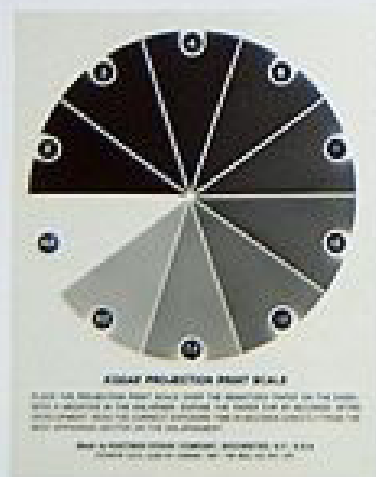
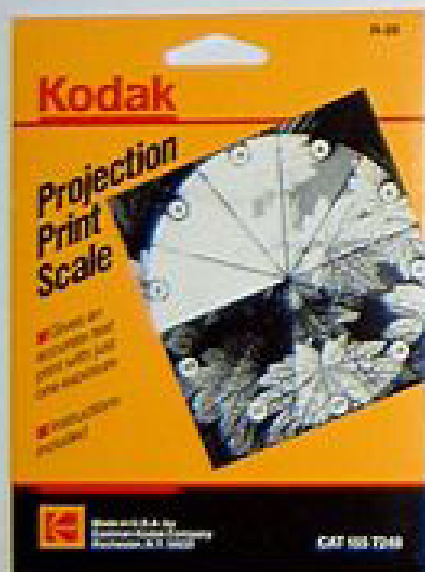
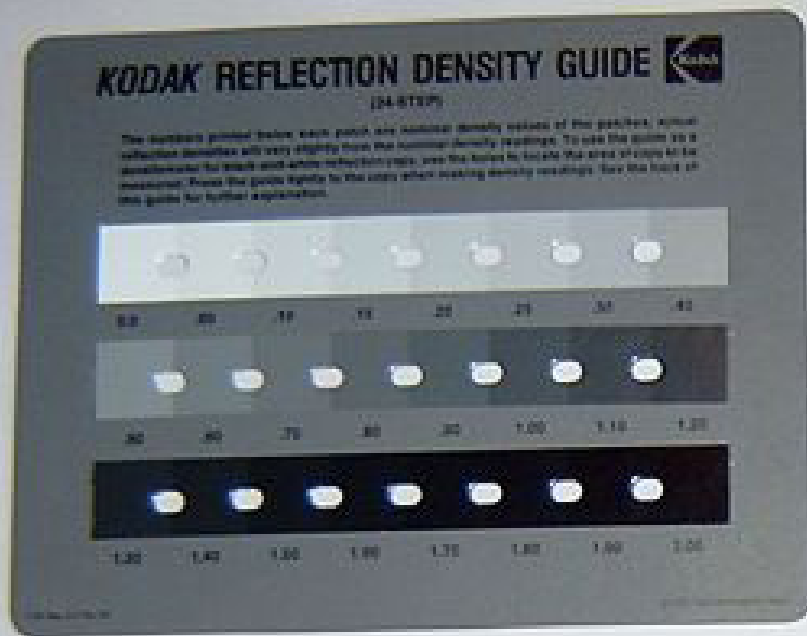
Elle sert en photographie à réaliser des échantillons de pellicules de manière normalisée, afin de permettre la construction de courbes caractéristiques, parfois appelées courbes sensitométriques. L'appareil sensitométrique (sensitomètre) dispose d'une source lumineuse très stable en intensité, munie d'une batterie de filtres internes de grades croissants (souvent 21 grades). On place à l'intérieur de l'appareil le film non exposé, puis on l'expose sur toute sa surface pour une durée donnée à l'aide de la source et des filtres.

Il résulte du développement un bout d'essai de 21 zones de densités croissantes, et une fois ces densités analysées à l'aide d'un densitomètre, on peut tracer la courbe caractéristique de l'émulsion.





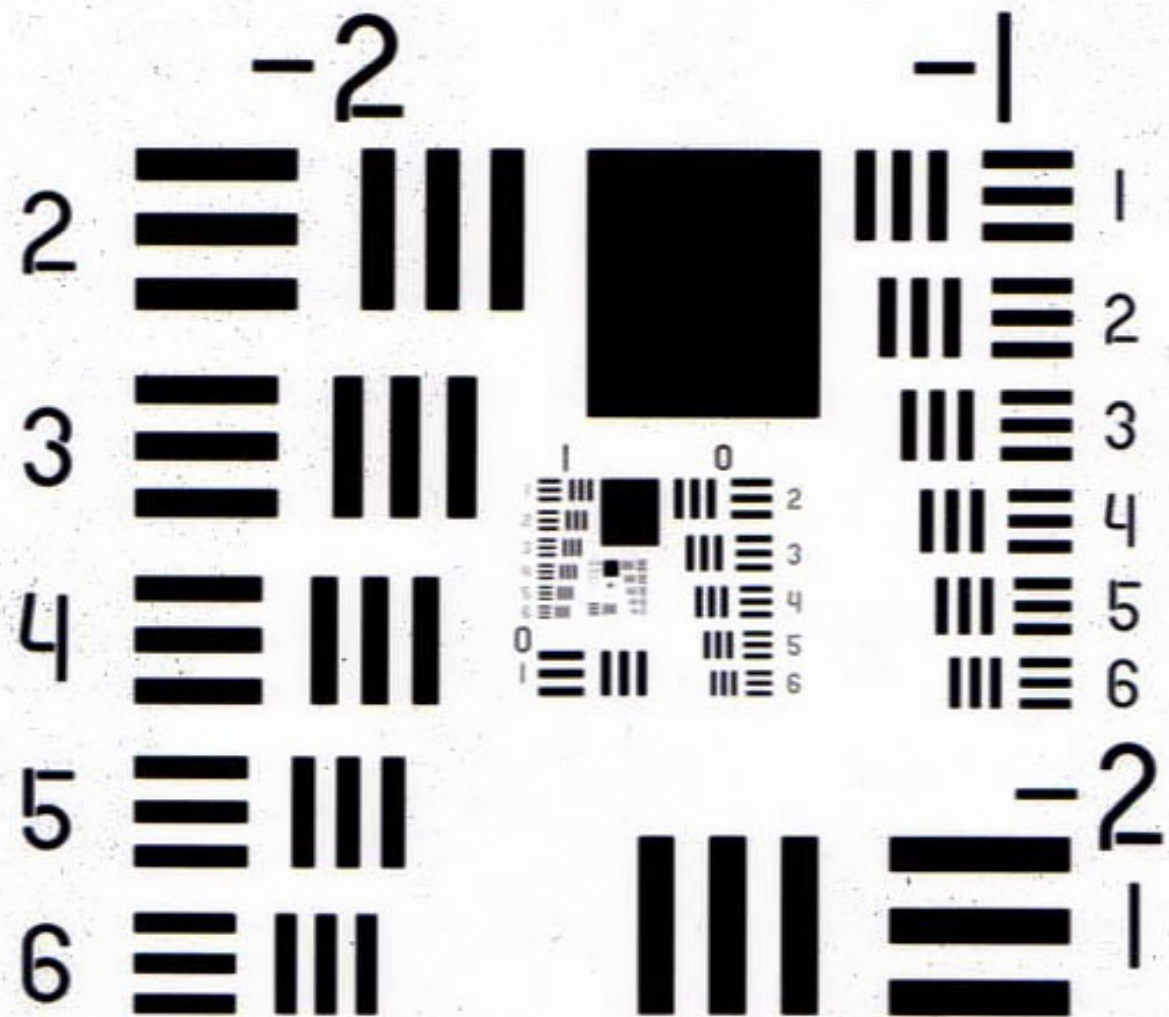




**L'idée est simple, tout le monde connaît les mires qui permettent de tester la résolution des films et des capteurs.
Mais il ne s'agit que de résolution, la fameuse mire USAF 1951.**

Mire USAF 1951

RESOLVING POWER TEST TARGET



USAF • 1951

MADE BY

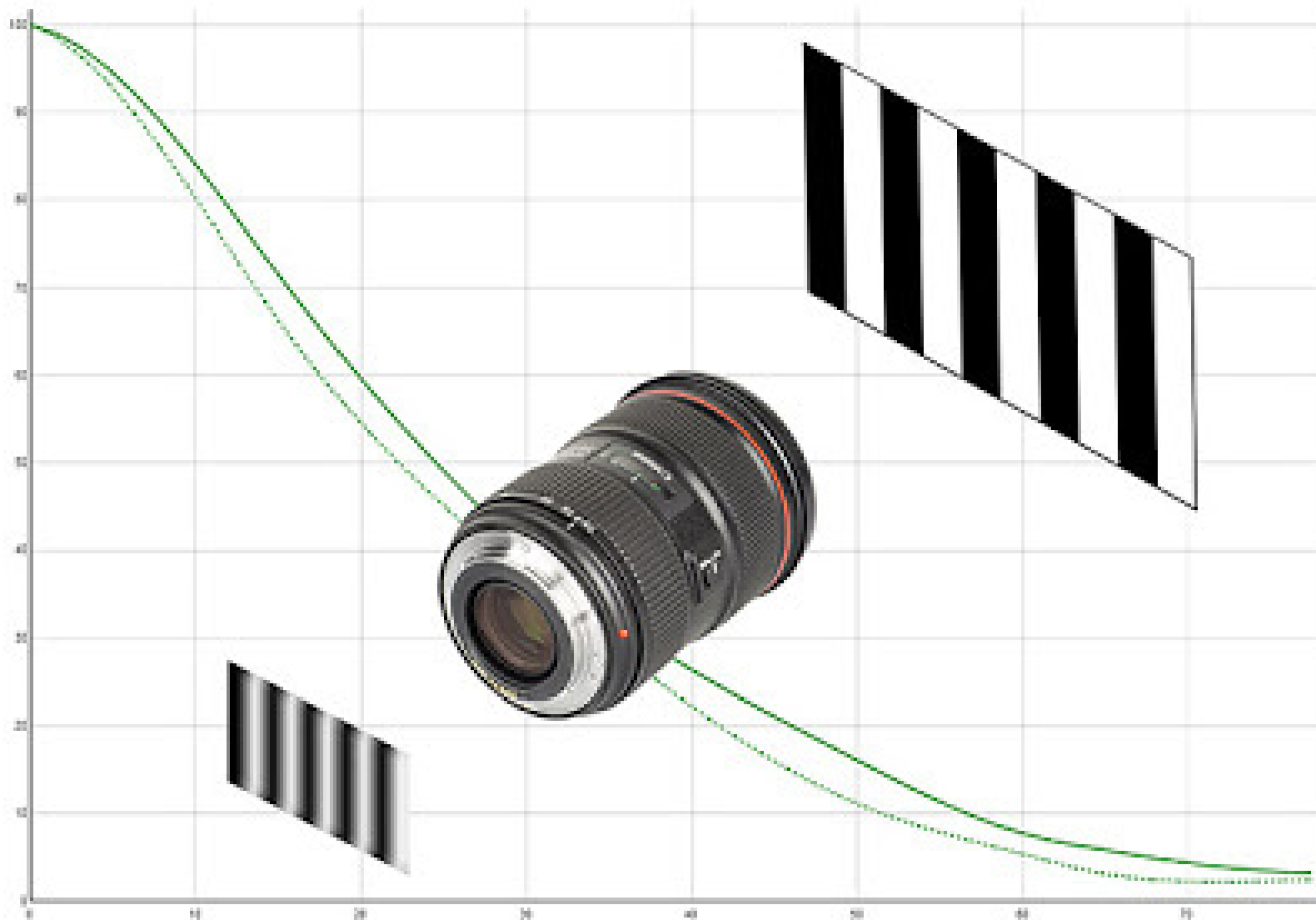
BUCKBEE • MEARS CO.

PAINT PRINTED IN U.S.A.

**L'idée est simple, tout le monde connaît les mires qui permettent de tester la résolution des films et des capteurs.
Mais il ne s'agit que de résolution, la fameuse mire USAF 1951.**

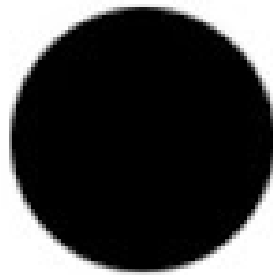
Mire USAF 1951

Protocole de test mire-optique-capteur

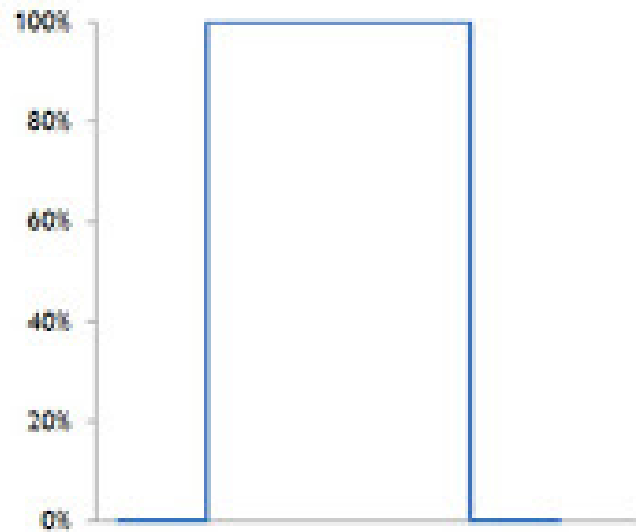


Entrée sortie

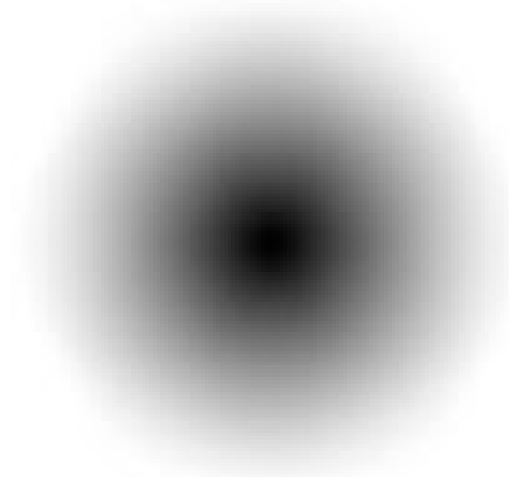
Cas parfait



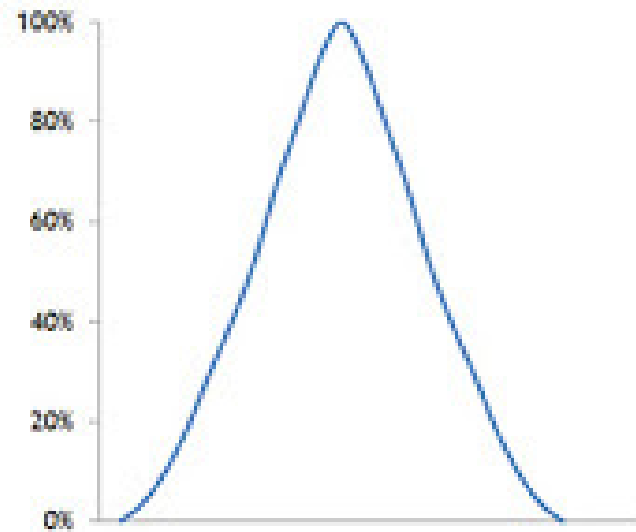
Contraste



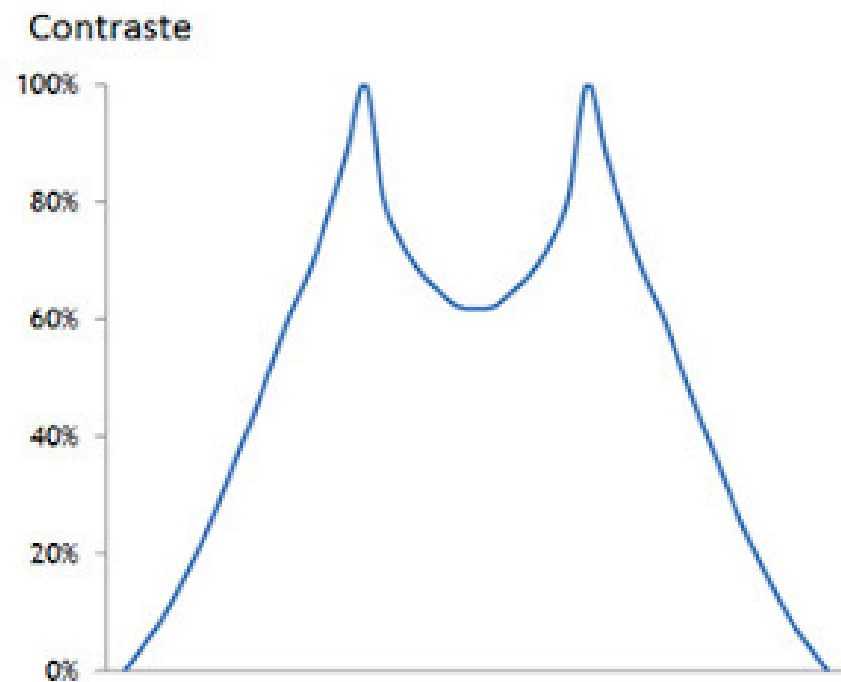
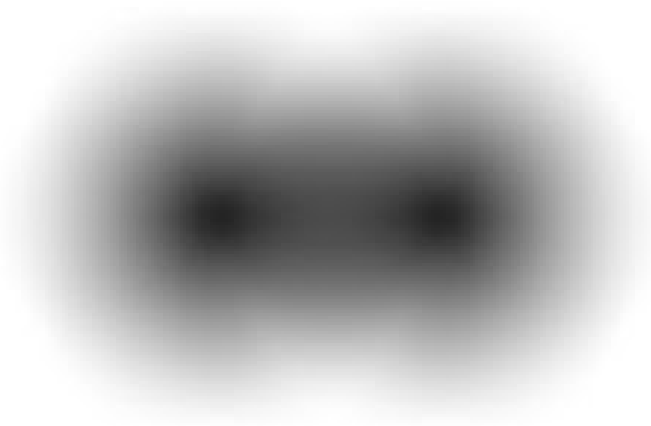
Cas limité par la résolution



Contraste



Limite de résolution - quand deux points sont confondus

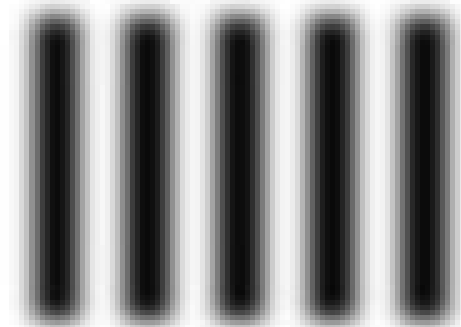
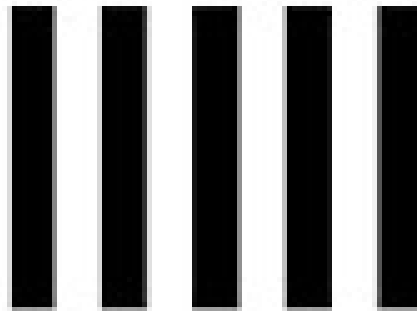


Lecture des résultats

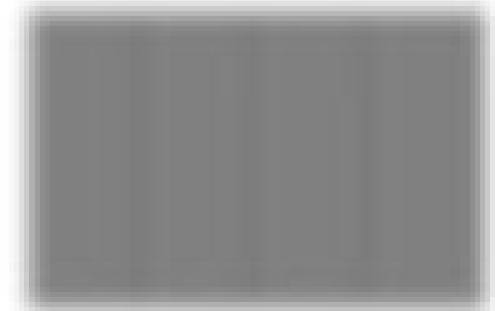
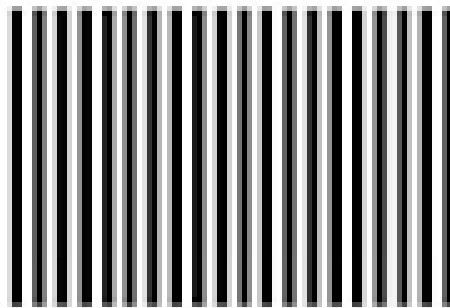
Bandes réelles

Bandes sur
le capteur

largeur > résolution



largeur < résolution



Combiner les deux tests

Tracer une courbe H&D de noircissement

&

Tracer une courbe H&D USAF de résolution



Le process sera combiné de telle façon :

Deux machines seront utilisées comme sensitographes (des sensitographes bien imprécis, mais il faut savoir faire avec ce que l'on a) :

Un Canon Ds III et son F/2,8 90 mm TS-E et Lightroom 4

un Hasselblad 500 CM et son 120 mm F/4 Macro-Planar et du film HP5 traité dans le HC110

Ces optiques seront utilisées à F/8 pour toutes les poses

23 poses échelonnées en intervalles de 1 IL (ou EV)

Deux mires :

un gris à 18% cadré plein cadre optique défocalisée sur l'infini et une mire USAF 1951 à 3,73 m mise au point parfaitement calée sur la mire.

L'idée étant pour les premières et les dernières plages de se trouver en dehors des capacités de restitution des deux systèmes mis en cause.



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☶ ☰ 3

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☶ ☰ 4

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☶ ☰ 5

6 ☰ ☶ ☶

☶ ☰ 6

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3 ☰ ☶ ☶ 2

4 ☰ ☶ ☶ 3

5 ☰ ☶ ☶ 4

6 ☰ ☶ ☶ 5

☶ ☰ 1

Bertho Boman: 16-July-2000

☶ ☰ 1





Suite de l'opération :

Développement du film HP5 (exposé sur base 100 ISO comme le capteur du Ds III) traitement sur machine Jobo ATL 2500 dans une cuve 2500 et à 26 °C, 7 mn de préchauffage, 7 mn de prémouillage, 7 mn de développement HC 110 1+24, 2 mn de bain d'arrêt, 7 mn de fixage, 7 mn de lavage, bain mouillant, essorage au sopalin et séchage à l'air libre comme du linge.

Une fois secs (pour les films, les CR2 n'ont pas besoin de sécher).

les 23 plages de gris sont mesurées au densitomètre Macbeth 1224.

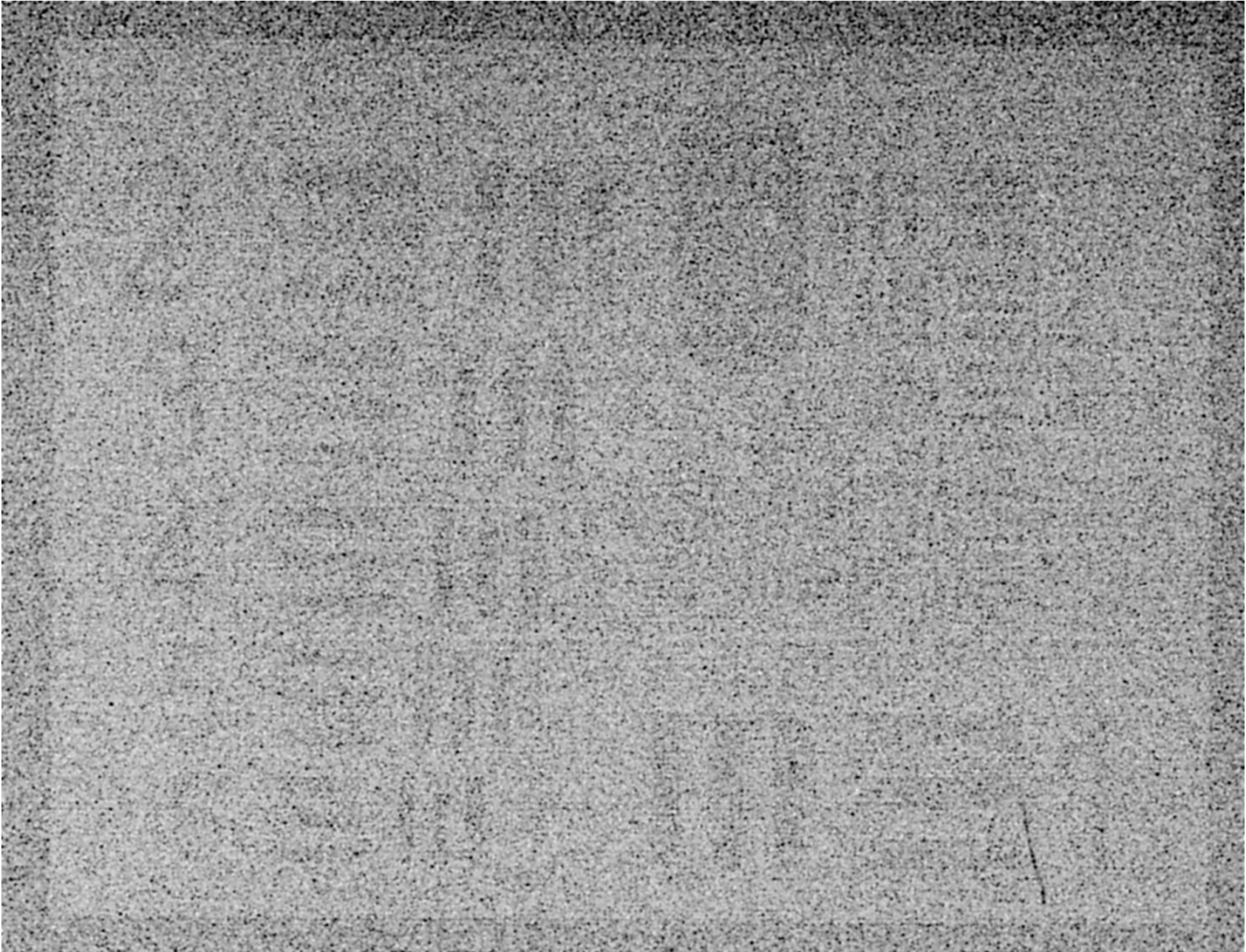
Scan des 23 vues de mires USAF 1951, sur IQsmart 3 à 5000 Dpi, le scan compense les écarts de pose et extrait le maximum des infos contenues sur le film pour ces 23 poses types.

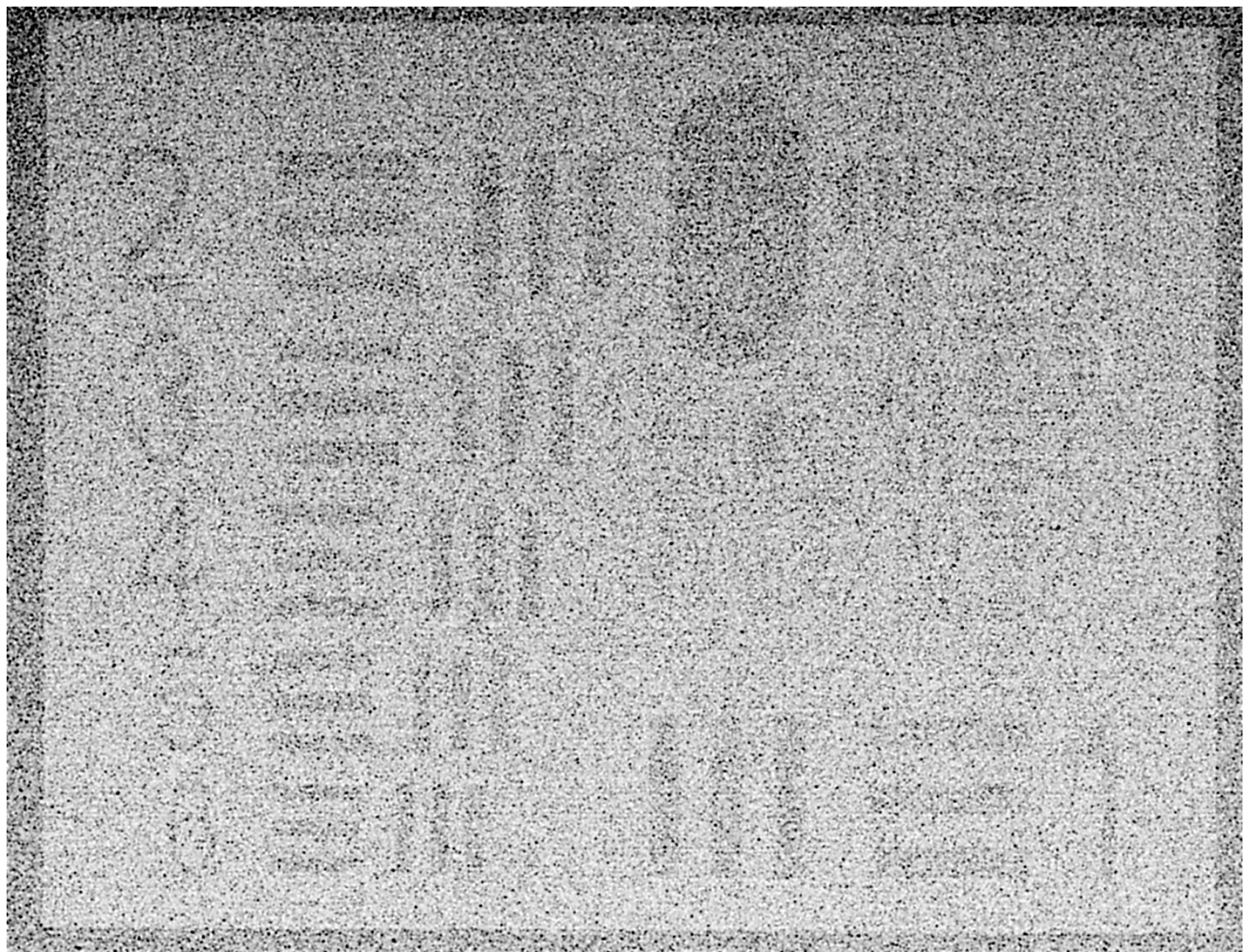
Développement des fichiers, même technique d'extraction maximum de données, ouverture de 3 génération de fichiers, N-5 N N+5 tant pour les 23 gris à 18% que pour les 23 USAF 1951.

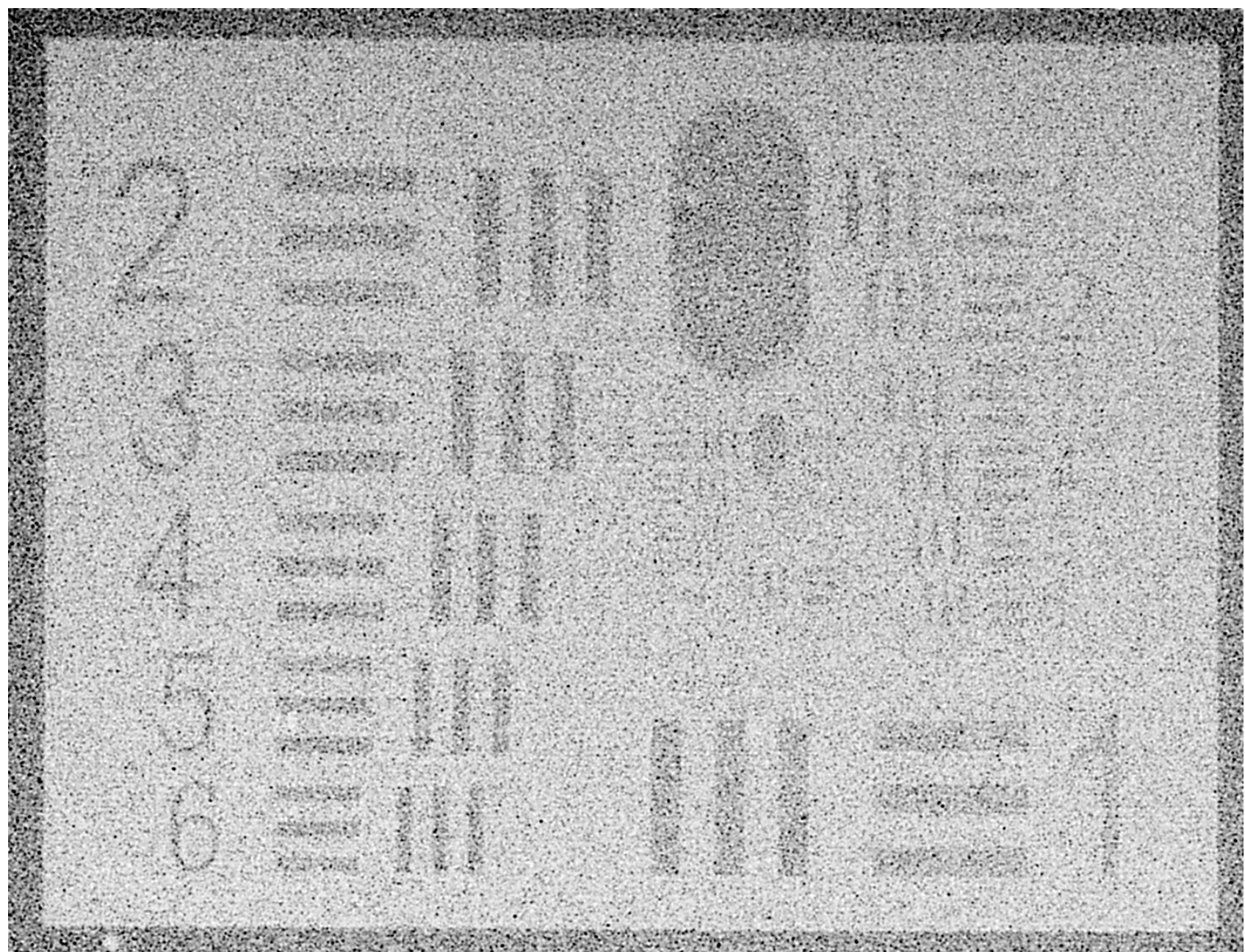
Résultats chiffrés

Tableau de chiffres H&D de noircissement
Tableau de chiffres H&D USAF de résolution
Hasselblad HP5
Canon Ds III

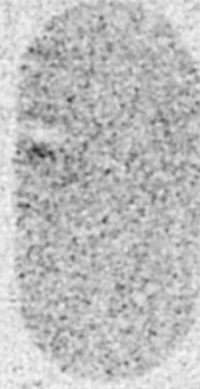
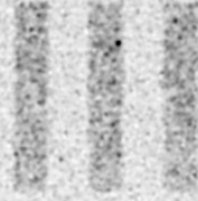
Hasselblad HP5





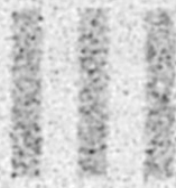
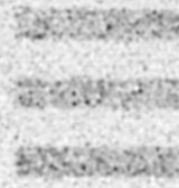


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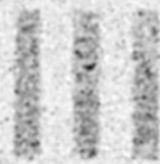
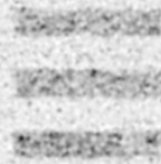
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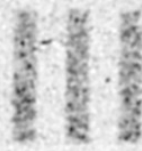
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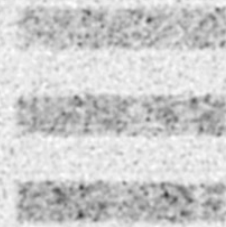
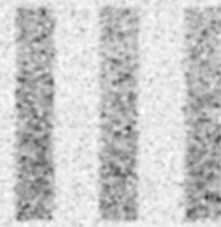
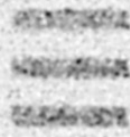
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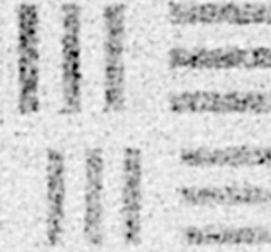
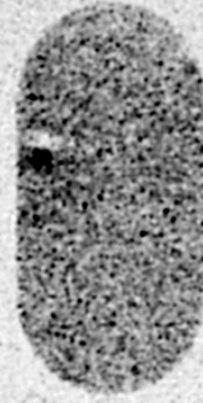
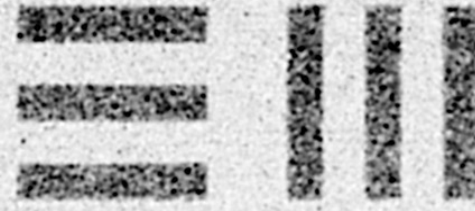
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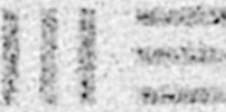
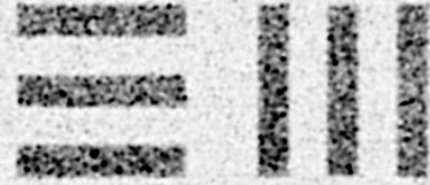
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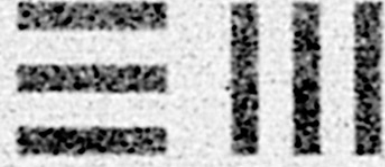
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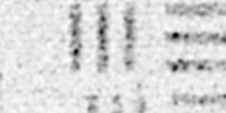
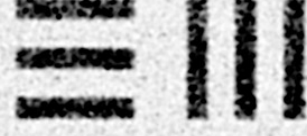
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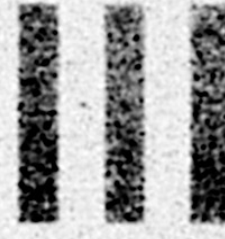


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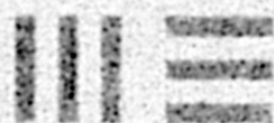
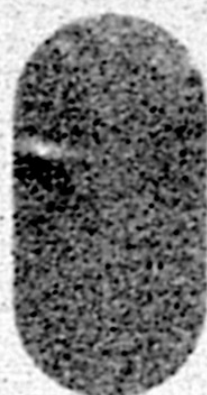
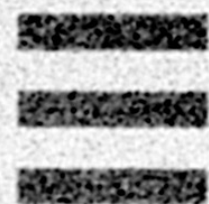


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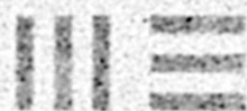
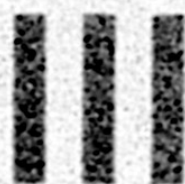
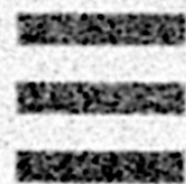
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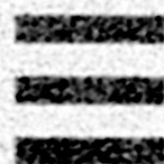
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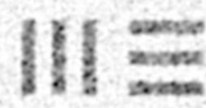
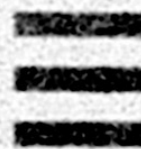
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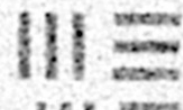
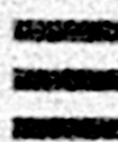
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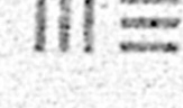
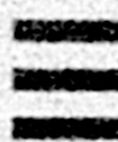


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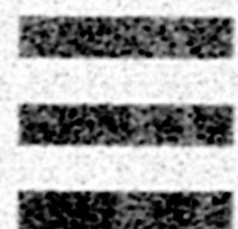
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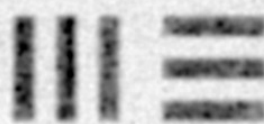
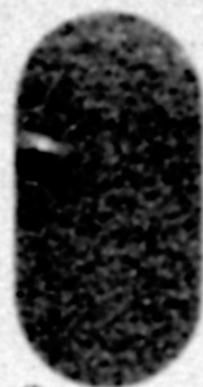


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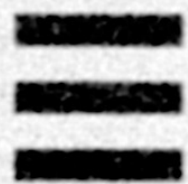
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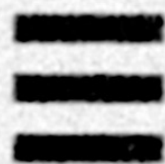
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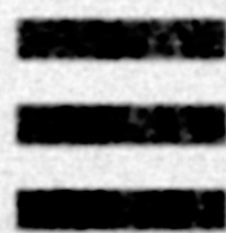
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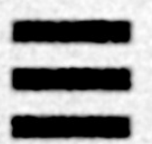


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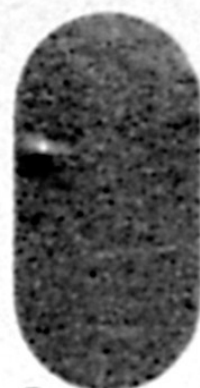


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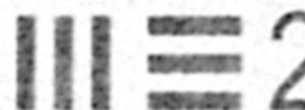


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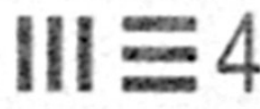
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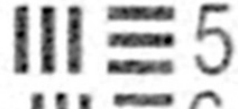
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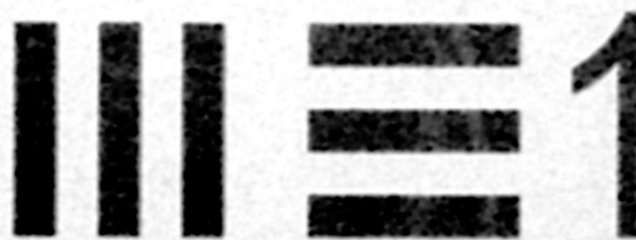
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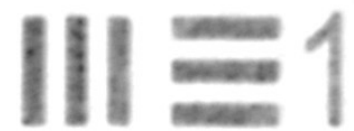
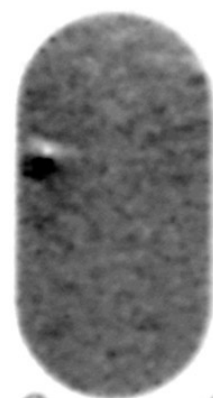


Bertha Boman:
16-July-2000



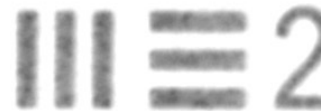
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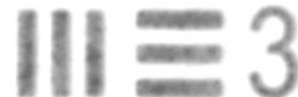
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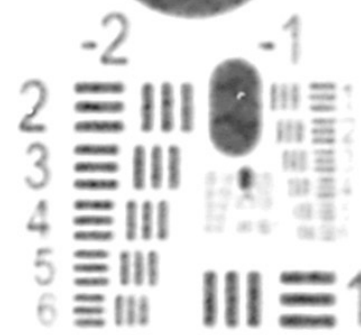


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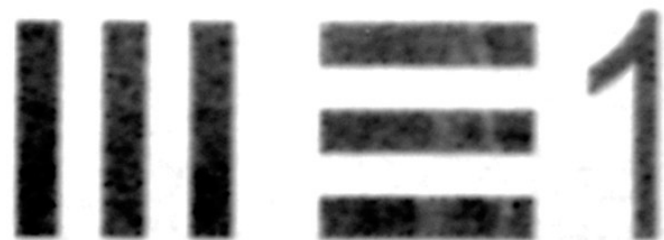


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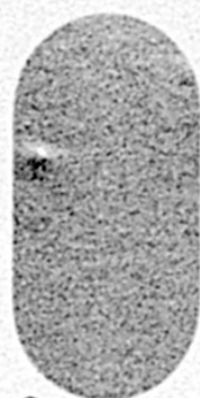
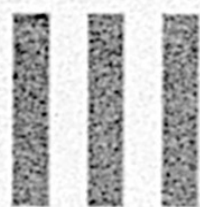
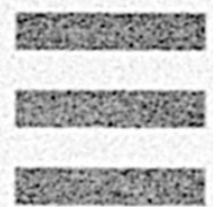
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16 July 2000



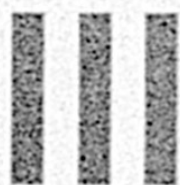
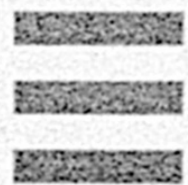
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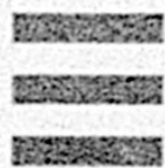


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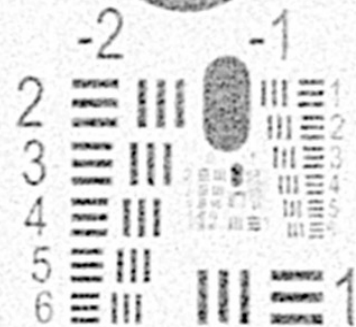
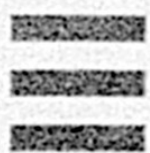


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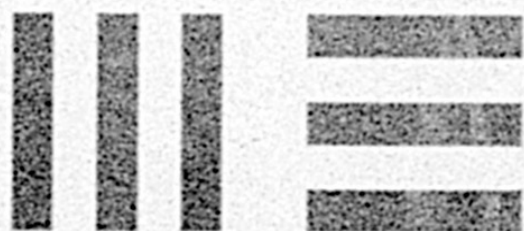
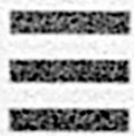
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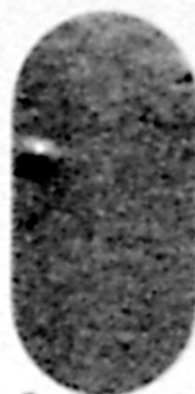
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16-July-2000

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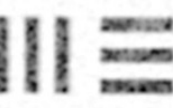
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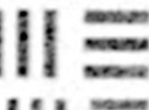
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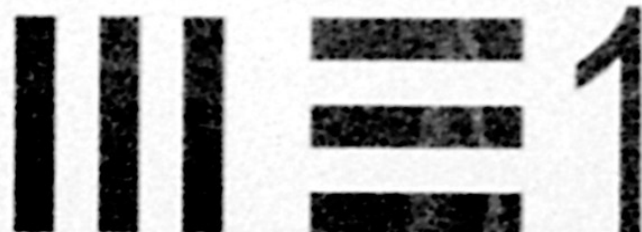
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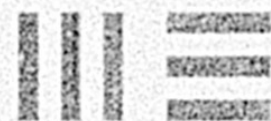
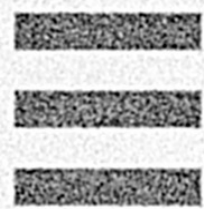


Bertho Bonani
16-July-2000



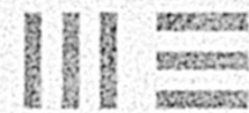
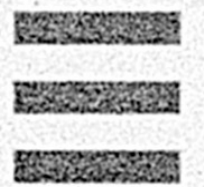
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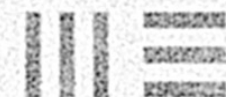


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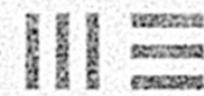


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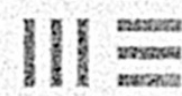


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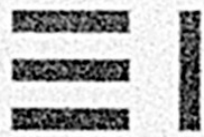
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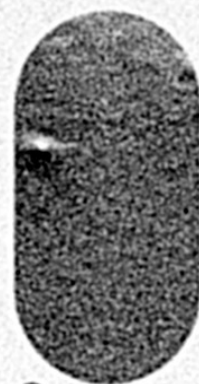
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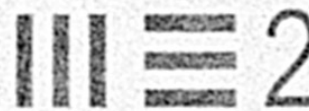
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16-July-2000

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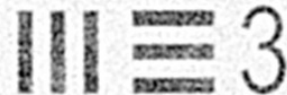


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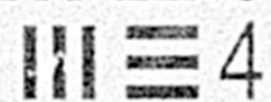


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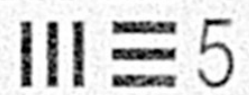


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Sertha Bonan
16-July-2000



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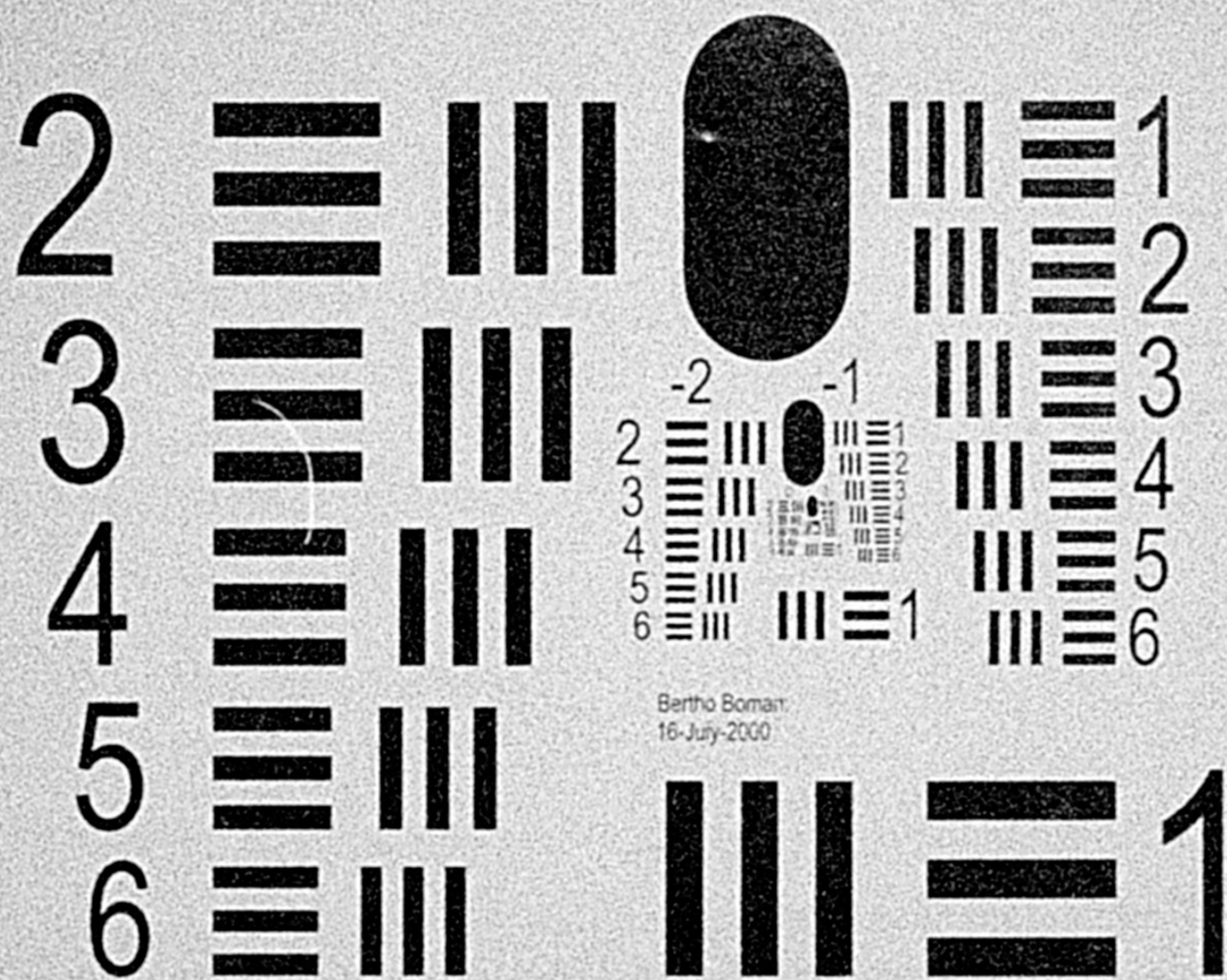
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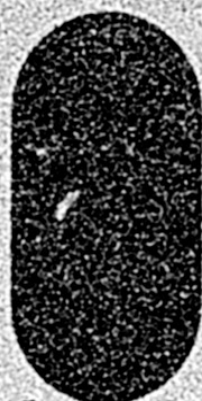
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Bertho Boman
16-July-2000

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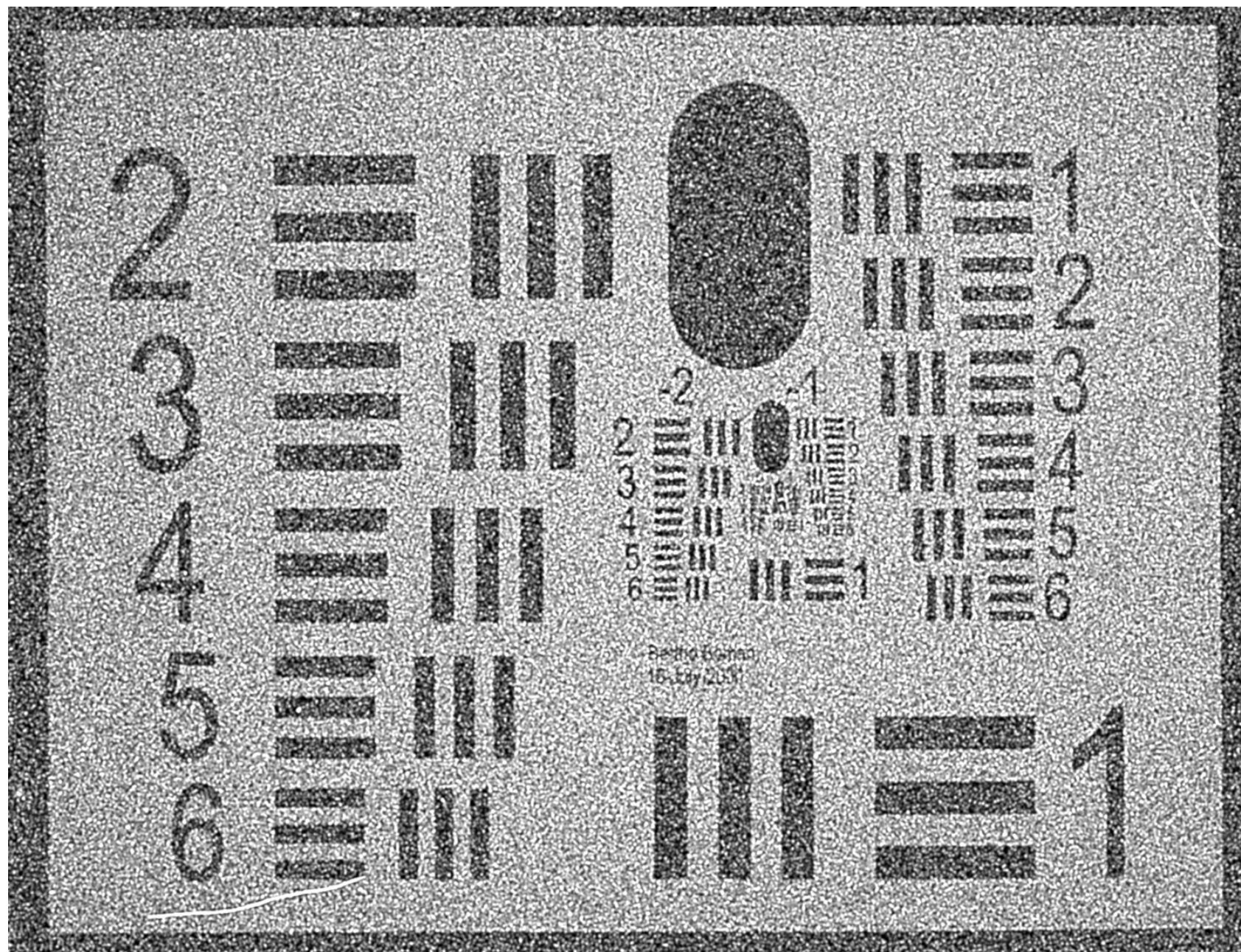
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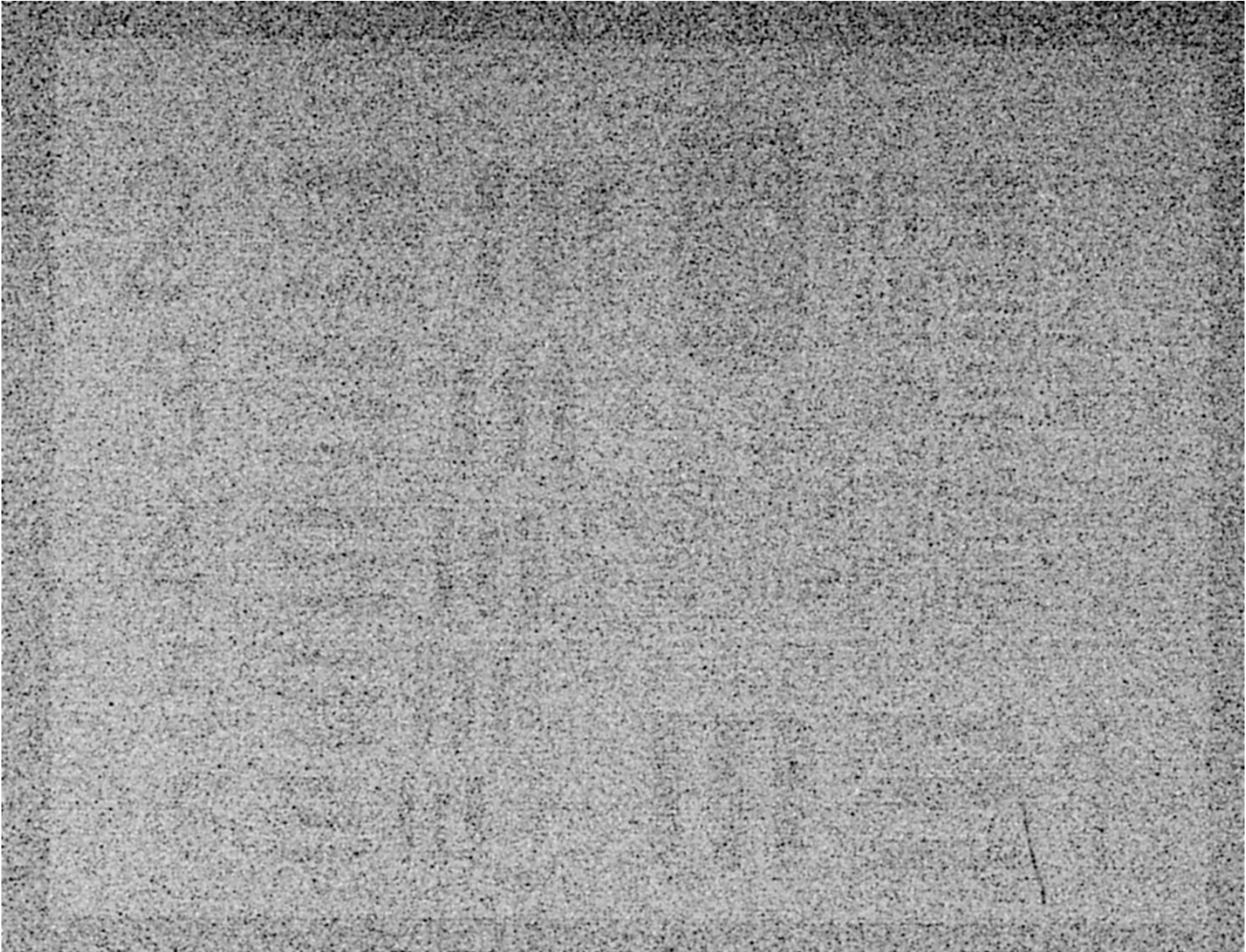


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16-July-2000

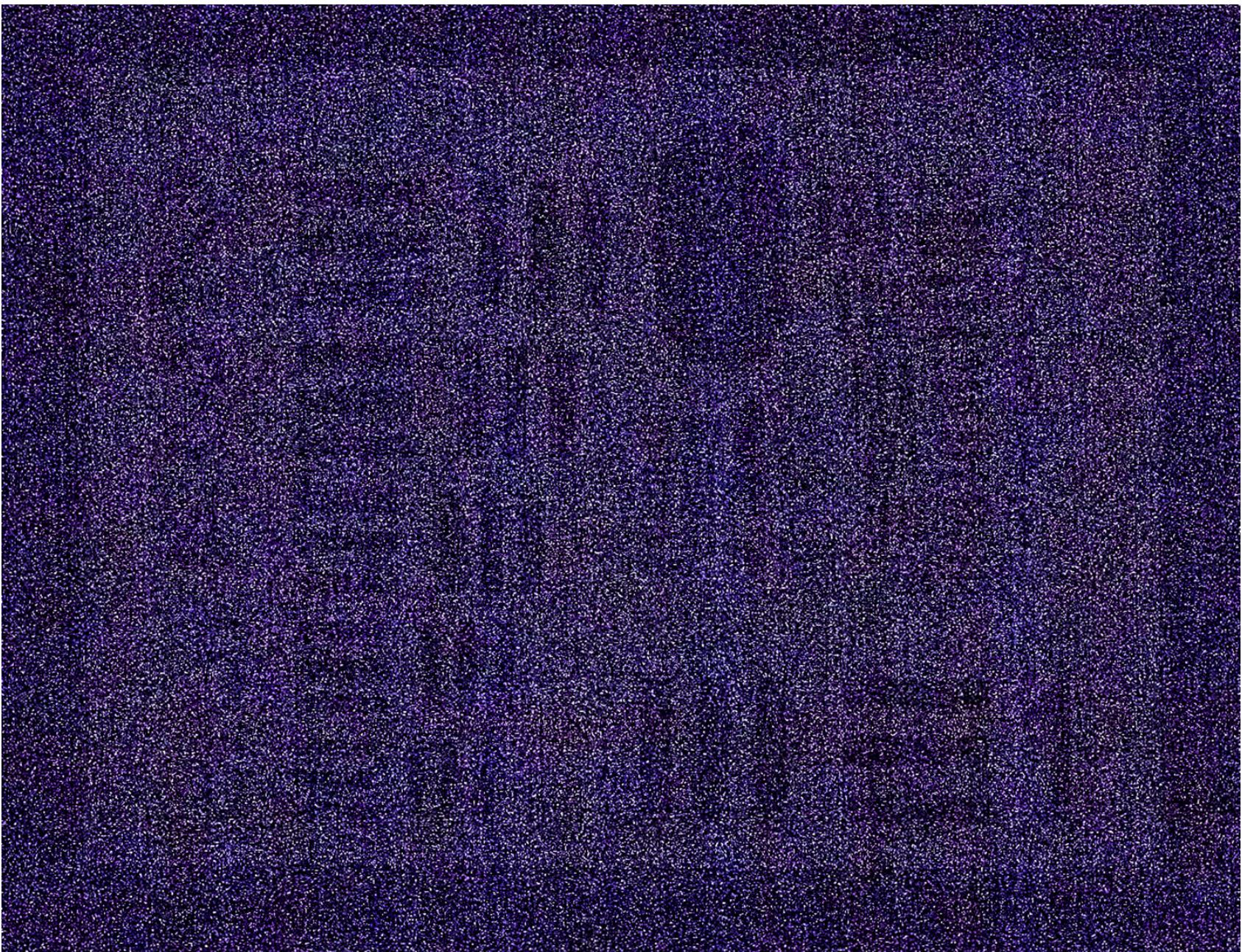


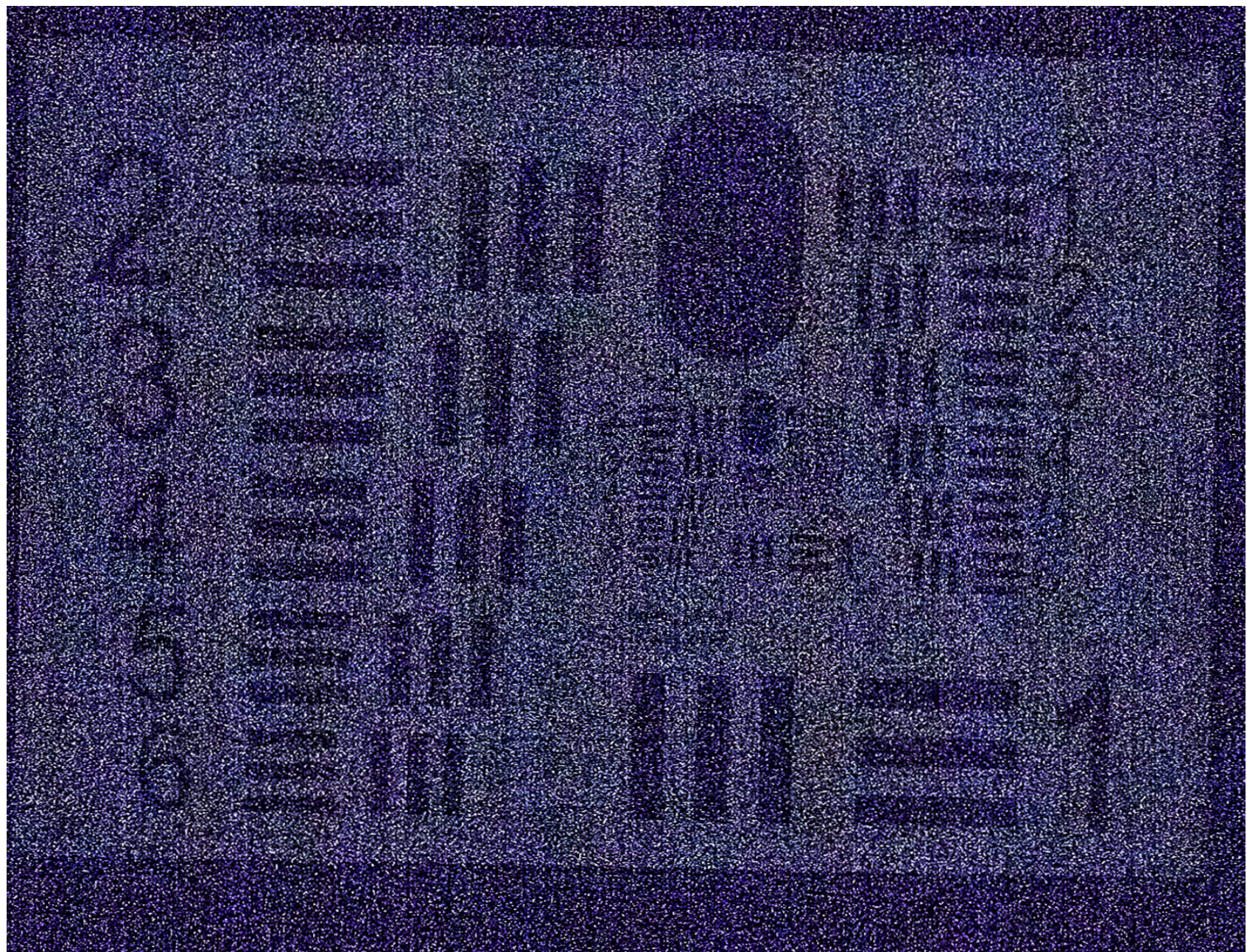
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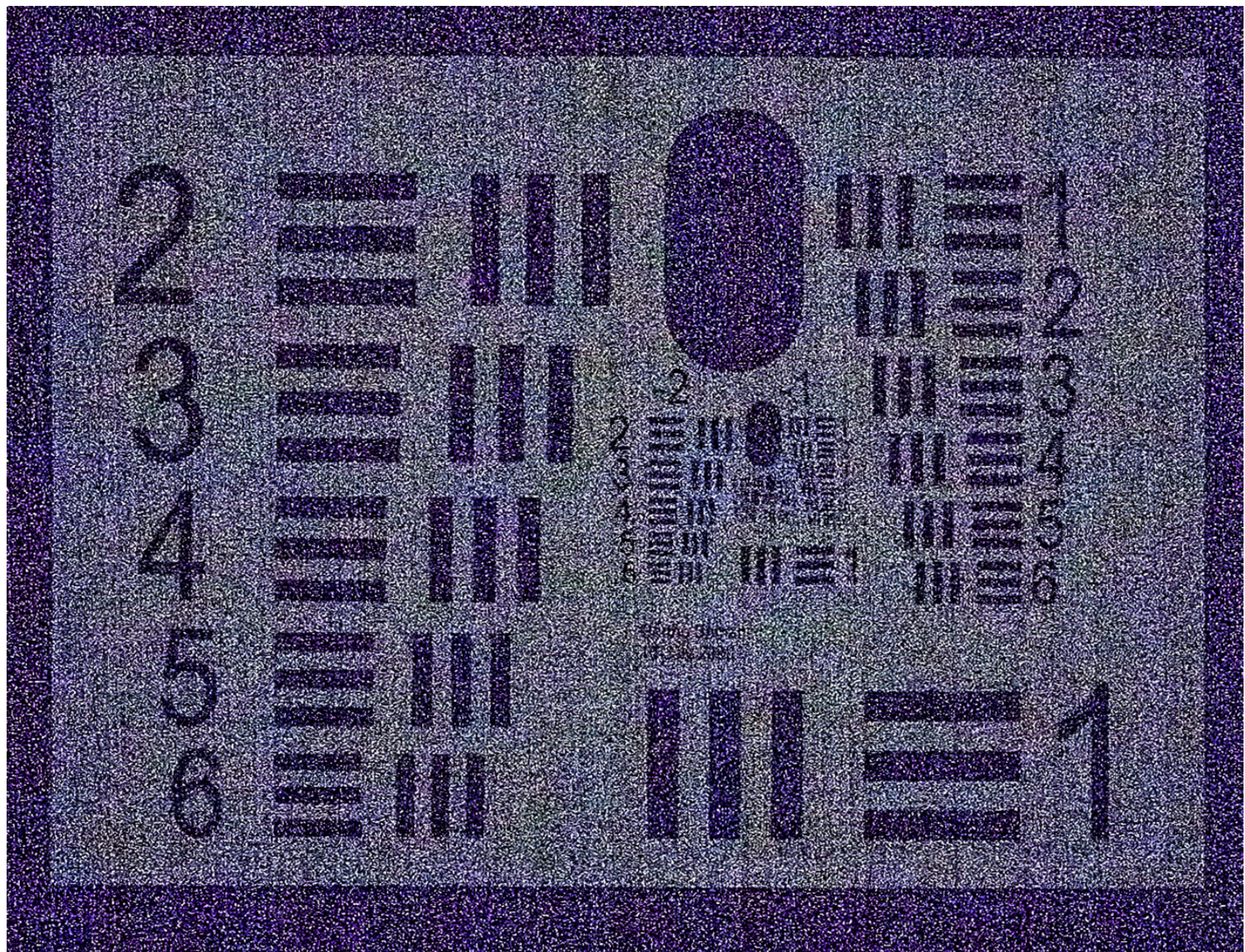




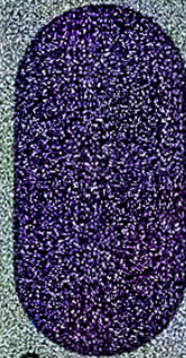
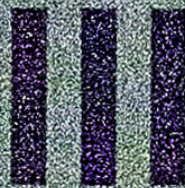
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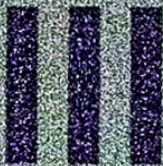


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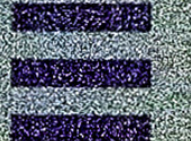


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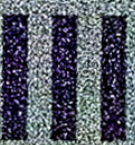
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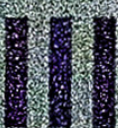
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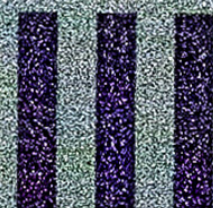


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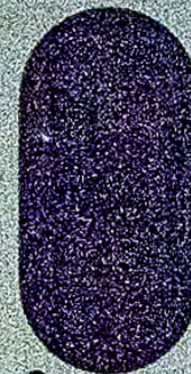
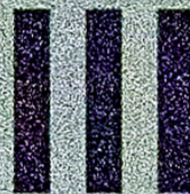


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16 July 2009



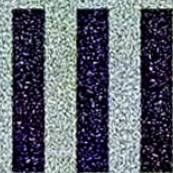
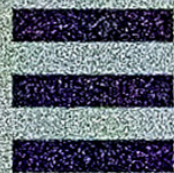
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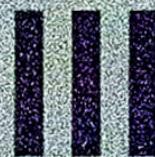
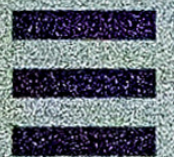


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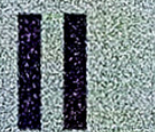
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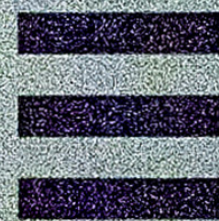
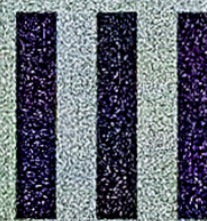


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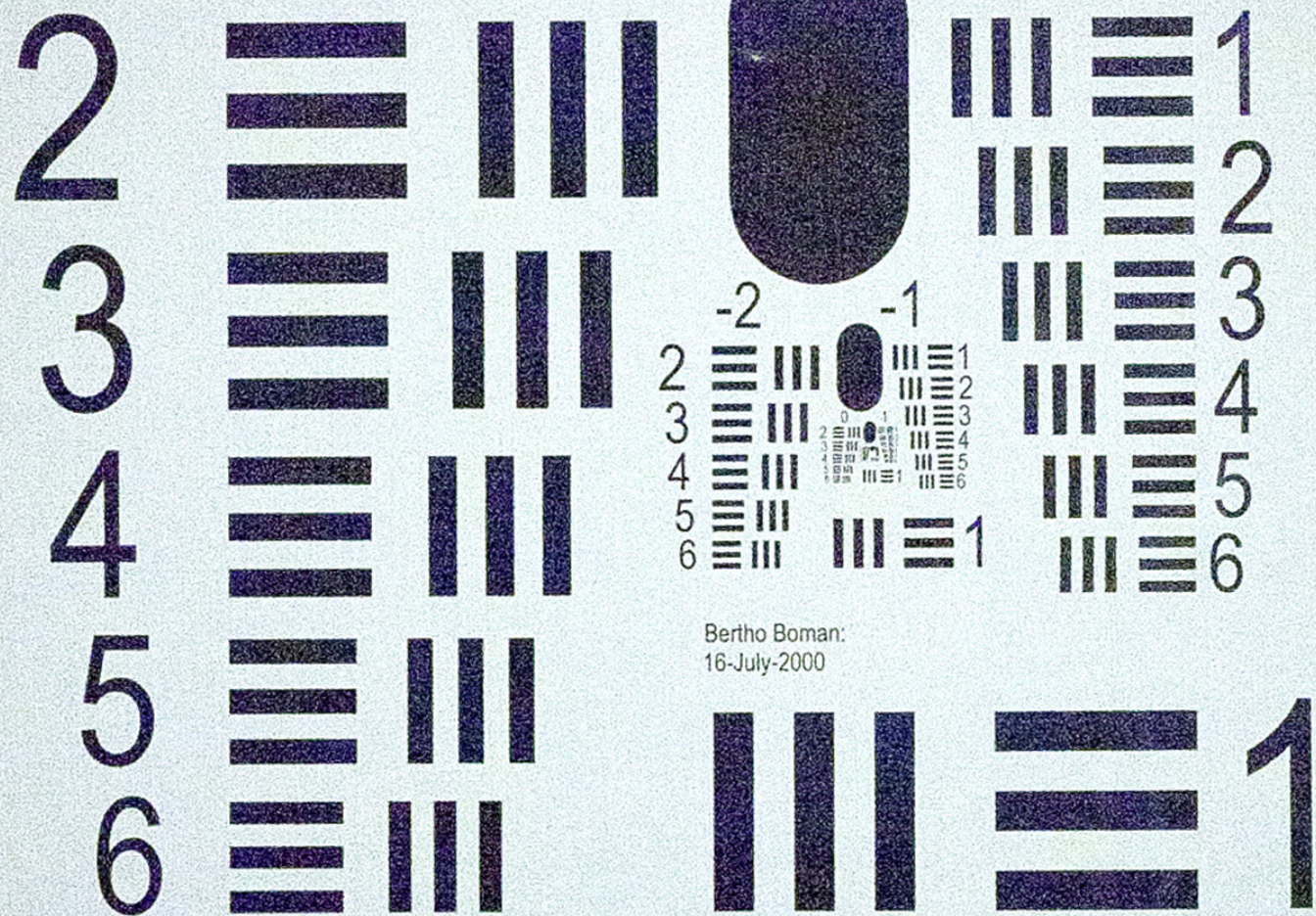
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16-July-2000

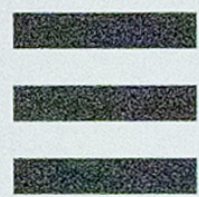


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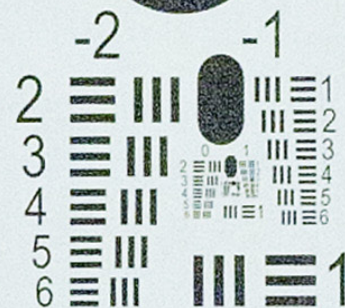
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16-July-2000

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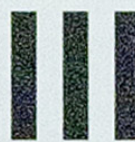
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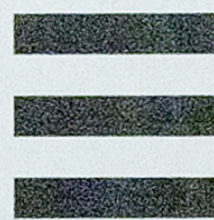
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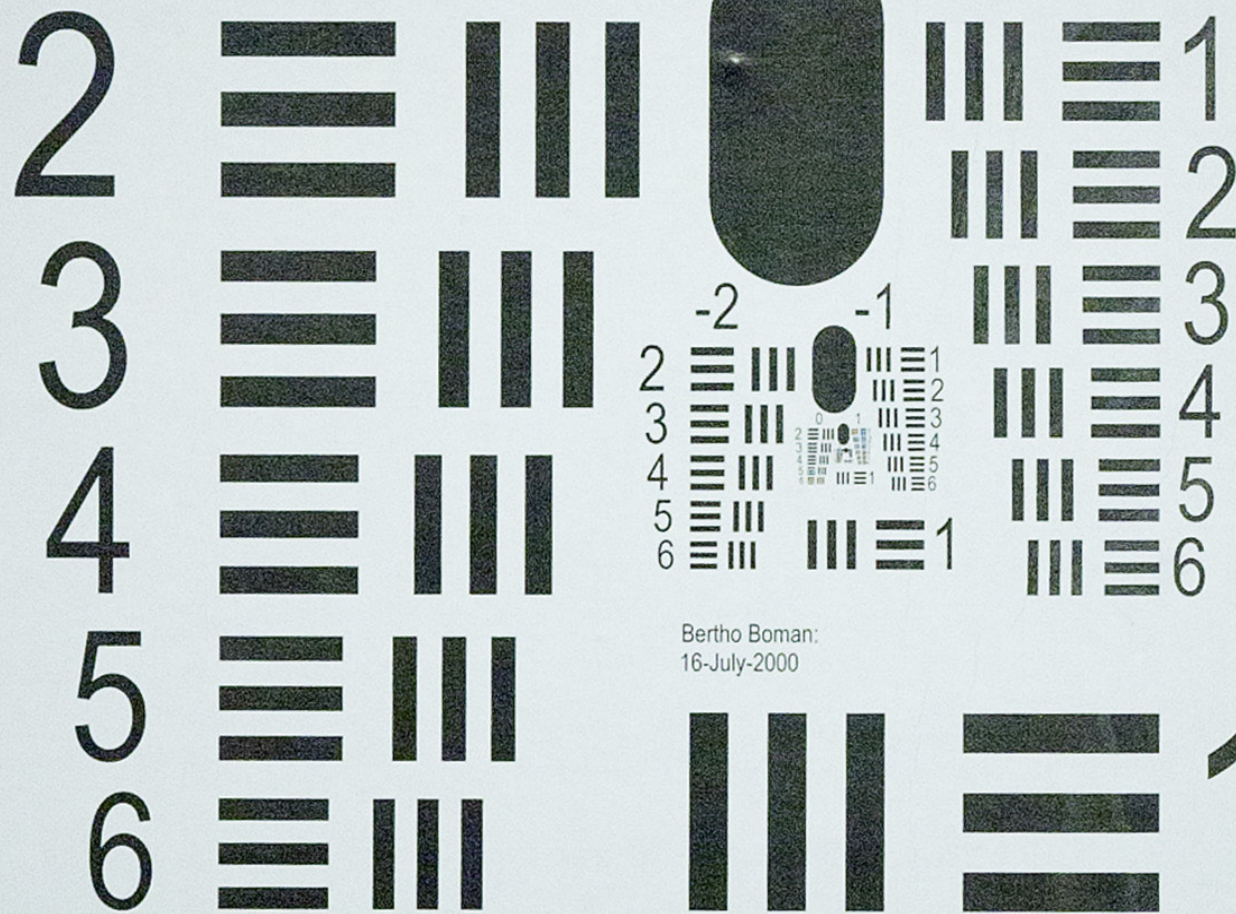
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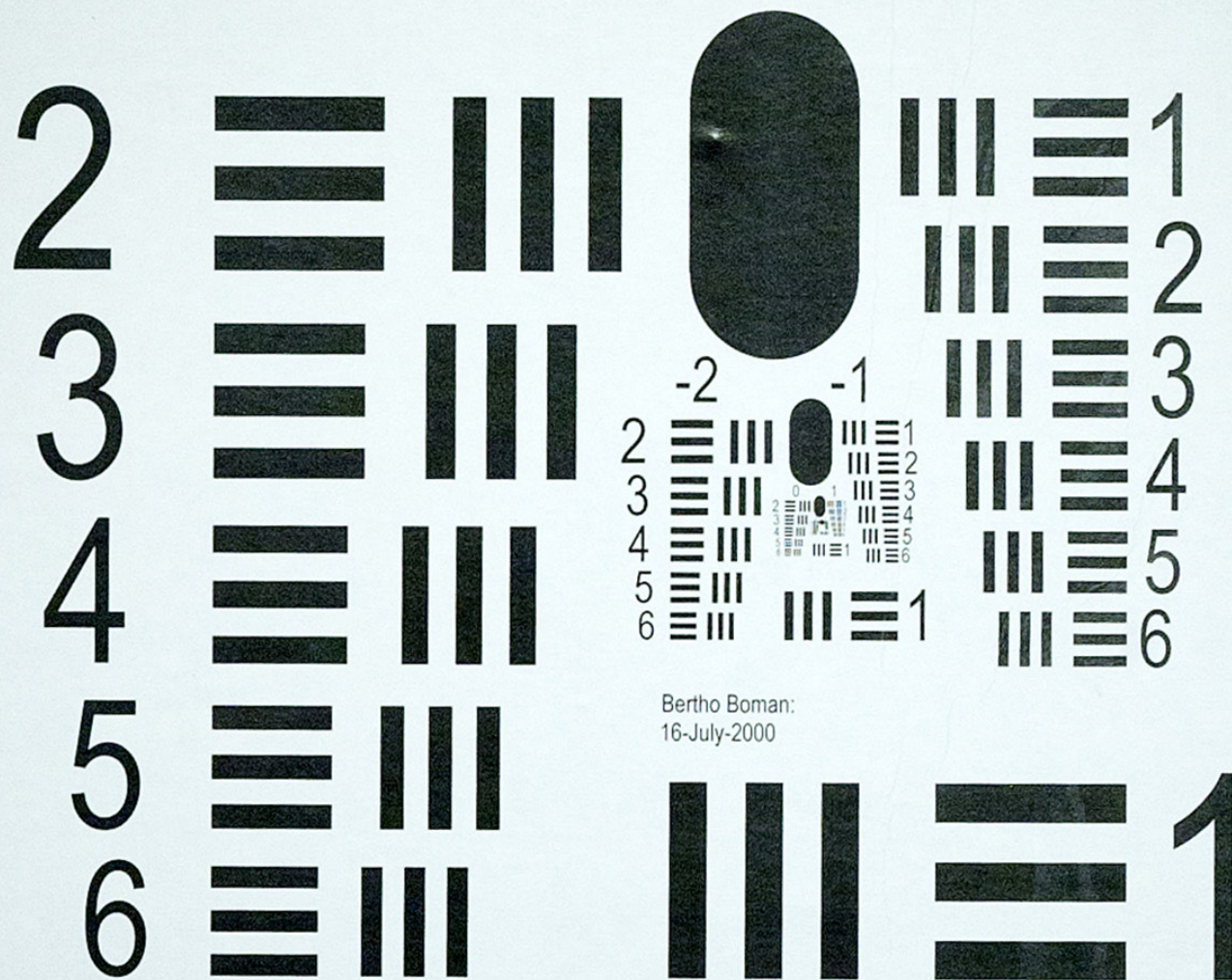
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16-July-2000



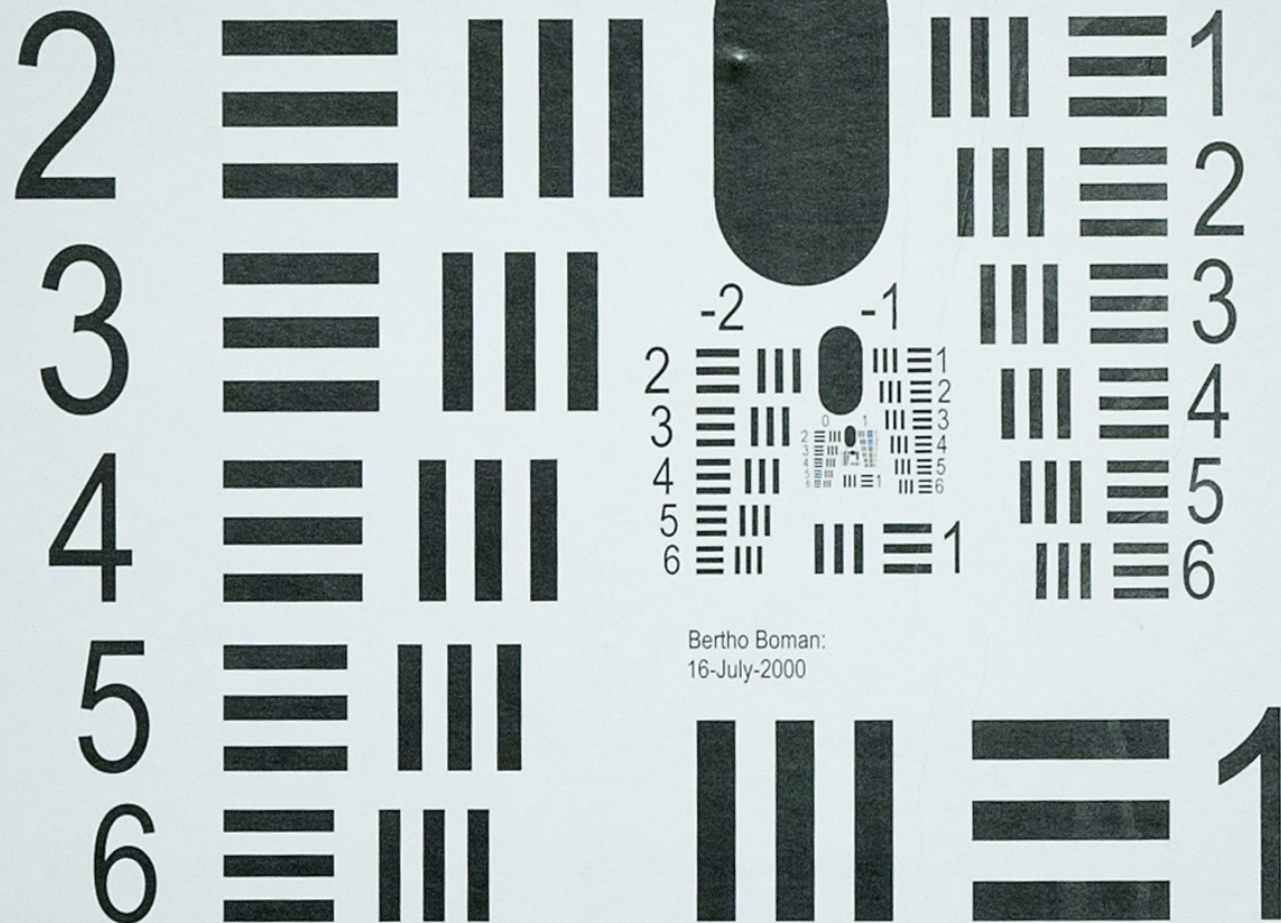
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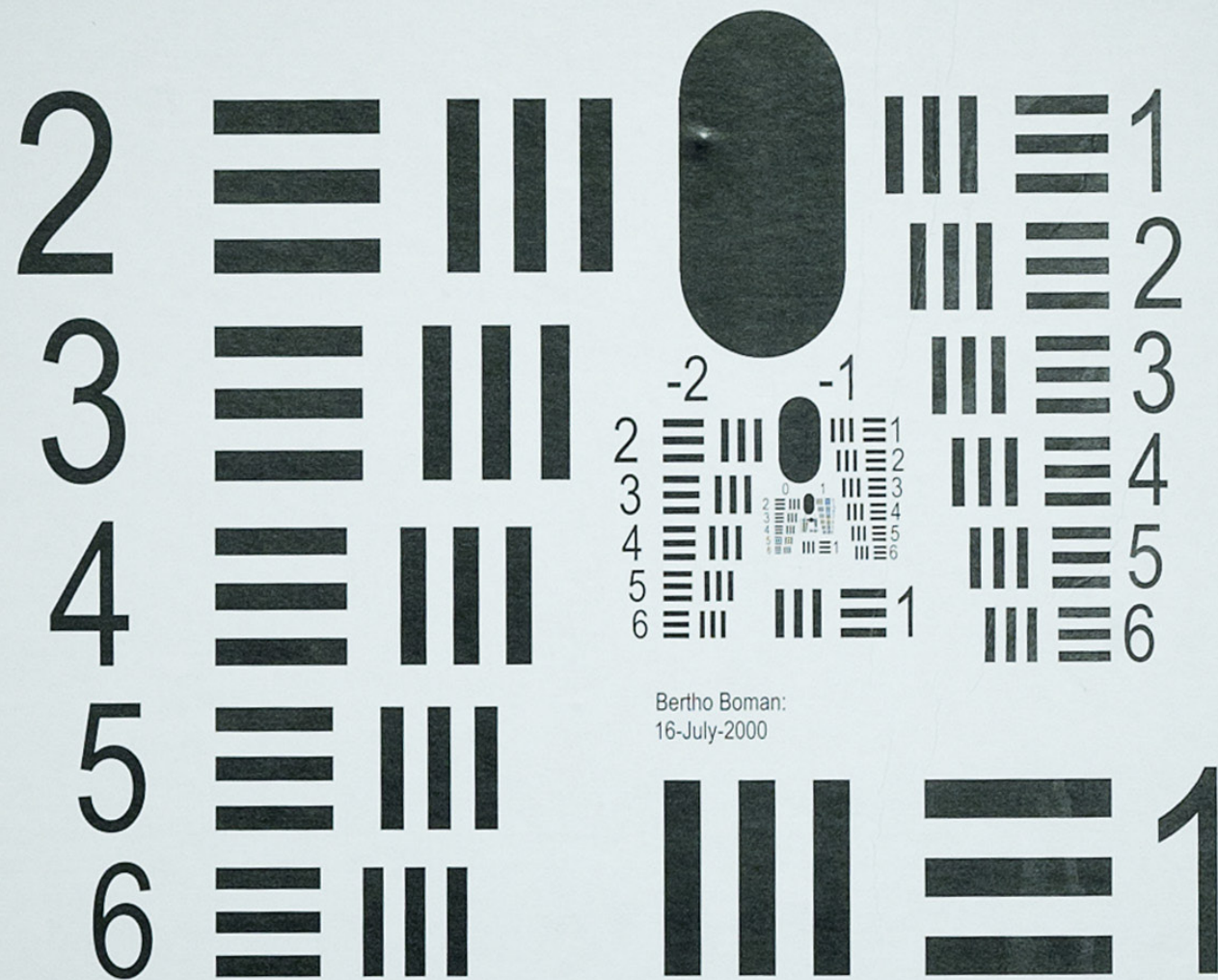


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16-July-2000

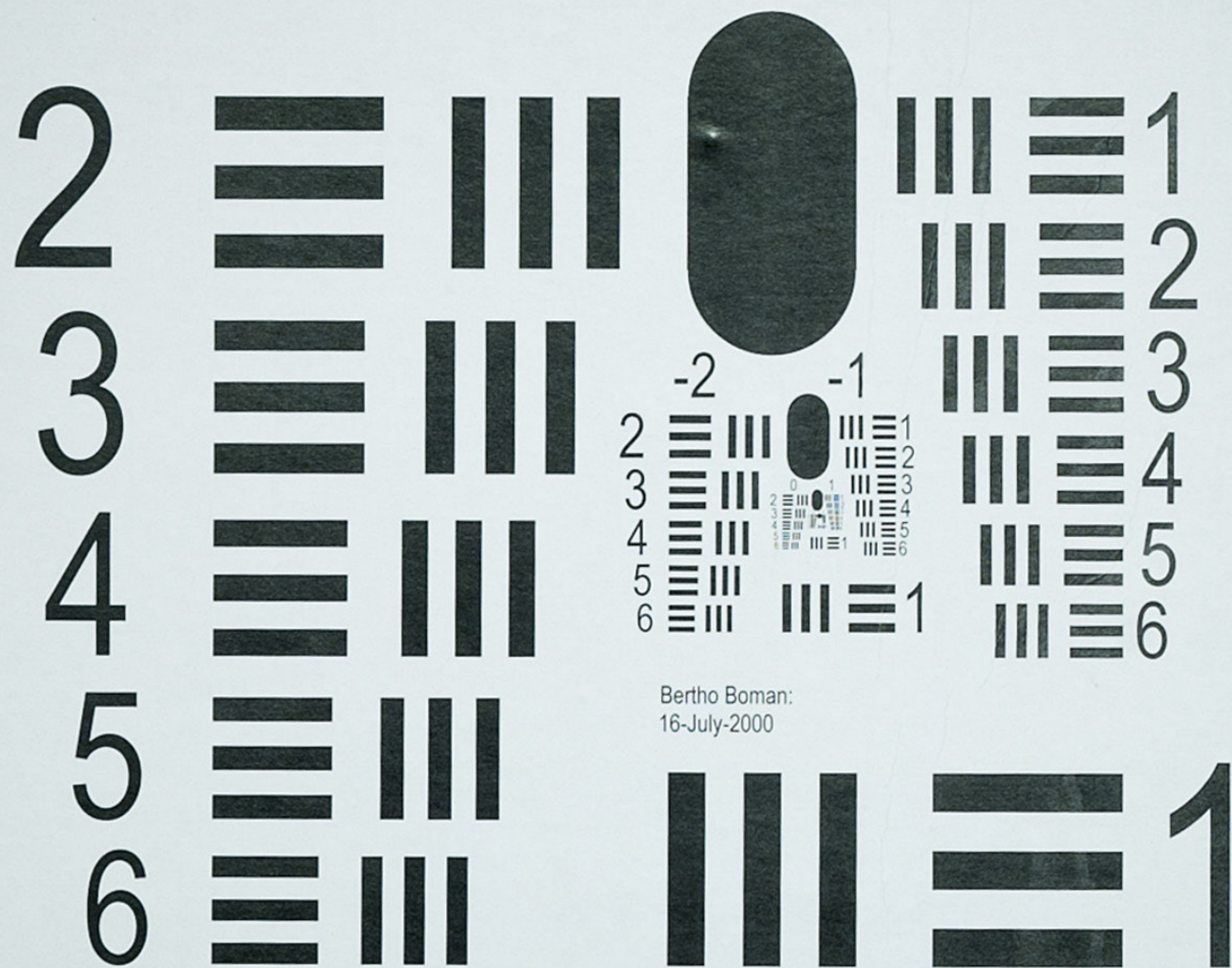


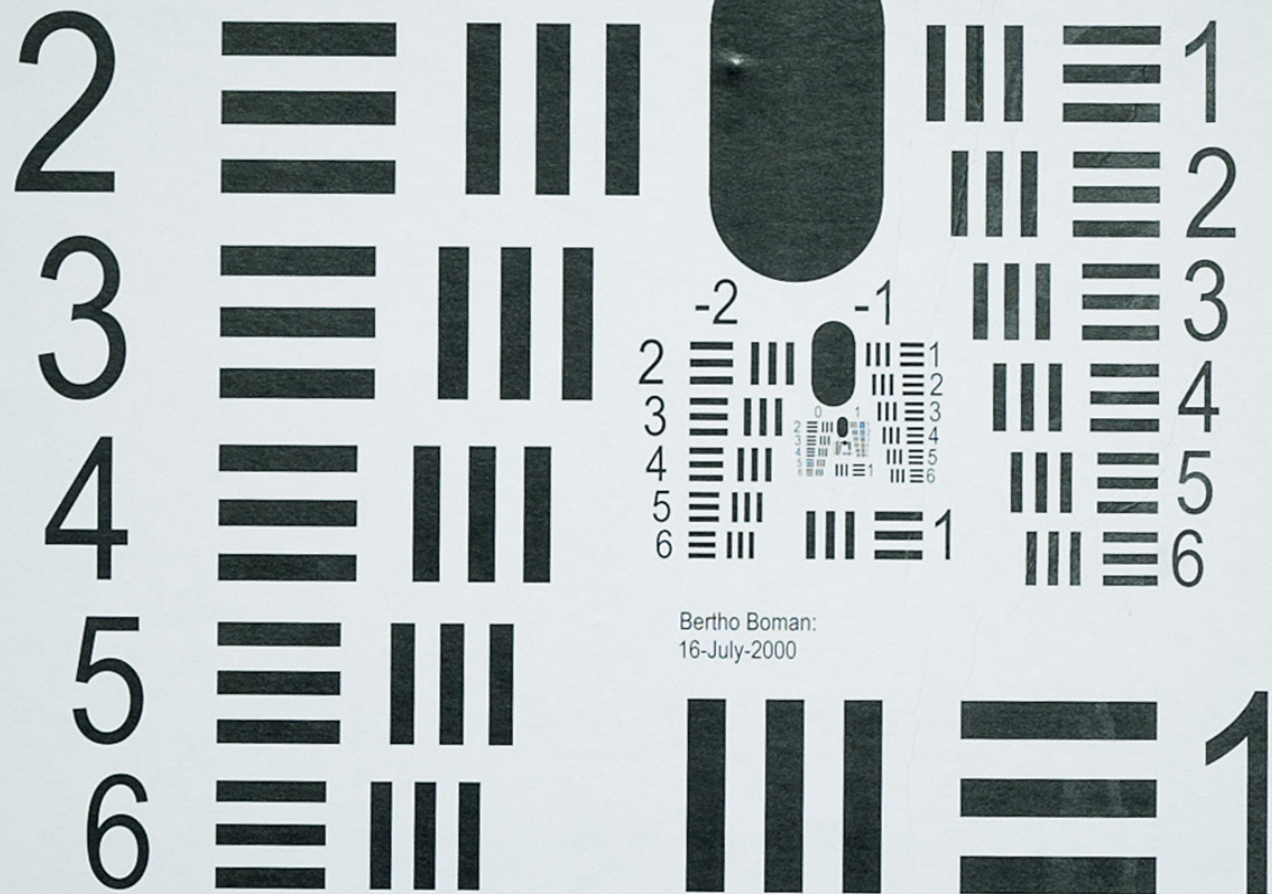
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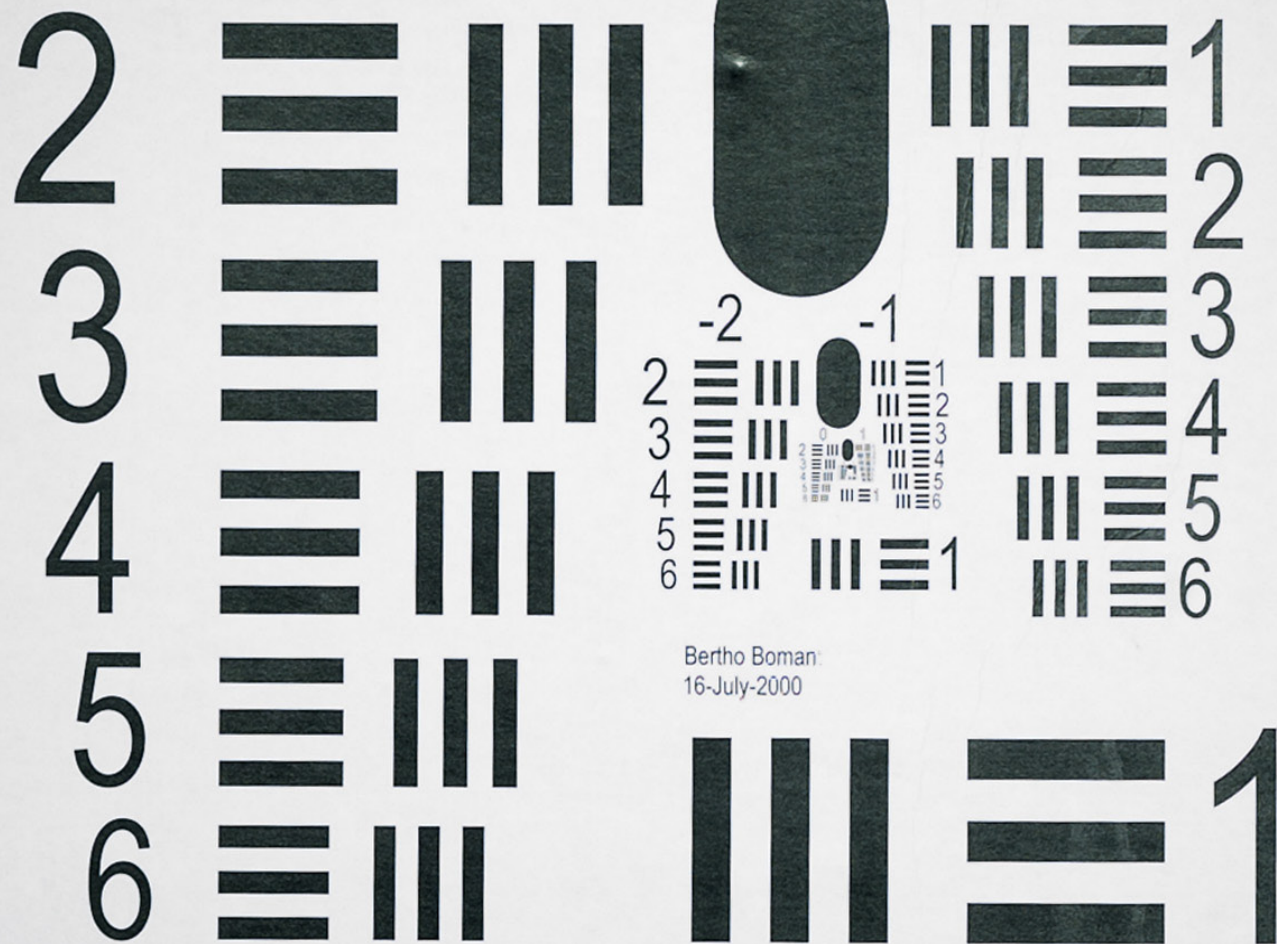


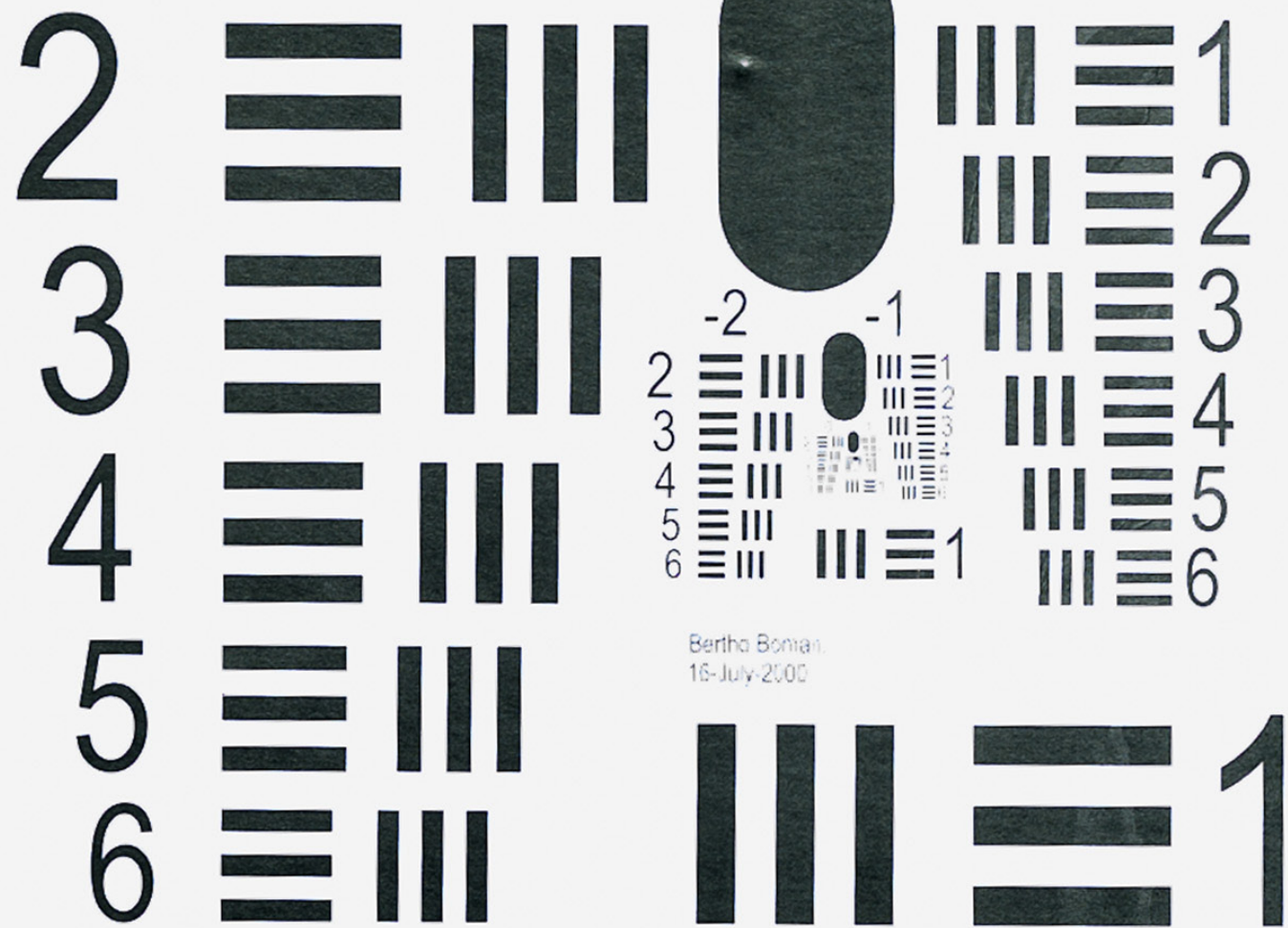
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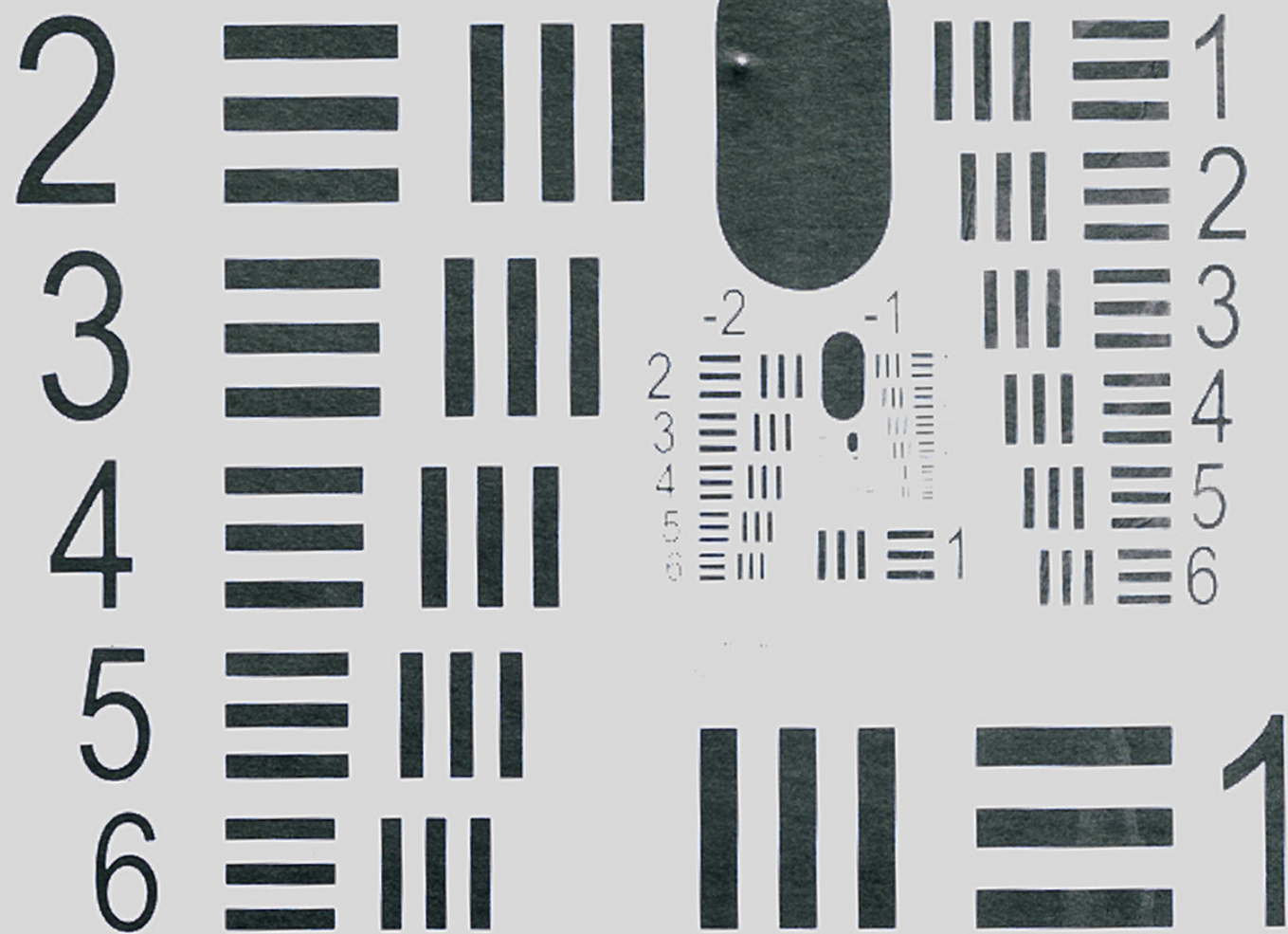




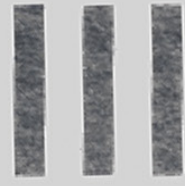
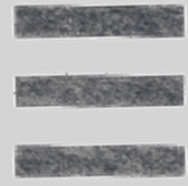
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16-July-2000





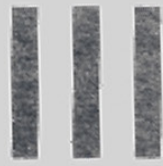
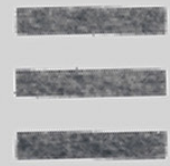


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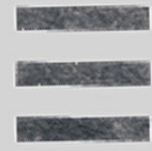


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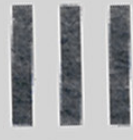
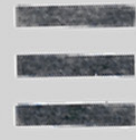


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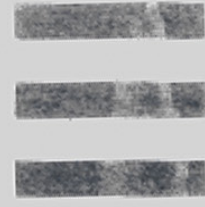
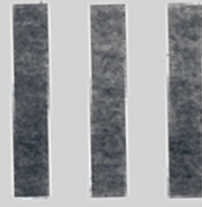
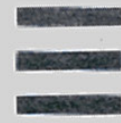
4



5



6



1

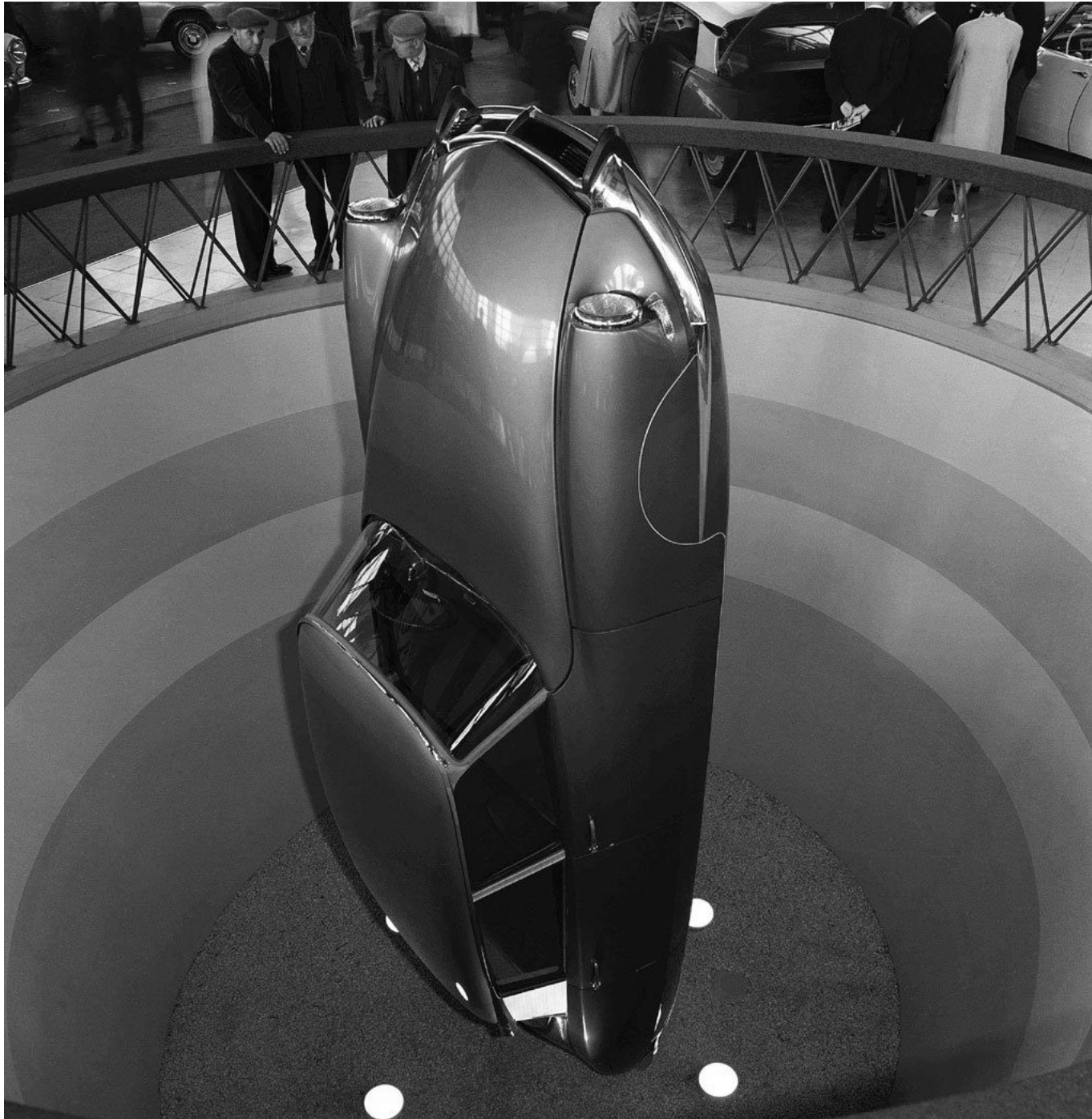
	Courbe caractéristique					focale (mm)
						distance (mètres)
	<u>100 ISO</u>		<u>HP5</u>			1_sur_g
			<u>Densite</u>			
1	1/500s à F/32	19 EV	0,19	-6	0	0 Pl/mm
2	1/500s à F/22	18 EV	0,19	-6	0	0 Pl/mm
3	1/500s à F/16	17 EV	0,19	-4	2	2 Pl/mm
4	1/500s à F/11	16 EV	0,20	-2	2	8 Pl/mm
5	1/500s à F/8	15 EV	0,21	-1	3	19 Pl/mm
6	1/250s à F/8	14 EV	0,28	0	1	30 Pl/mm
7	1/125s à F/8	13 EV	0,41	0	2	34 Pl/mm
8	1/60s à F/8	12 EV	0,61	0	1	30 Pl/mm
9	1/30s à F/8	11 EV	0,83	0	2	34 Pl/mm
10	1/15s à F/8	10 EV	1,04	0	1	30 Pl/mm
11	1/8s à F/8	9 EV	1,31	0	2	34 Pl/mm
12	1/4s à F/8	8 EV	1,54	0	1	30 Pl/mm
13	1/2s à F/8	7 EV	1,72	0	1	30 Pl/mm
14	1s à F/8	6 EV	1,95	0	1	30 Pl/mm
15	2s à F/8	5 EV	2,22	-1	5	24 Pl/mm
16	4s à F/8	4 EV	2,46	-1	6	27 Pl/mm
17	8s à F/8	3 EV	2,69	-1	3	19 Pl/mm
18	16s à F/8	2 EV	2,86	-1	3	19 Pl/mm
19	30s à F/8	1 EV	2,99	-1	1	15 Pl/mm
20	1mn à F/8	0 EV	3,01	-2	4	11 Pl/mm
21	2mn à F/8	-1 EV	3,02	-3	4	5 Pl/mm
22	4mn à F/8	-2 EV	3,03	-4	6	3 Pl/mm
23	8mn à F/8	-3 EV	3,05	-4	1	2 Pl/mm

Des courbes encore des courbes

Tracer une courbe H&D de noircissement

Tracer une courbe H&D USAF de résolution

HP5 et Ds III



may 04 mai

l	m	m	j	v	s	d
m	t	w	t	f	s	s
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

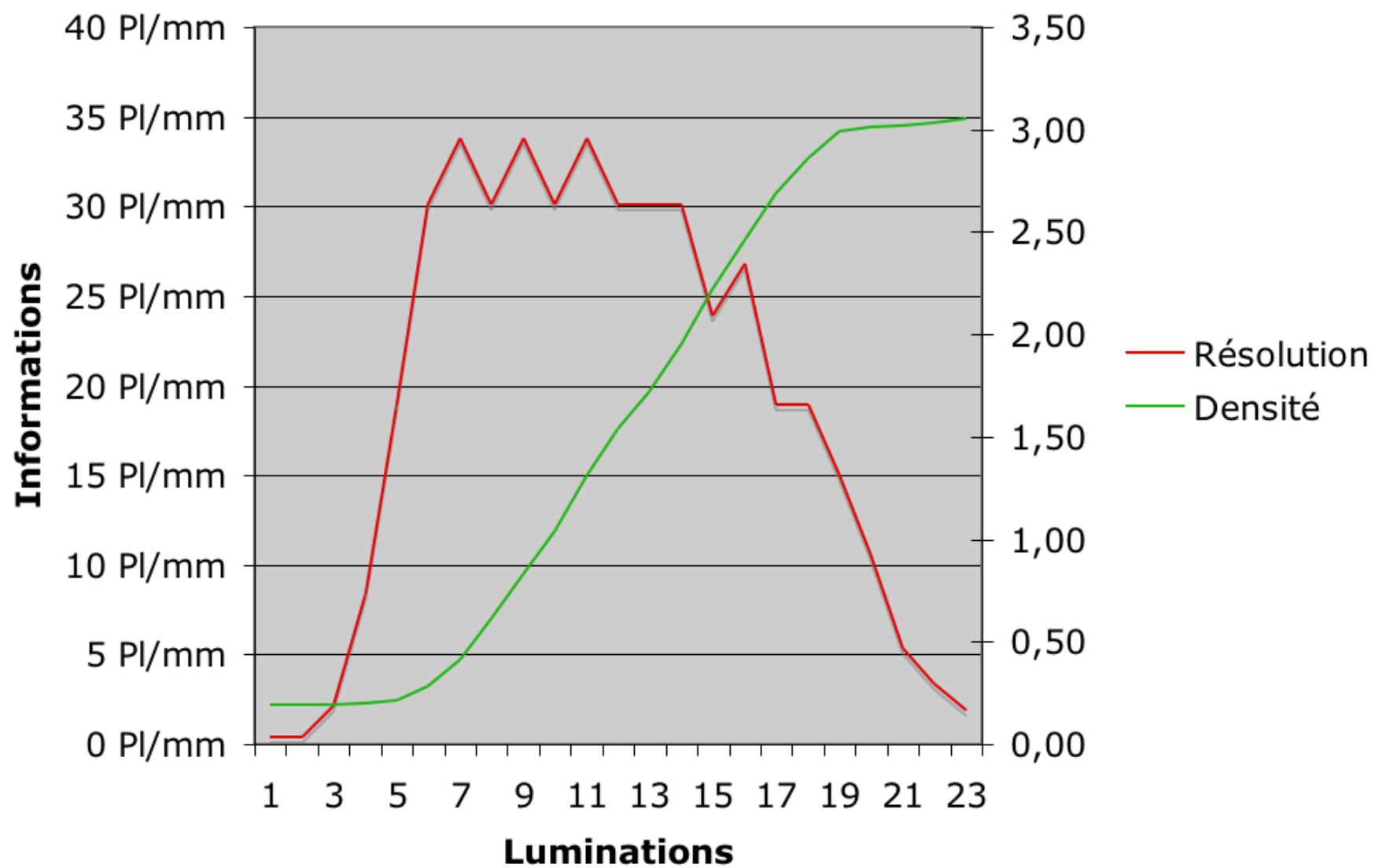
wpp.microchiot.com



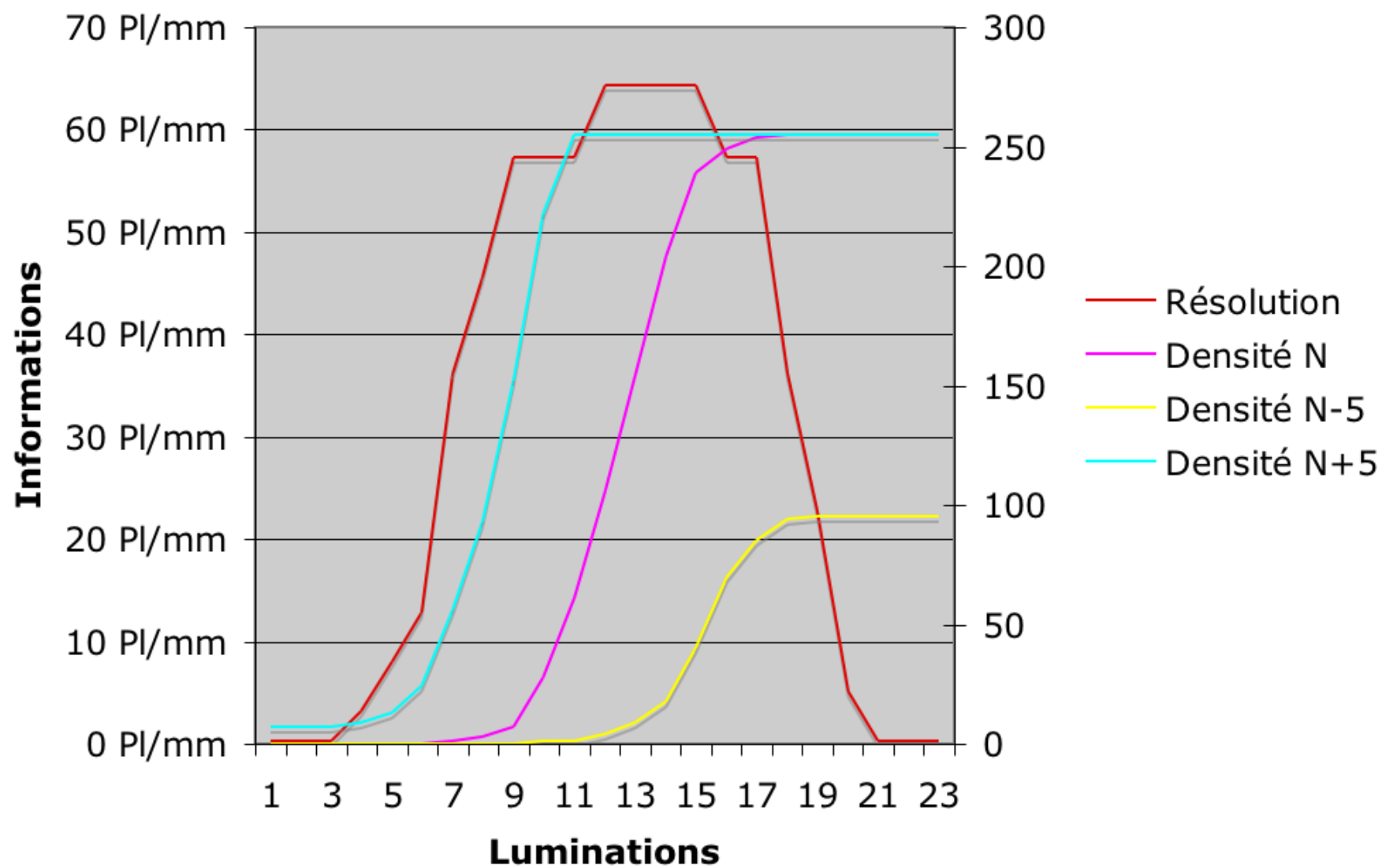
Leçon n°57
Déconcentrer
l'adversaire.

wallpaper-microchiot.com

Courbes caractéristiques HP5

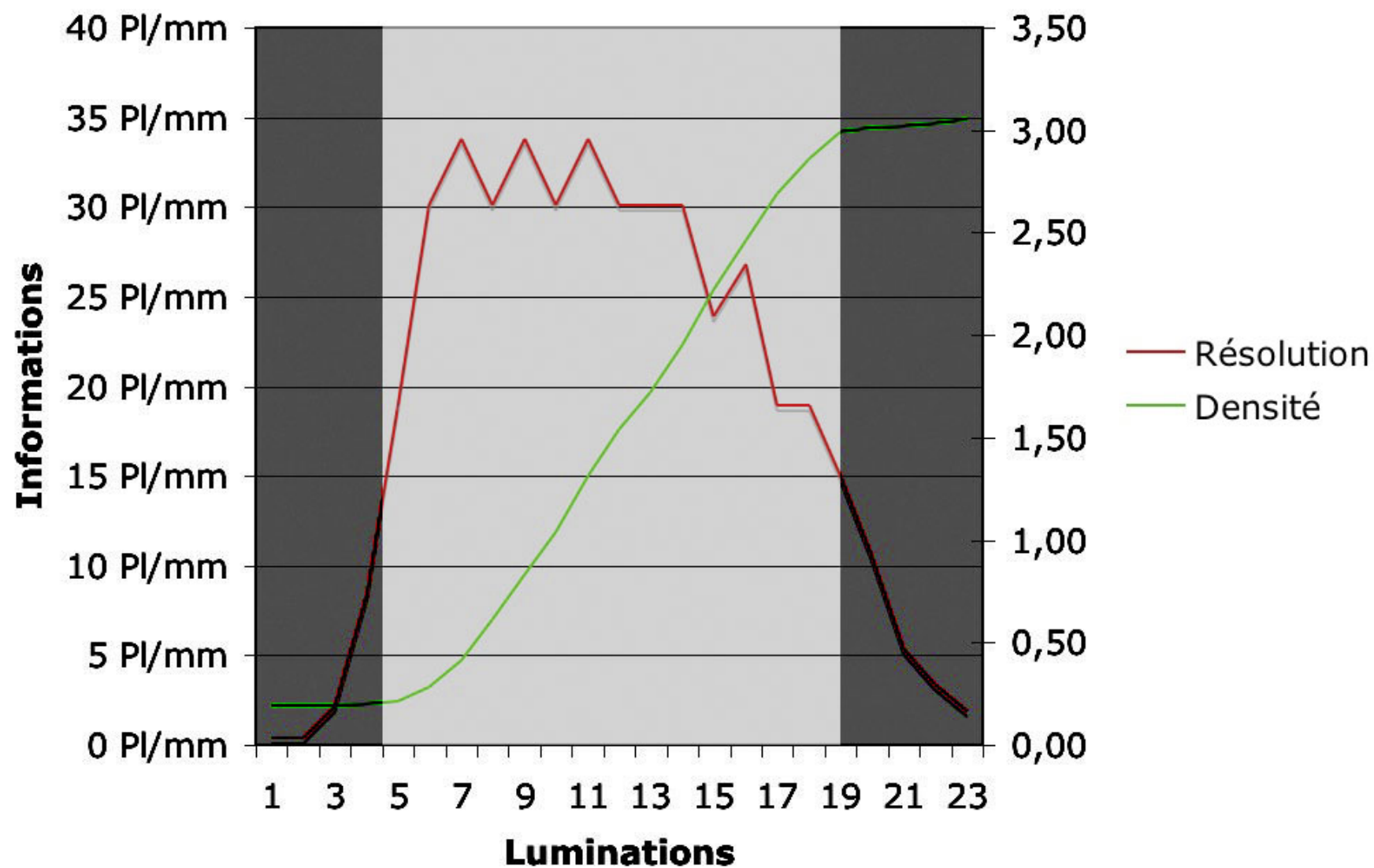


Courbes caractéristiques Canon Ds III

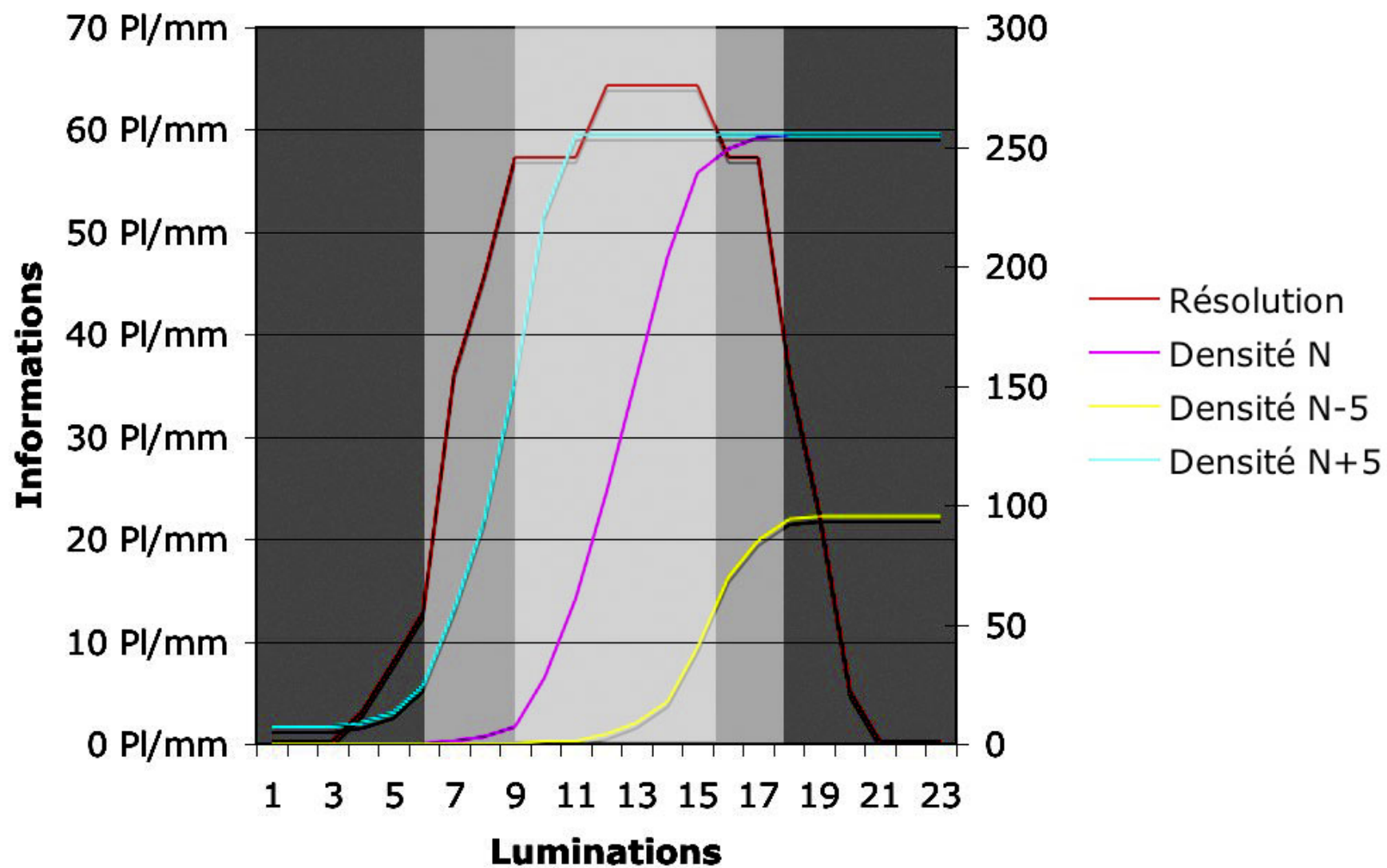




Courbes caractéristiques HP5

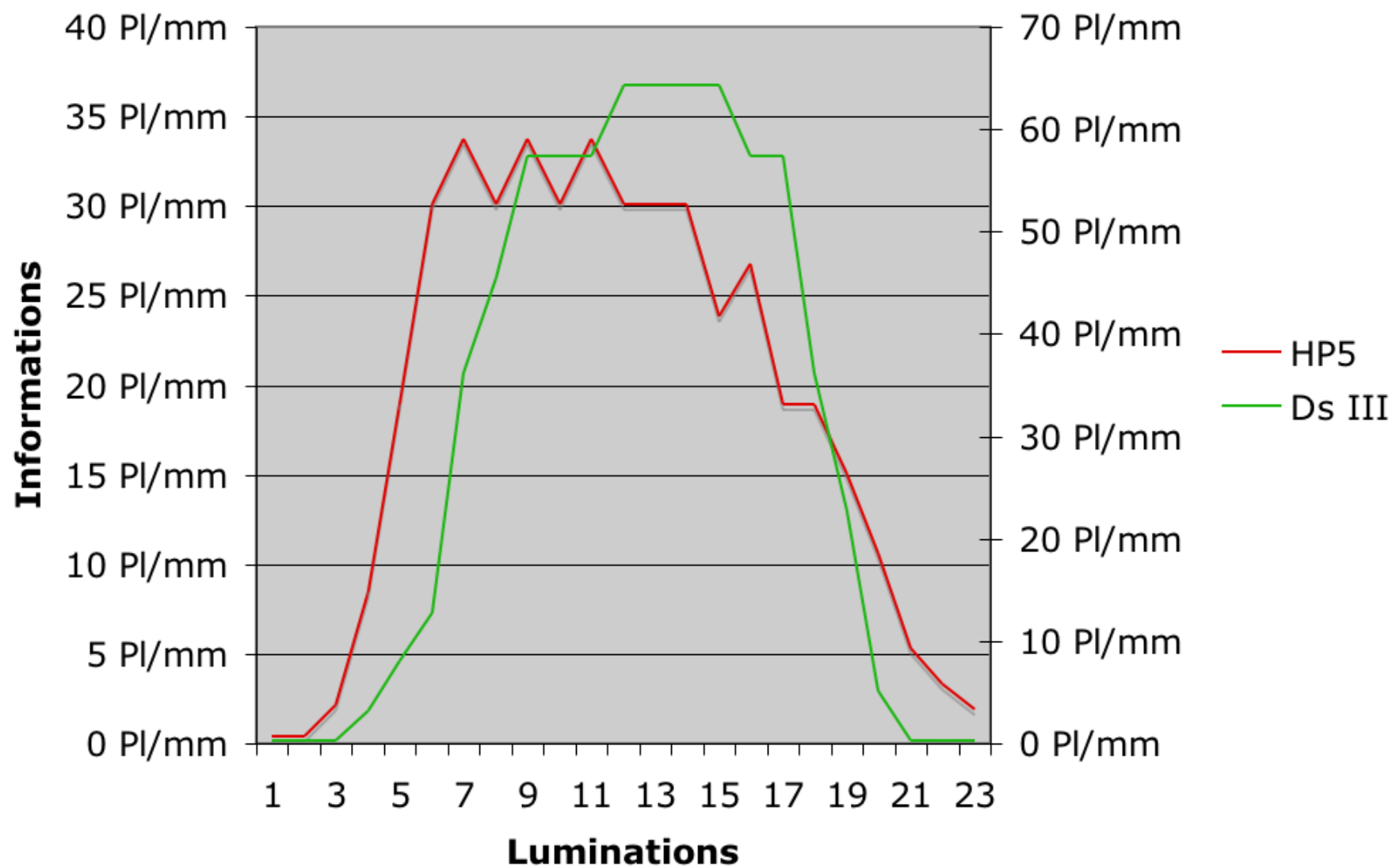


Courbes caractéristiques Canon Ds III

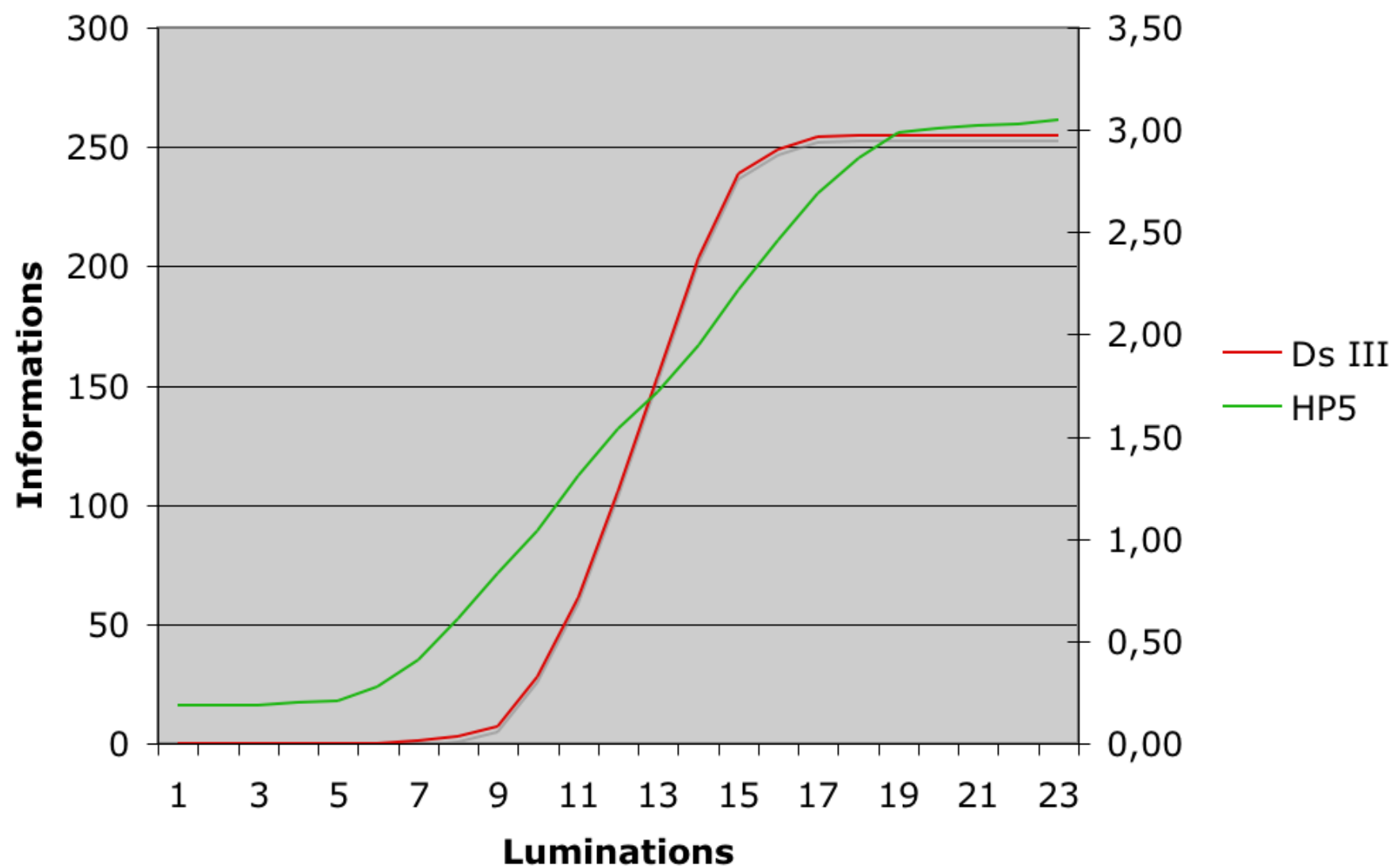




Résolution HP5 Canon Ds III

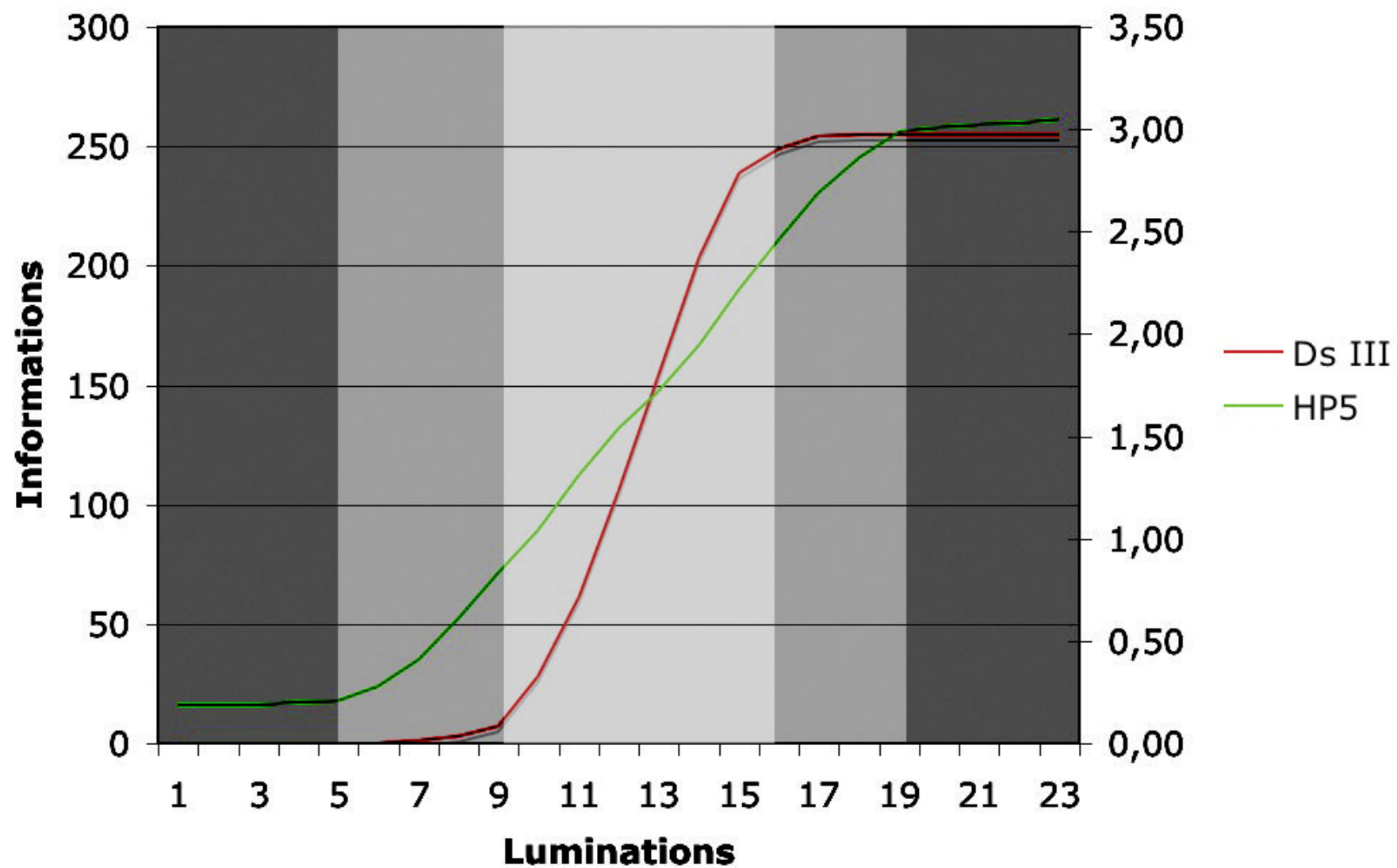


Courbes caractéristiques HP5 Canon Ds III

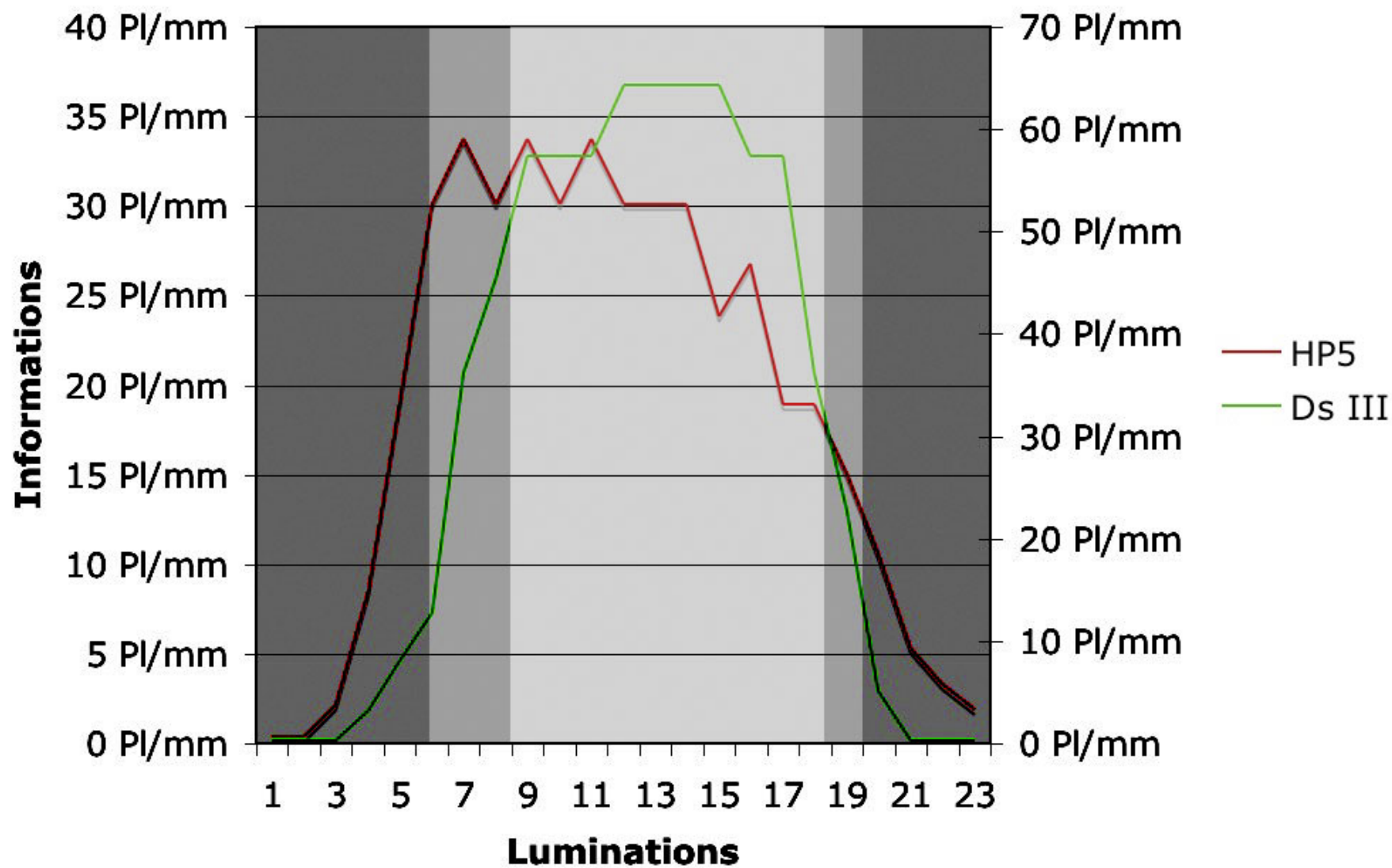




Courbes caractéristiques HP5 Canon Ds III



Résolution HP5 Canon Ds III



Conclusion No 01 :

On peut lire clairement que noircissement et résolution sont corrélés,
Que l'argentique est plus performant que le capteur silicium,
Mais que le rendement est nettement meilleur chez le capteur silicium astucieusement aidé par le logiciel d'ouverture de raw.



Conclusion No 02 :

**Que ces considérations ne vous empêchent pas de faire des photographies
Les courbes font bon ménage avec les photographies et les photographes,
mais attention !!!**



Conclusion No 03 :

Attention, madame veille

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<http://trichromie.free.fr/trichromie/index.php?>