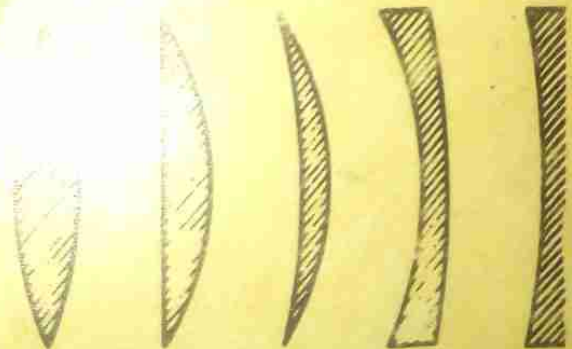


DICTIONARY of PHYSICS

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...odes is held... hard le...
...d. The plates... interleaf...
...electrolyte is dilute sulphuric acid...
...e.m.f. when fully charged is abo...
...V. This falls to a steady 2 V wh...
...current is drawn. As the accumulator
...begins to run down, the e.m.f. falls
...urther. During discharge the electrolyte
...comes more dilute and its relative
...y falls. To recharge the accumula-
...ge is passed through it in the
...direction to the direction of
...ly. This reverses the cell

...and gum forming an electrolyte pas-
...lens. An optical component that refra



biconvex plano-convex convex meniscus concave meniscus biconcave

4572

DICTIONARY of PHYSICS

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Library Use Only FOR WOMEN M. GAN

Serial No. 68.32

Date Initial

Published by Intercontinental Book Productions Ltd.
in conjunction with Seymour Press Ltd.
Distributed by Seymour Press Ltd.
334 Brixton Road, SW9 7AG



Published 1981 by Intercontinental Book Productions Limited
Berkshire House, Queen Street, Maidenhead, Berkshire, SL6 1NF.
in conjunction with Seymour Press Ltd.

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ISBN 0-85047-936-3

Compiled and prepared for
typesetting by Laurence Urdang
Associates Ltd., Aylesbury

Typesetting by Oriel Computer
Services Ltd., Chipping Norton.

Printed in Singapore.

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A

ab- A prefix used with a practical electrical unit to name the corresponding electromagnetic unit. For example, the electromagnetic unit of charge is called the *abcoulomb*. Compare *stat-*.

aberration A defect in an optical system such that the image is not a true picture of the object. For instance, coloured fringes may appear, the image may not be equally focused, or the shape may show distortion. Techniques of aberration correction exist; these can, however, be complex and costly.

†*Chromatic* (colour) *aberration* is found with a single lens; mirrors do not suffer from chromatic aberration. Because dispersion always accompanies refractive deviation, the 'red' image will be further from the lens than the 'blue'. Consequently, the image is surrounded by coloured fringes. Chromatic aberration is corrected by forming a compound lens, whose elements have different refractive constants.

Spherical aberration always occurs with rays that are distant from the axis and incident on a spherical mirror or lens. It is the cause of the caustic curve. Spherical aberration is corrected by using parabolic reflecting and refracting surfaces.

Astigmatism affects rays neither close nor parallel to the axis. The cone of rays through a lens from an off-axis object does not focus at a point. Instead, two images in the form of short lines are formed at different distances from the lens. Between the two the image appears circular. Mirrors forming images of off-axis points show a similar defect. The best method of minimizing astigmatism is to reduce the aperture with stops, thus allowing light only through the centre of the lens.

Coma is rather similar in cause, effect and correction to astigmatism. After refraction by a lens, a cone of rays from

absolute zero

an off-axis object tends to have a tadpole-shaped section because of coma. *Distortion* is the result of differences in a lens' magnifying power between different axes. Reduction of aperture is the normal solution to both coma and distortion.

absolute expansion †See *expansivity*.

absolute humidity The mass of water vapour per unit volume of air, usually measured in kilograms per cubic metre. Compare *relative humidity*. See also *humidity*.

absolute permeability †See *permeability*.

absolute refractive constant See *refractive constant*.

absolute temperature Symbol: *T* A temperature defined by the relationship $T = \theta + 273.15$, where θ is the Celsius temperature. The absolute scale of temperature was a fundamental scale based on Charles' law applied to an ideal gas:

$$V = V_0(1 + \alpha\theta)$$

where *V* is the volume at temperature θ , *V*₀ the volume at 0, and α the thermal expansivity of the gas. At low pressures (when real gases show ideal behaviour) α has the value $1/273.15$. Therefore, at $\theta = -273.15$ the volume of the gas theoretically becomes zero. In practice, of course, substances become solids at these temperatures. However, the extrapolation can be used for a scale of temperature on which -273.15°C corresponds to 0° (absolute zero). The scale is also known as the *ideal-gas scale*; on it temperature intervals were called *degrees absolute* ($^\circ\text{A}$) or *degrees Kelvin* ($^\circ\text{K}$), and were equal to the Celsius degree. It can be shown that the absolute temperature scale is identical to the thermodynamic temperature scale (on which the unit is the kelvin).

absolute zero The zero value of thermodynamic temperature; 0 kelvin or -273.15°C .