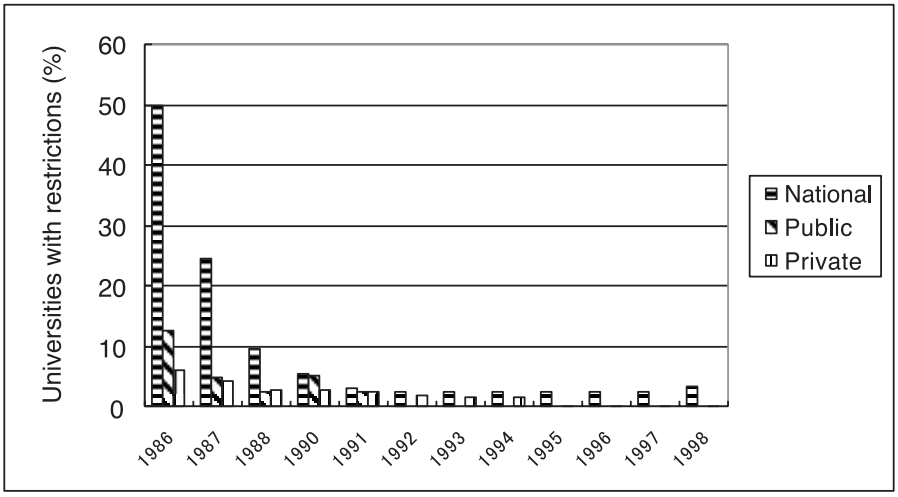

Fig. 1. The ratio (%) of national, public, and private universities which restrict the admission of color defective students.

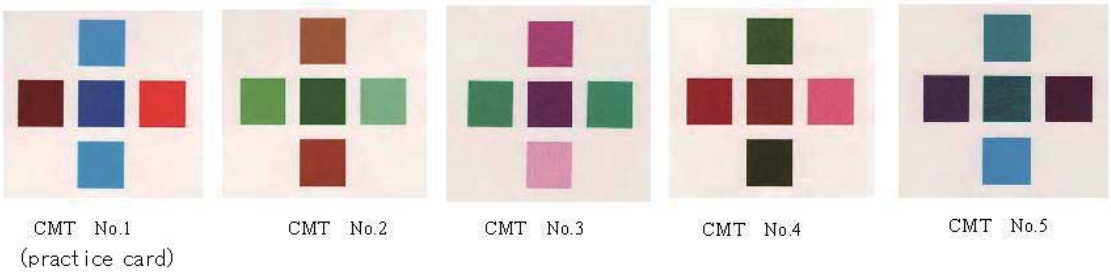

Fig. 2. Color Mate Test (CMT). The CMT has five cards, numbered 1 to 5, on which people are asked whether the "color mates" are aligned vertically or horizontally. The first card is a practice card in which red-brown colors are aligned horizontally and blue-green colors are aligned vertically for comparison. Even color blind students taking the test can easily see that the three colors "mates" on the practice cared are aligned vertically.

ness).

Even with the Panel D-15 test it is not possible to accurately estimate how people see color. An ophthalmologically accurate diagnosis is only possible with an anomaloscope test, with which diagnoses of protan, protanomalia, deutan, and deuteranomalia are made. The authors have proposed calling young students with color vision problems "color special." Even with the anomaloscope it is not possible to predict the specific color combinations that will be difficult to distinguish by people with abnormal color vision.

With the various color vision tests above, it is possible to make an ophthalmologically detailed diagnosis without overlooking even minor abnormalities. However, using ophthalmological diagnoses in educational settings to judge a child's or a student's "color vision abnormality" for the purpose of guidance for their future education. This logic has a history of leading to restrictions in the paths that are open to them.

From the perspective of school education, a specific example may be given of the need for teachers to understand what color of chalk on the blackboard or what color of printing in textbooks will be easy and difficult for students with color vision abnormalities to see. The authors have developed a new color test for schools, the Color Mate Test (CMT; Fig. 2), for this purpose (Kaneko, 1995a, b, c; Takayanagi and Kaneko, 1998; Kudo, 1999; Takayanagi, 2002). The CMT has five cards, numbered 1 to 5, on which people are asked whether the "color mates" are aligned vertically or horizontally. The first card is a practice card in which red-brown colors are aligned horizontally and blue-green colors are aligned vertically for comparison. Even color blind students taking the test can easily see that the three colors "mates" on the practice cared are aligned vertically. Depending on whether the student misses any of the next four cards, cards 2 through 5, it is possible to judge the degree to which the student will mistake colors in combinations that occur frequently in daily life.

The second and third parts of this paper described the utility of the CMT as a color vision test for school use by comparing it with other color vision tests. We also aimed to demonstrate that color discrimination ability tested using traditional ophthalmological color vision tests differs from that in actual society, and to discover future measures that will be needed for school education.

2. Traffic Signals and Colorblindness

Miyao *et al.* (1993) used 1) one hundred and ninety-one 7th-grade boys in Nagoya city, who were suspected of color-blindness and underwent a close examination for color-blindness by the city board of education, and 2) thirty-six age-matched junior high school students as controls,