are either two particles or two anti-particles ; in each case the two emitted neutrinos are identical. The application of the exclusion principle gives the same results as above, except that now the interactions in g_2 and g_3 do not appear. (In the formula put $g_2 = g_3 = 0$) (Fig. 2). From the experimental value of the mean life of the μ-meson, the g's are found of the same order of magnitude as that of the Fermi constant[4].

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The Resolution/Brightness/Contrast Sensitivity of the Eye in Certain Forms of Picture Reproduction

AT a meeting of the Physiological Section of the British Association last September, Prof. H. H. Hartridge described some experiments on visual acuity, using a Landolt ring as test object, which showed little difference in resolving power when the ring was illuminated with red, green or blue light. The results of some experiments which we have been carrying out appear to be relevant to this point.

We are investigating the resolution/brightness/contrast sensitivity of the eye in certain forms of picture reproduction. In these tests, the observer's eye is adapted by a 'picture' and surrounding field of constant specified brightness in any given experiment. A small part (approximately one-seventh of the picture height) in the centre of the field is then varied in any desired manner. In one set of experiments, this test patch was masked with tricolour red, green and blue filters in turn, the remainder of the picture being in black and white. The brightness of the coloured test patches were adjusted to correspond to those of the reproducing primaries in a three-colour additive system. At brightnesses appropriate to the white high-lights of the picture, we have found that visual acuity is slightly less for blue light than for red, which in turn is practically the same as for green. These conditions are analogous to Hartridge's experiment, in which a black test object is printed on a white card illuminated by red, green or blue light, and the results confirm his findings. At successively lower brightnesses of the test field, however, visual acuity is, of course, progressively reduced for all three colours. The drop in the case of blue, however, is much more rapid, with the result that a blue/green acuity ratio of approximately 0·8 at high-light brightness falls to approximately 0·3 at 1/32 high-light brightness. Adaptation conditions must apparently, therefore, be taken into account in assessing experimental results such as Prof. Hartridge's.

The above results represent the mean of five observers viewing the test picture at a distance of four times its height and at a high-light brightness of 10 ft. lamberts.

Our results confirm that similar discrepancies occur when comparing the performance of various monochrome imaging systems. A comparison made under high-light conditions (maximum brightness and contrast of the test pattern) can be quite misleading. It is necessary to give a range of resolution/brightness/contrast data if a fair comparison is to be made. This fact is, fortunately, now becoming more widely understood.

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Behaviour of Crystal Boundaries in Aluminium and its Alloys during Melting

WE have recently been engaged on an examination of the mechanical properties at temperatures in the region of the solidus of super-purity aluminium and high-purity alloys in the three binary alloy systems, aluminium–copper, aluminium–iron and aluminium–manganese. In this work, tensile tests have been carried out at elevated temperatures in a modified Hounsfield tensometer on small cylindrical test pieces of the alloys, the technique and apparatus being similar to those used by Singer and Cottrell[1].

The analysis of the super-purity aluminium (99·988 per cent aluminium) and that of a representative alloy based on this material was as follows :

Material	Si%	Fe%	Cu%	Mg%	Al%
Super-purity aluminium	0·005	0·0015	0·0005	0·005	remainder
Aluminium–3% copper alloy	0·006	0·005	3·07	0·006	remainder

Each cast bar from which test pieces were machined was annealed for approximately six weeks at a temperature some 25° C. below the equilibrium solidus temperature of the particular alloy considered. The annealed test-pieces were tested at temperatures between 400° C. and the temperature at which each contained so much liquid that all coherence was lost. The tensile strength of the alloys gradually decreased, and the ductility (measured as percentage elongation and reduction of area) increased correspondingly with increase in the temperature of testing up to a temperature some few degrees below the solidus temperature determined from the equilibrium constitutional diagram. At this temperature the elongation and reduction of area decreased suddenly to zero, and the strength dropped rapidly to a small finite value which was retained up to a temperature between that of the solidus and liquidus. The surfaces of fracture in the specimens having no ductility were intercrystalline and had a glazed and rounded appearance.

It seems unlikely that the glazed type of fracture can be accounted for on the basis of viscous flow of the crystal boundary material at the high temperature of testing, since the occurrence of fracture due to viscous flow would not be expected to be accompanied by a sudden fall in strength. It has therefore been assumed that the sudden loss of ductility with increase in the temperature of testing, and the appearance of the glazed type of fracture, are associated with incipient melting at the crystal boundaries.

With super-purity aluminium and with all the alloys examined in the three binary alloy systems,